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Guidelines for Authors

The Editor is always pleased 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, especially if an article is well written and interesting.

Length. Normally approximately 4500 words (approximately ten A4 pages double line spacing at 12pt) plus illustrations.

Copy. Ideally one copy of the text should be submitted, typed in double spacing, plus a short pen picture of the author and a head and shoulders photograph. Please don't forget to add captions for any artwork to be included.

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

Computers. Articles submitted on 3½in discs are very welcome. Please ensure that text is typed with no formatting, ie LH justified only, and saved as Microsoft Word 5 (with a .DOC extension) or as an ASCII file (with a .txt extension).

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Photographs should be black and white if possible, or coloured of good quality with sharp definition. Please do not submit laser/photo copies of photographs.

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

Contributions should reach the Editor by:

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Early February for the April 1996 issue
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Submissions before the deadline are particularly welcome.

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Engineer in Chief (Designate)

BRIGADIER I D T MCGILL BSc(ENG) FICE CENG

BRIGADIER Ian McGill takes over as Engineer in Chief in September 1995. He was born in Quetta in 1946, son of Lieutenant Colonel Dick McGill DSO, who commanded 2nd/8th Gurkha Rifles in Italy during the war. Brought up in Zimbabwe he was commissioned into the Corps from Sandhurst in 1967.

After young officer training he had six months as a troop commander with 54 (FARELF) Support Squadron in Thailand and Singapore, before studying civil engineering at Shrivenham. He then commanded a field troop in 12 Field Squadron, which included four months in 1971 in the Short Strand, Belfast, in the infantry role; the first of four emergency tours he spent in Northern Ireland. His last troop commander's tour was with 59 Independent Commando Squadron (59 Squadron), with which he deployed to Kansas, Cyprus, Turkey and finally, Northern Ireland, based in Antrim in the sapper role supporting 39 Infantry Brigade in Belfast. He left 59 Squadron to join 9 Independent Parachute Squadron (9 Squadron) as 2IC, returning shortly to Northern Ireland, this time to Castle Dillon to support 3 Infantry Brigade operating in Armagh, South Fermanagh and Tyrone. He later took part in exercises with the squadron in France, Bavaria, Cyprus and the UK.

From 9 Squadron he attended the Long Civil Engineering Course which included attachments to Gleeson's Civil Engineering Limited, working on the M25, building motorway bridges, and L G Mouchel and Partners at West Byfleet, designing a motorway bridge. Staff College at Camberley provided a change of focus from whence he returned to 9 Squadron (no longer independent) as OC in 1980. Midway through his tour the squadron returned to Northern Ireland (for its sixth tour) – and back to Castle Dillon – with its main effort devoted to building the steel-framed and concrete-clad protective buildings in Crossmaglen and Forkhill. The squadron also sent detachments to Vanuatu with a combined French/British task force and to Zimbabwe as part of the Commonwealth monitoring force; field troops to Canada, America and Kenya; and deployed to Denmark for a major UK Mobile Force (Land) exercise. After two most rewarding years as OC he was posted to Ottawa on an exchange appointment with the Canadian Army where he was the desk officer for British training in Canada and Canadian airborne training and where his main effort was learning how to ski! He returned to the British Army in early 1984 as 2IC 28 Amphibious Engineer Regiment in Hameln, leaving 18 months later to take command of 36 Engineer Regiment in Maidstone in 1985. There he enjoyed supporting 5 Airborne Brigade, especially on three major "out of area" exercises

Brig I D McGill
Engineer in Chief (Designate) p116

in Scotland and Oman, where he was "double hatted" as Commander RE Joint Forces HQ.

He left the regiment in 1988 for a tour at Camberley as a member of the directing staff. Within 16 months he was promoted to a post in the Ministry of Defence working for Director of Military Operations on establishing a method of assessing operational effectiveness. Thankfully the post was only for a year and he escaped to become Colonel Tactical Doctrine just as the army embraced "doctrine" rather than the "Soviet threat" as the foundation for its new force structures. Soon after starting his new job he left to attend the Higher Command and Staff Course in 1991. This was foreshortened by a posting to Riyadh immediately after the end of the Gulf War, initially as Chief Engineer Middle East, but within three weeks of arrival he was appointed Commander British Forces Kuwait. Apart from commanding a very ad hoc representational force of some 1200 men largely formed around 2 Royal Anglian Armoured Infantry Battle Group, the job also entailed assisting the British Ambassador and the British community and liaising with the other coalition forces and the Kuwaitis. The next four months provided an unexpected chance for some training in the desert, plus an insight into post-conflict planning and the political/military interface.

He returned to tactical doctrine from Kuwait before being promoted to brigadier as Commander Engineer UK Land Forces in December 1992 (Land Command since April 1995). During this appointment, field army sappers have been stretched on operations, exercises and projects, whilst also having to cope with the effects of drawdown and the reorganization into Land Command.

In 1970 he married Mary; they have two children, David, recently graduated from Oxford, and Anna, who is still at Oxford. His interests include most sports, travel, photography and hill walking. He has played cricket for the Corps and has run for the army (middle distance).

He is very honoured (and surprised!) to be the professional head of the Corps. Conscious of the current pace of change in the army and throughout the country, his aims are:

- First, to ensure that the Corps will continue to be capable of meeting its operational commitments.
- Second, to enhance the Corps' future by highlighting its core capabilities and identifying a long-term strategy for its future development. In all this it will be necessary to achieve a sensible balance in our tasking and between our military, combat engineering and construction expertise; more important, the sappers must continue to attract high quality officers and soldiers who are as innovative as our forefathers.

Annual Report to the Corps
by the Engineer in Chief

Introduction

Today I find myself with mixed emotions in preparing to present my annual report to the Corps. On the one hand, I am honoured to be holding the appointment that requires me to make this report. The post of Engineer in Chief is one that as a young officer I could hardly have dared to contemplate and to have been allowed to be the head of the Corps has been an enormous privilege. On my various visits to units I have been constantly reminded of the excellence, zeal, improvisation and adaptability shown by all sappers. On the other hand, this is also a sad day, as it provides me with my one and only opportunity to report to the Corps; from September I move full-time into a new appointment, and the Engineer in Chief's post is down-graded to one star – as it was from 1904 to 1911!

This last year has seen the Corps remain fully committed in support of the field army, the other services and other departments of state. As I report later, the Corps' contribution in Bosnia continues to be its major operational commitment but deployments to Rwanda and Angola have, yet again, reinforced the view that the sapper's combination as soldier, combat engineer and artisan makes him uniquely useful in operations other than war. While carrying out these operational tasks, we have still managed to play our full part in providing sapper support on exercises and other all-arms training. We have also managed to enhance the training facilities available to the field army by completing a number of key projects on the UK's Crown Estate training areas.

The reorganization of the Corps has continued, not so much now to meet the *Options* order of battle but more in response to various studies, changing procedures and a further refinement of the structure and strength of the UK's reserve forces. The Royal School of Military Engineering (RSME) continues to meet major challenges, not just in providing its Phase 2 and 3 training function, but also in response to some critical financial pressures. Throughout all of this, our manning state remains healthy and after the particularly hectic period last year it has been something of a relief for Regimental Headquarters to return to a more normal existence.

Operations and Deployments

Our performance on operations has continued to bring great praise and recognition to the Corps. Throughout most of the year 28 per cent of our field army strength has been either on operations or on predeployment training. Since June, with the latest reinforcement to Bosnia, this has risen to 32 per cent on operations or on reduced notice to move, with a further 12 per cent on predeployment training. The implications of any substantial need for roulement are obvious.

Operation *Grapple* in the former Republic of Yugoslavia has remained the major commitment. The period started with Regimental Headquarters 36 Engineer Regiment commanding 5 Field Squadron, 32 Field Squadron, 61 Field Support Squadron, 524 Specialist Team RE (Works) and a troop of 33 Engineer Regiment (EOD). They were replaced in October by 28 Engineer Regiment with 64 HQ Squadron, 29 Field Squadron, 23 Amphibious Engineer Squadron, 522 Specialist Team RE (Works) and a further troop of 33 Engineer Regiment (EOD). 21 Engineer Regiment has now taken over and 1 Field Squadron, 4 Field Squadron, 7 HQ Squadron, 519 STRE and an EOD troop are settling into the task. This is the first time that a regiment has deployed with its normal affiliated subunits. We must do all in our power to make this the norm. The most recent reinforcement, in response to the hostage crisis in June, has seen another 223 men deployed including a strongly enhanced armoured engineer troop. 51 Field Squadron is also at reduced notice to move as part of 24 Airmobile Brigade, as is 35 Engineer Regiment which would provide the "get you in" package which could take two to three months work. Our total strength in Bosnia now stands at some 600 men. The Corps has continued to provide the majority of the engineering support necessary to keep UN forces effective in their role of providing humanitarian aid. This has included maintenance and repair of the 480kms of roads constructed earlier, EOD clearance, the provision of infrastructure and camp hardening. In addition, 36 Engineer Regiment constructed the now famous Mostar Bridge, a 270-foot double span

extra wide Bailey bridge on an equipment pier. The specialists have also been busy. 521 Specialist Team RE (Well Drilling) completed a series of wells for British forces and returned in March to construct more for other UN force contingents. On a more sombre note, Sapper Nicholas, tragically, was killed in August in a mine explosion and Corporal Onions was injured after a mine exploded under his vehicle in December. *Grapple* has now involved more than 2000 members of the Corps, and some specialist tradesmen are now on their third tour.

The Corps is still working hard in Northern Ireland, notwithstanding the recent cease-fire. 26 Armoured Engineer Squadron was the first roulement squadron of the year, replaced by 37 Field Squadron last August. 8 Armoured Squadron is now in the province. The Corps has continued with an unusually wide variety of tasks in support of army and Royal Ulster Constabulary operations. Among the tasks completed in 1994 during Operation *Rectify*, was the upgrading of accommodation at the Crossmaglen security force base. The period up to the cease-fire also saw a concerted effort to close a large number of border crossing points and since the cease-fire many of these have now been opened and the roadways reinstated by civil contractors. 25 Engineer Regiment has undertaken a number of tasks designed to assist the peacebuilding process, including, most notably, providing a floating pier on the tidal River Laggan to create access to the water for a water sports centre in an area which until recently was in the "no man's land" between the communities.

9 Parachute Squadron, with support from 33 Engineer Regiment (EOD), was deployed as part of the UK's contribution to the UN's operation in Rwanda between August and November. Main tasks included road and bridge construction, mine clearance, and the provision of potable water for the UN and refugee camps. The tour was a great success and was marred only by the accident that injured Sapper Copsey in October. Sapper Copsey himself remains in good heart and is undergoing rehabilitation at Headley Court.

A troop of 11 Field Squadron deployed with 45 Commando, which as the spearhead group were sent to Kuwait in October to deter possible aggression by the Iraqis. The deployment was relatively uneventful and the troops returned in December in time for Christmas.

This April, 20 Field Squadron deployed on light scales to Angola in support of the UNAVEM III (UN Angola Verification Mission). The squadron, as part of 9 Supply Regiment Group, is providing infrastructure engineering for the subsequent deployment of the main UN force. It is due to return home in early August.

Elsewhere the Military Works Force and 12 Engineer Brigade have provided extensive support to the RAF. Sappers have undertaken a variety of infrastructure support tasks and minor construction projects at short notice in support of Operation *Deny Flight* and Operation *Jural* in Italy and in Turkey. Military Works Force has been as busy as ever, with its members deployed away from base for five months of the year. In other parts of the army this would be trumpeted as a seven-month interval between tours, and much would be made of it. Typically for sappers, Military Works Force just gets on with its job without fuss, and next year will be very similar, I have no doubt. 33 Engineer Regiment (EOD), as well as supporting those operations already mentioned, also continued to provide teams to the Falklands and Northern Ireland. In addition, the regiment is heavily committed on battle area clearance tasks notably at Bramley and, as was seen so prominently in the national news with the Portland incident, the bread and butter business of the disposal of World War Two bombs.

We have also sent short-term training teams to Mexico, Belize, Egypt, Zimbabwe and Ghana, as well as responding at short notice to the ever-increasing demand for "just in time" training, most graphically illustrated by the requirement to give mines awareness training at three days' notice to the 5000 men of 24 Brigade.

Military Survey

Military Survey's most visible role for the field army continues to be in the provision of geographic advice and products for operations, planning and training. As with the rest of the Corps, the Former Republic of Yugoslavia has been the main focus with the production of a new map series, together with routine map supply. Survey has also continued to provide a military survey officer as Chief Geographic Officer to HQ UNPROFOR, (UN Protection Force) as well as four geographic support sections in the main national and UN centres. Over a third of military survey lieutenant colonels and almost a third of survey soldiers have now served in this area.

In addition, support to the UN has been provided through short notice mapping for operations in Rwanda and Angola, and a field survey team and a global positioning system and navigation training team to support the spearhead deployment in Kuwait.

Looking wider, military survey has supported operations in 15 other countries, ranging from rapid response map supply, through acquisition and production of material both conventional and digital, to direct field support.

Projects and Exercises

Despite the level of support to operations, our commitment to projects and exercises remains as strong as ever. The main effort within the UK has been our work on the Army Field Training Centre (AFTC) projects required to provide the field army with much-improved facilities on the training areas, whose use has increased dramatically with the return to UK of so many units from Germany.

On all the AFTC projects Engineer Branch Land acted as the project sponsors, and Military Works Force the project managers. The projects included rebuild and refurbishment of the Warcop Training Area by 39 Engineer Regiment. Here six new ranges were constructed, eight existing ranges upgraded, 16 buildings rebuilt or refurbished and 600m of new roadway built. The project also included two civilian contracts to replace the electrical and water supplies and a new car park. At Catterick, 36 Engineer Regiment constructed a permanent defence position of 66 trenches together with toilets and storage facilities, a 250-man emergency shelter, 20 outdoor classrooms and other training facilities. 22 Engineer Regiment, with some help from 21 Engineer Regiment, constructed the Berril Valley Obstacle Line on Salisbury Plain. This will provide all arms and sappers with a realistic obstacle line including three bridges which incorporate sliding spans to simulate them being destroyed. The total cost of the projects is in the region of £3M, a saving of £3.5M when compared to the cost to the Ministry of Defence (MOD) if civilian contractors had been used, and involved over 60,000 man training days. The projects have been valuable training, but the need to tackle them quickly has seen them being taken on by the next available unit, rather than the nearest, and I am concerned to reduce this wholly avoidable degree of separation in future.

Special to arm overseas training exercises at squadron strength included exercises in Kenya (Exercises *Oakapple*), Cyprus (Exercise *Pinestick*) and Canada (Exercises *Waterleap* and *Warpaint*) as well as troop exercises in Kenya (Exercise *Crabapple*) and Norway (Exercise *Northern Quest*). As usual, sappers supported many all-arms exercises including: seven Exercises *Medicine Man* in Canada, with UK engineer regiments contributing for the first time; three Exercises *Pond Jump* also in Canada; three Exercises *Grand Prix* in Kenya; two Exercises *Trumpet Dance* in the USA; and Exercise *Hardfall* in Norway.

Training and projects remain crucial to our ability to sustain the high standard of military engineering that is constantly being required, and acknowledged, on our operational deployments. Put simply, one of the main reasons why we were able to be so effective so quickly in Bosnia in laying out and producing the extensive 480kms road and track network there, and in the "get you in" service for the rest of the troops deployed, was because of the expertise we had developed throughout the Cold War in deploying and exercising outside of the central region on construction projects.

Organizational Changes

The main changes to our organization in the past year have come about through the implementation of the Review of the Army Command Structure. This has seen the disbandment of HQ 12 and 30 Engineer Brigades with many of their functions being transferred to Commander Engineers Land. To assist Commander Engineers in his increased responsibilities we have formed the RE Air Support Group at Waterbeach, headed by a colonel who provides, along with his small staff, the key focus for matters relating to RAF support. To provide a focus for the remainder of our TA, both independent and specialist, we have created a small command and staff cell at Minley commanded at colonel level. This new organization, HQ RETA/Central Volunteer HQ RE, will have as its main peacetime function the inspection and validation of special to-arm training. In war, it will form an intermediate HQ for Allied Command Europe Rapid Reaction Corps (ARRC) engineer corps troops. The role of this HQ RETA may yet be expanded if a civil affairs group, heavy in professional engineer capability, is formed.

Other reductions have been the disbandment of the Independent Field Troop AMF(L) with its role being transferred to a field troop of 69 Gurkha Field Squadron at Maidstone. 410 Plant Troop, a

Continental TA unit, has also been disbanded. The Queen's Gurkha Engineers has ceased to be a regiment, with only 67 Independent Gurkha Field Squadron and the Military Engineering Services Works detachment remaining based in Hong Kong until 1997. The functions of Regimental Headquarters and Commandant Queen's Gurkha Engineers are now being carried out by the CO and Regimental Headquarters staff of 36 Engineer Regiment.

My own HQ moved to Minley in November 1994. While the move and subsequent period of shake down has gone well, further organizational changes have been necessary. As mentioned, my own post reduces to one-star in September and Director Engineer Support (Army), along with his Military Engineering Services' staff, are due to leave us shortly for Andover to be collocated at the Quartermaster General's HQ. As a consequence, the HQ will have just one colonel post as chief of staff and three branches each headed by a staff officer grade 1; Engineer 1 (Operations/Organizations/EOD), Engineer 2 (Doctrine/Equipment) and Engineer 3 (Training). This establishment is tight, but workable, given the links we have forged with other sections of the MOD.

Virtually all our TA units have had their establishments rewritten to take account of the Secretary of State's November 1994 announcement on the future size and structure of reserve forces. The TA Implementation Plan saw only a minor reduction in our TA peacetime numbers, but we have taken the opportunity to review all establishments and to rerole some units from national defence in support of the ARRC, the Combat Service Support Group or 3 Division. The RAF TA units have also been considerably reworked to provide a more deployable and flexible capability particularly for 76 and 77 Engineer Regiments. All of these changes have now been agreed although it will take some time for the units to be fully equipped for their new roles. Even so I believe that their new establishments and roles represent a real step forward and enhancement for our TA.

Training Issues

Since last year's report HQ Inspector General Doctrine and Training (IGDT) has reorganized. On 1 April 1995 the Army Training Organization moved from the newly formed Land Command to become part of the Adjutant General's Personnel and Training Command. The doctrine element of HQ Doctrine and Training, whilst remaining at Upavon, moved to Assistant Chief of General Staff's area and thus HQ IGDT was redesignated HQT (HQ Training). Work is now progressing to prepare for the formation of the Army Individual Training Agency on 1 April 1996. It is this impending change to agency status, balancing a barely adequate budget and the development of the RE Employment Structure Review (REESR), that has been the dominant training issue during the last year.

The REESR report, produced by Colonel Mounde and his team, has been accepted by the RE Employments and Training Committee (RETEC) and has been forwarded to IGT (Inspector General Training) for his approval. In the meantime, planning for the implementation of the proposals is well under way. The review will make significant changes to the career and training structure for the soldiers of the Corps. There will be no formal training at Class 2 level; Class 1 level will be achieved at an earlier stage in the career structure. The standard of Class 1 tradesmen will be more closely aligned to the requirements of field units but the capacity for more advanced training for some tradesmen will be retained. This will produce more "just in time" training, and less "just in case". Command training for JNCOs and SNCOs will be standard across the career structure with additional technical modules for those requiring them. There is much work to be done before the recommendations are fully implemented. I have set target dates of September 1996 for the introduction of the new Class 1 trade training and June 1997 for the introduction of the revised Class 3 training – be in no doubt, that with about 35 man-years of course rewriting ahead, these are demanding deadlines.

The RSME has now achieved its post-*Options* reorganization and has taken over the £16M extension to the trade training workshops that we needed to replace capacity lost when Chepstow closed. Electrical and Mechanical Wing has been reformed from Design Engineer Wing with adjustments between its and Construction Wing's responsibilities. I remain concerned that the span of command in the Construction Wing is too wide, and am looking at how to extract plant training from it. Like Chatham, Minley has benefited from some substantial new building works to fit in the training staffs and facilities that have been moved there. Communications Training Wing is now at Minley alongside Battlefield Engineering Wing.

RE Diving Establishment will become part of the Defence Diving School on 4 September 1995 and as part of this reorganization, will move from its present location at Gunwharf Portsmouth to Horsea Island in July 1995. The Defence Diving School is a joint Royal Navy (RN) and Army organization, with administration being provided from naval resources. Command of Defence Diving School will rotate between RN and RE, with the first commander coming from the Navy.

The Apprentice Training Wing is now up and running in first class accommodation at Minley and the first intake of 140 arrived in January 1995. It has had a successful start with only a 16 per cent wastage rate. The future of apprentice training post-1998 is under the microscope again and IGT has been tasked to study the whole question one more time; a decision on the future will be made at the end of this year. The Corps remains as ever fully committed to the apprentice entry, a view which is shared by the Royal Signals, the Royal Electrical and Mechanical Engineers and the Royal Logistic Corps – other users of the current apprentice scheme; and those who have studied the Bett report know that it acknowledges the need for such a form of technical entry. However, it seems to be a truism that no review of the apprentice entry is valid for more than four years!

Finally, as part of the process of moving to a defence agency and the continued drive to maximize value for money within the armed forces:

- Both RSME (Chatham) and RSME (Minley) are to undergo separately the competing for quality (CFQ) process. CFQ is a part of the government's "next steps initiative" and examines an organization with the aim of deciding which is the most cost effective way of delivering that organization's role. Options include abolition, privatization, partnering with industry, strategic contractorization or market testing. As the process only started at Chatham in April 1995 and will not start at Minley until October 1995, it is too early to speculate what the outcome will be. Each study is expected to take two years to complete.
- IGT has commissioned a number of studies in an attempt to maximize the rationalization of training resources. Main areas for review are AFV (armoured fighting vehicle), signals and elements of artisan trade training.

In summary, the Royal School of Military Engineering has transformed itself and has achieved a miracle of crisis management in continuing to run courses while restructuring. We now need to confirm that we are configured absolutely correctly as we embark on CFQ and implementing the employment structure review. I am confident that it is all achievable, and believe that we can look forward to a measure of predictability in our activities in the Royal School of Military Engineering.

Manning and Recruiting

Manning. PB 7's (Personnel Branch 7) main concern over the past year has been that of managing the continuing drawdown of the Corps past the three phases of redundancy which, in common with other parts of the Army, have left us in a slight state of surplus to our officer requirement. This is partly because the Corps' PVR (premature voluntary retirement) rate over the past year has not been as bad as expected; it has certainly been better than the overall army average although the potential for this to surge in the future is always present, given the uncertainty about the detailed outcome of the Bett study into careers and remuneration.

In essence the Corps has a current overall officer strength of 1090 against a future manpower target for 1996 of 1010. Nevertheless, it is important to stress that no further redundancies are planned among junior officers. At the more senior level, five volunteer colonels were selected in April and a handful of senior PQE (professionally qualified engineers) and survey officers (an area otherwise untouched by the drawdown) are to be selected this summer.

However, this healthy overall surplus masks a shortage of young mainstream officers caused by the MOD policy of "rate-capping" the Corps on the number of young men and women whom we commission. Whilst ERLO (Engineer Recruiting and Liaison Officer) and his excellent staff have no difficulty in attracting more than enough potential officers to Sandhurst, the Director of Manning (Army) has set limits on the number we actually commission so that other cap badges get a fair share of the reduced intake into Sandhurst. The outcome of this is that regiments are now starting to experience gapping in a few of their junior officer posts. Nevertheless, these gaps are seen as a short-term difficulty rather than a long-term problem for the officer manpower structure of the Corps. Moreover, it offers the opportunity for some first class short service voluntary commission TA officers to serve in regular units, to the advantage of everyone.

Elsewhere within the Corps the technical rosters remain broadly in balance and there is no

overall shortage of applicants for the long courses although, on the PQE side, there is a shortage of electrical and mechanical qualified officers. I have reviewed the rules governing professional engineer training to allow a "last look" for those who have just missed formal staff training. In military survey, the tied two-star Director General Military Survey post has now gone down to one star and is currently being run by Director General Operations. Major General Mike Wilson has become the first Director General Intelligence and Geographic Resources – an open competition post in the defence intelligence staff.

On the late entry (LE) side there have been particular difficulties in managing an expanding surplus of officers and this has had to be controlled by various measures, including a restriction on the numbers of commissions and conversions from short service commission (SSC) to regular commission (Reg C). This has been unfortunate for those high-calibre warrant officers applying for a LE commission. However, in the light of current shortages of junior mainstream officers, I intend to review the numbers of LE officers and the SSC/Reg C balance therein, before the 1996 LE commissioning board.

As far as promotion is concerned the main change has been the introduction of selection procedures for the substantive promotion of captains to major at age 30 and upwards for the first time. Overall this should have no major impact since the new system simply regularizes the previous haphazard practice of granting acting rank to selected officers. As far as quotas for the 1995 pink and blue lists are concerned the good news is that the numbers selected for promotion are greater this year than last. We hope that this trend will continue. However, the bad news is that the chances for promotion to brigadier and above are now permanently reduced for both the Corps and indeed for the entire post-*Options* Army. However, rest assured that I am fighting hard to increase the number of sapper brigadier posts and there is some sympathy for our case.

In summary therefore, the Corps officer manning seems broadly well placed to meet the future demands likely to be placed upon it.

Now turning to soldier manning. The last year has seen the final phase of the drawdown process resulting in over 900 redundancies. This has caused a great degree of turbulence for units and men alike. However, to increase stability, longer tours will be the norm for the future. It is my intention that once Mounde is implemented the initial tour length should be set at four years. After redundancy, voluntary discharges have increased but not to the degree that some had forecast. Recruit allocations for the immediate future are reasonably healthy and sufficient to replace predicted losses.

Consequently the Corps is slightly overmanned by about two per cent against our manpower manning target of 7770 soldiers and will remain in surplus throughout this year. Although the overall manning state is reasonably good, certain trades – fitter heating, ventilation and air conditioning, combat signaller, and driver RE – remain in deficit. Likewise manning for 9 Parachute Squadron and 59 Independent Commando Squadron is causing some concern and more volunteers must be encouraged to come forward if these squadrons are to be able to meet their commitments.

The technical rosters of clerks of work and military plant foremen remain healthy. The military survey trade and manpower restructuring is now complete and a more sustainable rank structure is now in place.

With the redundancy process completed, manning control point (MCP) discharges, mainly at the 12-year point but some at nine years, have had to be reintroduced with effect 1 April 1996. For nine-year MCP soldiers there is an option to change their career employment qualification to the deficit trade of combat signaller RE, where they are likely to improve their chances of having a full career. I intend to even out the manning of deficit trades as much as possible in this way in the future.

Internally, both within PB 7 and RE Manning and Records Office, the emphasis has been placed upon developing plans and procedures in preparation for the impending formation of the Army Personnel Centre in Glasgow, scheduled to take place in the autumn of 1996. In principle it has been decided that there will be one manning division at Glasgow dealing with both the officers and soldiers of the Corps, headed up by a colonel. The detail of the new staff grouping and the manning procedures is still under review. One other feature of this reorganization is that it will increase the number of retired officers needed in Glasgow.

Recruiting. Against a background of an increasing shortfall in recruiting for the Army, the

Corps continues to meet its quotas for officers, and our soldier recruiting figures are also holding up well; however, the wastage rate in training is too high for soldiers. For officer recruits, Regular Commissions Board briefings have been centralized at Westbury, which means that we will have less opportunity to assess our candidates' suitability for the Corps; we will have to compensate for this by making more use of unit attachments. With the change of emphasis within the Corps towards construction engineering, we will need to redouble our efforts to increase the proportion of engineering graduates we recruit from Sandhurst, for we have of late never achieved the 60 per cent of engineering graduates we consider we need.

Military Secretary Key Appointments

Major General S C Grant CB is appointed Commandant Royal College of Defence Studies in 1996 in the rank of lieutenant general; Major General A D Pigott CBE was appointed Commandant of the Staff College, Camberley in October 1994, followed shortly afterwards by the appointment of Major General R A Oliver OBE as Deputy Chief of Staff Headquarters UK Land Forces (now Land Command) in December 1994. Looking ahead, Brigadier I D T McGill succeeds me as Engineer in Chief, in September 1995 after I move on to become Director Support in HQ LANDCENT in Heidelberg; and Brigadier C L Elliott MBE is appointed to Chief Combat Support ARRC in February 1996 on promotion to major general. So in the two-star league we have had a good year – but let us hope we can match this with one-stars in the coming years.

Honours and Awards

The honours and awards received by members of the Corps during the past year are as follows: two CBs, four OBEs, eighteen MBEs, one MC and two QGMs. Captain P Y Bassett MC was awarded the Military Cross for operational service in the Former Republic of Yugoslavia during 1994, the first such award to a member of the Corps since 1967. This is all excellent news and confirms my view that the Corps is finally beginning to receive the recognition from others it so thoroughly deserves. This must continue and I look to commanding officers and other commanders to assist in this by giving due thought and effort to the writing of citations and in bringing exceptional conduct to the attention of commanders early on.

Doctrine

Engineer 4 staff continue to work very closely with staff from the Directorate of Land Warfare in developing Corps doctrine and the Corps' input to Army doctrine, and indeed a sapper lieutenant colonel is embedded in the Directorate of Land Warfare establishment.

The primary work of Directorate of Land Warfare remains the development of doctrine under the British Army 2000 study. The results of this study will largely determine the size and shape of the future Army. Engineer 4 staff are intimately involved in the force development working groups which will be taking this study forward under the components of capability identified as essential in the Army of the future.

Significant progress has been made over the past year in the dissemination of doctrine throughout the Army using a hierarchy of doctrine publications. The base document, *British Military Doctrine* (BMD), is in the process of being revised. From this document doctrinal principles are set out in Army Doctrinal Publications (ADPs). *ADP Operations* was issued in late 1994 and *ADP Command* will be issued in July 1995.

Doctrinal practices are set out in Army Field Manuals (AFMs) and recent publications include *AFM Volume 1 – Combined Arms Operations*, Part 1 – *Formation Tactics*. Part 2 of Volume 1, *Battlegroup Tactics*, is due to be issued in the spring of 1996.

Within the Corps the following higher level doctrine papers have been endorsed during the past year:

- *Mine Counter-Measures Doctrine*
- *The Future Family of Mines*
- *Engineer Operations in Force Projection and Sustainment*

At the tactical level the RE Tactical Doctrine Committee (RETDC) has produced the following tactical doctrine notes which have been endorsed during the past year:

- *Command and Control of Engineers Within the Division*
- *Tactical Handling of Engineer Reconnaissance*
- *Engineer Support to UN Peace Support Operations*
- *Tactical Handling of Vehicle Launched Scatterable Mines System (VLSMS)*

These papers have been distributed within the RE chain of command and will eventually be

published as Army Tactical Doctrine (TD) notes or be incorporated in appropriate AFMs. Further TD notes will be produced during the coming year on:

- The Tactical Handling of BR 90
- Engineer Logistics Within a Division
- Engineer Intelligence

There is no doubt that following the diminishing of the threat from the former Warsaw Pact countries, doctrine has become the key factor in shaping force structures and in the development and procurement of new equipment. It is therefore of vital importance that all are aware of, and understand, Army and Corps doctrine.

Equipment Matters

The engineer equipment programme remains coherent and well funded despite the continuing budgetary pressures. The M3 and BR90 systems are about to enter service, a family of new mines is to be procured, and there is a substantial research programme addressing our future countermine requirements – in depth, in support of moving formations, and a replacement for the obsolete hand-held mine detector. There are also a number of funded programmes in support of our battlefield engineering role, including survivability and force sustainment.

Perhaps the most significant change since last year's report has been the commitment to replace by 2001 the Chieftain AVRE (Armoured Vehicle RE) and AVLB (Armoured Vehicle Launched Bridge) with vehicles based on Challenger chassis. The inability of Chieftain-based vehicles to keep up with Challenger has long been a serious deficiency that sappers have known about all too well in training, but it was Operation *Granby* that really brought this into all-arms focus.

It has also been agreed to replace Combat Engineer Tractor (CET) in 2005 with an "off-the-shelf" vehicle (Terrier). The staff target was endorsed in August 1994 and the project is now in the feasibility stage. The vehicle will be optimized as a very capable piece of armoured plant but other functions and capabilities must not be added at the expense of its principal role. As we all know, the swimming capability of CET was achieved at the expense of reliability, performance and protection; Terrier is therefore unlikely to swim, although deep wading remains a desirable attribute.

Our mines programme is still well funded, although there have been some delays and slippages. The procurement of VLSMS continues for an in-service date of 1999. The international development of ACEATM (Aimed Controlled Effect Antitank Mine) is almost complete and the weapon should be with the field army in four years' time. The Area Defence Weapon remains funded as an "off-the-shelf" buy, and a number of options are being considered. And finally, the Barmine fuzes appear to be lasting longer than was predicted, a tribute to the quality control in their manufacture, and thus the replacement for Barmine has been slipped by two years.

Along with other NATO nations, we are now placing more emphasis on minefield detection. Two projects are being considered: a close-in detection and neutralization system known as MINDER (Mine Detection, Neutralization and Route Marking) which will be fitted to countermine vehicles, and a long range minefield detection system known as REMIDS (Remote Minefield Detection System) which will enable engineer reconnaissance staff to detect minefields remotely out to 100kms. It is far too early to say what form the systems will take, but these are high-priority research programmes with provisional in-service dates of 2005.

This year has seen two important airfield damage repair projects emerge from the doldrums. Requirements for both an armoured heavy wheeled tractor (HWT) and a flush capping system, formerly called flood grout, have been endorsed and are moving quickly to the tender stage. HWT will be armoured against area denial munitions and, in place of its bucket, will be able to mount either an armoured blade to clear munitions or a hydraulic dynamic compactor. The flush capping system will allow craters to be capped speedily with a surface which does not place any restrictions on aircraft operation. Both systems are due to enter service in 1999.

On the survey side, the most significant development has been the deployment in June of the Interim Geographic Support System (IGSS). IGSS is a mobile map production system based on ISO (International Standards Organization) containers. It will provide 13 and 14 Topographic Squadrons with a rapid-response map production and TERA (terrain analysis) capability.

Our equipment programme is on track, but we must not be complacent. The arguments for and

against mines must be properly followed through, despite the emotional arguments being deployed through the press. There is no doubt that "dumb" mines will be having a difficult time in the future. On M3, we need to complete the buy with enough to replace the M2 as they reach the end of their life in 227 Squadron(V). With so much of our activity likely to be with allies, the need for interoperability is reinforced, and the best sort of interoperability is to encourage export sales by pointing out to allies the quality of our equipment.

Corps Affairs

Major General D A Grove OBE was appointed Colonel Commandant on 1 February 1995 and Major General A N Carlier CB OBE was appointed Representative Colonel Commandant for 1995. Air Chief Marshal Sir Richard Johns KCB CBE LVO and Major General R Wood were appointed respectively as Honorary Colonels of 73 Engineer Regiment (V) and 135 Independent Topographic Squadron (V).

1995 has proved to be a quieter year for Corps events than the exceptionally busy 1994. The Corps' major involvement in the celebrations to mark the 50th anniversary of Victory in Europe Day was in Jersey, where the privilege of the Island was granted to the Jersey Field Squadron (Militia) on 8 May. This coincided with the Island's liberation celebrations, and the Chief Royal Engineer and the Corps band were present. Simultaneously the Representative Colonel Commandant and I represented the Corps at the St Paul's service of commemoration.

Another celebration this year is the 75th anniversary of the formation of the Royal Corps of Signals and the Corps will be involved in a number of events to commemorate this, including a one-off revival of the former annual sapper/signals dinner, to be held in the Royal Engineers Headquarter Mess on 14 November.

Colonel M R Cooper was appointed Corps Secretary and Secretary of the Institution in October 1994; he is exceptionally well qualified for this post, having spent nearly four years as Regimental Colonel. The Institution has continued to recruit warrant officers as associate members, and several good articles by warrant officers have been published in the *Journal*. I am also delighted to report that honorary associate membership has been extended to and accepted by a number of chief engineers of ARRC nations.

Much progress was made in the Museum last year. Visitor numbers rose by 24 per cent, aided by the D-Day Special Exhibition. There have been some important new acquisitions for the collection, including two Victoria Crosses and a George Cross; we have also acquired on loan Kitchener's regalia, which means that we now have on display the regalia of four of our five field marshals. A new special exhibition on the theme of "Sapper as Artist" was opened on 13 April, and another exhibition on the "War in the Far East" is opening on 21 July. Museum Foundation members have persevered with fund raising efforts and have been most successful. As a result, the long-awaited plans for the development of the covered courtyard are now coming to fruition. Following a competitive tender, the contract for the design of the displays was awarded to Roundel who submitted some very imaginative plans, incorporating an overhead walkway. Work has now started on the series of inter-related displays and tableaux which will portray all the campaigns in which the Corps has been involved since 1945.

Our Corps funds have weathered the drop in income caused by the reduced manpower in the Corps and are still remarkably healthy. There was a surplus of income in 1994 in the Central Charitable Trust of £186,000, including reinvested dividend income. No good cause for a grant from Corps funds is ever turned down. I commend the Corps Treasurer and his staff for their careful and efficient stewardship of the Corps' private money, and their clear presentation of the accounts. These accounts are in the process of being computerized, which will hopefully make them less labour-intensive to operate in the future.

The new Corps Enterprises shop in the Brompton Study Centre has allowed a wider range of goods to be stocked and has contributed significantly towards increased turnover. The manager, Mr D B Moffatt, has been taking steps to improve liaison with units and I hope that all members of the Corps will make more use of the comprehensive service which Corps Enterprises can now provide.

Lieutenant Colonel P R Evans has now retired as the Director of Music of the RE Band, and the army's senior Director of Music. We are very grateful for his outstanding service to the Corps and for the very high standards which he achieved with the Band. His place has been

taken by Captain A R Chatburn, to whom we extend a warm welcome.

The benevolence workload of the RE Association continues unabated. Over 1200 cases were dealt with in 1994 and some £360,000 was spent on benevolence in total, of which approximately half was found from Corps funds, and half from the Association's own investments. Cases appear to be getting ever more complicated and an enhancement to the Association's staff has been agreed to help them cope with the increased workload. The branch structure remains largely unchanged, although some adjustments have been made at group director level to reflect changes in the structure of the serving Corps. The advancing years of many branch members has prompted a further review of recruiting for the Association, and a "way ahead" paper is being drafted.

Our holdings of Corps property continue to increase. A magnificently detailed Centurion AVRE centrepiece has been commissioned for 32 Engineer Regiment and several paintings have been completed or are in progress. One of the paintings will be a portrait of the doyen of our bomb disposal veterans, Colonel B S T Archer GC, who is currently chairman of the VC and GC Association.

The RE mobile display team continues to tour county shows, helping to keep the Corps in the public eye, as well as recruiting for the regular Army, the TA and also the RE Association.

Sport

As ever the Corps continues to be at the forefront of army sporting achievement. There have been a series of fine team and individual performances throughout the year.

The Corps' strength in association football was once again confirmed by winning the Inter-Corps championships and reaching the army major units cup final where 3 RSME Regiment was narrowly defeated by 2 Division HQ and Signal Regiment. The sapper cup final between 28 Engineer Regiment and 3 RSME resulted in a 1-0 win for the Minley side.

The Corps rugby trophies were competed for as fiercely as ever. The Fern Cup between 1 RSME and 3 RSME resulted in a win for 3 RSME Regiment which then comfortably defeated a composite sapper UK Support Command (Germany) side in the Campbell Cup. The Corps side had a splendid win against the Gunners 13 – 5, the first for many years.

On the cricket field the Corps side continues to prosper having a satisfactory season and another successful tour of Devon and Cornwall. 42 Survey Engineer Group had a marvellous season culminating in an emphatic victory in the Army minor units cup.

The Devizes to Westminster race at Easter saw our team finish second to the Royal Marines – the marines made a well-sponsored effort to break the course team record, but failed by 40 minutes to break our record set in 1993.

In the sailing world the RE Yacht Club will again be represented in this year's Fastnet race in early August – the only Yacht Club to have competed in every Fastnet race since the race's inception.

Boxing has again featured strongly this year. Probably one of the best events of the year was the Army minor units final where 59 Independent Commando Squadron retained their title by narrowly defeating 9 Parachute Squadron.

In the cycling world, Sapper Murray has been competing successfully at the highest level in the UK time trials and recently broke the Army ten-mile record which, like many cycling benchmarks, has stood since National Service days.

The Corps has also won the inter-Corps shooting and badminton, but finished runners-up to the Royal Logistic Corps in squash. There was some consolation in squash at unit level where 39 Engineer Regiment were the Army major unit champions.

Summary

In concluding, it is now clear that a number of balances have changed. The tendency for only squadrons to be deployed is being replaced by a mix of both squadron and regimental deployments, so both must be capable of standing on their own two feet. The combat engineering/construction engineering balance has shifted, but the two disciplines have moved closer and feed off each other to a greater degree. Similarly the balance between regulars and TA has shifted, and the TA are maturing in their new roles. With a smaller Corps, and a greater need for military engineering, we need our tradesmen to be available as a useful resource earlier in their careers, and Mounde will achieve this. The RSME is able to deliver this new approach to artisan training, and in so doing could well achieve a significant degree of partnership with the construction industry.

Finally, I feel much more confident that everyone at every level has a clear idea of where we

are and where we are trying to go. All this can only be good, but we must continue to sell ourselves to best effect. If we have a fault it is that we just get on with things and make them look too easy. We know that we are the "really useful part" of the Army – we are needed in every area of the spectrum of conflict, albeit in different proportions and with different hats on. It is important that this message is passed on without undue modesty.

I move on, knowing that the Corps is very busy, but equally aware of the strong sense of purpose at all levels. I remain constantly impressed at the quality of everyone I meet, and I am proud to have been allowed to be the professional head of the Royal Engineers at such a crucial time.

Journal Awards

The Publication Committee announces the following awards for articles of special merit published in the April 1995 *Journal*.

THE RHINE CROSSING 1945
by Major General J C Woollett CBE MC – **£75**

"BRIDGING FOR THE NINETIES" – A BRIDGE TO THE FUTURE
by Colonel T H E Foulkes – **£50**

ONE MORE RIVER. SOME PERSONAL REMINISCENCES ABOUT BURMA
by Brigadier John Constant – **£50**

BONSIA DIARY
by Major J D Beaumont – **£25**

GORAZDE
by Lieutenant M D Curtis – **£25**

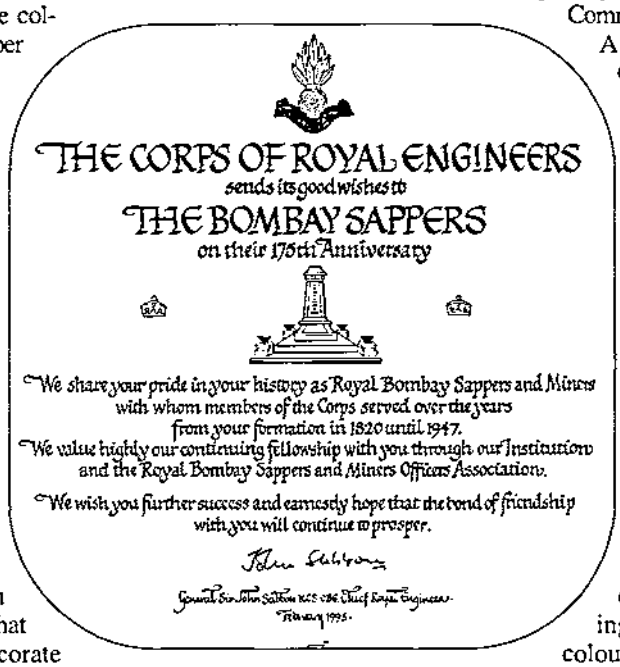
175th Anniversary of The Bombay Sappers

BRIGADIER D A BARKER-WYATT CBE

AN illuminated message in gold, red, blue and black (see copy of text in box below) from the Chief Royal Engineer to the Bombay Sappers was presented by eight members of the Royal Bombay Sappers and Miners (RBS&M) Officers Association during the anniversary celebrations at Kirkee 23-25 February 1995, together with a bronze statuette of a 1990s Sapper with a mine detector, from the Corps.

The statuette is similar in size to one of a World War Two Royal Bombay Sikh Sapper in silver, presented to the RE HQ Mess by the Kirkee Mess in 1947. Several copies of paintings and photographs of Royal Bombay officers pre-1947 were also given to the Kirkee museum which has an excellent and extensive collection of Bombay sapper and pioneer artefacts.

In return the association party was given a magnificent large RBS&M pre-World War Two gate type badge in brass (cast during the celebrations), a bronze metal plate decorated with old sapper and pioneer badges and crests, a set of prints (old uniforms) and a colour photograph of Lt Gen P S Bhagat VC (a Royal Bombay officer second lieutenant in Abyssinia in 1941). It is intended that these gifts should decorate the proposed RBS&M guest room in the RE HQ Officers Mess, Chatham.



The origins of the Bombay Engineer Group (BEG) stem from the company of pioneer lascars raised by the first chief engineer Bombay in 1777. Major General (later field marshal) Nicholson, RE Engineer in Chief and Commander in Chief of the Bombay Army, raised a separate small corps of engineer lascars in 1799, which in 1820 was enlarged and established with a RE officer and six British NCOs and designated a company of sappers and miners. The 1777 pioneers who had also expanded, having fought with distinction under Wellesley (Wellington) and in Arabia, were amalgamated with the sapper and miners corps in 1830. From 1870 all officers in the group had to be RE. In 1921 the "Royal" title was bestowed and in 1932 most of the other ranks of the disbanding Bombay and Sikh pioneer regiments were absorbed by the RBS&M together with much of their silver and property. "Pioneer House" the present BEG Centre commandant's residence was the old pioneer officers mess.

The association party (which also included four wives and one widow) at the celebrations was made most welcome and greatly enjoyed the extensive hospitality of the BEG Colonel Commandant, Major General A K Puri AVSM, and Centre Commandant, Brigadier C D Puri and his officers. As well as a series of most enjoyable parties in the messes, clubs and homes of the officers, there were several spectacular events. They included an excellent parachute display by 411 Parachute Company BEG (the oldest airborne unit in the Indian Army) and a magnificent water sports carnival of large rafts of differing provincial troops of colourful dancers, with a massive display of torch swinging physical training clubmen and fireworks set pieces, all wonderfully reflected in the rippleless waters of the Moola River. The final ceremonial parade, taken by the Indian Army chief of staff was immaculately performed in brigade of guards and RE style. The bonds of tradition and friendship that remain between the Corps and the Bombay Sappers are manifest in the latter's "march on" and "march off" of their Colours which were performed with perfection to the accompaniment of *Wings*.

From Ripon to Rangoon

CAPTAIN M WILKINSON BEng CEng MICE

After the war, I was posted to the Training Battalion Royal Engineers at Lockerbie and from there went to Germany to serve briefly with 32 Armoured Engineer Regiment at Hameln, and then as Staff Officer Royal Engineers 3 at Headquarters British Army of the Rhine, where the Chief Engineer was Brigadier Broomhall, who died recently. I accompanied him to Holland as his personal assistant when he gave a lecture to the Dutch Institution of Civil Engineers on wartime bridging. I remember him giving me a dressing down for having a hangover at breakfast!

After demobilization I read for a degree in civil engineering at Sheffield and after graduation joined the Air Ministry Works Directorate. I served with them until my retirement, working on airfields, barracks, skillcentres and, latterly, prisons.

In May 1942 I was selected for the Royal Engineers Short Course at Cambridge and assembled with others at Training Battalion Royal Engineers, Ripon, where for two weeks the instructors tried to kill us before the enemy had a chance. Everywhere at the double, every evening in the gym where we boxed. With my long nose and short arms this was not enjoyable. The wall of the gymnasium bore in large letters "You are a soldier first and a tradesman afterwards." After a fortnight I felt more like a corpse than either.

Trinity College was much more congenial. I shared rooms with a gunner cadet in Great Court with its lawns inviolate from undergraduate feet. The six-month course was a blend of first and second year mechanical science tripos with sapper training thrown in.

We had expected to go to RE officer cadet training units (OCTU) from Cambridge but the authorities decided on infantry recruit training first. So to Bury-St-Edmunds and the depot of the Suffolk Regiment we went. It remains a blurred six weeks. Route marches, bully beef hash, the rifle range at Thetford and volunteering – you!, you!! and you!!! – for the camp concert. I learnt "The Battle of Hastings" and "Magna Carta" at short notice. My long suffering mum had copied out both from Stanley Holloway's 78rpm recording. I remember them still.

The famous event of the course was when Officer Cadet Whitcher bayonetted the lance corporal. Whitcher used to trot round the assault course very gracefully in a most unwarlike manner and LCpl Parker got crosser and crosser. Eventually he chased Whitcher round the assault course with a fixed bayonet in the small of his back. At the last prone dummy he shouted "stick him" and they both went for the dummy. Whitcher missed but stuck Parker in the calf. It was, I think, a genuine accident. Poor Parker was in the wrong and while we put a dressing on his wound swore us all to secrecy. He limped a bit for a few days – that was all.

Next stop was pre-OCTU at Wrotham. The camp was on the top of the North Downs overlooking the village of Trottiscliffe to the south. We were in the tender care of the Leicesters who taught us yet more infantry lore. We threw grenades, practised map reading and went on the inevitable route marches. We usually returned to camp through Trottiscliffe and passed the pub which we frequented of an evening when our three shillings a day allowed. We developed the practice of having the scout – we moved in AA formation – rap on the pub door as he passed. When the next section reached the door half a pint of mild and bitter changed hands for six pence and we went on much refreshed. Came

Captain M Wilkinson
From Ripon to Rangoon p130

the day we were spotted by the platoon commander and after a dressing down for such a breach of military discipline, he had us charge with fixed bayonets up the scarp face of the Downs back to camp. A lot of burping and out of breath swearing ensued.

Our camp of Nissen huts was set in a scrub jungle of rhododendrons which had its advantages. Sunday church parade assembled in the curving cinder track in front of the billets. If you fell in on the extreme right, answered your name and then marched backward into the undergrowth nobody in authority saw you vanish. This worked fine for a few Sundays until the parade commander found he was reaching church with more than a few souls missing. I was in the billet cleaning my shoes ready for a trip to meet my then current girlfriend when the orderly sergeant appeared at my elbow enquiring "Why the 'ell aren't you at church?" We eventually compromised. He didn't put me on a "fizzer" and I volunteered to go with a party of like miscreants and help with the harvest at a farmer friend of the sergeant. This turned out better than expected. The farmer's son was in charge of the volunteers and when I explained I had a girl waiting for me in Gravesend he took me on the back of his tractor to the nearest bus stop.

We were introduced to the mysteries of D&M – driving and maintenance – both motor cycles and vehicles, spending a week on each. Instruction in riding a motor cycle required a very large field, one instructor and a motor cycle per cadet. The instructor showed us how to start and ride and then said "off you go". Upwards of 30 embryonic TT (Tourist Trophy) riders tottered off towards the nearest hedge and soon the field looked like the aftermath of battle with machines and cadets lying prone.

One of our officer instructors was the son of a member of the Cabinet and was as mad as the proverbial hatter. He instructed in "the hand grenade" and supervised our live throwing practice sitting on top of the sandbag surround from behind which we, one at a time, threw grenades. When I threw mine he came down in a heap and I thought I had killed him. His rapid descent was to complain that a grenade fragment had passed between his arm and body and torn his shirt. He didn't sit up there again.

While I was at Wrotham we were visited by Brigadier Burrowes, a most distinguished and charming officer whose task was to persuade us to join the Indian Army. He talked at length about polo ponies, living in a bungalow in cantonment and not getting into debt – all very peacetime soldiering. It was inevitable that given the chance I should end up there as both my father and his brother had served with the Border Regiment; my father in Burma and my uncle on the North-West Frontier. I had been regaled as a child with stories of dacoits and Pathans, Burmese women smoking cheroots and happenings in the Khyber Pass. So I volunteered. Perhaps his telling us to take some "civvies" to wear in South Africa where we were sure to call and be greeted by beautiful suntanned girls encouraged others to volunteer.

After embarkation leave we travelled by troop train to Scotland and the Clyde where we boarded our troopship the *SS Mooltan*. We were allocated to troop decks and issued with hammocks. These we had to sling in a very small space and practise climbing in without overshooting and falling out on the other side. We then went exploring and found a shop on board selling white bread, tinned Vienna sausage and tins of condensed milk. Two slices of bread "buttered" with condensed milk and filled with Vienna sausage made an acceptable snack. After an uneventful but rough voyage we reached Gibraltar where the ship "turned left" into the Mediterranean. So much for the brigadier's South African lovelies waiting on the quayside.

We were, I believe, the first convoy to go through the Mediterranean after the German defeat in North Africa. We were heavily escorted but unhindered. The weather was glorious. We were issued with khaki shorts and shirts and a wonderful Wolsey sun helmet lined with green baize and metal foil. Wearing one of these you felt like an empire builder.

We had hoped to get ashore in Egypt but "nothing doing". We amused ourselves by throwing handfuls of our cigarette ration at the Egyptians working in the barges alongside. We were not being generous. The fags were frightful; labelled "C to C" meaning Cape to Cairo, but known to everyone as Camel to Consumer.

Passing through the canal we had a ship ahead of us carrying only females – Women's Auxiliary Air Force, Women's Royal Naval Service and the like. It suddenly started to list as all the women fled shrieking to the starboard rail. On the bank was an Egyptian with his skirts lifted to reveal his all, shouting "Shafti memsahib." Fortunately the

ship passed him before it turned turtle with the officer on the bridge shouting "Trim the ship. Trim the ship."

Then into the Red Sea where it grew hotter and hotter with a following breeze. Twice a day we put about and steamed head to wind to clear the ship of its various smells.

We stopped briefly in Aden and then on to Bombay. As we passed through the entrance lock, Indian dockers threw bananas at us that were very short and stubby – plantains somebody called them – but they tasted like bananas and as we hadn't seen any for years were a welcome surprise. We went by troop train from Bombay to Mhow in central India. The train was made up of third class carriages, the seats being wooden benches and we spent a full day on the journey. In the morning as the sun rose we pulled into a siding and were allowed out to collect hot water from the engine for washing, shaving and brewing tea.

When we reached Mhow our beautiful Wolsey helmets were replaced by lightweight pith helmets – Bombay bowlers. They were much more practical but nothing like as glamourous. My Bombay bowler was so large that it was likened to a landing craft and I was nicknamed *bari topi* which is Urdu for "big hat".

Yet more infantry training. When, we wondered, would we start Sapper training? However it gave us a chance to become acclimatized and to learn Urdu, a language spoken in some parts of northern India and used as a lingua franca in the Indian Army.

We also learned about mules. We were told that the mule carried a useful load and walked at the same pace as a marching soldier. In practice we found that the mule's object in life was to throw off its load as quickly as possible and head for the jungle. They also kicked.

Towards the end of our course we and the mules took part in a "scheme" as exercises were universally known in India. This involved advancing towards and crossing the Narbadda river at night followed by an attack on an "enemy" dug-in in the hills overlooking the river. To cross the river the directing staff had hired a number of country boats, about 20ft long and very heavy and cumbersome. A rope had been strung across the river and cadets in each boat were supposed to haul themselves across.

When our turn came the current proved so strong that the boat was being pushed downstream and we, the pullers, were likely to be left hanging on the rope like so much washing. So we let go and sailed merrily downstream. The native crew got us across by rowing but landed us in a swamp. The rest of the scheme was uneventful apart from one cadet casualty. His patrol met up with another and as his water bottle was empty he asked for a drink. He was handed a water bottle but not told it held neat rum. He took a huge swig and promptly passed out. He was evacuated by ambulance. He survived and years later won the George Medal.

We left Mhow early in 1944 for, at last, engineer training at OCTU at Kirkee near Poona the home of the Royal Bombay Sappers and Miners (RBSM). I remember little but the six months passed happily and quickly. Then at midnight on a day in August we took off our cadet flashes, proudly put on our new pips, and then got drunk.

I was posted to 26 Field Company at Hardwar in the Siwaliks, the foothills of the Himalayas. We had a very comfortable mess. It had started as a large tent then a huge baronial style brick fireplace had been built at one end – as a trade test I was told – walls, were added, the tent removed and it was roofed and thatched. It looked like a piece of old England dropped in the middle of the jungle.

The jungle training area was in the vicinity of the Viceroy's shooting lodge so was well stocked with deer, wild pig and tiger. We shot deer for the pot and a friend of mine tried shooting pig. He went up a dry river bed in his Jeep and waited below a point where the pig crossed the river bed. He hit one firing from the back of the Jeep but as so often happened the pig charged the shot and ended up in the back of the Jeep. He and the driver bailed out and waited for the pig to die.

I favoured an engineer's method; not very sporting but effective. I wrapped a small explosive charge in a wad of string and dough activated by a pull-switch. This was laid in an area where the pig rooted at night; when one pulled at the bait it took his head off very neatly. The pork was delicious.

Early in 1945 I was posted to 24 Engineer Battalion (24 Engr Bn) then near Pagan in Burma. The battalion formed part of 457 Forward Airfield Engineers whose task was to build temporary airstrips for transport planes flying supplies in from India. Initially paddy fields were used, it being the dry season. The surrounding bunds were

levelled, by hand if I remember correctly. Later on as the monsoon threatened, all-weather strips were built using bit-hess (bituminized hessian) overlain by pierced steel plank (PSP). On poor ground hardcore was laid over the bit-hess before the PSP was laid. We moved steadily down the road from Pagan via Meiktila towards Rangoon, either building new airstrips or making use of former Japanese airfields.

The Dakotas often brought in American servicemen eager to acquire souvenirs. One day I saw half a dozen West African soldiers sitting beside the airstrip laughing "fit to bust". They said an American had asked if the flag they were carrying had been in action. "Oh, yes sah" they replied, so the American parted with a ten-dollar bill and went off happily with D Company's latrine flag.

A great problem was dust. Every aircraft movement made such a dust cloud that we had to keep the airstrip regularly watered. We used a number of Coventry Climax fire pumps for relay-pumping from the nearest river. Infantry on the move used to see these reservoirs with delight and in no time at all had stripped off and jumped in. Our prudish Sikh sappers stood aghast at all this naked flesh.

We had built an airstrip near Toungoo and were enjoying breakfast outside one cool early morning when we heard the sound of many aircraft. A small armada of transport planes towing gliders appeared. We thought it was heading for Rangoon but the gliders cast off and landed on our newly built airstrip. The CO sent his driver to investigate and he returned with an immaculate American colonel who announced that he and his boys had come to build the airfield. He was rather put out when told that he had just landed on it. We rushed off to have a look at the new arrivals and were amazed at the miniaturized earth moving equipment being discharged from the gliders. The dozers were half the size of a D4 and the scrapers of a size to level a lawn before seeding. Our colonel did some quick thinking and said that a small strip for Army spotter planes was needed. The Americans set to work attempting to clear enough jungle to build one. They were still at it when we moved.

As MT (military transport) officer I scrounged the nylon towropes used for towing the gliders. Later on in the monsoon a glider towrope folded fourfold was excellent for pulling out bogged transport. One end was attached to the front of the bogged vehicle and the other to the towing hook on our large "Mac" backed up as close as ground conditions allowed. Then away went the "Mac" changing up rapidly. The slack was taken up, the rope stretched alarmingly and vibrated violently whereupon the bogged vehicle leapt out of its hole and followed. Any ropes which broke where cut into short lengths, unravelled, and knitted into scarves by the sappers.

We carried on towards Rangoon and I was then posted to 6 Engineer Battalion in July 1945. It was part of 45 Beach Group based at Syriam across the river from Rangoon. The battalion was training for the invasion of Malaya. Inevitably I became MT officer and spent much time practising the drivers in reversing into canvas makeshift landing craft. Early in August I was detailed to take all my drivers to Rangoon to collect new vehicles for the Malayan venture. We collected our lovely new 4x4 vehicles and drove them to the docks at Rangoon to await craft to take us to Syriam. We bedded down for the night in a dockside warehouse. Suddenly all hell was let loose in the harbour – Verey lights, parachute flares, tracer and signal rockets lit up the night sky to the accompaniment of ships' sirens. I was at the window with my Sten gun ready thinking it was a Japanese surprise attack when I heard Indian troops surging along the quayside shouting "*Larai khatam hogaya. Larai khatam hogaya.*" ("The war is over. The war is over.") I found myself crying. That was the day the Japanese surrendered.

Many of the officers in the battalion had served right through the Burma campaign and soon returned to India on their way home. We youngsters were promoted in their stead and I took command of A Company as a captain.

In southern Burma around Moulmein the Japanese Burma Area Army was still in being. Higher Command decided that a formal surrender of that army was necessary as it was thought they might carry on the war independently. Road communication from Rangoon was difficult because of the monsoon so the OC 45 Beach Group was ordered to go by sea and land on the beach at Setse near Moulmein where the Japanese would formally surrender to him. Colonel Anderson, the Beach Group Commander was allotted three motor torpedo boats (MTBs) for this task. He took with him members of the beach group to assist and I was the sapper member.

The whole affair from start to finish was a blend of coincidence, high drama and Laurel and Hardy slapstick. It started as I set off from Syriam. I was nearing the jetty to take the launch to Rangoon when a Sunderland flying boat landed on the river. An Aldis lamp flashed and the launch went over to the plane returning with an RAF officer whom I recognized as an old school friend. We had time for a brief chat before I boarded the launch. In Rangoon harbour I boarded the MTB in which Colonel Anderson and some members of his team were to travel. I chatted to members of the crew before we sailed and discovered that another friend of mine from my home village in Lincolnshire had left the ship only the day before.

We sailed in the evening heading down the Rangoon River for the open sea. I bedded down on the bridge or what did duty for one on an MTB and was being lulled asleep by the radar operator reporting his sightings. "Land astern" he kept saying "Land astern." The skipper consulted his chart. "There is no land astern, we are too far out." Still the radar operator insisted that there was land astern. Suddenly the penny dropped and I was awakened by an irate roar from the skipper – "It's the ship astern you bloody fool." After that, peace reigned.

Next morning the three MTBs were bobbing in a gentle swell in the lee of an island. Everything looked peaceful as the sun rose. The Rangoon pilot, one of our specialists, came blearily on deck, took one look at the island and shouted to the skipper "Get out to sea we are in a minefield." I did not know an MTB could tiptoe – but ours did until we were clear of danger. Giving the minefield a wide berth we headed towards Setse beach but had to anchor about 400yds off because of the heavy surf. We had two folding boats on board which we assembled, manhandled over the side and made fast. The beach was filled with what looked like every last Japanese in Burma drawn up in review order behind their colours. Colonel Anderson decided to go ashore despite the heavy surf so we climbed into the folding boats grasped our paddles and pushed off.

A jemadar was paddling in front of me and from the colour of his face did not like being in an open boat heading for a lee shore. Come to that neither did I. About 50yds from shore a huge wave reared up astern, broke on top of us and we all ended up in the sea – the boat sailed merrily ashore upside down. The jemadar had vanished. Then his head appeared so I grabbed him and tried my hand at life saving. Before I got very far with this noble effort my feet touched bottom and we both stood up – only to be flattened by the next wave. We were washed ashore. As I staggered onto dry land I saw Colonel Anderson struggle out of the water minus his cap. A Japanese soldier rushed up holding it out for him. The colonel, in a thoroughly bad temper, snatched it from him and slammed it on his head only to be doused with more seawater and a large piece of seaweed. We were marshalled into three ranks facing the huge Japanese contingent with the colonel standing in front. We were all soaking wet and a most unprepossessing sight.

To reduce our impressiveness further the CO of a Sikh regiment had swam ashore from another MTB in a pair of bright blue swimming trunks. Sailors from all three MTBs had got ashore somehow and were having "donkey rides" along the beach on Japanese ponies. Colonel Anderson, nothing daunted, addressed the Japanese senior officer demanding his surrender to the King Emperor. He ordered that all officers' swords be removed and piled on the sand. He then asked for a car to take him to the main road. The Japanese interpreter apologized profusely saying they had no mechanical transport operational. "What have you got then?" barked our colonel. "Bullock carts," came the reply. At the thought of Colonel Anderson riding in a bullock cart I burst out laughing and got the rough edge of his tongue. He said that if I did it again I would be sent back to the MTB in disgrace. "How?" I wondered.

Eventually two very large horses were produced and the colonel, with a glint in his eye, told me to mount one and the Civil Affairs Services (Burma) officer to mount the other. We were to ride up the rough track from the beach as far as the metalled road and report on its suitability for wheeled vehicles. Now I had never ridden a horse. My colleague obviously had for no sooner were we mounted – and I was facing the right way – when he said the Burmese of "gid-up" and we did, rapidly. I made a wild lunge for the horse's neck and hung on tight. We trotted briskly up the track for a seeming age but at last I gained some confidence and sat up holding the reins and trying to look nonchalant. We turned back at the main road and thundered – or so it seemed – back to the beach. As we reached

the colonel my horse stopped suddenly but I didn't, landing in an ignominious heap at his feet. I have a vague recollection of saluting from a prone position and giving my considered opinion that the track was unsuitable for wheels and not really suitable for horses.

Not long after rejoining my battalion at Syriam I was again detached and went with a party from 45 Beach Group by road to Moulmein. I was given a party of Japanese surrendered personnel (JSP) to carry out a variety of semi-engineering tasks. My first meeting with the JSP was instructive. The rendezvous was in a large warehouse which was to be demolished. They marched up under command of a young Japanese officer who said with a strong American accent "I am going to order my men to salute you." He snapped an order and they all saluted which I gravely returned. The officer then said "I must insist on you observing the Geneva Convention for captured personnel." I got somewhat heated at that and reminded him of the way his people had treated their prisoners. I explained what was to be done; he said a few words to his NCOs who in turn spoke to their men. The Japanese then stripped to their jockstraps and set to work. There was no chattering, laughing or arguing as my Mahrattas would have behaved. They just took the warehouse to pieces and stacked everything in neat piles. When I returned home the following year I warned that the Japanese had lost the war but would win the peace.

I rejoined the battalion at Waw. But I had one last laugh. One of the officers returned from Rangoon with a wonderful bargain – a handful of rubies for a few rupees. He assured us the rubies were genuine; the man in the bazaar said so and had even explained that they were a stone called jipriolite. Someone in the mess started to laugh and explained that they had been made from a Jeep rear light.

All that remained was to take the battalion back to India for disbandment. We went by sea from Rangoon to Vizagapatam in the south of India, stayed for a few days in Vizagapatam and then set off on our own troop train for Sialkot. This took five days and nights. We stopped twice a day in a siding where food was cooked for the sappers. We always stopped somewhere in the wilds but within a very short time a small crowd of locals gathered, squatting patiently until our chaps had eaten their fill, then they in turn lined up and finished off the leavings.

At Sialkot the battalion disbanded and one by one the officers returned home via Deolali transit camp.

50th Anniversary Articles

The Editor of the *Journal* would be pleased to receive further articles from anyone who took part in World War Two, with a view to their publication on or near to the 50th Anniversary of the event. Now being considered are articles about events just after the end of the war in 1945 and the year following, 1946, but accounts of later events are always welcome as they can be kept for publication in the appropriate issue,

Engineer Operations in Support of Humanitarian Operations – Rwanda Operation Gabriel August to November 1994

MAJOR I S JAMES MBE BSc(H) MSc

Major Iain James was commissioned on a university cadetship in 1979. After graduating with first class honours from Leeds University he completed a short tour with 50 Field Squadron Construction, including a Falklands tour, before joining 9 Parachute Squadron in 1984, taking part in a second Falklands tour and Waterleap 86.

At the start of 1987 he began a five-year association with Northern Ireland operations as Second in Command 33 Independent Field Squadron, moving to a Headquarters Northern Ireland post in 1989, and to the Northern Ireland desk of military operations in 1991. Following Division 1 of Army Command and Staff Course 27 he assumed command of 9 Parachute Squadron. Since then he has completed a third Falklands tour, Operation Gabriel *in Rwanda, and Operation* Descant *in Northern Ireland.*

Introduction

Since the end of the Cold War, UN Security Council consensus on peacekeeping operations has allowed a wide range of peace support operations to be launched. The British Army has become increasingly involved in these operations with deployments such as Operation *Haven* in Northern Iraq, Operations *Hamden* and *Grapple* in the former republic of Yugoslavia (FRY), and Operation *Gabriel* in Rwanda. In each of these, military forces have worked in a humanitarian role under the auspices of the UN, and in each of them considerable emphasis has been placed on the provision of engineer, logistic or medical support, rather than the traditional "peacekeeping" role involving only a security function.

In this article the Royal Engineer contribution to Operation *Gabriel* will be examined as an example of how a component of a military humanitarian force operated within the national contingent. It will show how a support arm can not only be employed beyond simply supporting its own national contingent, but can also work alongside both nongovernmental organizations (NGOs) and the host nation whilst staying within the original military mission.

Background

Rwanda has had a long history of tribal conflict dating back several centuries. It is essentially a society composed of two tribes, the Hutu, numerically superior, and the Tutsi, in the minority but dominating the professional classes and intelligencia.

Since gaining independence from Belgium in 1962 there have been several periods of political and civil instability, leading to a coup in 1973 which installed a Hutu-dominated civil-military government. The Tutsi had long-running attempts at gaining political power, and a Tutsi dominated guerrilla army, the Rwandan Patriotic Front (RPF), mounted armed rebel activity from 1990, culminating in an unsuccessful invasion of the country from Uganda in October of that year.

Further diplomacy over the next two years led to a cease-fire being negotiated in 1992, overseen by a small UN monitoring force. Despite continuing tension and tribal strife, this cease-fire led directly to an accord being signed between the government

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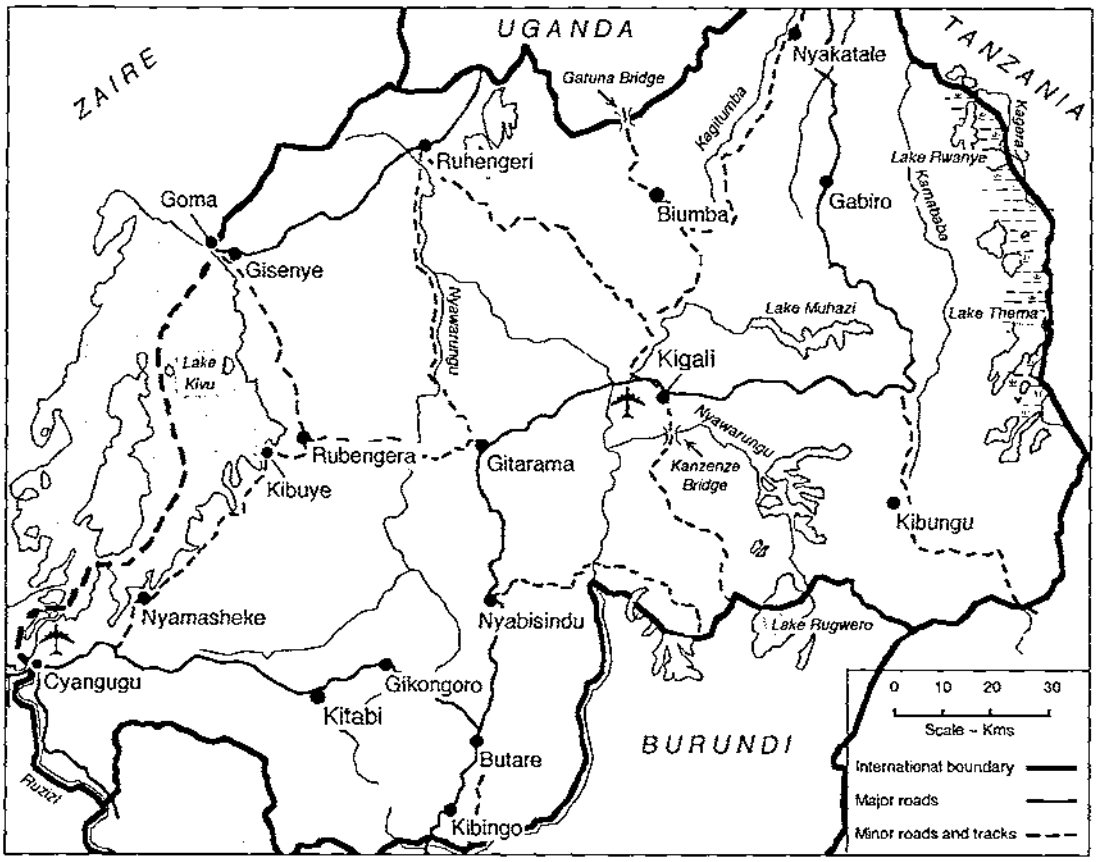

Map of Rwanda and surrounding countries.

and the RPF which would have created a multi-party government. The accord angered Hutu extremists who were concerned at the presence of Tutsi in government; however the President, a Hutu, stood by the principles of the reforms.

In April 1994, as the presidents of Rwanda and Burundi were landing at Kigali international airport, their plane was shot down by a ground-launched missile, fired, it must now be assumed, by Hutu extremists. Within 30 minutes, systematic killing of Tutsi and moderate Hutu began in Kigali and rapidly spread throughout the country. In response the RPF launched a rapid invasion of the country from their stronghold in the north, sweeping south and west in a spectacularly rapid advance. The former Rwandan government forces offered little resistance, and by July had been driven from the country. The tribal killings continued during the retreat, and by the time of the present cease-fire an estimated one million Tutsi and moderate Hutu had been killed.

The majority of the remainder of the population, fearful of further killings or anticipating a Tutsi backlash, had fled their homes and established themselves in camps principally across the Rwanda/Zaire border in Goma, and in a humanitarian protection zone (HPZ) set up by the French military southwest of Rwanda, as part of Operation *Turquoise*. These camps quickly became overcrowded; food and water were scarce, and epidemics soon spread throughout the area – by the middle of July cholera and dysentery were claiming thousands of lives every day.

Most of the UN monitoring force established in Kigali prior to the civil war (UN Aid Mission in Rwanda (UNAMIR)), had been withdrawn; the remainder staying within their compounds, riding out the storm. Soon after the cease-fire, as world attention focused on the plight of the refugees, the UN authorized the re-establishment of a new force with a total strength of 5500, drawn primarily from African nations.

It is against this background that on Monday 25 July 1994 a ten-man-strong Ministry of Defence (MOD)-sponsored reconnaissance, including OC 9 Parachute Squadron (9 Para Sqn) as the engineer representative, was warned to deploy to Rwanda.

Reconnaissance

The primary aim of the reconnaissance was to assess the feasibility and optimum composition of a UK contribution to UNAMIR. It was obvious that there was a strong political imperative for a quick response to the crisis by Her Majesty's Government, and that this would be reflected in a speedy deployment of British forces. The reconnaissance therefore would also have to cover both task and administrative requirements for the UK contingent. Of those who were ultimately destined to return to Rwanda, CO 5 Airborne Brigade Logistic Battalion (CO 5 AB Bde Log Bn) and OC 10 Airborne Workshops Corps of the Royal Electrical and Mechanical Engineers (REME) represented the logistic element, OC 9 Para Sqn the engineer element, and 2IC 23 Parachute Field Ambulance (23 PFA) the medical component.

The team was in Rwanda for 26 hours, allowing little time for detailed reconnaissance, and only giving time to get a general feel for the scope of work. Additionally the UN HQ was itself in a state of flux, and priorities given to the British element were changed several times during our visit. It became obvious that the British contingent would need to be well balanced, and prepared to show considerable flexibility in its initial deployment in order to be able to respond to a fast-changing situation.

Twenty-six hours was sufficient to gain only an overview of the country. The engineer perspective had to embrace support to the other components of the contingent and the UN mission as a whole, the scope of which was still vague. It was ascertained that the country had little or no established infrastructure: no mains electrical power, no running water and no sanitation works. There were only five blacktop roads in the whole country, the remainder being single-lane dirt tracks. Most importantly, however, there was no source of engineer resources or plant which could be identified.

As a result of the information fed back to the MOD by the team leader, ministers approved the deployment of a UK contingent on 28 July, with the lead elements to depart on 31 July. The contingent was to be commanded by CO 5 AB Bde Log Bn who became COMBRITCON (commander British contingent), and consisted of the major functional elements of the logistic battalion (close and general support squadrons Royal Logistic Corps (RLC) and workshops REME), 9 Para Sqn complete, and a large component of 23 PFA. Additional smaller support elements were to come from RLC specialists, 30 Signal Regiment and 216 Parachute Signal Squadron, together with a platoon from 2nd Battalion The Prince of Wales Royal Regiment.

UN Concept of Operations

The UN mission was to provide security and to assist and coordinate the humanitarian support of participating countries and organizations to facilitate a rapid and effective end to the immediate crisis in Rwanda. This mission contained many of the components of wider peacekeeping as defined in the new "Army Field Manual". These are:

- Conflict Prevention. The provision of stabilizing measures and surveillance.
- Humanitarian Relief. Meeting the needs of refugees, displaced persons (DPs) through the delivery of supplies, medical treatment and logistic support.
- Military Assistance. Advice and direct support to the newly established government in the re-establishment of infrastructure.
- Guarantee of Movement. Encouraging and facilitating and protecting the return of refugees to their homes.

BRITCON Concept of Operations

The BRITCON mission, developed by COMBRITCON, was to provide combat support and combat service support to UNAMIR but would not involve security operations. In carrying out this mission, the contingent was to concentrate on the humanitarian aspects of the UN mission. The main effort was rapidly to become focused on refugees and DPs, and to this end COMBRITCON established a proportion of the force, based around 23 PFA, to work within the refugee camps, with the remainder based in the capital, Kigali. A separate engineer troop deployed into the north at Biumba, initially tasked with maintaining the main supply route (MSR) from Uganda, although its role was to diversify considerably during the tour.

Predeployment Training

The rapid nature of the deployment resulted in little predeployment training being possible. A

Squadron combat engineer training period some two weeks prior to the deployment had concentrated on water supply with the water purification unit NBC (nuclear, biological, chemical), Bailey bridging and HF (high frequency) communications, all of which were to prove beneficial in the theatre. All troops received health briefs and, with the exception of the preadvance party, received mine awareness training from the Battlefield Engineer Wing, Royal School of Military Engineering. Officers and SNCOs carried out media training, including interview techniques, run by public information staff from HQ UK Land Forces. Some field troop elements deploying on later flights were able to carry out further water supply training and weapon zeroing. The limited amount of pretraining possible resulted in the squadron relying predominantly on the level of skills held within the squadron as a result of normal artisan and combat engineer courses. The overall success of the mission must to a large extent be seen as a vindication of the Corps' training system.

Engineer Concept of Operations

Sufficient information had been gained during the reconnaissance to ascertain that the engineer concept of operations would involve establishing and supporting the contingent, followed by supporting the contingent's humanitarian operations. Engineer tasks at this stage were likely broadly to encompass water supply, mobility support, general engineering support for the provision of accommodation, with a degree of reinstatement of facilities.

There was some uncertainty over the need for specialist technical support such as bulk petroleum engineers, well drillers etc, as the brief reconnaissance had not allowed time to confirm a requirement for them. The engineer element of the preadvance party was therefore used to conduct a detailed reconnaissance which, in conjunction with discussions with HQ UNAMIR, led to the following final series of engineer tasks being agreed with COMBRITCON:

- Provide engineer support for the establishment of BRITCON bases.
- Produce potable water for BRITCON and, where specifically requested, refugees.
- Carry out maintenance and repair work on MSR and other routes.
- Assist with the restoration of essential services and facilities throughout the country.
- Clear mines and unexploded ordnance (UXO) directly affecting the BRITCON mission.
- Carry out general engineering work as directed by Force Commander UNAMIR through HQ BRITCON.

These tasks fell into the following three areas of engineer effort, and are discussed in turn:

- Establishing the contingent.
- Direct support to humanitarian operations.
- Re-establishment of local infrastructure.

Establishing the Contingent

Water Supply. Throughout the deployment 9 Para Sqn was required to produce water for consumption by BRITCON personnel in Kigali and Kitabi; the small Biumba contingent remaining on bottled water throughout. The possible presence of crypto spyridia, a protozoa, in the local water required the use of reverse osmosis (RO) for purification, and RO production was maintained throughout with the water being used for drinking and cooking. The in-service water purification unit (NBC) was used, with raw water storage in standard S tanks, and treated water storage in 13,500-litre pillow tanks. The use of pillow tanks is ideal in a medically hostile environment, as it reduces the possibility of recontamination, although a 2ppm free residual chlorine was also added. Raw water was obtained by the squadron from natural springs and transported in 10,000-litre towed bowsers, and cross-loaded into standard S tanks for storage. Towards the end of the deployment this function was taken on by a civilian contractor. Water for ablutions was drawn from the same source as drinking water but was only filtered and chlorinated. The water was then stored in standard S tanks, feeding by gravity into parts of existing plumbing systems which had been isolated in order to provide water for taps and showers, and later toilets.

Sanitation. A range of waterborne intestinal diseases is endemic in Rwanda, and therefore robust and reliable sanitation systems were required. The lack of a mains water supply, and a reliable sewerage system, led to the use of deep trench latrines (DTLs). These proved to be extremely effective and, when used in conjunction with a pipe vent, were hygienic and not unpleasant. They were used for the first ten weeks of the deployment in Kigali, and for the whole deployment in Kitabi. Once sufficient raw water could be transported into the stadium by tanker, further S tanks were set up as header tanks, and a number of WC systems

reconnected, which was warmly welcomed by the contingent, although many missed the unique social aspects of the 3-man DTL. Good hygiene discipline, based on improved sanitation coupled with the use of chlorine hand dips, helped counter any outbreak of intestinal illness.

Self-Sufficiency. The provision of water, and sanitation, together with the capability to carry out construction tasks within base locations, contributed to the total self-sufficiency of the British contingent. Self-sufficiency is vital in a humanitarian operation because it minimizes the effect of the sudden arrival of the force into an environment which has difficulty sustaining its population. Additionally it allows components of the force to concentrate on their primary function without the need to search for food, water, transport, accommodation, fuel, etc. It was noticeable that many of the NGOs were not self-sufficient, sometimes even becoming victims of the diseases they were trying to treat. Similarly many UN contingents arrived without any organic support, expecting this function to be provided by the overstretched UN organization.

Support to Humanitarian Operations

General. The humanitarian concept of operations fell into two distinct areas. Encouraging the refugees outside the country to return, and encouraging the internally displaced to remain in the country and not to flee.

Central to this concept was medical assistance. 23 PFA established treatment facilities, initially in the northwest at Ruhengeri, to try to draw in refugees from the camps in Goma, and then moving southwest into an area containing some 800,000 DPs. Their function was to provide an attractive environment within the area under a UN security umbrella, which together with food aid, was intended to encourage DPs not to flee the country. Priorities were to control and treat endemic diseases, and to prevent epidemics. The units concentrated on treating waterborne disease, principally cholera and dysentery; and providing inoculation programmes, and general medical treatment of conditions such as malaria. Engineer support to this function was provided in three areas:

- Engineer assistance to establishing base locations and treatment facilities.
- Route maintenance and access to camps.
- Improving environmental conditions and support to the medical programme by the provision of water and sanitation.

Support to base locations and treatment facilities. In a similar manner to the way engineers established and maintained the main contingent, engineering support was a critical component in the establishment of both the main medical base, and forward treatment facilities. Engineers provided water, sanitation and power in the base location at Kitabi, and assisted with the setting up of field treatment centres both for 23 PFA group and for the multitude of NGOs working alongside them in the camps.

Water supply.

- DPs Camps and Hospitals. The squadron produced water for consumption by refugees and hospital patients in 23 PFA's location at Ruhengeri, and throughout the DP camps in the southwest of the country. Water points were initially set up using the WPU(s),(water purification unit(s)). However as the deployment progressed, increasing liaison with NGOs allowed joint ventures to be undertaken, typically with BRITCON engineers constructing water points using NGO equipment.
- Siting of water distribution points. Difficulties often arose because of the distance between DP camps and water sources. DP camps were generally on high ground, chosen to avoid wet lowland areas and arable farmland, and the DPs would never travel to a clean water source, being content to use the closest source to their camp, regardless of its quality. Distribution points therefore had to be sited in the centre of camps to ensure maximum accessibility, and also to coincide with treatment being given by the medical teams. The close relationship between the engineer water supply and sanitation effort and the medical programme was vital if treatments were to be effective. Each component then became mutually supporting and had a significant synergetic effect on the successful reduction in intestinal disease fatalities amongst the people.

  The policy of providing water distribution points in the centre of crowded camps, often based on steep hillsides, created unique transportation problems. Accessibility was generally restricted to a military 4-wheel drive 4-ton truck towing a 10,000-litre trailer, or in extreme cases carrying a number of 800-litre water carriage packs. On easier routes, tankers or trailers provided by NGOs were used, although the preponderance of small timber bridges and weak culverts resulted in a significant route maintenance bill.

Mobility Support. Route maintenance became a vital function. Camps around Kitabi were generally located on hilltop sites, and access was via single lane unmetalled roads. The major aid agencies bringing supplies to the camps, used 20

to 30-tonne trucks as prime movers, which quickly broke up road surfaces, and in particular destroyed numerous timber culverts and bridges found on the routes. Throughout 23 PFA operations in the southwest, a minimum of a field section, and often a complete field troop, was dedicated solely to route maintenance.

Over 60 culverts were replaced with timber (won by tree-felling) and sandbag structures, although some concrete culverting was obtained from local sources. One of the three JCB light wheeled tractors that had deployed by air was used to assist in the work.

Re-establishment of Local Infrastructure

General. Work on the re-establishment of Rwandan national infrastructure took place throughout the deployment. Coordination of this effort lay with the UN, both within UNAMIR, and via the UN Children's Fund (UNICEF) office in Kigali. In practice, however, coordination was limited, and the majority of work was self-generated by the squadron, following liaison with NGOs in the north, attendance at UNICEF water/sanitation coordination meetings, or by unsolicited approaches to the Rwandan Ministry of Public Works. The latter proved most useful, as the embryonic ministry was quick to take up the offer of engineering construction capability in exchange for access to their material stockpiles. The primary capability offered to the ministry was to undertake bridge repairs using Bailey components and basic construction materials owned by their road and bridge division.

Bridging. The conflicts had left many of the country's bridges demolished, some extensively with all spans, piers and abutments destroyed and some with just the loss of a single span. As the road network was limited, any bridge reconstruction would have a visible and immediate beneficial effect. Despite the difficulty of obtaining engineer resources, two significant bridge tasks were undertaken.

- Gatuna I and II. The first replacement was one of the few engineer tasks given to the squadron by HQ UNAMIR, was the repair of a small improvised timber bridge at Gatuna on the main Rwanda-Uganda MSR, which was being used by the majority of vehicle traffic ferrying in aid. The bridge site had previously been a 5m culvert, destroyed during a previous conflict and replaced by a simple timber structure, which had started to break up under the weight of up to 300 trucks trying to cross it each day. This bridge was replaced in the first days of the deployment by an improvised 10m steel and timber bridge built entirely from components found abandoned on Kigali airport. The crossing was upgraded during the last weeks of the deployment with a parallel 50ft Bailey bridge, the components of which were left over from the Kanzenze site.
- Kanzenze (Copsey Bridge). Kanzenze bridge had been a 260ft 4-span Bailey bridge located some 20kms south of Kigali. It had carried the main road access into the south, and its destruction added a 3-hour detour to journeys. In liaison with the Ministry of Public Works it was decided that the availability of some Bailey bridge components in ministry yards, coupled with the application of RE bridging skills, would make this an ideal task to be undertaken by 9 Para Sqn. The bridge was repaired over a 6-day period, resulting in the reopening of this vital route. The replacement of the bridge also represented a high profile prestige project of considerable benefit to the Rwandan people. It significantly raised the esteem in which the British contingent was held (and therefore the UN as a whole) by the Rwandan government, elements of which were becoming sceptical at the efforts of the UN to rehabilitate the country.

Roads. The Rwandan road system, although limited, had remained virtually intact after the civil war. Road repairs were constrained by the limited amount of engineering plant that could be deployed with an air-delivered force. Some damaged Rwandan plant was recovered and repaired and some use made of machines owned by the Ministry of Public Works. In general, however, road repairs concentrated on mobility support to the humanitarian operation, and little was done to contribute to the national infrastructure.

Local Water Supply.The field troop based at Biumba undertook an extensive programme of reinstatement of local water supply facilities in the north of Rwanda astride the primary Rwanda-Uganda MSR. These tasks were initiated following liaison meetings with a water and sanitation engineer from the International Committee of the Red Cross, based in Uganda, who was responsible for attempting to coordinate the reinstatement of local water supply. It became obvious that whilst many local villages were "assigned" to a particular NGO, NGOs were often medically orientated and had little or no capability to undertake repairs to water or power systems.

This work demonstrated a new facet of engineer support to humanitarian operations, as the majority of the tasks the squadron undertook

OC, 21C and SSM 9 Para Sqn, viewing the damaged Kanzenze Bailey bridge, later reopened by the squadron as the longest bridge in the country.

were outside the UN resource and finance system. NGOs requesting work would provide funding, normally in cash, which was held and accounted for in separate project accounts administered by the BRITCON administration office. Materials were then procured by the squadron, either in Kigali, or in Uganda. The advantage was in not having to use the ponderous UN resource procurement system; work could be started almost immediately and with minimum fuss, with direct and tangible benefit to the Rwandan people.

National Infrastructure. The military works force (MWF) detachment liaised extensively with senior officials from the Rwandan authority for national power supply and urban water supply, the Ministry of Public Works, and UNICEF, for the reinstatement of national level water supply infrastructure. As a result of these meetings the OC MWF detachment initiated the repair or reactivation of a number of water treatment plants throughout the country, by providing logistical support to enable standby generators, donated by UNICEF or NGOs and ranging in size from 800KVA to 27KVA, to be transported to and connected into key installations, and providing technical appraisals on the viability of repairing key installations for the restoration of power and water supply services.

General Construction. General construction work concentrated on the repair of hospitals, orphanages and clinics, and demonstrated how the application of simple building and construction skills can have a dramatic effect on the standard of medical care or living conditions with the expenditure of small amounts of finance. Military engineers are ideally placed to undertake this work due to their wide range of trade skills and ability to operate effectively in small self-contained units. In a humanitarian operation they provide a useful short-term solution, and a precursor either to the use of civilian engineers or to the re-establishment of a national capability.

Funding and Resource Procurement

UN Funding. Since Operation *Gabriel* was mounted as a UN operation, all funding for equipment and resources theoretically had to be approved and provided by the UN. Initially on deployment, when HQ UNAMIR was still in a

state of flux as it expanded into UNAMIR 2, there was no workable system for provision of engineer resources, and materials had to be scavenged from wherever they could be found. Sadly, once systems were established it was found that all of the procurement staff, less one, had based themselves in Nairobi. This led to extraordinary delays in obtaining materials, compounded by adherence to a 3-tender procurement system, and the majority of the engineer resource demands put to HQ UNAMIR by the squadron had not been received by the end of the deployment. A useful system was set up in conjunction with UN building management services which involved advancing cash sums up to $2000 for local purchase. However its effectiveness was severely curtailed as a combination of the under-developed infrastructure, war damage, and looting, resulted in only a limited range of domestic building materials being available, and almost no heavy construction materials.

Direct NGO Funding. Much of the work carried out by the squadron was on behalf of NGOs. To enable work to be carried out quickly, separate accounts were set up, with NGO-provided money administered by the BRITCON pay and finance staff, for the procurement of stores for specific purposes. Wherever possible NGOs were encouraged to purchase their own materials from lists provided by the squadron. Overall, NGO funding was a great success, allowing useful engineer work to be carried out quickly in conjunction with medical and aid programmes.

Rwandan Sources. Some two months after the end of the civil war, towards the end of the deployment, the Rwandan Ministry of Public Works began to be re-established. The squadron liaised extensively with people from the department, and curried favour immediately by reroofing the minister's private office. The squadron was given access to the ministry's supply yards, which although not extensively stocked, contained useful items such as Bailey bridge components, and a small range of steel beams and concrete culvert sections; almost all of their plant and machinery however had been vandalized beyond repair. The only criteria for the provision of materials from this source was that tasks had to be in support of Rwandan national infrastructure, and not projects in support of the UN.

Establishment of this good working relationship must be regarded as one of the key successes in the engineer work carried out by BRITCON, and reinforces the need for UN contingents to work closely with the host nation and with their full consent.

Explosive Ordnance Disposal (EOD)

Intelligence. Prior to the arrival of the UK contingent, EOD operations were being undertaken by the Canadian contingent (CANCON) EOD team. They had gathered some intelligence on the mine and UXO (unexploded ordnance) problem within Kigali. However there was very little detailed information on the full scope of the problem. Minefield maps were obtained from the former Rwandan government forces showing the locations of a number of pattern minefields laid in the north along the cease-fire line of a previous RPF invasion. These were in French and often, whilst containing some detail regarding types and numbers of mines laid, were difficult to relate to the ground.

During the last civil war, a large number of mines were laid in Kigali by the withdrawing Rwandan government forces. Unmarked and unrecorded, they were supplemented by a number of nuisance antipersonnel mines, indiscriminately laid with the sole purpose of targeting the civilian population.

Collation. During the reconnaissance it was ascertained that HQ UNAMIR had no mines collation or information desk, and this responsibility was taken on by the BRITCON EOD team. The cell, headed by OC EOD detachment, ran the desk and provided a focal point for EOD matters within UNAMIR, giving such information as routes regularly in use by vehicles, mined areas (particularly in Kigali), information gathered from mine incidents, and importantly providing a reception area and focal point for UN employees, NGOs, visitors, etc to be briefed on the mine threat.

Training. Mine awareness programmes were set up with the help of UNICEF/UN Educational, Scientific and Cultural Organization and Save the Children Fund, with the detachment contributing information and illustrations of mine types and mine signs commonly found in Rwanda. This information was then made into teaching packs by UNICEF in the form of leaflets, posters, fabric cloths, etc and distributed to schools and other institutions. Some 18,000 packs were distributed by these agencies during the tour.

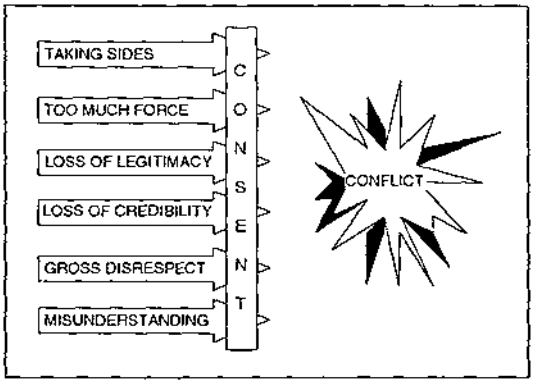

Figure 1. Extract from AFM Wider Peacekeeping. The routes to conflict.

EOD Operations. The four-man EOD team from 33 Engineer Regiment (EOD) was under the operational command of 9 Para Sqn for the whole deployment. The team was initially tasked to deal only with mines and UXO directly affecting the BRITCON mission. Since the BRITCON EOD team was effectively the only operational UN team, this was a considerable constraint, and caused a degree of difficulty with HQ UNAMIR. The terms of reference were subsequently expanded to allow clearance to be undertaken which affected the UNAMIR mission, but still precluded work on mines or UXO which affected only local people. The team carried out a number of mine clearances of areas in which BRITCON was to operate. However the bulk of their work involved the destruction of UXO, mainly around Kigali. Working in close liaison with the RPF for crowd and access control, they destroyed over 3000 pieces of UXO. Such work is another excellent way of establishing and maintaining credibility of the national contingent in the eyes of both the local population and national government, although a balance must always be struck between undertaking work for this purpose, and the risk to the soldiers involved.

Summary and Lessons Learnt

Humanitarian operations will often be undertaken in conditions of limited or nonexistent national infrastructure. In this environment medical, engineer, and logistic assets must be targeted and coordinated for maximum effect. During Operation *Gabriel* the functional components of BRITCON operated independently, but the synergetic effect of these units working together was of considerable importance. Additionally in a country traumatized by civil war or natural disaster, the aid forces must be self-sufficient, and not draw on local resources to sustain themselves.

Humanitarian operations have a political dimension, and must never be carried out in isolation. Even in the context of responding to an immediate humanitarian crisis, planners should be aware of the consequences of their actions, not just in the short term, but on the effect they have on the long-term political and social affairs of the country as a whole. The aim of the operation must be consistent with the overall aims of the UN to re-establish normality, and must never be partisan or follow a unique agenda.

Central to these concepts must be obtaining and maintaining the consent of all relevant parties throughout the operation. The diagram from AFM wider peacekeeping (shown at *Figure 1*) is as applicable to a low level humanitarian operation such as Operation *Gabriel* as it is to more hostile or politically sensitive environments.

The diagram shows some of the many traps which can catch the unwary, and is something which all of our soldiers must be trained to recognize. Engineers can contribute significantly to achieving credibility, respect, and understanding as they carry out work which is of visible benefit to the host country. Care must be taken however, that a working relationship is not seen as being too close to, or supportive of, the ruling government or army. The military must also avoid the temptation to operate independently, and must establish early liaison with governmental and nongovernmental organizations, if necessary taking a proactive role in the identification and coordination of requirements.

In summary, Operation *Gabriel* demonstrated the utility of a broad-based unit comprising combat support and combat service support elements, in providing humanitarian relief. Within BRITCON the diversity of skills possessed by engineers allowed them to play a vital role in the establishment of the force in theatre, and subsequently to contribute significantly to the success of the overall humanitarian mission.

Sappers in Land Command – A Personal View

BRIGADIER I D T McGILL BSc(ENG) FICE CENG

"There's only one Corps which is perfect – that's us;
An' they call us her Majesty's Engineers,
Her Majesty's Royal Engineers'
With the rank and pay of a Sapper!"

Rudyard Kipling.

INTRODUCTION

THE army has just completed drawing down to the *Option W* orbat (order of battle) and is implementing the *Review of the Army Command* (RACS) and *Defence Costs Study* (DCS) proposals. We may be able to look forward to more stability over the next five years, compared to the previous five; however, change will undoubtedly continue as society in general and the armed forces in particular are changing faster today than they have ever before in the past 50 years.

This article provides a brief update on the new structure of the Royal Engineers within Land Command, together with a personal view on our current capability.

ROYAL ENGINEERS STRUCTURE IN LAND COMMAND

FIGURE 1 outlines the new Land Command in its peacetime configuration. It is a very large, complex command comprising 72 per cent of the whole army; 72,500 regular soldiers plus 59,000 TA soldiers. Commander in Chief's span of command is vast.

Figure 2 outlines the Royal Engineers Command and Control (C^2) arrangements for sapper units in the field army. We have lost the two HQs for 12 and 30 Engineer Brigades but have at least retained the brigades' units. Theatre engineers are now all grouped under Commander Engineer Land Command. Figure 3 provides a simplistic schematic representation of how sappers might be grouped for major operations. Task-packaged forces have been increasingly used on recent and current operations. It would be surprising if we did actually deploy as the figure depicts but it is helpful to see how the various components might all fit together.

Comment. The last few years have been very unsettling for many in the armed forces. There is justified concern that the recent savings, especially in manpower, may have cut too deep but defence expenditure will continue (rightly) to be subject to increasing scrutiny. I believe that our new structure in Land Command is workable but it is already stretched too tautly in certain areas. Without dwelling on any detail, or on past arrangements, we lack:

- A coherent focus for TA sappers, particularly those earmarked for national defence (ND) and the new combat service support groups (CSSGs).
- Any robust C^2 of sappers behind the divisional rear boundaries.
- Viable C^2 and logistic support for those sapper regiments in support of the RAF. These weaknesses were exacerbated more by *Options* than RACS or DCS. However, the loss of the sapper one star post (commander 12 Engineer Brigade) as a result of RACS has further highlighted this issue.

Remedial Action. The most immediate structural remedies identified so far are:

- The development of CVHQ RE (Central Volunteer HQ) which currently runs all specialist engineer training. We are increasing its responsibilities to provide a special-to-arm training focus for those TA units which are scattered around the country within regional brigades and which were previously commanded by 30 Engineer Brigade. Additionally, the proposed new civil affairs group for the ARRC, which will provide the ARRC's G5 focus, will be administered in peace by an "up-gunned" CVHQ RE – to become HQRE TA. Once HQRE TA is formed, we will be in a far better position to monitor special-to-arm sapper training amongst our scattered TA units – as well as further nurturing the Corps' ethos in the TA.
- The closer affiliations of the ND/CSSG sapper units with the CSSGs. This is still very much in the early planning stages.
- The provision of a dedicated bulk fuel capability for air support units.

Other measures which need addressing are:

- The correction of manning shortages in many of our units. The average cadreisation of our regular units is 20 per cent, which compares badly with the infantry

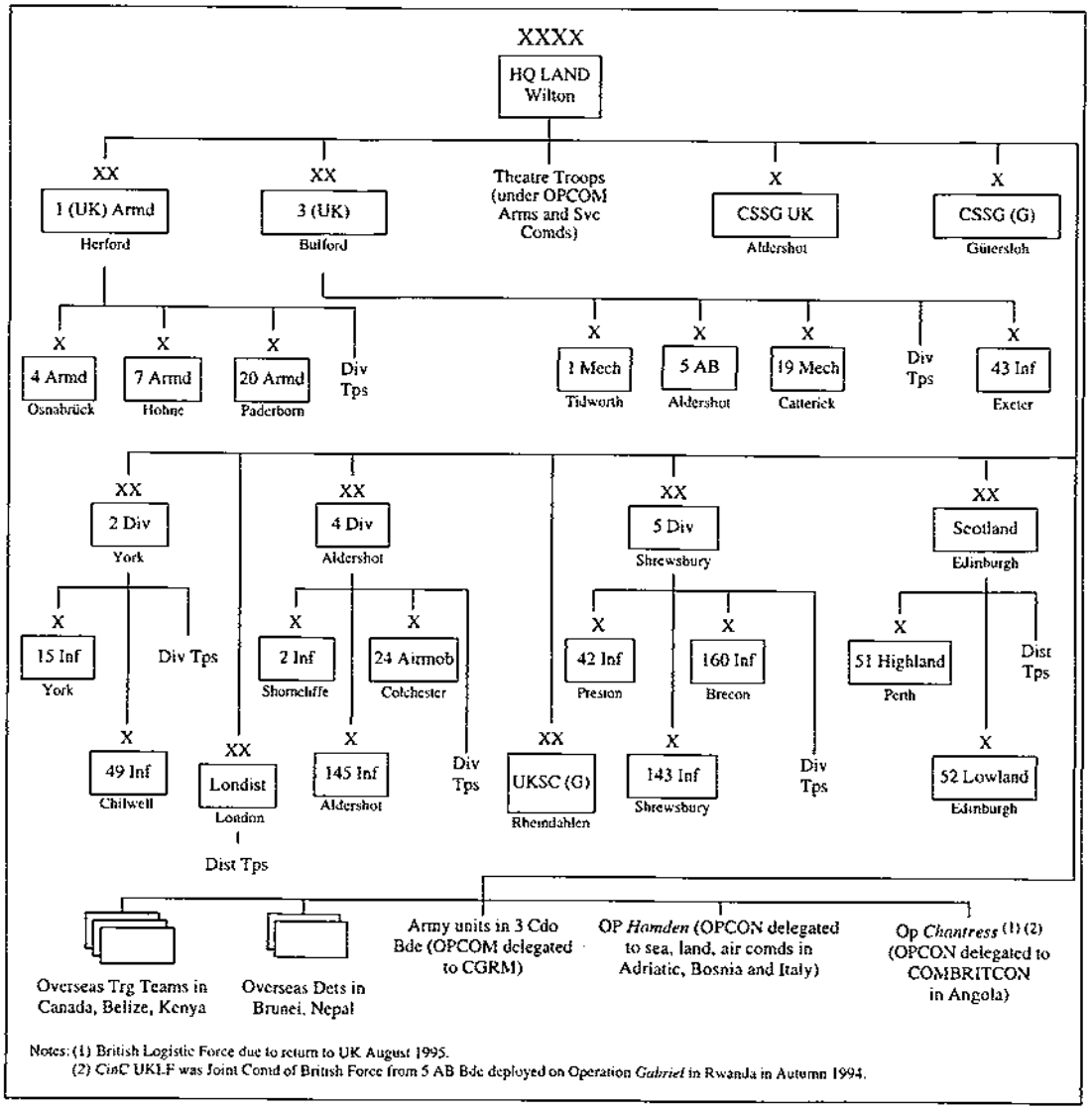

Figure 1. Outline of Land Command (peacetime organization).

(less than 5 per cent). We would find it easier to handle the range of different taskings if our peace and war establishments were better matched. The Engineer in Chief and I have, jointly, identified the most crucial sapper units where any extra addback of manpower would provide the most significant operational benefits to the Corps. However, there are no indications yet that we will receive any additional soldiers.

- An improvement to the Corps' ability to handle our engineer resources and logistics in any future operation. Our support squadrons have been drastically pruned (see Table 3). Our HQ squadrons' manning is especially taut.

Effect of Option W changes

Tables 1, 2 and 3 provide an overview of how the *Option W* drawdown has affected regular sappers in the field army, not simply numerically but how the Corps is now organized in terms of types of units and broad capabilities.

There is no doubt that the close and general support concept of engineer support, together with the grouping of engineer regiments to brigades, and battle group engineering operations officers (BGEOOs) with battle groups, have been major steps forward in the effective coordination

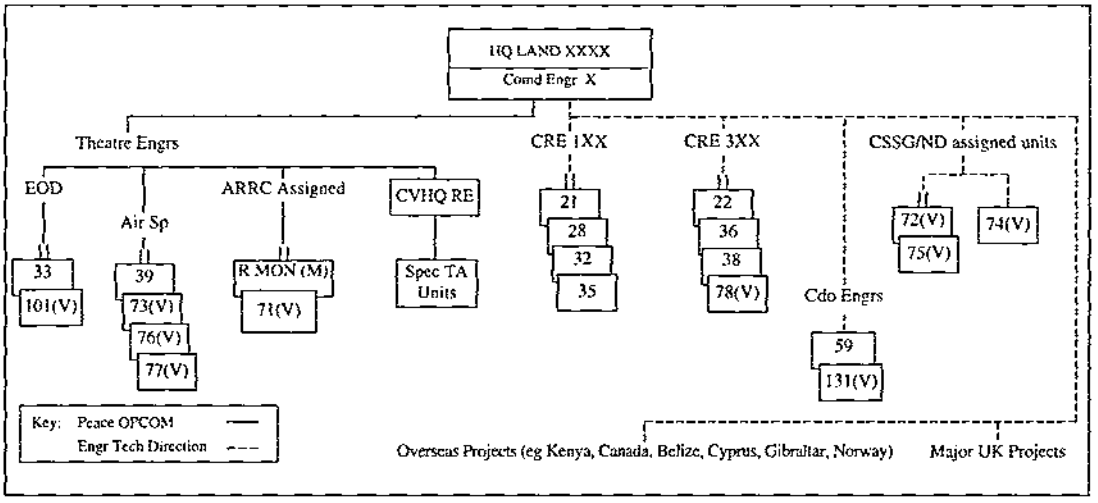

Figure 2. RE C^2 in Land Command.

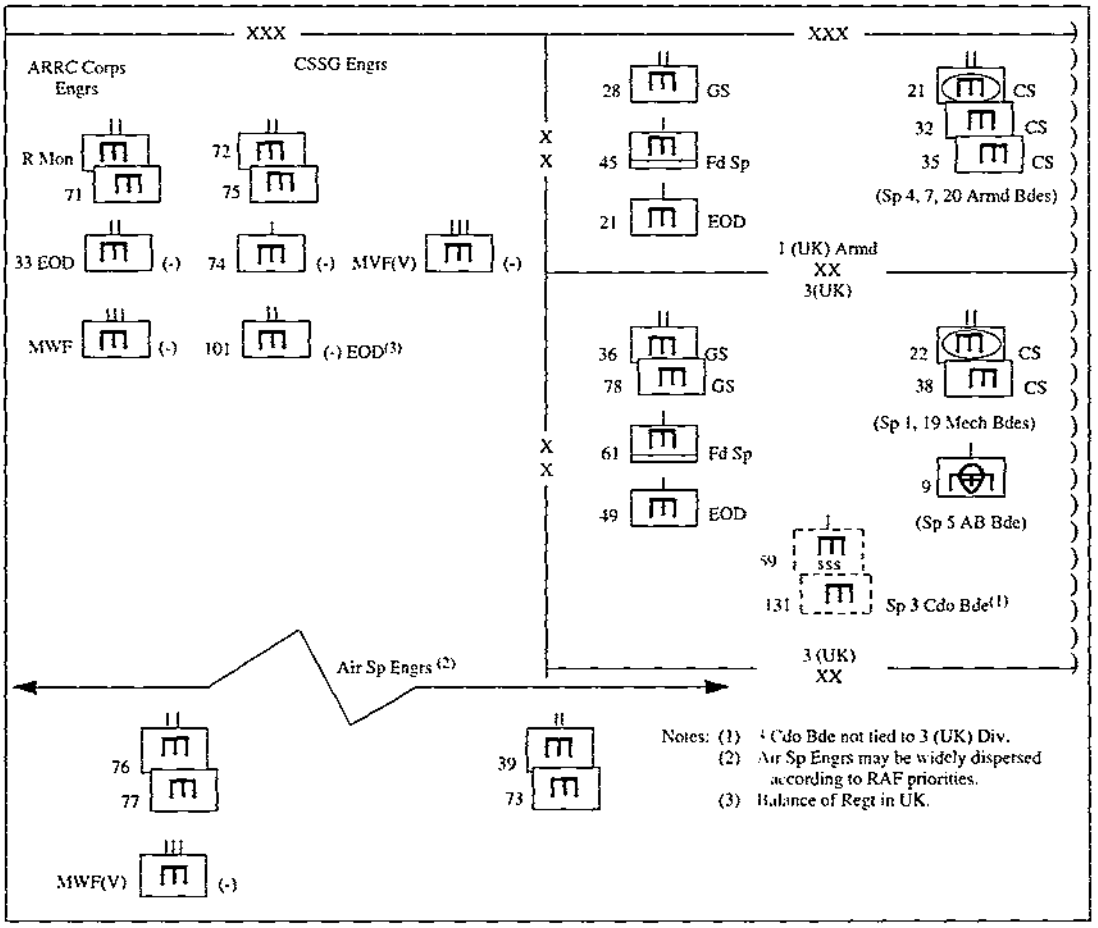

Figure 3. Schematic representation of possible Royal Engineers grouping for a major operation.

TABLE 1. Summary of Royal Engineers regular units in the field army disbanded during the drawdown.

Regiments	23 Engineer Regiment 26 Engineer Regiment 40 Army Engineer Support Group QGE (reduced to 67 Independent Gurkha Field Squadron) (25 Engineer Regiment moved from Osnabrück to Antrim)
Squadrons	10 Field Squadron (Gütersloh) 38 (Berlin) Field Squadron 52 Field Squadron (Bruggen) 24 Field Squadron (Chattenden) (67 Independent Gurkha Field Squadron disbands in April 1997)
Other Units	Fortress Squadron Gibraltar Specialist Team RE Gibraltar 2 x Mobile Civilian Artisan Group

Note: Not included are units within the training organization which have been disbanded (eg Junior Leaders Regiment RE, 12 Royal School of Military Engineering Regiment, Army Apprentice College Chepstow, 1 Training Regiment RE Minley etc).

TABLE 2. Comparison of total numbers in Royal Engineers before and after the drawdown.

Year	Numbers
1991	12,200(1) (2)
1995	8,900(3)
Change (-)	3,300
% Change	27%

Note: (1) Figure adjusted not to include clerks or postal and courier personnel.
(2) Figures include all ranks (sapper capbadged) including officers.
(3) Total number (all ranks) in sapper units in field army in 1995 is 7,381 (RE capbadge number is 6,063).

TABLE 3. Breakdown of Royal Engineers regular squadrons, by type, before and after the drawdown.

Squadron type/ numbers of squadrons	1991	1995
Field squadrons (mechanized) – UK	–	2
Field squadrons (mechanized) – Germany	11	5
Field squadrons (wheeled)	11	4
Field squadrons (air support/(construction))	5	3
Field squadrons (parachute) (commando) (airmobile)	3	3
Armoured squadrons – UK	–	2
Armoured squadrons – Germany	5 (2 CS)	3
Amphibious squadrons	3	1
Field support/support squadrons	10	4
Field park squadrons/field parks/ Corps support squadrons	6	2
HQ squadrons	–	10
Explosive ordnance disposal squadrons	2	3
Total	56	42

Note: Table also includes units in Hong Kong, Cyprus and Northern Ireland, but not the Falkland Islands.

and tasking of sappers in combined arms operations and exercises. However, our "balance" has shifted; we are more "task-specific" and geared towards high intensity operations as per the *W* orbat, with fewer field and field support squadrons but more armoured and HQ squadrons. We are organized as part of the bigger "Train Set" for major operations, despite our increasing deployments in support of the UN.

Operational Tasking

Tables 4, 5 and 6 summarize the extent of the Corps' current operational tasking and commitments. Over the past 18 months some 2000 soldiers from sapper units have either actually been on or are about to deploy for operations. This figure will rise with extra troops being deployed to the former Yugoslavia. At the time of writing (end of June 1995) over 200 soldiers, including a very large armoured engineer troop, have just reinforced 21 Engineer Regiment; 35 Engineer Regiment is scheduled to provide the engineer support to the Combat Service Support Group (UK) (CSSG (UK)), which is responsible for reception facilities for reinforcing troops; 51 Field Squadron (Airmobile) will deploy with 24 Airmobile Brigade; more surveyors have deployed with 19 Field Regiment Royal Artillery.

Comment. Not until we have met our commitments can we train, either as part of a combined army formation, or on our special-to-arm training. I have not included figures for the training which sappers do at BATUS (British Army Training Unit Suffield), or other overseas exercises or projects, with their parent formations in Germany and the UK, or within their own units. The Corps is far busier now than at any time since I joined it 28 years ago – apart from the relatively short period of the Gulf War.

Throughout the drawdown, reorganization and extensive operational commitments, no sapper unit has been in baulk; all of them have contributed their share to the operational tour plot (OTP) and many have taken on extra training projects. The resulting turbulence and continuous high tasking levels affect our:

- Balance and our ability to react to other operational tasks.
- Sustainability; the level of commitments will be difficult to maintain in the longer term.
- Training levels, especially our opportunity for combined arms training.
- Retention of key specialists (eg: clerks of work, electricians and fitters heating, ventilation and air conditioning).

TABLE 4. Standby contingency forces – sappers.

Contingency	Size of RE response
Spearhead troop	1 + 44
Leading parachute battalion group (leading parachute battle group) troop	1 + 54
Air mobile force (land) troop	1 + 52
Crashed aircraft recovery	Assessing officer 6hr notice to move (further manpower and resources as required)
RAF support	One field squadron (air support)
33 Engineer Regiment (Explosive Ordnance Disposal) for:	
Bomb disposal Improvised explosive device disposal High risk search Battle area clearance Other military aid to the civil population operations	Up to 300 personnel at varying rates of notice from immediate to 24hrs.

- Morale. I detect some cynicism amongst our soldiers and a view that we may no longer be defending "Queen and Country" but "Great Britain plc".

That said, the advantages of being a sapper outweigh by far the disadvantages. Sappers are useful in all scenarios and at all levels of conflict; the same is not true of a MLRS (multiple launch rocket system) gunner or a Royal Armoured Corps armoured regiment! It is worth stressing that:

- The Corps today, certainly at regimental level and below, is very capable and professional. I am very proud to be a sapper when I see what our young officers and soldiers are achieving.
- Overall, we are employed on worthwhile operations, tasks and training. We are, undoubtedly, very stretched at the moment but there is light at the end of the tunnel – once we have completed the current tranche of training area projects at the end of 1996.
- On operations, sappers are well to the fore and have been well tried and tested in Bosnia, Rwanda, Angola and Northern Ireland.
- Our barrack accommodation and workshops in the UK are vastly improved; our soldiers do appreciate the fact that a great deal of money has recently been spent on the infrastructure.

Historical Perspective

Bishop Gundolph, who replaced Humphrey de Tilleul as William the Conqueror's Chief Engineer soon after the Battle of Hastings in 1066, is regarded by most sappers as our founding father. He still remains an ideal example of a person we should strive to imitate today. Not only was he a skilled military engineer and soldier but he was also an innovative architect – or professional engineer.

TABLE 5. Support to Army Field Training Centre projects and regular army assistance tasking.

Army Field Training Centre project/Regular Army Assistance Tasking/year	1994/5	1995/6	1996/7
Warcop training area project.	One sqn – 8 mths		
Information Technology Centre Catterick and Feldom defence position project.	One sqn (+) – 8 mths		
Berril Valley project.	One sqn – 9 mths		
Peat Fell range project.		One sqn – 8 mths(+)	
Tidworth demolition training bridge project.		One sqn(-) – 6 mths	
Minley demolition training bridge project.		One sqn(-) – 6 mths	
Imber track project.			One sqn – 10 mths
Berril Valley phase II project.			One sqn – 6 mths
Regular army assistance tasking (including training support plot)	21,006 man days	Estimated 11,000 man days	To be confirmed.

TABLE 6. Summary of Corps' recent operational tasking.

Operations	Total Numbers	RE capbadge only
Current operations		
Operation *Grapple 6* (former Yugoslavia) (1)	386	322
Survey support to Zagreb/ Sarajevo/Gornji Vakuf (1)	17	17
25 Engineer Regiment (Northern Ireland) (less roulement engineer squadron)	370	344
Operation *Descant* (roulement engineer squadron to Northern Ireland)	141	128
Operation *Chantress* (Angola)	89	83
Falkland Islands field squadron (2)	164	135
UN Forces in Cyprus	13	13
Operation *Cornelius* (Bramley)	108	102
RAF support (3) Operation *Deny Flight* (Gioia del Colle)	2	2
Operation *Jural* (Riyadh, Dharan, Muharraq)	2	2
Training for operations		
Operation *Grapple 7* (1)	386	322
Operation *Descant*	141	128
Falkland Islands Field Squadron	164	135
Total	1983	1733

Recent Operations

Gabriel – squadron in Rwanda.
Windbreak – battle area clearance Belize 1994 (squadron -).
Upraise – battle area clearance Cyprus 1995 (squadron -).
Pineapple – battle area clearance Kenya 1994 (troop -).
Training team to Mexico 1994.
Training teams to Zimbabwe 1995: combat engineering
mine awareness

Note: (1) These figures do not include the additional reinforcements committed to the former Yugoslavia in June 1995.
(2) Recently, Falkland Islands Field Squadron order of battle reduced from 198 all ranks.
(3) Normally project liaison officer + general engineer/clerks of work to supervise local contractors. Periodic reinforcement of section (+) specific tradesmen as required.

The traditional role of the Corps is still defined as helping the army to fight, to move and to live. The title "Military Engineer" perhaps now best embodies (in two words) what we expect from sappers in the Corps. Clearly, unless we are soldiers with the requisite military virtues, we will not survive on the battlefield in order to do our job as combat engineers or construction specialists. But we also have to employ our expertise as and when required; be it mobility support in terms of bridging and routes, or counter mobility support with demolitions and/or minefields, or survivability and sustainability support ranging from hardened shelters to hutted portacabin accommodation together with all the associated services of water, sewerage and power. Being simply a "good soldier" is not good enough.

Professor Michael Howard, writing in *The Times* some three or four years ago, reminded his readers that the tasks which now confront the army, since the collapse of the Berlin Wall, are not unlike those which it was undertaking two or three hundred years ago. There is, still, Northern Ireland (although there is real hope that a peace may be secured there soon); there is a sprinkling of overseas settlements, about as many as there were in 1695; and there is the need to contribute to the stability and cohesion of our Continental neighbours, not now by sustaining a traditional "balance of power" but by contributing somehow to a new kind of "secure community", the limits of which still have to be determined. This is not easy and we are all aware of the difficulties facing NATO (North Atlantic Treaty Organization), the WEU (Western European Union) and the UN.

Maintaining the security of this wider Europe is seen as part and parcel of the defence of the UK itself. When that security is threatened, as it was in the Gulf and where some perceive it to be in the former Yugoslavia, then our capacity to contribute to any resolution of the conflict will determine the degree of influence which we can exercise afterwards. That is the fundamental reason for maintaining forces of respectable size. We as a Corps therefore have to be effective right across the "military and engineer skills spectrum" in order to be able to support the army. We have to be every bit as versatile today as our forefathers were; that is no small challenge!

Conclusions

Thankfully, the Corps still retains a wide capability in both combat and "professional" engineering; in design and construction; especially when we also take account of the expertise within both our regular and TA units. We also have unique links with eminent engineers in the Engineer and Transport Staff Corps and the Institution of Civil Engineers. We are still (just) capable of undertaking every type of military engineering task except really "heavy engineering", by which I mean ports, docks, railways (of significant length) and major infrastructure projects.

We provide a very adequate "get you in" package for the field army deploying on operations other than war; we certainly do provide the wherewithal for the army to **Live**.

As far as the **Moving** and **Fighting** are concerned, we still provide a credible service (and the **Moving** will improve markedly when we get Challenger hulls for our AVREs (armoured vehicles RE) and AVLBs (armoured vehicle-launched bridges.)). We do still have a suite of capabilities spread amongst our units ranging from:

- Field squadrons (both wheeled and mechanized).
- Armoured, amphibious and EOD squadrons.
- Parachute and commando squadrons.
- Air support regiments.
- And, last but not least, field support and field park squadrons.

But not everything in the garden is rosy. My greatest concern is how we will manage to sustain our capability with the Corps as small as it now is, with the ever-increasing squeeze on our budgets. More specifically, how do we juggle our commitments and maintain a balance between our soldier, combat engineer and specialist skills? (When the tendency in many areas, both civilian and military, is towards increasing specialization.)

Paradoxically, I feel that we may find it easier to develop our "project management" and "construction" expertise in the short-term because of the the current emphasis on "operations other than war". But we will have to struggle to maintain our military and combat engineer skills with far fewer FTXs (field training exercises) and no division or corps level FTXs out on the ground. The army's high intensity capability is already subject to increasing scrutiny; for example, it is becoming more difficult for us to convince our political masters to fund new mines (especially any new antipersonnel mines) and the gunners, I feel sure, will have problems in funding future enhancements to their MLRS etc.

I remain convinced that we must retain a strong combat engineering capability, commensurate with

"manoeuvre warfare" doctrine. As with the other arms a "warfighting" capability can cover the whole spectrum of conflict and can still be used on "operations other than war" and on "peace support operations". The reverse is not necessarily true and we must not now focus too exclusively on construction engineering. We are very definitely **Military Engineers and not Engineers in the Military!**

I said earlier that it will be no small challenge for us to be every bit as versatile as our forefathers and to maintain a capability right across the "military and engineering skill spectrum". We will only do this if we recruit and retain quality people, both officers and soldiers.

"The way of the Sapper is hard and dangerous, and lies across the ground between friend and foe. It calls for the best and bravest in any army".

From the book "Soldiers, A History of Men in Battle" John Keegan and Richard Holmes.

Building Bridges in Greece in 1945

MAJOR W A G GERRIE MC

The author was a sapper in 239(Highland) Field Park Company, Territorial Army, which went with 51st Highland Divison to France in January 1940. Fortunately he was with those who escaped capture when the division was forced to surrender at Saint Valery.

Commissioned into the Corps in February 1942, he served for a short time with 698 General Construction Company before being posted to Bangalore, and subsequently to the Indian Army in the Middle East, joining 4 Field Company of King George V's Own Sappers and Miners, one of the engineering units of 4th Indian Division, and remaining with them from Alamein to Tunis. In November 1943, the division took part in the Italian campaign through to the capture of Rimini, before being transferred to Greece. During his time in Italy he served for a short period as a field engineer and then returned to 4 Company as second in command. He was awarded the MC.

Demobilized in 1946, he returned to his civilian occupation and completed training to become a chartered surveyor.

THIS is an account of engineering works carried out by 4 Field Company King George V's Own Bengal Sappers and Miners (4 Coy) in Greece during the summer of 1945.

4 Coy was one of the sapper units in 4th Indian Division (4 Ind Div), a formation hastily withdrawn from 8th Army front in northern Italy in October 1944, and sent to Greece to assist the civil powers in maintaining law and order following the withdrawal of the Germans.

Returning from exile, the Greek government was faced with the mammoth task of re-establishing authority in a country in chaos resulting from the war. Adding to their difficulties was the fact that a strong communist movement, the Elas, was determined to overthrow them and set up a communist state in Greece. Neither the Greek nor British authorities could countenance the further advance in Europe of a thinly-veiled Russian influence and so this threat had to be subdued.

5th Indian Brigade, with 4 Coy providing sapper support, landed in Piraeus, the port of Athens, early in December and was tasked with clearing Elas forces out of that area. After a series of sharp engagements in the maze of streets in Piraeus, enemy groups were largely disarmed and dispersed.

In mid-January the brigade moved for a short spell of duty in central Greece before finally taking up position in the north along the Albanian and Yugoslavian frontiers. 4 Coy set up its headquarters in the small town of Kozani about 50 miles south of the Yugoslavian border.

With the return of more settled conditions the principal need was to restore road communications. Every bridge of any strategic importance had been damaged or destroyed, and there was an urgent requirement to open roads for the passage of military, civilian and relief transport.

The company's three platoons were dispersed over a wide area, building and repairing bridges, forming diversions and getting the roads into passable condition. By mid-May the Greek Public Works Department had been re-established and began to assume responsibility for the roads, thus freeing sappers to concentrate on major engineering works.

Kozani stood on the main road between Athens and Salonika. Fourteen miles south of the town the road crossed the Aliakmon river where a bridge with a length of 510ft had been destroyed; a further 20 miles south, a 40ft span over a gorge had been similarly blown up at a crossing near the boundary between Macedonia and Thessalonia.

On 23 May bridging equipment was ordered and an immediate start made to prepare the approaches and abutments for new bridges to be built.

Shortly after their arrival in Kozani the company had built and continued to operate a pontoon flying

Major W A G Gerrie
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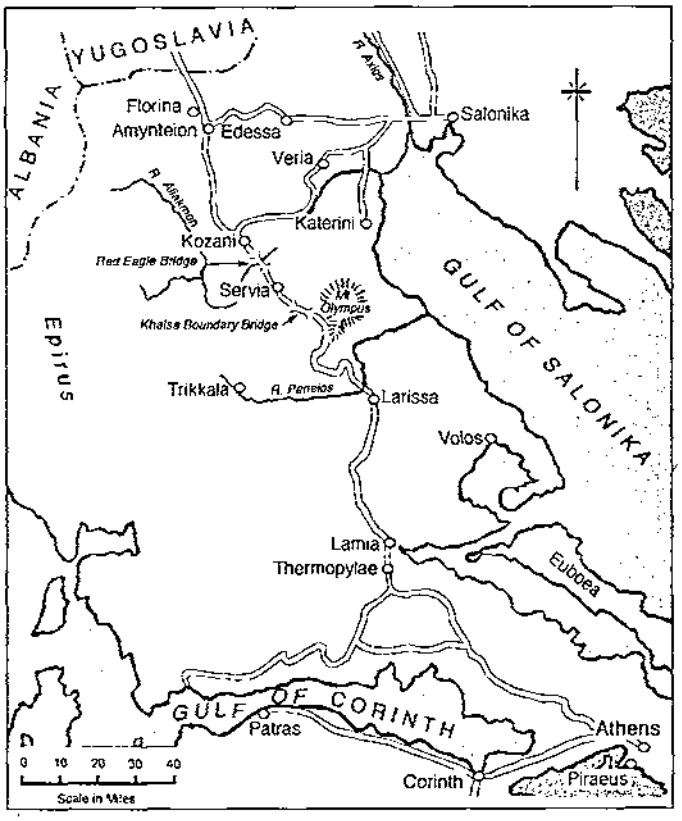
ferry over the Aliakmon river alongside the demolished bridge, and to keep traffic flowing during the summer a fair-weather diversion was formed (with 44-gallon drums covered with stones or soil) over the river bed at the Khalsa boundary bridge situated at the boundary between Macedonia and Thessalonia.

The bridge over the Aliakmon had been a 3-span structure with two masonry piers in mid-stream. Though both piers had been prepared for demolition they had not been blown but both abutments were destroyed, and in order to launch a Bailey bridge, a level area had to be carved out of the hillside on the southern approach. Pending the arrival of the bridging equipment there was therefore plenty of work to be done.

The company's A and C Platoons were allocated to the Aliakmon bridge and, combining with a squad of civilian workers, they began the task of rebuilding the masonry abutments which were completed by 23 June when the first delivery of Bailey bridging arrived. Concrete pads were cast on the pier heads large enough to hold the Bailey bank seats.



Map of area covered in article.

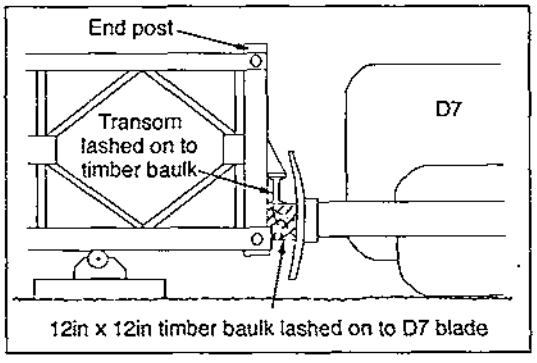
Due to the extremely hard nature of the soil, a D7 angledozer took over from the D4 which had started the job, and in three days completely transformed the site allowing bridge building to commence on 25 June.

The erection of the bridge followed the precise guidance given in the Bailey handbook. A single single launching nose 100ft long, with two links to raise the tip, was constructed before the double double bridge was built. Manpower was used in the early stages of launching but after 130ft of bridge had been completed the D7 took over and from then on, unaided and using only half power, it pushed the complete 510ft of bridge into place.

The D7 was attached to the bridge by fitting two end posts to the end panels of the bridge into which a transom, with a 12in x 12in timber baulk lashed on, was fitted. The transom and timber were then attached to the D7 blade by a light steel wire rope. This arrangement allowed the machine to be detached from the bridge rapidly by simply opening the clamps on the end posts. The D7 was also used to raise the tail of the bridge so that the launching rollers could be repositioned.

Speed of building outstripped the rate of delivery of equipment and a few delays were thus experienced but the bridge was in its final position across the gap on 18 July.

Work then began to raise the bridge, remove the launching rollers, and lower it on to its permanent



Launching arrangement for Aliakmon bridge.

Aliakmon Bridge coming out over gap.

base plates. In order to lessen the strain on the jacks lifting on the piers, the northern end of the bridge was raised about 1ft 6in and temporarily supported on heavy timbers. The standard jacking procedure was used for this lift. Jacking of the bridge at the central piers presented problems due to the small working area. The plan adopted was to place two transoms under the top chords of the Bailey panels, securely lashed on. Two jacks were then set at each end of the transoms making eight in all. Work then began on the north pier.

The only mishap to occur on the whole project happened during this lift. After the bridge had begun to rise clear of the rollers a transom suddenly twisted. Jacks and jack handles flew in all directions as the bridge sat back heavily on the rollers. Mercifully there were no injuries but all concerned were considerably shaken by the event with the realization that the force required to twist an 8in x 4in steel beam into a spiral was certainly not to be trifled with.

A thorough examination of the jacks was carried out and it was ascertained that one end jack had got out of phase with the others placing a heavy load on its opposite number and leading to the accident. A contributory factor was the fact that there was a shortage of jack handles and steel crowbars were used as substitutes which, with a loose fit, may have aggravated the situation. This was a salutary lesson on the care required with a multiple jacking arrangement.

New jack handles were fashioned from tubular steel poles and jacking recommenced. This time an NCO was in charge of each jack and reported after each movement of the handles to the two platoon *havildars* (sergeants) who checked that each jack had advanced by one notch on the ratchet. From then on jacking operations proceeded smoothly and on 26 July the bridge had been lowered onto its base plates. To allow for expansion and contraction, the bank seats below the base plates were liberally greased and guide rails welded on to ensure that the movement of the base plates would be confined to a line parallel with the bridge. Decking then began and the D7 raised the road level up to the bridge deck to complete the project. The two officers who supervised the construction of the bridge were Lieutenant Alan Braithwaite and the late Lieutenant Peter Bromhead.

The opening ceremony took place on 31 July and on that day the sappers who had built the bridge, resplendent in their smart uniforms, formed the guard of honour. They were inspected by Brigadier J C Saunders Jacobs DSO, the Commander of the 5th Indian Infantry Brigade, who thanked them most warmly for all that they had done and congratulated them on their skill and endeavour. The brigadier, on behalf of the British government, then handed the bridge over to Mr Christopher Noltsas, the Governor General of Western Macedonia. After a short religious service conducted by the Bishop of Kozani, the Governor General formally cut the tape and declared the bridge

Aliakmon Bridge jacking arrangement.

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open. The longest Bailey bridge in Greece was now in service. As a token of esteem to the divisional emblem the bridge was named Red Eagle Bridge and subsequently a plaque was erected at the northern end inscribed with its name, the name of the builders and the date.

While the Aliakmon bridge was under construction, B Platoon, working in collaboration with a squad of civilian workmen, began the reconstruction of the bridge at the Macedonian-Thessalonian boundary. This was not a large project but was a typical example of the contribution made by sappers to the general rehabilitation of war-torn Greece during 1945.

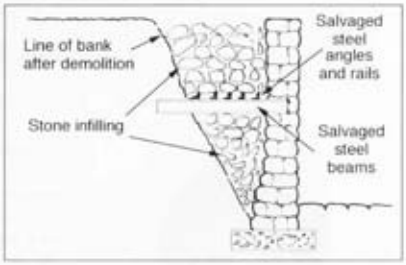
The first task was to clear away the great mass of rubble masonry and prepare the foundations for rebuilding the abutments. The stone had to be picked over and classified as suitable for external and internal face work with the remainder to be used as packing behind the walls.

Sappers rebuilt the 16ft high south abutment and civilian workers built the opposite one.

The local road engineer, with whom the company had an excellent relationship, advised that precautions should be taken to stabilize the abutment walls because when the inside face of abutment walls are backfilled to restore the road level, the infilling can exert an outward pressure which tends to overturn the wall. His suggestion was to build steel beams, taken from salvaged steelwork, into the inside face of the walls, bedded down on the remaining formation of the original infilling. The beams were roughly decked over so that the weight of the infilling would exert a downward pressure on the walls. This arrangement was placed in position 10ft above the foundations of the walls and appeared to be effective.

Good progress was made on both walls which were completed on 8 July.

Instructions were received that a double single Flambo bridge was to be placed over the gap and be provided with a concrete deck to make it a permanent structure. The equipment arrived on 20 July and was put in place three days later. Flambo bridging looked like Bailey equipment but there the similarity ended. It was fabricated in mild steel, much heavier to handle, and did not have the precision fitting of the Bailey



Arrangement for stabilizing abutments.

and a heavy sledge hammer was an essential tool. The underside of the panels did not lie flush and "rocking" rollers had to be used to ease the bridge forward. At every stage diagonals had to be checked to ensure that bracing could be fitted. The 30ft long launching nose was decidedly wobbly, but as the technique was mastered satisfactory progress was made and once in position it was a good bridge. Shuttering was fitted to the underside of the lattice transoms and a reinforced concrete deck was poured by 3 August to complete the work – the last permanent link on the Athens-Salonika road.

This bridge had a less impressive opening ceremony, carried out by the youngest sapper in the platoon who broke a bottle of beer on the end panel! A small pillar was built at the southern end stating that the bridge was built by B Platoon of 4 Coy in 1945 and it was called Khalsa Boundary Bridge. The construction was supervised by Lieutenant David Alexander.

In 1982 one of the officers who built the Aliakmon Bridge had the opportunity to visit the site. He was informed that the bridge was still there. It was under 20m of water! The whole of the valley had been converted into a hydro-electric and irrigation reservoir. The road crossing is now a very impressive curving high concrete bridge.

Aliakmon Bridge completed.

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The Noble Sapper on the Box

Charles Robson RE

LEE STEVENSON ESQ

The author was born in Brighton, East Sussex. His interest in the Anglo Zulu Campaign of 1879 stems from a silk bookmark commemorating the death of Louis Napoleon, Prince Imperial of France, at the hands of the Zulus, which belonged to his great-grandfather.

He has spent eight years researching the lives of members of the Rorke's Drift Garrison with a view to publishing his completed work in due course.

He is a member of several military history societies and also runs his own research service for anyone seeking information from War Office records held at the Public Record Office.

Introduction

The defence of the mission station at Rorke's Drift is probably one of the most well known and most written about of all the "little" actions fought by the British Army during the Victorian era.

It was there on 22/23 January 1879, during the very opening stages of the war against the Zulus, that some 150 British and colonial soldiers, barricaded behind a hastily prepared wall of mealie bags and biscuit boxes, held off a Zulu impi 4000 strong for over 12 hours. As a reward for their conduct, 11 defenders were later awarded the Victoria Cross, six of the officers receiving accelerated promotions and five NCOs and men received the Distinguished Conduct Medal.[1]

Of the defenders themselves, the majority were from "B" Company, 2nd Battalion, 24th Foot (B Coy 2/24th), commanded by Lieutenant Gonville Bromhead. This company had been left at Rorke's Drift to cover the crossing over the Buffalo River and to protect the stores held in two commandeered Swedish mission buildings. The remainder of the garrison was made up of the so-called "other" men, a mixed bag of staff; a doctor and his orderlies and 36 sick and wounded men installed in one of the buildings, now a makeshift hospital.

The command of the garrison had been given to one Lieutenant John Rouse Merriott Chard, 5th Company RE (5th Coy). He had only recently arrived at Rorke's Drift, with orders to repair and maintain the ponts over the river, a quarter of a mile from the actual mission station itself. With him came his batman and the only other RE to take part in this famous battle, Driver Charles John Robson, a fact worthy of recognition in itself and certainly not forgotten by the current 5th Field Squadron, descendants of 5th Coy.

[1] Awarded the VC: Lieutenant G Bromhead, Corporal W W Allen, Private A H Hook, Private F Hitch, Private R Jones, Private W Jones, Private J Williams (Fielding) – 2/24th Foot, Lieutenant J R M Chard, 5th Company RE, Surgeon Major J H Reynolds, Army Medical Department, Acting Assistant Commissioner J L Dalton, Army Commissariat Department, Corporal F C Schiess Natal Native Contingent.
Accelerated promotions: Bromhead, Chard, Reynolds, Dalton, W A Dunne, Army Commissariat Department Reverend G Smith.
Awarded the DCM: Colour Sergeant F Bourne 2/24th, Corporal W Roy 1/24th, Gunner J Cantwell, Royal Artillery, 2nd Corporal F Attwood Army Service Corps, Private M McMahon Army Hospital Corps (later cancelled).

Lee Stevenson
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Unfortunately many of the "other" men, Robson included, received scant mention in the various accounts of the battle; indeed Chard himself only refers to Robson by name once in his second extended report compiled especially for Queen Victoria in February 1880. There was confusion as to Robson's christian name and even his rank, a problem which stems from errors made in the various official rolls of the defenders[2] and also original documents now held at the Public Record Office (PRO), Kew, with several discrepancies appearing in the pay and muster rolls for the 5th Coy at the time of the Zulu War.[3]

The South African War Medal Roll however gives the following information:

5th Company Royal Engineers
12046 Driver Robson C
Awarded Medal and Clasp 1879
Medal issued 1st April 1880
Signed Captn. and Bvt. Major
Walter Parke Jones RE
RE Office
Whitehall 1880.

This entry can be confirmed in the service and discharge papers found for Charles Robson, which also include the entry "present at actions of Rorke's Drift and Ulundi." It is now possible therefore to build up a clear picture of his life, army career and just how he too came to be at Rorke's Drift some 116 years ago.

Army Service and The Zulu War (1873-1879)

Charles John Robson was born on 7 January 1855 at 7 Ebury Mews, near Victoria Station, London. His parents were Ann, a domestic servant and George, a coachman. At the age of 18½, Charles enlisted as a driver in the Royal Engineers, having previously been working as a groom with his father in the Saint George's area of London. He was not a tall lad standing at 5ft 5ins, and he weighed 9½ stone. There is no record of why he chose to join up, although the place of enlistment was Bow Street Police Courts, Westminster, suggesting perhaps that some petty crime had occurred resulting in a choice of a short stretch with her Majesty's Army or a longer stretch at her Majesty's pleasure.

Whatever the reason, Charles was soon to find himself posted to Aldershot and "B" (Equipment) Troop RE Train, his home for the next four years. (It was during these first few years that there occurred the first confusion as to his Christian name with "B" Troop's muster and pay rolls listing him as "James" Robson for several months).[4] In August 1875 "B" Troop moved to Brompton Barracks, Chatham, for a brief spell, returning to Aldershot some 11 months later. They were still at Aldershot in December 1877 when the majority of the drivers, including Robson, were transferred to 5th Coy, which was forming a mounted engineers detachment. With such a large influx of men, came also the need for new officers and on 18 April 1878, one Lieutenant J R M Chard joined the mess, Driver Robson being appointed as his batman soon afterwards.

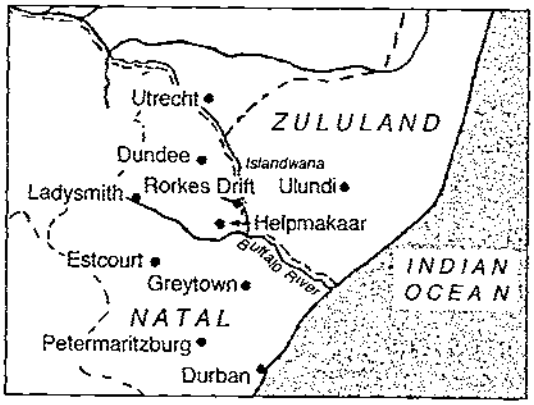
At the end of 1878, and with the political situation in South Africa steadily worsening and war against the Zulu King Cetchwayo seemingly unavoidable, the newly strengthened 5th Coy was mobilized to reinforce Lord Chelmsford, officer commanding British Forces in South Africa. Given just five days' notice the company embarked, along with 2nd Company, aboard the *ss Walmer Castle*, a hired transport ship, at Gravesend on 2 December, bound for Capetown and finally Durban. Their passage was to be a good one for the ship docked in Capetown on time on 2 January. The men were allowed two days' shore leave before setting sail once more for the last leg round to Durban.

In Durban they were greeted by bad weather and, in a torrential downpour, the men faced the unenviable task of unloading the hundreds of tons of stores and equipment needed for the campaign ahead. The first problem to arise was transport. The CO, Captain Walter Parke Jones, was faced with the job of finding wagons and oxen for the 150-mile trek up to Helpmakaar and the Natal/Zululand border. All the best teams had been acquired by Lord Chelmsford's forces, already in place at the front. It would be another three days before enough wagons were collected and the company was ready to proceed. In the meantime, Lord Chelmsford requested a small team of engineers to join him at Rorke's Drift, to repair and maintain the ponts over the Buffalo

[2] 'Private' Robson,
(a) Chard's Roll dated 3rd Feb 1879,
(b) C/Sgt F Bourne DCM's second amended roll c.1936.

[3] PRO, Kew. Pay and Muster Rolls (W016 series), 5th Coy.
- 1 April to 31 December 1878 Chas or Charles.
- 1 January to 10 August 1879 "Edward" (this covers the period that the company was in South Africa until Robson left for embarkation back to England).

[4] PRO Kew. Pay and muster rolls for "B" Troop RE Train 1873-74.



Map showing areas mentioned in article.

River, the centre column's gateway into Zulu territory. The job fell to Lieutenant Chard, as senior subaltern, Driver Robson, his batman, Corporal Gamble and Sappers Cuthbert, McClaren and Wheatley. A small mule train with a native driver and a native boy, was supplied for their equipment, the sappers riding in the back. Chard and Robson rode horses.

After a slow start, the first team of mules giving up after only two hours, Chard's "Flying Sap"[5] set off for Rorke's Drift.

Whilst there is little space here for a full account of Lord Chelmsford's plans, it is necessary to explain briefly his intentions at the outset of the war. The plan was simple, "take the war to the enemy" by invading Zululand in three columns at separate points along the border, all converging on the capital, Ulundi, where the Zulus would be crushed in a single set piece battle. He had placed his HQ with the number three centre column which began crossing the Buffalo River at Rorke's Drift on 11 January. He began the push into Zululand on the 20th, leaving one infantry company, "B" Coy 2/24th, and some 350 "friendly" natives of the Natal Native Contingent, behind to guard its line of communication at the border.[6]

Chard and his men finally arrived and set up camp on the Natal side of the river on the 19th. They then set to work on one of the ponts, the other still at full stretch with the wagons of the centre column. The damaged pont was repaired and in use by the evening of the 21st. Unfortunately there would be no respite for the four sappers; having endured the long slog up from Durban, they now received orders[7] to join the centre column next day at their new camp at the foot of a hill named Isandlwana, some ten miles up the road from Rorke's Drift. On the morning of 22 January the four men climbed into their empty wagon and the native driver set off for Isandlwana, (later that day, having successfully lured Lord Chelmsford and half the column away from Isandlwana, the 20,000 strong Zulu army swept down on the camp which, in spite of fierce resistance, was totally overrun, the four sappers being amongst the 1350 casualties, only 78 Europeans escaping).

Chard had also been at Isandlwana that morning to obtain his own orders. Leaving just before the main force of Zulus appeared, he had arrived back at the Drift in time for lunch which Robson had prepared. He then settled down to write some letters home. The peace and quiet was soon to be shattered however, when several riders appeared, having just escaped from Isandlwana. They brought news of the disaster and of a large Zulu impi now racing for the mission station.

Orders were hurriedly given and Robson saddled the two horses and started up the hill, the native driver following close behind with the wagon, which he left near to a rough stone cattle kraal not far from one of the buildings. In all the commotion no one noticed as he and the native boy slipped away, the boy on Robson's horse. Robson had by this time joined the men of "B" Company, who had also received the warning and were now frantically building up walls of mealie bags, connecting the two buildings. Robson took a place in front of the storehouse where the perimeter met a stronger built cattle kraal. From here he had a clear field of fire across to where the wagon was parked.

The defences were barely finished when the first Zulus appeared on the hills above the station at about 4.30pm, only 75 minutes after the first alert. At that moment, the 350 or so friendly natives inside the fort thought better of a fight with the Zulus and bolted over walls, their European officers following behind. The Zulus charged down against the south wall to be checked with volley fire from the remaining defenders. The main force of Zulus then arrived veering around the post eager to find the weakest

[5] As referred to by Captain Walter Parke Jones RE. Private letter held at the RE Library. *RE Journal* 1 April 1879 page 67.

[6] For a fuller account of Chelmsford's plans and the course of the war, see "Washing the Spears" by D Morris.

[7] A copy of these orders survive at the PRO (ref WO32 7705), along with a letter from Chard to Parke Jones confirming the men's movements with the "Flying Sap".

spot. As the battle developed, Chard made a note of where Robson was placed, which he later recalled in his second extended account:

> "the Zulus were wrecking the camp of the company of the 24th, and my wagon which had been left outside, in spite of the efforts of my batman, Driver Robson (the only other man of the Royal Engineers with us), who had directed his particular attention to keeping the Zulus off this wagon in which were, as he described it, our things".[8]

The front wall and stone kraal was to come under fierce attack during the evening as the Zulus, desperate to get at the defenders, launched repeated charges at the walls. For some 12 hours this relentless assault continued until on the morning of 23 January and with the defenders' ammunition down to the last 20 rounds each, the Zulus retired. They left 350 dead bodies scattered around the area, but many more were discovered in the weeks to come, hidden under rocks and in caves on the hills above the fort. The defenders suffered only 17 killed and eight seriously wounded. As the weary men cautiously moved around the area, collecting weapons and repairing the defences, Chard inspected the wreckage of his wagon, discovering an unbroken bottle of beer, which he shared with Lieutenant Bromhead – Robson's efforts were not totally wasted!

Chard and Robson were to remain at Rorke's Drift for several weeks after the battle, Chard supervising the construction of more permanent stone walls around the fort, with half of 5th Coy finally arriving from Durban to help. Unfortunately a combination of the cramped conditions inside the fort and the proximity of so many dead Zulus, buried in a mass grave just outside, brought on a bout of fever of which Chard fell victim in early February. He was sent to Ladysmith to recover, staying with a Doctor Hyde and his wife and, in spite of several newspaper reports to the contrary[9], he did recover sufficiently to rejoin 5th Coy for the re-invasion of Zululand where both he and Robson were present in the British Square for the long awaited showdown with the Zulus outside Ulundi on 4 July. The combined firepower of the British Martini Henri rifles and Gatling guns were too much for the Zulus who were completely routed with massive casualties.

[8] Chard's second extended report compiled expressly for Queen Victoria.

[9] The *Natal Colonist*. 17 May 1879.

This photograph is part of one taken at Chard's sister's wedding, and is reproduced here with the kind permission of Mr D Phillips. Driver Robson, in uniform, is standing at the back; Major Chard VC is sitting on the floor.

Thus ended the Zulu War. The British slowly marched back to the border, 5th Coy moving down to Saint Paul's Mission Station (some 20 miles south of Ulundi) where they built another fort. On 16 July, the newly promoted "Major" Chard was presented with the Victoria Cross for his part at Rorke's Drift. At the end of the month he decided to leave 5th Coy and, taking Robson with him, began the journey back down to Durban and a triumphant return home to England.

Peacetime Service 1879 – 1894

Major Chard VC and Driver Robson arrived at Portsmouth aboard a hired ship the *ss Egypt*, where

a whole host of generals including the Commander in Chief His Royal Highness The Duke of Cambridge, were waiting to greet them. Amongst the other passengers were several other Rorke's Drift' defenders, including Surgeon Major James Reynolds VC and Gunner Arthur Howard (a former patient in the makeshift hospital), now returning to 5th Brigade Royal Artillery Depot, and five men of 1st Battalion 24th who had also found themselves at that little fort back in January.[10]

Once home Major Chard VC commenced an unofficial tour of the country, being requested to leave a contact address with the adjutant general so that an audience with Queen Victoria could be arranged. First stop was the home of his sister in Moredon, Somerset. News of the visit travelled fast and a huge crowd of over 4000 had gathered at Taunton railway station to greet Chard's train. When it finally arrived, Robson too received much attention:

> "Major Chard was accompanied by his military servant in full regimentals and the appearance of this soldierly young fellow bearing an armful of Zulu assegais and other trophies of the campaign excited much interest".[11]

Chard and his family were then taken by carriage through the streets of Taunton, to the strains of "Hail the Conquering Hero Comes", and on to the village of North Curry where a large and elaborate party had been planned. In one of the many speeches made later that day, Chard said that he was sorry that Bromhead and Reynolds were not with him to see how much was thought of what they did at Rorke's Drift but he was glad to say that there was one other besides himself (meaning Robson, who was occupying a box seat of the carriage) who had the opportunity to see how greatly their services were appreciated, and what a splendid reception had been accorded them. One of the assembled crowd, General Sir Percy Douglas, Chelmsford's predecessor in command of the forces in South Africa, then stood up and called for three cheers for the "Noble Sapper on the Box".[12]

The tour (and welcoming receptions) continued to Plymouth, London and Chatham where Chard was entertained by his fellow officers at Brompton Barracks (several Zulu warriors being amongst the guests!) On 10 October Chard and Robson went to Balmoral and an audience with Queen Victoria.

For Robson though the share of Chard's glory was all too brief. At the beginning of November 1879 he left Chard in Somerset to return to the more normal army existence, taking with him a brief testimonial from his former master:

> Moredon, 17th November 1879
> "Driver Charles Robson, Royal Engineers, served with me in the 5th Coy, RE as my batman, for some months before and during the whole of the Zulu campaign. His conduct has been very good and he has given me great satisfaction – he was the only Royal Engineer with me at Rorke's Drift on the 22nd January, where he did good service. He was also present at the action of Ulundi.
> I sincerely hope he may get on and do well".
> John R M Chard, Capt and Bt Maj RE

Robson's six years' service with the colours was nearly complete and he decided not to re-engage, choosing instead to take his discharge into the Army Reserve. He briefly returned to the Field Park and Depot at Aldershot, before transferring to 7th Field Company at Chatham in February 1880. In May 1881, he was transferred again to 11th Field Company, to be discharged a month later on 20 June. He had served a total of eight years and 47 days with the colours, and collected a tidy sum in deferred pay of £15 7s 6d.

Colonel A G Durnford, (whose brother Anthony William had been killed at Isandlwana), the commandant at Chatham gave Robson another testimonial, this time for a Mr Saunders (evidently a prospective employer). It is not clear if he actually got the job, but some three months later he was back at Brompton Barracks as a civilian groom and general servant to Captain C H Gordon, RE. He was to follow his new master to Dublin and Cork Districts, Ireland, completing his army reserve service there, returning to Chatham in July 1882. Before Gordon left for service in Egypt he also wrote a testimonial for Robson dated 4 July.

On 2 August, Robson was recalled to the colours and returned to the depot at Aldershot once more, having completed only one year and 42 days on

[10] *The Times* 4 October 1879 lists Sergeant E Wilson, Lance Corporal W Roy DCM and Privates Desmond, Payton and Jenkins. Jenkins is a mistake however as he was killed in action at Rorke's Drift. The other survivors of the 1/24th being Private H Turner, who may also have been aboard the *Egypt* and Private J Waters who had sailed home on an earlier ship.

[11] *RE Journal* 1 November 1879, page 205/6.

[12] *Taunton Courier* 8 October 1879, *Somerset County Herald* 4 October 1879, *Somerset County Gazette* 4 October 1879. These three incorrectly name Robson as a soldier of the 24th.

the reserve. He now became batman to a third RE officer, Lieutenant F N Maude, signing on to complete 12 years with the colours soon afterwards. He seems to have been very well regarded by all the officers that he served under and apart from one minor incident back in 1874, resulting in two days in the cells, he retained an unblemished record. He was to serve under Maude for a further two years until November 1884 when Maude too moved on to another posting; Maude also gave Robson a glowing testimonial:

S Camp Aldershot 12.11.84
"Driver Robson was batman to me at Aldershot for two years. He is a thoroughly capable groom and strictly honest. He understands cleaning accoutrements, breeches etc and will always do his best to turn his master out smartly and well".
F N Maude, RE.

Early in 1883, Charles met Jane Elizabeth Farrand, a young nursemaid who had been working in one of the married officers' households. They decided to marry, but could not obtain the permission of the CO at Aldershot. On 13 May 1883, Charles took matters into his own hands and left the camp. He and his young bride were married in the small parish church of Hale in Surrey, a tiny village some two miles south of Aldershot. Aware that he had broken the rules, Charles gave his trade as groom and an address in Heath End, the neighbouring village, hoping to go undetected. It seems that the military authorities chose to be lenient, for no punishment awaited him on his return to camp, indeed some years later his new wife moved into a house in Perowne Street, Aldershot, coming under the married establishment roll with the birth of their only child, Annie Lilian in July 1891.

On 30 April 1894 and after 21 years in the army, Charles took his discharge. Of those 21 years, he'd spent only 305 days on campaign, the majority of his time being spent with the Field Park and Depot at Aldershot. Over the years, he had collected four good conduct badges and was to receive a pension of 13d a day, although as a result of his brief spell in the reserve he was not eligible for the Long Service and Good Conduct medal.

After the Army 1894-1933

For some years the family lived with Charles' sister, Laura, in a small house in Orchard Road, Dorking, where Charles found a job as a groom for a local doctor. Sometime later and when their daughter was still quite young, they moved to Plumstead and a newly built terraced house in Swingate Lane.

During the First World War, both Charles and his wife worked in the Woolwich Arsenal, Jane working in one of the "danger" rooms packing "cordite". Charles was to retire in 1919, having plenty of time to enjoy his garden and for the chickens that he bred in a large chicken house at the bottom of the garden.

The family also kept a dog called Gyp and an enormous cat named "Buller" (after Sir Redvers Buller, who gained the Victoria Cross during the Zulu War and later served in the Boer War of 1899-1902).

Even in the latter years of his life, he remained very proud and dignified and although he rarely spoke of his heroic exploits, it seems that all the neighbours were aware that he had been at Rorke's Drift and treated him with the utmost respect.

Charles John Robson died at St Nicholas Hospital, Plumstead on 19 July 1933, aged 78 years, having been taken ill several days earlier. The cause of death was recorded as cerebral embolism (blood clot on the brain). Six days later he was buried in a large common grave in Woolwich Old Cemetery, just down the road from Swingate Lane.

A memorial service held in honour of Charles Robson took place on 22 January 1993, and included the laying of a small wooden tablet commemorating his presence at Rorke's Drift on his grave. Attended by Robson's granddaughter and her family, Lieutenant Colonel Mike McCabe RE, representing the Corps, and 20 members of the Woolwich branch RE Association. The simple dedication service was read by Reverend Adrian Pollard from the Queen Elizabeth Military Hospital, Woolwich.

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The Old Portonians

G B CARTER ISO CBIOL MIBIOL

Gradon Carter began his civil service career in 1948 at the Ministry of Supply's Microbiological Research Department at Porton. He remained at what later became the Microbiological Research Establishment until 1976, when he joined the Defence Intelligence staff in London. In 1979 he returned to the Chemical Defence Establishment (now the Chemical and Biological Defence Establishment) at Porton, where from 1984-90 he was head of the Technical Intelligence and Information Section. Apart from earlier scientific papers on microbiological topics, he has published papers on Russian biotechnology, historical aspects of international defence collaboration, chemical and biological warfare and on Porton itself. He is the author of the 1992 Her Majesty's Stationery Office book "Porton Down: 75 years of chemical and biological research." He continues to pursue information research at Porton. In 1987 he was made a Companion of the Imperial Service Order in the Queen's Birthday honours list.

UNTIL recently it seemed reasonable that the description "Old Portonian" could be used generically for anyone who had formerly served at Porton Down; or indeed, in a slightly different sense, for any older and long-serving members of the present staff. However, papers have come to light which reveal that the term "Old Portonian" was first used quite specifically for those officers of the British Army who served at Porton Down during the Great War of 1914 to 1918 under the first Commandant, Lieutenant Colonel A W Crossley, CMG CBE FRS RE from 1916 to 1918.[1]

What is now the Chemical and Biological Defence Establishment (CBDE) at Porton Down, has its origins in the development of the British means to retaliate-in-kind after the German gas attacks on British and Allied troops on the Western Front in April and May 1915.[2]

The first British retaliatory gas attack was made at Loos on 25 September 1915 and gas continued to be used by both sides for the rest of the war. The realization that optimum effects could not be achieved solely by impressions of operational effectiveness and that the use of gas needed to be based on scientific principles soon appeared. The prime need was for a testing ground in the UK where scientific and military staff could apply such principles. Accordingly, a tract of Wiltshire downland near Porton was acquired in 1916. Originally known as the War Department Experimental Ground, it soon became the Royal Engineers' Experimental Station, Porton.

Porton pioneered gas warfare, and from 1917 anti-gas defence, during the Great War and did so on a considerable scale.

At the time of the Armistice, Crossley commanded 916 servicemen, 33 servicewomen of the Queen Mary's Army Auxiliary Corps, several hundred civilian workmen and one civilian scientist. Two months before the Armistice, on 16 September 1918, the station was visited by

[1] Arthur Crossley, as Professor of Organic Chemistry at Kings College, London, first became involved with chemical warfare as Secretary of the Chemical Sub-Committee of the Royal Society's War Committee and then as Secretary of the Ministry of Munitions Scientific Advisory Committee. In 1915 he was commissioned in the RE. In June 1916 he was posted to Porton to take charge and was appointed commandant in 1917. In 1919 he returned to London but later went to Manchester to set up the British Cotton Industrial Research Association laboratory, to be known by 1920, and still, as the Shirley Institute.

[2] A bibliography of papers and records dealing with CBDE and its precursors at Porton can be found in "Porton Down: 75 years of chemical and biological research" by G B Carter, HMSO London 1992. Since April 1995 CBDE has been a division of the Defence Evaluation and Research Agency (DERA) of the Ministry of Defence.

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King George V, a date which was to become of special significance.

The names of the officers at the time of the Armistice were recorded (and shown on the following page verbatim) in what has become known as the Crossley Report.[3] They and others who served at Porton, but departed before the Armistice, were the original "Old Portonians".

In 1992 CBDE was presented by Mr T R Hall of Yatesbury in north Wiltshire, with two valuable items; one a 15 carat gold[4] lucifer or vestas case presented to his father, Lieutenant Samuel Romilly Hall[5], by Crossley and bearing the inscription "SRH 1917-19 Porton" on one side and on the other "from AC". The other item was a battered attaché case containing the records of the "Old Portonians", which provided the first intimations that Crossley's officers had, in 1919, formed a group entitled the "Old Portonians" to perpetuate their wartime comradeship and devotion to Porton Down and to their Colonel Commandant. This group was extant from 1919 to the outbreak of the Second World War.

The complete list of "Old Portonians" derived from an address book and their yearly newsletters is as follows:[6]

L D H Acland	H W Metcalfe
A I Anderson	R W R Miller
R H Atkinson	P Murphy
J Barcroft	H Napier Rowlatt
A M Barnes	R C Orr
S Bird	C Palmer
A E Boycott	J F Payne Gallwey
E J Burns	R A Peters
D A Butterfield	S I Pettit
S V Cargill	J Rafferty
J A Carpenter	R M Rendel
H A Collins	E R B Roberts
A W Crossley	H J Robinson
E R Evans	J Savage
C A Garden	B Satow
Godber	J Shaw Dunn
E J G Hartley	C A C Stainer
S R Hall	E Stedman
G B Johnson	V C Sylvester
G E Jenkins	F G C Walker
H R Le Sueur	C Walker
A P Langton	C H Warner
R K Clymont	C G Woolway
J McLeish	G E Yarrow
P D McLean	

This portrait of Crossley was taken by Reginald Harding at the Royal Studios, High Street, Salisbury. The signature date may be misleading: by 1923 Crossley had been demobilized for at least three years and it seems unlikely that he would have returned to Salisbury, complete with uniform to sit for this photograph. Also, he is shown wearing solely the ribbon of his 1917 CMG. The 1918 portrait in oils by Stainer shows the ribbons of the CMG, CBE together with Service and campaign medals. This suggests that the photograph was taken between 1917 and 1919 and a copy signed in 1923. The version shown here with caption and the date of Crossley's death was printed for distribution to the "Old Portonians."

The "Old Portonian" records include printed annual or six-monthly newsletters, correspondence from members and Trocadero Restaurant, receipts, bills, newspaper cuttings and a few photographs. The records are far from comprehensive

[3] The "Crossley Report" written in 1919 and now in the Public Records Office (PRO) as WO 142/265 is Crossley's account of "The Royal Engineers Experimental Station, Porton" from its inception in 1916.

[4] The 15 carat standard was abandoned in 1932.

[5] Lieutenant S R Hall was "Officer i/c Transport" at Porton. Stephen Romilly Hall was a director and sometime chairman of the once well-known Bristol firm of John Hall and Sons (Bristol and London) Ltd which was founded in 1788 and became celebrated in the decorative glass and paint trade and notably as manufacturers of "Brolac" paints. Mr T R Hall, his son, was also a director of this family company.

[6] Not all the names on the list of the 1919 "Crossley Report" appear here, although notionally the "Old Portonians" embraced all officers who had served at Porton up to the date of the Armistice.

Commandant and Superintendent of Experiments	Lieutenant Colonel A W Crossley, CMG FRS RE
Assistant Commandant	Major H Napier Rowlatt, Manchester Regiment

ADMINISTRATIVE

Camp Quartermaster	Captain J Rafferty, Connaught Rangers
Medical Officer	Captain P D McLean, RAMC
OC Experimental Battery	Major R M Rendel, RFA
OC Experimental Company RE	Captain J McLeish, RE
	Lieutenant K C Orr, RE
OC Detachment RASC	Lieutenant C G Were, RASC
OC Detachment RDC*	Lieutenant G E Jenkins, RDC
OC Labour Corps	Major E J Harbottle, RFA
	Lieutenant E R B Roberts
Officer i/c Messing	Lieutenant S Bird, Worcestershire Regiment

WORKS DEPARTMENT

Assistant Superintendent of Experimental Grounds	Major J Payne Galliwey, RE (late Northumberland Fusiliers)
Deputy Assistant SEG	Captain H W Metcalfe, RE
Assistant DASEG	Lieutenant H A Collins, Middlesex Regiment
Divisional Officer RE	Captain G Woolway, RE
Mechanical Department	Lieutenant S J Pettit, RE
	Lieutenant H J Edmunds, Welch Regiment
Officer i/c Transport	Lieutenant S R Hall, General List
Officer i/c Agriculture	Major R K McClymont, RE
Officer i/c Stores & Magazine	Captain H J Robinson, RE
	Lieutenant B T Satow, RGA
Officer i/c General Construction	Lieutenant W R Cowell, RE

EXPERIMENTAL OFFICERS

Officer i/c Chemical Laboratory and Anti-Gas Department	Captain P Murphy, RE
Assistant Officer	Lieutenant E Stedman, RGA
Officer i/c Physiological Laboratory	Mr J Barcroft, CBE FRS**

ASSISTANT OFFICERS

Pathology and Toxicology	Major A E Boycott, FRS RAMC
Field Experimental Work	Captain R A Peters, MC RAMC
Histology	Captain J Shaw Dunn, RAMC
Toxicology	Captain C H Warner, RAMC
Therapeutics	Captain G H Hunt, RAMC
Administration & Field Experiments	Lieutenant C B Johnson, RE
Toxicology and Field Experiments	Lieutenant A I Anderson, General List
Artist	Lieutenant C A C Stainer, RGA
Officer i/c Artillery Experimental Work	Major R M Rendel, RFA
Assistant Officers	Major R K Hewer, MC RFA
	Captain E C Sylvester, RFA
	Captain E J Burns, RFA
	Lieutenant E R Evans, RFA
	Lieutenant A M Barnes, RGA
	Lieutenant R K Broader, RFA
Officer i/c General Field Experimental Work	Major F G C Walker, MC RE
Assistant Officers	Lieutenant C Walker, Lancashire Fusiliers, (Special Brigade RE)
	Lieutenant G E Yarrow, Northumberland Fusiliers, (Special Brigade RE)
Staff Officer to the Superintendent of Experiments	Lieutenant R W R Miller, RE
Officer i/c Statistics	Lieutenant J F Savage, MC RE
Attached Officers	Captain L H D Acland, MC, RE
	Capt N P McLeland, Royal West Kent Regiment (Special Brigade RE)

* Royal Defence Corps, a short-lived home service body of more elderly or wounded troops.

** Joseph Barcroft (1872-1947) was the sole civilian scientist at Porton during the Great War: this famous Quaker physiologist resisted all attempts to put him into uniform.

but provide a picture of a peculiar *ésprit-de-corps*, which persisted between the world wars.

Whilst the history of chemical warfare, chemical defence and Porton Down is well known, the story of the "Old Portonians" has hitherto escaped notice. The earliest intimations appear in a printed circular headed "RE Experimental Station, Porton" and dated 10 August 1919, from James McLeish, described as the Honorary Secretary, and sent from his home address in Middlesex. This shows that an April 1919 meeting of officers at Porton had agreed to hold an annual reunion of "those officers who were actually members of the Porton staff up to the date of the Armistice" and that the first dinner would be held on 16 September 1919 at the Trocadero Restaurant, Piccadilly Circus.

A two-page printed newsletter dated 14 October 1919, from McLeish, shows that the title "Old Portonians" was agreed at the dinner. It briefly describes the dinner, gives news of absent members and fixes the annual subscription at 2/6d. It is evident that some guests were also present, since it was decided that no guests be invited to the next dinner. The newsletters and the correspondence have the idiomatic style of humour which is encountered in old volumes of "Punch". Emotion and sentimentality are profusely evident, centered about what appeared to have been, during their years at Porton Down, a period of camaraderie with great devotion to a cause, and to their Colonel Commandant.

In October 1920, Arthur Crossley sent out a printed circular to members from the Shirley Institute at Manchester. This is remarkable for its emotive message, recalling the visit of the King, the "body of men working in perfect harmony as one man, each one with a single purpose in his daily work ... to ensure that through our united effort, Porton should be the best and most powerful of its kind. That is what made us all gradually get to love Porton; not the place, that is still there; not the camp, which is still there, though lifeless; but the effort 'Porton' (sic) which we made and that will always live in our memories". The main purpose of the circular was to admonish absentees from the first dinner. "You were not, however, in your place when you were wanted. Horrid thought, an 'Old Portonian' marked 'Absent from duty' ... Personal convenience does not enter into the question; Porton was an organized effort; you took part in it; you must help to commemorate it; we all want you to be among us". Crossley concludes "My love together with this chiding".

The newsletter from McLeish dated March 1920 shows that most "Old Portonians" are now demobilized; although Carpenter "is sporting his red tabs in GHQ France" and Rendel and Rafferty are evidently still at Porton. One valuable revelation in this newsletter is that E R B (Beno) Roberts was the builder of the Porton light railway.[7]

The second annual dinner was held in 1920 and reported in an undated printed newsletter from McLeish. It becomes evident here that Crossley had devised a toast "The Porton that we knew and loved so well"; this continued to be used until Crossley's death. "Murphy is still at Porton ... Carpenter is on 'disposals work in France' and a twice-yearly dinner is proposed."

The third dinner, probably in April 1921, was reported in an undated newsletter: this shows that Rafferty and Le Sueur are dead and that Crossley was prevented by illness from attending. Rendel was still at Porton. Anderson "reports a kink in his breathing mechanism. Puts it down to some of his 'orrible 'abits at Porton". The fourth dinner was on 16 September 1921 and is reported in a newsletter dated Christmas 1921. Barcroft is revealed as in Peru; Carpenter is still in the Royal Engineers at Chatham. A photograph album of "Old Portonians" was proposed; some few photographs were eventually sent to McLeish for this purpose but, regrettably, most have no indication of identity. The proposal for multiple copies foundered but at the fifth dinner, reported in a November 1922 newsletter, Crossley proposed that one album be prepared, to be held by the secretary, circulated in rotation and passed around at the dinners. Murphy "is still at the old station carrying on the good work. If we have another war Murphy, don't tell them I was at Porton for they might want me to join up again".

The sixth dinner attended by only 13 "jovial spirits" was reported in a newsletter dated November 1923. Crossley reported on his recent visit to Porton and his feeling that "the present and future officers of the station would greatly appreciate some permanent reminder of those who made the place". It was agreed that some piece of plate be subscribed for by the "Old Portonians" and that the commandant of Porton

[7] The Porton light railway is of particular interest to military railway buffs, notably because its history is poorly documented: at least one authoritative source has concluded that it was planned but never built. A brief description and some illustrations appear in the book referred to in note 2.

The Porton light railway; approaching the main line station at Porton.

be invited to accept it at the next dinner. The death of Lieutenant C B Johnson is reported.

The newsletter of October 1924 shows that at the seventh dinner in September, Colonel S W H Rawlins of Porton received a "large silver cigar and cigarette casket engraved on the rounded lid with the RE Badge and the following inscription "Presented to the Officers of the Experimental Station, Porton, by the Officers of the original Establishment" and the inscribed names of the "Old Portonians".[8] The death of Captain Pettit, is reported and the number of members is 35. R A Peters is now a Cambridge professor and "Hookie" Walker appeared at the dinner after five years in Shanghai.

There are no newsletters between 1925 and 1931 though there is every likelihood that these were produced. Correspondence reflects the anguish of the "Old Portonians" at the death of Crossley on 5 March 1927. An undated typed circular from McLeish announces the death and includes a photograph of Crossley taken whilst at Porton. McLeish observes that the "Old Portonians" celebrate 16 September as a special day and adds the suggestion that on each 5 March the photograph "be taken out and gazed upon so that the memory of our late chief might be kept fresh in the minds of us all". At Crossley's funeral at Manchester Crematorium on 9 March, "the Old Station was represented by Hall and Yarrow together with RSM Packer, Corporal Irving and Sapper Conway".[9]

A typed circular from McLeish dated 15 February 1928 recounts discussions held at the tenth dinner on 17 September 1927 on a suitable memorial to Crossley. It was decided to place a brass memorial plate in Idmiston church, "the scene of the Colonel's last church parade", to get C A C Stainer to paint a portrait in oils for the Porton Mess and to arrange the 1928 dinner at Porton. In the event, the brass plate was erected in the hutted garrison church in Porton Camp: when this was demolished in the late 1950s the memorial was re-erected in the main entrance hall of the HQ building at Porton. A portrait of Crossley never appears to have been hung in the Porton Mess: nor indeed, is there evidence that Stainer painted a second portrait of Crossley. A portrait in oils by Stainer was subscribed for, and presented to Crossley, by the officers at Porton in 1918 and hangs today in the office successively occupied by commandants, chief superintendents, directors the director general and now the managing director.

At the thirteenth annual dinner on 13 September 1930, 12 "Old Portonians" were present, two on leave from Jamaica's Public Works Office and tin mining in West Africa: five other "Old Portonians" were scattered in other countries of the Empire. After Crossley's death, the chair at the dinner was taken by J F Payne-Gallwey, usually referred to in newsletters as "PG" but from newspaper cuttings amongst the papers and contemporary records, it is evident that in 1916 he became Sir John Frankland-Payne-Gallwey,

[8] This box is displayed at CBDE together with other silver of the one-time officers' mess which existed at Porton from 1916-1979. S R Hall's presentation gold matchbox has been displayed next to the "Old Portonians" box.

[9] Information on the WOs, NCOs and other ranks at Porton in the Great War is extremely limited, although it is evident from a 24 August 1918 sports' day programme that at least five RSMs of the RE were stationed there, including RSM Dobbs, who was probably the first soldier to appear at Porton on 7 March 1916. At this sports' day, the band of the Army Veterinary Corps, Bulford, rendered selections, supported at intervals by Porton Camp Orchestra. The Inter-Unit Sports' Shield was won by the Experimental Company RE. Kent's "History of Porton" (PRO WO188/802) records that at the time of the Armistice there were 12 WOs, 29 sergeants and 861 other ranks at Porton. Curiously, Kent does not refer to the single officer and 33 other ranks of Queen Mary's Army Auxiliary Corps listed by Crossley in his 1919 report (note 3). Formerly the Women's Army Auxiliary Corps, this Corps was stood down soon after the Great War. It can reasonably be seen as the precursor of the Auxiliary Territorial Service and the later Women's Royal Army Corps, which are also now defunct.

The Royal Engineers building the Headquarters building in July 1918.

(having succeeded his uncle, as the fourth baronet) and was later a director of the General Mortgage Society (Great Britain) Limited. A cutting also reveals that his wife "the well-known social worker" was occasionally enlisted by Vernons to present cheques to pools winners.

By the sixteenth annual dinner in 1933 only seven of 33 members were present. McLeish had died in 1932 and R H Atkinson became secretary. The death of Major Garden was also reported. In April 1935 the newsletter reports eight members dining in September 1934 and that a fund in memory of McLeish had raised £470 to be invested for Mrs McLeish. Robinson's death in Johannesburg is reported, as is the election of Peters to a Royal Society Fellowship. The December 1935 newsletter reports the knighthood bestowed on Joseph Barcroft and the attendance of eight members at the eighteenth annual dinner. In 1936 and 1937 the members present at the annual dinner was still small. In 1937 Murphy died; "in 1926 he resigned from his post at Porton and devoted his attention mainly to literary work dealing with the problems of gas defence ..."[10]

No newsletters beyond that dated October 1937 are present and few papers exist thereafter. In December 1939 Atkinson wrote to S R Hall in Bristol expressing his thanks that the latter had agreed to take over the "Old Portonian" records. A few days later, S R Hall wrote to Atkinson to confirm the safe arrival of the papers and also a balance sheet showing a credit of 14/11d. It seems reasonable to conjecture that the "Old Portonians" never met formally together again, although a few such as Peters, Barcroft and Hartley returned to Porton for periods during the Second World War and maintained contact through their membership of advisory committees. It is providential that the meagre records of the "Old Portonians" were safeguarded, until his death in the 1960s, by S R Hall and thereafter by his son. It is unlikely that any of the "Old Portonians" are still alive; if any are they must be in their late 90s or be centenarians. Some became notable in differing spheres, at least three were knighted and three were Fellows of the Royal Society. Others had obviously satisfying careers and some others appeared to have lost contact with their colleagues at an early stage and we know little of their later life. Doubtless, research would enable more biographical data to be assembled on their roles before and after their service at Porton. Their corporate achievements during the Great War as pioneers in gas warfare and anti-gas defence is well documented.[11] The way in which they attempted thereafter to perpetuate that now almost unfathomable *ésprit-de corps* established at Porton under Crossley has not been described hitherto. It seems eminently fitting that these military founding-fathers of what is now CBDE, Porton, should be briefly remembered through the pages of *The Royal Engineers Journal*.

[10] Major Murphy was Director of Experiments at Porton from 1921-1925. In the *Army, Navy and Air Force Gazette* of 1 February 1934 in which he has an article entitled "Chemical War", he is described as the author of "Armadas of the Sky".

[11] The 7798 reports producted at Porton during the Great War are in the Public Records Office as WO142/209-211 (Colonel Commandant, Porton (CCP) Series)

Facing the Future with Confidence – HQ ARRC Reaches Operational Readiness

BRIGADIER J D MOORE-BICK OBE MA

Since the publication of his last article in the Corps Journal, Operation Granby, Preparation and Deployment for War, *in December 1991, the author has been recycled through the Multinational Airmobile Division Trial, spent three years in London as Colonel Army Plans and is at present Chief Engineer of the Allied Command Europe Rapid Reaction Corps.*

Introduction

April 1995 marks the date set by Supreme Allied Commander Europe (SACEUR) for reaching operational readiness targets set over three years ago for HQ Allied Command Europe Rapid Reaction Corps (ARRC) and its assigned forces. Much has been achieved against a background of constantly changing international military evolution and new demands on assigned forces. Institution members will have read many articles in support of and critical of the UK's framework role within the ARRC. The author, together with several other prominent sappers, was involved in the concept of ARRC from its earliest days at the Ministry of Defence and is now serving as Chief Engineer in the Corps' headquarters. In this article he presents a flavour of the operational readiness state that has been reached and an assessment of the challenges ahead.

Headquarters' Staff

Gathered in Bielefeld and moved to Rheindahlen in April 1994, the headquarters' staff is well established with a stable, multinational composition. In general, nations have sent their most competent staff with impressive language skills. Some have been with the ARRC since its inception and it will be a continuing challenge to maintain calibre and language fluency with future rotations. Better access to British staff and language training facilities would provide valuable assistance and strengthen loyalties. Provision of junior support staff remains a difficulty, both for those nations retaining conscription or short-term regular service, and those with fully regular personnel. Integration of the international staff is generally impressive with the British way of doing things, from the full-fried breakfast on exercise to ATD (annual training directives) skills training being accepted, adapted and adopted amicably. Discrepancies in conditions of service, working hours, leave, overtime and the like cannot be ignored, nor can the running sore of British charging regimes, despite some recent ameliorations. Yet, generalization in working practices would overlook the exemplary commitment and expertise of individuals from every nation. Sports, the social round, operational reconnaissance and contingency planning are duly shared in a spirit of cooperation, with some outstanding allied performers. There can be no denying however, that a strong thread of Anglo Saxon staff work forms

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the foundation of the headquarters and that particular responsibilities, duties and workloads fall accordingly, sometimes deliberately, sometimes by default. Clear objectives, precisely defined and consistently monitored are essential to officers working for the first time in a foreign language, but is this not also true for national service?

Exercises and Operations

Operations, plans and detailed reconnaissance for Balkan employment have driven the evolution of the headquarters' operational capability, and have been invaluable in unlocking resources for travel, exercises, ADP (automatic data processing) and not least flexibility on the part of individuals and contributing nations. Nevertheless, the completion of Exercise *Arcade Fusion* and the BALTAP (HQ Baltic Approaches) Exercise *Chinese Eye* at the end of 1994 tested the ability of the headquarters to command subordinate divisions and corps troops, albeit in CPX (command post exercise) mode, in a major regional conflict. Both drew in the wide range of external agencies germane to the corps level, and, not least, quantified the communications and liaison requirements from superior and host nation staffs. Deficiencies are evident in both of these latter areas, with major implications for those authorities which might take command of an ARRC deployment. These two exercises found the headquarters in building mode and the air of concentrated industry with the corps' main staff in one hangar, clearly impressed the by now normal crowds of high and very high ranking visitors. Nevertheless, this mode must be the exception rather than the rule. Subsequent headquarters' builds during exercises, concentrating on peace support operations in the winter months, have used the well-tried box body truck. To the author, having used a variety of armoured command vehicles/office trucks/Land Rover-mounted and tin shed headquarters, the latest design is the most battle-friendly yet.

The culmination of the winter exercises was a ten-day computer assisted exercise at the Warrior Preparation Centre (WPC) at Ramstein with the battle command training programme staff from Fort Leavenworth to monitor and judge. HQ ARRC came out with a glowing report amongst the best performers at WPC so far, not only giving encouragement to the staff, but, even more so, to those who may employ the headquarters or put troops under its command.

Work in the Headquarters

Briefing of high profile visitors is a never-ending commitment, widening to ambassadors, foreign office officials and officers from national command headquarters. For the bulk of the staff, the establishment of concepts, standing operating instructions and procedures are largely complete or at least at the stage where routine revision and re-issue are the requirements. Policy is generally established, the keystone of this being the memorandum of understanding governing the staffing, operating and financing of the headquarters, signed in October 1994 after three years of tough negotiation.

Having got our own house in order it is now time to turn our attention to assisting assigned formations and units in training and evaluation. Restructuring continues in many nations, often beginning again before the last phase is complete, causing us continued uncertainty as to where to find authorized and competent points of contact. Some allied training establishments are requesting advice and assistance in writing and running multinational exercise scenarios, ARRC-based, whilst ARRC concepts and procedures are being adopted as lower level standardization models.

Travel is a predominant feature of staff life: in addition to visiting liaison staff with UNPROFOR (UN Protection Force) and having copious dealings with Supreme Headquarters Allied Powers Europe and Allied Forces Southern Europe for Balkan affairs, attending special to arm exercises, giving lectures to courses, and carrying out reconnaissance for SACEUR's reinforcement and crisis management plans, these all conspire to keep us away from Rheindahlen.

Relationships with the French have blossomed, with an easy chemistry unknown at diplomatic and political levels in NATO (North Atlantic Treaty Organization). Staff training must claim its due proportion of time as befits a field command headquarters: operational IT (information technology), C^2 study periods, and predeployment military training, must all be crammed into a full programme. However, so too must adventurous training, physical training and sports, and welcoming visits to assigned units. The rhythm of life is irregular, guaranteeing to foul evening classes, club and society meetings and domestic expectations alike – perhaps this is a natural concomitant of a reaction force headquarters, but it is one still to come to terms with.

HQ ARRC Main in Denmark.

Assigned Forces

Each assigned unit or formation sees its relationship to HQ ARRC differently. All are committed to national operations or responding to national imperatives which compete with the ARRC command status of coordinating authority. For many, links to the ARRC are vital for readiness, and equipment and personnel resourcing; for others, the ARRC relationship is at best poorly understood. In some cases, symbols on organizational diagrams and Defence Planning Questionnaire responses are not backed by a specific unit with a known point of contact. There is, nevertheless, a noticeable wish to tie in closely with the ARRC concept of force packaging as a reflection of the requirement for future operations to be in alliance or coalition. There is general acceptance that the mutual understanding developed and developing in the ARRC, the cross links and bilateral plans that fall out of study days, and exercises and national planning periods, have their utility in Article V and non-Article V operations. Simply put, the ARRC is, for most participating nations, the mainstream military organization. In the engineer world, of which more below, we are loyally supported by many commanders who wish to carry out activities with us and generally commit people and resources in order to do so. One area of disappointment remains the failure to establish Multinational Division (South) where the politics of the Mediterranean confound the attempts of military men to put together an ambitious formation from Turkish, Greek and Italian brigades.

ARRC Engineers

The term "ARRC engineers" describes more correctly a sphere of professional interest rather than a fixed order of battle. Focal point for ARRC engineers is the *Acrobatic* series of exercises; *Acrobatic Cruise* is an interoperability exercise for junior instructors held twice a year, one north of the Alps, one south. It includes a convention of commanders, trainers, inspectors and staff officers, for an informal meeting, observation of training, and demonstration of host nation unit skills. This is then built on after the autumn exercises, at the end of the year, by Exercise *Acrobatic Dawn*, the chief engineer's study period, which reviews the year's activities of assigned units, discusses the state of training and development, and determines where the requirement for future work lies. In the absence of any clear focus for military engineers in Allied Command Europe (ACE), *Acrobatic Dawn* provides an essential hub to NATO military engineer activities. Officers from all ACE major subordinate commands and principal subordinate commands are welcome to attend these exercises, and the recent addition of UNPROFOR and EUROCORPS (European Corps) representatives to our numbers has been most welcome.

Interoperability training is, of course, done in several other undertakings. Above all the Euro NATO Training Engineering Centre (ENTEC), with its imminent expansion, is fundamental to ARRC engineers, and ARRC-based scenarios form the heart of the ENTEC MAPEX (map exercise). Several headquarters of the integrated military structure exercise their assigned units in interoperability and it remains a future challenge to ensure that maximum effectiveness is gained from our separate undertakings, and that all nations and formations have access to such combined ventures. Others include the Partnership for Peace nations of eastern Europe, but we do not intend to include these, believing that the circle would become too wide to manage with purposeful, operational results.

Assigned engineers at corps troops level comprise British regular (33 Engineer Regiment (EOD)) and TA (71 Engineer Regiment, Royal Monmouthshire RE (Militia)) units and the Military Works Force, (both regular and TA), the Dutch 11th Engineer Battalion, the Italian 6th (Trasimeno) Battalion and a Turkish combat engineer company. While some units in this package have operational limitations, because the troops are subject to other competing "earmarks", the principle is well established that a range of combat and construction capabilities at corps level is an indispensable component of an operational force. Thus for recent planning, an all-regular force from three nations has been sought and offered, with one combat-heavy and two construction-heavy battalions.

Exercise *Chinese Eye* HQ ARRC MAIN in Hangar mode.

ARRC engineer procedures are not fixed to a predesignated orbat, rather, there is the acknowledgment that engineering capabilities, regular, reserve, NATO, non-NATO, military, civilian, host nation or imported commercial contractor, can all be harnessed and focused to achieve COMARRC's (Commander ARRC's) mission. Command and control of this provides a unique challenge, but the will of such a wide variety of engineers to work together is not in doubt and current experience gained in the course of UN operations is encouraging.

Conclusion

If this account is optimistic it is because that is the tone of the headquarters. Concentrating on exercises and operations has allowed the headquarters to break away from the policy-dominated procedural approach necessary to set the ARRC on its way. Completion of a memorandum of understanding has given a firm resourcing pattern to life. There are however grey areas and it would be wrong to overlook these. First, question marks continue to hang over NATO's ability to reconcile its members' foreign and military policy goals, one to another, to decide unanimously to react with military force. While unanimity may be difficult, we should at least bank on nations not exercising any veto on ARRC deployment. If nations should, *in extremis*, withdraw their staff, replacements from internal or external sources could be found.

The exception here is of course the UK with its framework liability for any ARRC deployment. The ability to bring in French officers, the developing air links through the growing Air Operations Coordination Centre, and the wide spread of expertise and experience would give resilience to the headquarters to weather out non-deploying staff contingents.

Allied to the question of political consensus is that of the equitable sharing of the burdens of a reaction force deployment. The principle must remain that all allies contribute – if not with troops, then with stocks, transport or material – an especially important aspect to sappers needing general corps and theatre contingency stocks not included in the unit scales of deploying troops. The next concern must clearly be the transport capacity to move a tailored force package to a crisis area and sustain it there. No easy answer exists, but the military and civilian aircraft and ship fleet alliance-wide has a considerable capacity to service initial deployment. Full deployment of the ARRC with four divisions currently appears a less likely worst-case scenario but deployment with smaller force packages will still need substantial numbers of suitable military transport aircraft and ships to provide a quicker, guaranteed response. This is the "force multiplier" area in which investment is likely to be rewarded most, and that message appears to be well understood in the UK.

The headquarters itself has reached equilibrium, but an establishment review is pending. This may not involve fundamental change, nevertheless local branch adjustments are likely. Some allies

have not been able to fill junior positions and will be anxious to be relieved of such posts. Others face arbitrary cuts in overseas posts causing allied employing officers considerable headaches. Language training remains fundamental to our business, English for allies, and other languages for the British, for both man and wife – fundamental to social life and courtesy in a multinational headquarters, but demanding funding and time for teaching. There are still some cultural difficulties to be overcome; the officers mess, whose institutions and rules we take for granted, is a very foreign being to our allies and we have to be prepared to re-examine and explain why we do things – or change the way we do them. The encouraging side of such questions is that common ground is usually identified quickly.

After three and a half years of building, the headquarters is a success; the willingness of allied officers to work together is encouraging, the spark and vitality of the mix of officers is impressive. Multinational working is not the most effective method of military command and staff work, but it is that which is likely to be politically acceptable and it can be made militarily acceptable. In practice, the presence of high quality officers brings unique types of operational experience from a wide range of national, allied and UN deployments. Operational communications support and the support of the UK-manned support battalion is first class, with high motivation and improved equipment (Intermediate ARRC Information Systems) in the pipeline. Whether HQ ARRC will deploy in the near future remains unknown; what is clear, however, is that it is prepared and trained to do so and has so far met the requirements laid upon it.

Operation Overlord

The United States Army's Engineer Planning and Preparation for the Normandy Invasion

MAJOR R J FAGAN UNITED STATES ARMY

Major Fagan is currently serving in the United States as the Deputy Commander, Detroit District, United States Army Corps of Engineers. He served as the United States Army Exchange Officer in the Command Wing of the British Army's Royal School of Military Engineering at Chatham from June 1993 to July 1995. Previous assignments include: Operations Officer, Department of Instruction, and Team Leader, Engineer Officer Advance Course, United States Army Engineer School; Company Commander 55th Engineer Company (Medium Girder Bridge); Civil Engineer, Assistant Operations Officer, Operations Officer, S-4 (Quartermaster) and Battalion Maintenance Officer in the 34th Engineer Battalion (Combat) (Heavy); Platoon Leader and S-4 in the 23rd Engineer Battalion of the United States 3rd Armored Division.

The following is a much edited extract of the full report now lodged in the Royal Engineers Library.

Background

PLANNING for the cross channel invasion of Europe actually began in early 1942, under the codename *Roundup*, and was planned for spring 1943. The Allies hoped to prevent the defeat of the Red Army until at least the spring of 1943 by bombing Germany and assisting with the flow of material to the Soviet Union. Had the Soviet Union collapsed sooner, the Allies might have been forced to invade the Continent in 1942, and a contingency invasion plan for this was drawn up under the codename *Sledgehammer*.

The British had "deep misgivings" about a cross channel invasion in 1942, mainly due to their concerns in the Middle East and the severe damage that Rommel's Afrika Korps was inflicting on the British Eighth Army. Nevertheless, the build-up of US forces in the UK began in mid-1942.

Both the British and the Americans felt that the 1943 invasion was a "logistic impossibility," and that *Sledgehammer* could not be executed either and so these were abandoned in favour of a landing in French North Africa (Operation *Torch*).

The US Chiefs of Staff (COS) undertook to help in the Mediterranean only if Britain agreed to invade the European Continent. The Combined COS considered that the build-up would take until spring 1944, and the invasion, named Operation *Overlord*, was planned for May of that year.

A quick look at the resources available at the time reveals why the Allies abandoned *Sledgehammer* and *Roundup*. In 1942 the British had 13 fully-trained divisions and the US no more than three divisions capable of being put ashore. Landing craft availability was the problem; there was sufficient for only 4000 men, less than one-third of a division.

The Build-Up – Operation Bolero

DUE to a build-up of US forces in the Pacific and various other overseas stations, the first shipload of American troops did not actually board until June 1942. Known as Operation *Bolero*, by August only 170,000 American troops were in or on their way to the British Isles. By the summer of 1943, however, the pace was increasing.

The logistical requirements of troops arriving on UK soil was staggering. Each formation needed camps, trains, training assets, rest areas, and supplies. Armoured and infantry units alike required their respective weapon ranges. Logistical planners determined that each armoured division would require 386,000 ship tons and that an infantry division would require 270,000 ship tons. Likewise, the logisticians determined individual needs. For instance, each man was allocated one ounce of sweets, two ounces of cookies, and one package of chewing gum for the initial invasion; the totals worked out to 6250lb of sweets, 12,500lb of cookies, and 100,000 packs of gum.

American Army engineers were vital to the success of *Bolero*, but were not without their

problems. By July 1943, only 75,000 engineer troops had reached the UK, and only five per cent of them had any equipment. After a major "overhaul" of the engineer supply system, equipment was received within seven to ten days of arrival, which helped, but as late as September 1943 engineers had 1000 fewer dump trucks than required by the tables of organization. Heavy construction equipment, augers, semi-trailors, angle blade dozers, generators, engineer hand tools, and asphalt paving equipment were all in critically short supply. The backlog was amazing – on 30 April 1943 it stood at 79,832 ship tons, by the end of August the figure had risen to 124,224 tons. With this shortage of equipment, the fact that engineers were still able to perform any of their *Bolero* construction missions at all is impressive.

Obviously the shortage hampered the engineers' construction efforts. At the beginning of 1943 no hospitals had been built and 14 camps had not been completed. Of the 12 airfields and ten depots on the construction list, none were more than about 25 per cent complete. All of the construction plans had to be redone to British standards requiring War Office approval. British red tape and the difficulties in obtaining construction materials and supplies cut effectiveness to 30 per cent.

Facing the possibility that construction was not going to be complete before the engineers had to be released for actual D-Day assault training, US officials revamped procedures and by May 1944 approximately 95 per cent of work was complete.

Engineer combat battalions were scheduled to help in the construction effort from July until December 1943, when they were to be released to prepare for combat. This period was extended to January however, and additional units gradually added until, in December 1943, the total number of engineer troops being used for *Bolero* construction projects was as follows:

September 1943	40,436
October 1943, up to	49,000
November 1943, up to	55,027
December 1943, up to	56,000

and construction effort reached its peak in March 1944, when 61,000 were being used. In May, one week before the invasion, 13,794 engineer soldiers were still doing *Bolero* construction projects.

Command and control for higher engineer HQ was, at best, difficult. The 1323rd Engineer General Service Regiment had units scattered across an 80 by 200-mile long stretch of the UK. The 346th Engineer General Service Regiment did not assemble for combat until April 1944. Likewise, from July 1942 until December 1943, no unit larger than a battalion, for the 342nd Engineer General Service Regiment, was ever in the same area.

Overall Planning

Detailed planning for the Normandy invasion began in July 1943. The chief planner was British Lieutenant General Frederick E Morgan. Morgan was designated the COS for the Supreme Allied Commander (COSSAC) for the yet to be named Supreme Allied Commander.

Morgan and his staff drew up several contingency plans, but the basis for the final *Overlord* plan was delivered to General Eisenhower, the Supreme Allied Commander designate, in early 1944. The overall ground commander was to be General Montgomery, the British 2nd Army was to be commanded by Lieutenant General Sir Miles C Dempsey, and the 1st US Army would be commanded by Lieutenant General Omar Bradley.

When the three-division wide attack plan was presented to General Eisenhower, he thought it was too weak. His private thoughts were, "My God, if I was going to do it I would want ten or twelve divisions."

The plan called for a three-division wide assault on a 20-mile wide front. Montgomery and Eisenhower agreed on a five-division front, 50 miles wide, which called for three infantry divisions in the initial assault with two follow-on infantry divisions. Additionally, two airborne divisions were to conduct a vertical insertion. A further 20 divisions would come later after the initial bridgehead had been established.

Existing port facilities needed to be captured and fighter cover had to be considered. Clearly Pas de Calais had the best port facilities, but the Germans knew this and it was therefore the most heavily defended. The Normandy coast offered the best alternative and was therefore chosen; it was less heavily defended but had no major ports and exits from the beaches were more difficult.

The assault area was extended to the east to encompass Caen, to gain a foothold on the Cotentin Peninsula and to get a head start on securing Cherbourg and its port facilities. Airborne operations were stepped up as well. Two airborne divisions would drop in on the right flank and one on the left flank. Due to landing craft availability, a 1 May assault was postponed until 5 June.

Since Pas de Calais seemed the obvious choice for an invasion, the Allies created a massive deception plan named Operation *Fortitude,* to trick the Germans. "Deliberate" leaks, "careless" talk in neutral embassies, and "false" radio traffic all helped paint the picture. One great bluff was the actual floating ashore of a dead Allied pilot who carried "operational plans" of the invasion. The deception worked and the Germans defended Calais much more heavily than they did the Normandy coast line.

Planning for the Assault

From the onset and initial planning stages of *Overlord* it was obvious that engineers were to play a key role. They would have to clear water and beach obstacles, and mark lanes through the heavily defended beaches to the exit points. Special engineer brigades were specifically created to organize the beaches for follow-on forces and handle the logistic build-up necessary to sustain the assault.

The plan called for VII Corps, with 4th Infantry Division leading the assault, to go ashore at Utah Beach. V Corps would assault Omaha Beach with 29th and 1st Infantry Divisions. Patton's Third Army would advance through First Army after the beachhead was secure and would clear Brittany, seize St Nazaire, then cover the southern flank while First Army went northeast.

For all of this to be successful, a good engineer plan was necessary. Detailed planning began in mid-March 1944. Troops available were divisional combat engineer battalions, corps combat engineer battalions, 1st, 5th, and 6th Special Engineer Brigades, and 16 naval combat demolition units (NCDUs). Each NCDU consisted of five enlisted men and one officer. NCDUs were trained to paddle to shallow water, wade to shore dragging explosive-filled boats, and clear beach obstacles.

By 9 April First Army still had no real plan other than that the engineers would have to clear the beaches "ahead of the tide". V Corps had submitted a plan calling for an engineer group consisting of two combat engineer battalions and 20 NCDUs. VII Corps' plan was similar but on a slightly smaller scale.

The plan for Omaha was to clear 50-yd gaps, each sub-sector of the beach having two gaps except for the easy red sub-sector which would have six. Boat teams of 35-40 combined army/navy personnel in LCM (landing craft medium) would conduct the assault on the beach obstacles. An assault gapping team consisting of 27 men (one officer, 11 combat engineers and one NCDU) would go ashore first. The NCDU would be augmented to 13 by attaching five army engineers and two seamen to handle the explosives and rubber boats. The assault team would be followed by eight support teams (one for every two assault teams) of about the same composition. Each assault team would be supported by a tank dozer. All boats would carry 1000lb of explosives, demolition accessories, mine detectors, and gap markers. Two command boats would comprise the rest of the flotilla.

The VII Corps engineers plan for Utah Beach was similar. Eight 50-yd gaps (four in each of the two landing sectors) would be developed. Boat teams consisting of 12 NCDUs (one officer and 15 men, augmented with five army engineers) would go forward in 12 LCVP (landing craft-vehicle and personnel). Their mission was to attack the seaward band of obstacles. Meanwhile, eight army demolition teams, consisting of one officer and 25 enlisted men each, would go ashore in eight LCM, to develop the lanes. Four reserve demolition teams would follow.

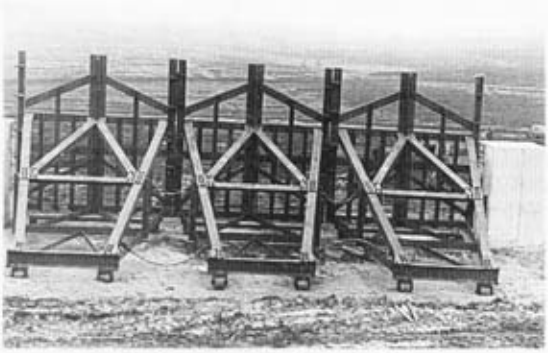
First Army's directive concerning the beaches was: "Assault teams must clear the beaches rapidly and pass through beach defenses as quickly as possible to establish positions in depth and leave beach defenses to be mopped up by support waves."

A very useful innovation called a "Hagensen Pack" was developed to breach the "Belgian gate obstacles" erected by the Germans. It was a sausage-like pack of 2lb of composition C-2 in a waterproof bag with a hook on the end. When connected to the ring main of prima cord the packs exploded simultaneously and made the gate fall over. Sail makers throughout England sewed 10,000 Hagensen packs for the Normandy invasion.

After the beaches were cleared the engineer special brigades were landed to handle the technical organization of the beaches.

Three special engineer brigades were used during Operation *Overlord*: 1st, 5th and 6th.

6th Special Engr Bde would use two battalion beach groups (combat engineer battalions with attachments) to organize the beach. Another engineer battalion would assume responsibility further inland. Beach groups would unload supplies and move them to supply dumps, and would be responsible for roads, mine clearance and similar engineer tasks. Quartermaster and



Examples of the Belgian gate obstacles erected by the Germans.

ordnance battalions would operate the dumps. 5th Special Engr Bde used three battalion beach groups in a similar fashion.

The special engineer brigades were to relieve the divisional engineers on the beaches then develop and expand the road system and open additional exits within the existing beach maintenance area. The goal was to have a fully developed beach maintenance area by D+3. Initially the supply dumps were to be 1000yds inland, being consolidated five miles further inland later.

5th Special Engr Bde had the additional specified tasks of: marking normal hazards, determining the best beach landing areas, marking the beach limits and embarkation points, removing beach obstacles, controlling port traffic, directing, unloading and salvaging all landing craft; and also to develop the beach exits to handle a flow of 120 vehicles per hour, establish initial beach dumps and beach dump traffic control, build a POW stockade, handle all supplies, establish ship to shore communication, and render first aid to casualties before evacuation.

The First Army plan called for the progressive development of Omaha Beach. During the assault phase the engineer company groups would retain control of the beach; during the dump phase control would be handed over to the battalion beach groups, and finally the beach would be handed over for brigade control when the beach main dump phase began.

HQ First Army dictated that each engineer battalion beach group would support the assault of a regimental combat team (RCT) and that each engineer company group would support the assault of an infantry battalion landing team.

First Army also authorized the grouping of 5th and 6th Special Engr Bdes (provisional engineer brigade group) when it became evident that the two brigades would be insufficient to handle the Omaha operation, which included the artificial harbours and minor ports of Grandcamples-Bains and Isigny.

Restoring the captured ports to operating capacity became an engineer priority second only to the development of beach installations. Port construction and repair groups were tailored for restoring the ports, the HQ company of which contained a specialist pool of heavy equipment operators supplied by engineer service troops.

Materials had to be stockpiled for the mission, but materials estimates were difficult to define because the ports were in enemy hands, so eleven planning assumptions were used:

- 90 per cent of existing suitable quayage would be initially unsuitable.
- Half of the above could be repaired quickly.
- The remainder of the quayage would require varying amounts of work.
- All ships in the area would be sunk.
- Cargo handling equipment would have been destroyed or tipped into the water.
- Railway accesses would be blocked with debris.
- Buildings within the port facility would be demolished.
- Entrances to the ports and lock chambers would be blocked.
- All locks would be demolished.
- Water and electrical services would have been broken.
- Extensive dredging would be required.

All ports were to be open by D+30 and the tonnage which each port would handle was planned. Six-week plans for the reconstruction and/or enlargement for each port were developed.

British geologists contributed immeasurably to engineer planning and preparation for the assault on the Normandy beaches. After Utah, Omaha, Gold, Juno and Sword beaches had been picked for the landings, "the character of the beaches and cliffs, and of the soils, and topography immediately inland where the battle would be fought, were of particular concern."

Firm routes over the beaches had to be found so that traffic did not become bogged down in any soft areas, and this was done with the help of existing records, aerial photographs and secret ground reconnaissance.

Training for the Assault

When extensive full-time engineer training was finally possible in March 1944, training was increased from 10-hour days to 12 to 15-hour days. The British Army's School of Military Engineering conducted mine warfare, booby trap, Bailey bridge construction, vehicle water proofing, and engineer reconnaissance training for their US engineer counterparts.

An assault training center was built for engineer training in Devon. Obstacles of the type they were most likely to encounter on the beaches were first built by US engineers, who then conducted unit operations against them. First Army emphasized that the engineers should concentrate their efforts on Bailey bridge construction, route maintenance and construction, mine/countermine operations and adjusting artillery fire.

Major exercises for the D-Day assault began in January 1944. The beaches at Slapston Sands were found to be ideal for approximating the conditions of Utah Beach. Unfortunately, 6000 civilians had to be evacuated while the 10,000 inexperienced 29th Infantry Division (29th Inf Div) soldiers participated in Exercises *Duck I, II* and *III*. Actual beach organization could not be practised, however, because the *Overlord* plans were not yet ready. Exercise *Fox* involved 17,000 soldiers, simulated the Omaha Beach assault, and involved 37th Engr Bn of 5th Special Engr Bde.

5th and 6th Special Engr Bdes had received only elementary training in amphibious operations at Fort Pierce in Florida; the quartermaster units had no amphibious training whatsoever. Brigade units needed further training in mine and countermine warfare, Bailey bridge construction, road maintenance, and demolitions training. 5th Special Engr Bde conducted their training at Swansea in Wales. 6th Special Engr Bde executed similar training in Devon.

There were two large-scale exercises prior to the D-Day landings. Exercise *Tiger* and *Fabius*.

Exercise *Tiger* simulated conditions at Utah Beach, involved 25,000 troops, and was under VII Corps control. It lasted nine days and involved elements of 4th Inf Div and 1st Special Engr Bde. During the rehearsal German E-boat submarines attacked 1st Special Engr Bde's assets and they suffered casualties of 413 men killed and 16 wounded; they made a poor showing during the exercise due to a loss of critical assets and men.

Fabius was actually a series of six exercises for the Omaha landings. *Fabius I* involved Force 0, 1st Inf Div and involved 25,000 troops and three regimental combat teams. *Fabius II, III, IV,* and *V* were British rehearsals.

Fabius VI involved Force B, the follow up forces of 29th Inf Div, and was conducted from 3 April to 7 May 1944 with a simulated D-Day on 3 May. Regimental combat teams from 1st and 29th Inf Divs supported by three combat engineer battalions with treadway bridge, matting, and other material simulated the necessary preparations and D-Day landing.

As a result of the exercises, it was discovered that the military police, the engineer brigade HQ company, and signal companies had to land earlier than had previously been planned. During *Fabius VI* almost all of the units that would participate in D-Day actually went to their prescribed marshalling areas.

Conclusion

US Army engineers played a key role in all phases of Operation *Overlord*. During the build-up phase, Operation *Bolero*, the engineer construction effort was Herculean. Well thought out engineer planning for the assault and organization of the beaches ensured that sustainment logistics got through to the necessary units.

The Normandy Invasion remains the greatest organizational achievement of the Second World War, a feat of staff work that dazzled history, a monument to the imagination and brilliance of thousands of British and American planners and logisticians which may never be surpassed in war.

In the training phase of Operation *Overlord*, engineers again played a vital role. Innovation was the key. Had it not been for the development of the Hagensen packs, the Belgian gate obstacles might never have been breached. The numerous rehearsals enabled the engineers to support the operation to the fullest extent possible. When the Supreme Allied Commander, General Dwight D Eisenhower, ordered that D-Day would be Tuesday 6 June and said "you are about to embark on the Great Crusade ... Good luck and let us all beseech the blessing of Almighty God upon this great and noble undertaking", the US Army engineers were ready, willing, and able.

Burma 1944/45 Remembered

MAJOR J A H WEST

I JOINED 749 Indian Mechanical Equipment Platoon (749 IME Pl) in the Kabaw Valley, west of the Chindwin, in October 1944 as 2IC (Lieutenant RE seconded to the Royal Indian Engineers (RIE)). The platoon of 100 men had eight caterpillar D8 bulldozers, two D4s, two motor-graders, ten tank transporters and other vehicles. We opened tracks in the jungle to the Chindwin, made forward airstrips, and took part in the dash to Rangoon.

During May to June the platoon occupied a length of the Pegu-Rangoon road with our tank transporters, the bulldozers partly covered to simulate tanks to deter enemy parties breaking out from the Pegu Yomas in their retreat to the Sittang.

Early in July I took a detachment of two D4s to support the field company of 89 Brigade 7 Indian Division in the village of Waw. We worked with 4/8 Gurkhas, 2 Kings Own Scottish Borderers and 4/15 Punjabs. A particularly wet monsoon not yet ended, the area was flooded by 2 to 5ft of water from west of Waw to the Sittang. Only the railway embankment, some parts of the tracks, and the destroyed villages were (just) above water level. The whole area was overlooked by enemy-held high ground east of the river, the Sittang Bend area by the aggressive Japanese 53 Division, with elements of their 18 Division; their task was to shield the retreating 28th Army's escape route (they called it "the road of corpses") towards Moulmein. At Nyaungkashe, which changed hands several times up to 3 August, I saw evidence of cannibalism of our dead when directing D4s to fill weapon pits.

The enemy resistance continued for weeks after the formal surrender in Singapore on 28 August. At the end of September the rest of 749 IME Pl joined us and we were ferried over the Sittang. Our task was to oversee a very stroppy half-strength Japanese infantry regiment breaking stones in Mokpalin quarry. At this time a few survivors of the Burma-Siam railway camps were hurried through our lines to Rangoon, so we were disinclined to obey MacArthur's order to allow Japanese officers to retain their swords – we made the officers hand them over and disarmed the units; we had no intention of allowing the enemy the "honours" of war. These Japanese surrendered personnel (JSP) continued to serve under their own command structure and military law, and the Japanese CO never lost an opportunity to demonstrate that his unit was undefeated. He maintained a strict peculiarly Japanese discipline, often striking his own officers and men. Once he kept them on their knees for 24 hours, searching for a lost detonator in the quarry, until ordered to give it up.

During our first week in Mokpalin this colonel asked if he could hold a trial for desertion of two 56 Division survivors; two skeletal survivors of the Pegu-Yomas break-out, who had collapsed on the track south through Mokpalin. Instructed to do nothing until we determined what the legal position was, the next day, with much formality and a faint smile, he reported that both men had died in the night. A doctor examined the bodies and reported they had been smothered.

About three weeks before Christmas the OC of a nearby RIE company, decided that some boxes of guncotton blocks which were "sweating" nitroglycerin, and some shaped charges which were damaged, needed to be destroyed. One morning my OC, Captain Angus Robertson, and I joined the doctor and two sapper officers of the RIE unit for a disposal/fishing expedition on the river. The 30ft launch was crewed by a JSP warrant officer and private. The intention was to use the last of the explosives to stun fish as we had been on reduced rations for many weeks.

The launch had a small cabin and steering wheel amidships. Some of the boxes of guncotton were open and globules of nitroglycerin could be seen on the slabs. The shaped charges, mostly "beehives", were forward of the cabin. I was in the stern with the doctor and the JSP warrant officer, the others were forward. Some ten minutes out, south of the 1942 destroyed Sittang bridge, we stopped the engine and drifted in the muddy water. Each of the four sappers would light the fuze of his chosen device on the command of the senior sapper, with an interval to recover the fish between each explosion. Cigarettes were handed out to all except me; I lit my pipe. The JSP warrant officer drew hard on his lit cigarette stood up and shouted a command to the other JSP, waved his cigarette, shouted some sort of war cry and moved his arm towards the open box of sweating guncotton. Over his moving arm I saw bodies diving into the water. Only the doctor had no idea what to do and I inadvertently knocked him over the side as I pushed him out of my way. As we hit the water I was aware of an explosion and went as deep as I could, finally surfacing, my pipe clenched in my teeth, within reach of my floating bush hat, much valued as a present from a Chindit. Only half the launch was left and that on fire – the JSP were missing. We were picked up some 20 minutes later, having suffered a few burns and (in my case) some days of deafness.

That evening when the Japanese CO came for orders he expressed the hope that Captain Robertson's honourable burns would soon heal, but made no mention of his missing men. He seemed pleased with himself and left with more bows and salutes than usual. Parading his regiment at sunset, he spoke rather longer than normal and I wished that I understood what he said to them.

I do not know whether the OC or the RIE company OC reported the incident; probably not.

A Mixture of Endurance, Humour, and Gory Too, but This is War

SAPPER W G HUGHES

The author, now 85 years of age, a sapper who served with 51st Highland Division, Desert Rats, was posted to the Middle East in August 1940 where he worked on the El Alamein defence line, then moved on to serve in Damascus and Beirut.

He landed with the Division in Sicily, and afterwards, when his unit was withdrawn to Europe, took part in the D-Day landings. Moving through France, Belgium, Holland and on to Germany he ended up in the Hanover area until war's end.

After demobilization he worked for "the Pru" for 30 years before retiring to live in Shropshire.

This much edited, matter of fact account of a young man's experiences during World War Two, was extracted from a much longer version, a full copy of which is now lodged in the Corps Library. It is published here with the author's kind permission.

I ARRIVED at Ripon station on 15 August 1940, along with lots of others to drill and sweat up and down the parade ground for the next six months. Then posted to 200 Artisan Works Company, I was soon aboard the *Oronteese*, a one time liner and, packed with the rest of the company like sardines, sailed from Avonmouth to the Clyde where a convoy was assembling for the Far East.

Under sole control of that mighty battleship *HMS Nelson*, was a convoy of 32 ships – troopships, cargo and defence vessels – and progress was set by the top speed of the smallest one.

Every mile or less the whole fleet turned left or right, to confuse enemy submarines. Cruisers patrolled the outer edges of the convoy and destroyers nipped in and out ready to drop depth charges.

The first port of call was Sierra Leone to take on water, fuel, etc – a four-day stop but nobody was allowed off. We were anchored in the bay and the boom, an anti-submarine net fixed across the harbour entrance, was closed. Local natives soon arrived, selling monkeys, parrots, oranges, bananas and so on. They were all in little paddle boats and on the bows of each was painted "Hallelujah", "Glory to God", "Praise the Lord".

Sailing again down the west coast and round the southern tip, the next port of call was Durban, and another four days stop. This time we were allowed ashore. A beautiful country and scenery; lovely people who couldn't do enough for us and entertained us in their homes. The main method of travel there appeared to be by rickshaw, I never saw a taxi. It was quite an experience to see these rickshaw men running at speed and, when suddenly the traffic lights turned to red, just skidding to a standstill on their bare feet.

Then we were off again, a seven week journey up to the port of Taufiq, the other end of the Suez Canal. A grand sight greeted us: the *Queen Mary*, the *Queen Elizabeth* and the *Mauretania*, all on the Australian run bringing in more fighting men.

Whilst there we were told that our original destination had been the Isle of Crete and that that's where our transport, tools and supplies had gone.

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Crete had fallen to the enemy whilst we were on the high seas, so we disembarked and found ourselves under canvas right near the sphinx and pyramids and a short bus ride into Cairo, a really enthralling city; a land of excellent pickpockets and thieves who could remove your wristwatch without you knowing.

Once transport, tools and supplies arrived, bringing us up to artisan works strength, we were on the road to El Alamein where we were soon put to work (along with men and women, dozens of snarling stinking camels, mules and donkeys) constructing underground defences. Thousands of tons of concrete went into the construction of the defence lines, which could not be seen from above apart from the entrances and exits.

Our work done, we moved on to Damascus, and later into the Beirut area. Again, with hundreds of natives, we worked on road construction.

With heavy casualties incurred by men and damage to transport in Egypt, the order went out to all A1 men in works companies to report to the RE depot. This meant a crash course on modern methods of mine detection and bridge building.

My pal Ron and I managed to stay together and were posted to 275 Field Company, the famous 51st Highland Division (51 Div), 25,000 men when up to full strength.

Tripoli fell to the Allies and we were ordered to clean tin hats, lorries and all webbing. Tin hats and transport were repainted green and marked up 51 Div. All webbing was blancoed white and we were told we were to lead the Tripoli victory parade. We sat stiffly to attention, rifles between our knees, in battle order and looking straight ahead, while Winston Churchill took the salute. Four days later we were into battle and doing everything possible to dirty new paint and white webbing while defending the Mareth Line, and laying down a minefield to protect the infantry. I was in a party of 24 laying one section. With mortar shells coming over we weren't messing about, but ran out of mines and sent the truck back for more. While waiting, we were told to go and wire the minefield using several coils of barbed wire and iron pickets. Opposite the enemy a trip wire was hung with red danger triangles 1ft above the ground; in the dark, anyone tripping over the wire would realize they were in a minefield. The remainder of the minefield surround had iron pickets about 4ft high with two strands of barbed wire.

My pal Ron and I got the job of laying the trip wire, with the enemy using a ten-barrelled mortar which we nicknamed "moaning Minnie" against us. It was getting a bit hot and, with our job done and the lorry returned with 500 mines on board, we headed back. Between us and the others and the lorry was a huge sand hill; with about 20yds to go and without any warning at all there was a tremendous bang and the lorry blew up. I remember Ron screaming "Get Down. Get Down". We dived to the ground, pulling our tin hats down over the backs of our necks; the air was full of shrapnel, picks, shovels, coils of barbed wire etc.

Round the sand hill we were met with a most horrific sight, dead and dying all over the place; arms, legs, heads scattered around. Of two of the boys there was not a trace except one's paybook and the other's German soldier's badge, a souvenir we knew he had had on his belt. There was a huge crater where the lorry had stood, the remains of the cab thrown forward about 20ft. The petrol tank had burst and the cab was ablaze with the driver still at the wheel unconscious. All his clothing was gone except half a trouser leg, even his boots and socks, and he was actually burning.

My pal said that there was nothing we could do for him and he went to see what he could do for others screaming on the ground. I was about to follow when I saw a very faint movement in one hand and I realized that some life still existed, so I set about the daunting task of trying to get him out. After what seemed like an impossible time, I forced open the door, the heat burned all the hair from my head and arms. The driver was pinned over the steering wheel by the buckled cab roof and I could not get the slightest movement at all. The heat was terrific and I was beginning to think it would get the better of me when I felt the something give. This gave me the strength of ten men and I was tremendously pleased to drag him out. He fell on top of me still unconscious. I dragged him away from the heat, and another of the boys came and helped me carry him about 30yds away and prop him up against a sand hill.

The other boy fell over the driver's legs and he too was unconscious. Turning him over I found he had a shrapnel wound in one thigh bleeding badly and a piece of barbed wire in his face about 10in long. The wire had gone in under his chin and out just under his left eye. I never knew whether he lived or died, but the driver, whose name was Danny Ryan, I later heard was in action again in Italy.

Out of a party of 24, eight survived. One man Ron and I went to help had taken the blast face on; every stitch of clothing and practically all his

skin was missing and he was still fully conscious. His two eye sockets were pools of blood and under a desert sun all he complained of was feeling cold. He recognized Ron and me by our voices. He said "I think I've had it haven't I?" I couldn't answer. Ron managed to say that the medical men would help him but he died before we could get him into an ambulance.

We who survived were taken back to camp, given a meal and sent straight out again laying mines so that our nerves didn't crack.

Later we were sent out to pick up a German minefield of what we knew as "S" mines; any RE will immediately know what I am talking about. "S" mines were like two metal pots one inside the other; the outer pot had a small amount of explosive in the bottom, the inner pot was filled with shrapnel or ball bearings and had a detonator fixed in place at the top with three little bits of like rusty bail wire sticking out about ¼in above ground which was extremely difficult to see especially in sand. If one of the bits of wire was touched it set off the small charge in the bottom pot which lifted the smaller pot out of the ground about 3 or 4ft; this would then explode and fill the area with ball bearings or shrapnel, supposed to be fatal up to 200yds.

A mine detector could not be used to find them, you had to go in on hands and knees with a bayonet probing the ground. We picked up all the mines we could find and were all crowding around waiting to board our lorry when one of the boys stepped on a mine we had missed. It went off and killed nine of our party.

That was just past Benghazi where there was a transit camp for men coming out of or going into the battle areas. I once stayed a night there, was allocated a bell tent and told to look round other tents for bed boards.

One of the tents I looked into was full of arabs in full dress (burnouses and head dresses with white scarves and black rings). They were all smoking and drinking cans of beer, and one of them said to me in perfect English "What are you looking for Mate?" I said "Bed boards," and he said that there were none to spare. Completely flabbergasted I returned to my tent and told the others what I had seen and heard. One said, "They're not Arabs, they belong to the Long Range Desert Group." Forerunner of the Special Air Service, these fearless men, led by an extremely brave officer, Lieutenant Stirling, operated hundreds of miles behind enemy lines causing havoc wherever they struck.

The final battle before the fall of Tunis, was the battle of Wadi Akarit. Before the battle we were briefed on what we were to do, namely cut a road through a minefield, drop a bridge over a wadi with a stream running through it and cut another gap through the minefield on the other side. We had the assistance of two flail tanks and eventually got the infantry, tanks and supply vehicles on their way. We then set about widening the gaps to take two-way traffic.

As I said earlier, there was a stream running through the wadi, and we were told that under no circumstances should anybody touch the water as it was believed to be poisoned. Seeing that lovely fresh sparkling water was unbearable with nothing but sand anywhere around; the desire for water overcame the warnings and one of the boys got down and dipped his fingers into the stream. He sat back and sucked them. All of us sat with mouths open expecting him to collapse, but he didn't. Then he cupped his hands and had a really good drink and within seconds we were all in it like pigs, drinking our fill of this beautiful, fresh, cool water. After six months in the desert suffering from hunger and thirst, it was the finest drink I've ever tasted.

We were then able to take things easy for a change and prepare for our next move. As a start we moved just outside a little port called Suosse, where there were more preparations and lectures.

We were sitting in the sand listening to our officer when he suddenly stopped and, looking toward the rear of the assembly, said "Hunt, you don't appear to be taking much interest in the proceedings." Hunt rose to his feet and replied "Neither would you sir, if you had been out here for two years and had just received a letter to say your wife has had a daughter." Everything went quiet. Everyone was completely shocked, including the officer who eventually recovered and said "Hunt, I am speaking for all the boys assembled here, and cannot put into words our feelings. Stay behind after the lecture and we will see what we can do to ease your burden." Hunt went back to England on leave, forgave his wife and accepted the child as one of his family. Later in Holland, just behind the front line, Hunt and some of his pals were overtaken by a convoy of army lorries. Sadly, one of the lorries hit Hunt and killed him outright.

When coming through the desert we had no bread at all for six months and very little water, none for cleaning cups or dixies, they had to be cleaned with sand. Water barrels could only be touched with an officer present. One of the lads got a brew of tea from somewhere, begged a drop of water from the cooks, and we all had a sip. We

had the same again next day then the tealeaves were dried out in the sun and smoked.

In an armada of little assault vessels we sailed from Suosse and eventually docked in Malta. Next morning we were advised to wash everything possible. The only spare clothing we were carrying in battle order was one pair of socks. I was busy washing my shirt when we were called on parade, so I rung it out and put in on, and it soon dried on me. We were addressed by the man himself, General Montgomery.

Four days later we set sail, arrived off the coast of Sicily, and the invasion was on. I landed up to my armpits in water with 28lb of high explosives (guncotton) on my back. Soaking wet we went straight into action. We slept from sheer exhaustion and it was four nights before we got any blankets. Pushing forward, we passed under the shadow of that massive volcano, Mount Etna, a tremendous sight even when passive. At the foot of the mountain were millions of tons of lava and nothing grows for a 12-mile deep area all round.

Up in the hills overlooking the Messina Straits, we were doing our best to keep the pass open. I was amazed, when one of the convoys of 25-pounder guns and support vehicles came along, to spot the name "Prees" pressed into the honeycomb of a radiator in silver paper. This was my home village where I was born and bred (Woodside, Prees Wood) and I only left to join the army. The driver I recognized as Charlie Ouseley, who I had known all my life. I jumped onto his running board and rode up the road a few hundred yards. Then with a toot on his horn and a wave of his hand, Charlie was gone. Sadly he was killed by a shell soon after landing in Italy. I was privileged to be the last face he had seen from home, and I shed a tear as I write these last few lines.

Sicily battles over, it was rumoured that we were going back to England to take our part in the French invasion on D-Day. We boarded an American troopship, again packed like sardines; two meals a day and fresh water for washing and shaving on tap for one hour in the morning and one hour in the evening. There were eight toilets for about 600 men, we slept in hammocks four deep and the air was putrid from sweating bodies and massed smoking after dark. One of my mates was convinced we were sailing into action again and shot himself.

When we docked at Liverpool the streets were lined with spectators. One lady seeing all these troops bronzed with the Middle East sun said "Are they English?"

We boarded a train for Didcot near Reading and from there a fleet of army lorries took us to Dropmore Hall in Buckinghamshire. While there every man was issued with a short length of ribbon representing the Africa Star, one pint of beer and duties were cancelled for the day.

We had ten days' leave and when my mum saw me she cried because I was so thin, and spent the rest of my leave trying to fatten me up.

In camp we went into intensive training on construction of the Bailey bridge. It was interesting, like a big Meccano set.

We were continually on manoeuvres, one going right up into Yorkshire. When we finally got into barbed wire compounds with fences 10ft high and continuously patrolled night and day, we realized that our next move would be into action.

There were tens of thousands of troops congregating in and around Grays in Essex and our last move before D-Day was, on 1 June, to board our landing craft. We lay off Southend until 5 June. I was on an American tank carrier with round about a dozen or more Sherman tanks all fitted with rubber aprons (to help them swim).

On the morning of 6 June, I have never seen such a sight; ships of all sizes packed so close you could have walked from one to the other, all waiting for their turn to land. The plan, with the assault vessel I was on, was to charge the beach full bore and get as far up as possible. We were then to drop the ramp and all foot troops dash out and regroup on the beach. Unfortunately when the ramp dropped it was still in 6ft of water so they withdrew and tried again, with all the foot troops clinging on anywhere they could get a handhold.

The only handgrip I could find was forward with my arms locked round a gun barrel. When we made it, the tank roared up the beach and as he slowed down the lads on the back dropped off. I had to wait until he stopped before I could let go, and found myself among hundreds of troops, and not a soul that I knew.

I reported to a military policeman nearby and he handed me over to his CO in a Jeep. The officer told me to keep my head down as there were German snipers up every tree, steeple and high building. I was with the military police for four days before they finally traced my unit. Back in the Jeep I went and was soon with my mates. They gave me a tremendous cheer of welcome and my officer came and shook my hand and said that he could now cross me off the "missing" list.

We were pinned down just off the beaches for days. There was a barrage of about 90 balloons

above. There were Spitfires overhead too, which we were watching one day when somehow two collided head on. One blew up in a huge ball of flames, the other come down in a wide arc with half a wing gone. We could see the pilot struggling to open the cockpit cover and a group of us ran in the direction of the plane to help. He jumped out but unfortunately the tail wing cut his head off. Burnt out nearby was a three-engine Junkers bomber, the pilot still sitting at the controls, shrivelled up, no bigger than a monkey. A member of his crew lay dead on his back, his tunic open and a huge swastika eagle on his white vest. Someone had hacked off his fingers to steal his rings.

Later, near Caen, we were unable to advance because there were about a dozen huge factory chimneys towering over the city being used as lookout posts.

Someone had the bright idea of sending in the engineers to blow them up, one team to each chimney. We were allocated a fleet of American White halftracks, and tons of high explosives in sandbags. We estimated how much it would take to make a suitable "necklace" around the base of each chimney. The idea was for a squadron of tanks plus infantry to drive the enemy out, engineers would dash in and lay a necklace, then all would fall back and let the enemy return before we set the explosives off. We later understood that the enemy was fully conversant with our plans, and infantry and tanks went in but none came back. The RAF dropped the chimneys with multi-bomber raids, but this ruined other areas as well which we had hoped to avoid.

Just behind Caen there were two highly important bridges upon which the paratroopers had landed on D-Day and held against all odds – one over the Caen canal and the other over the river Orne. We advanced and gave support, and in the river Orne, when the tide was out, pairs of hands could plainly be seen sticking out above the mud, their owners having been dragged under by the weight of the equipment they were carrying.

By now the Canadians had created what became known as the Falaise Gap, which we passed through. Quite a lot of Canadians had lost their lives and were still lying there as we pushed on towards Belgium.

We were then pulled out of the advance and, with others, taken back to form the attack on the port of Le Havre. The German commander refused to surrender. He agreed to evacuate the civilians to a point about five miles outside the city, and, still refusing to surrender, left us with no alternative but to attack with multi bomber raids which did untold damage.

When we attacked, we went through a field of swedes. The Germans had run short of mines and were using quart milk bottles full of high explosive with suitable detonators and the safety pins removed. We each carried a pocket full of 2in nails to use as replacment safety pins.

Closing in on the city we came across two huge graves, one either side of the road. We estimated that there were 2000 corpses in each and they were still arriving on handcarts and wheel barrows. Hardly a roof remained on any building; sewage was boiling up in the streets; there was no electricity, gas, water, or food. The remaining civilians had to be fed – a colossal task.

During the advance, trying to avoid shelling I lay four hours under a knocked out Churchill tank with petrol leaking out. Also underneath were my CO, Willie Duncan, and two sergeants.

The tank commander came up several times in his own tank and eventually got all his men out of other disabled tanks. At last the shelling eased and we went back to work, mostly keeping the gaps through the minefields marked with white tape to keep tanks and transport out of the danger zone.

I spent many nights with the Black Watch and Gordon Highlanders, going on patrol into enemy lines. There would be one or two officers, five or six soldiers and me the sapper at the rear. All brass was removed so as not to reflect light and leather jerkins were worn inside out for the same reason. One expedition was to find out the width of an antitank ditch for bridging. We didn't have to cross the ditch as we were capable of measuring it through a series of angles, with tapes and pickets.

We knew that Italians were occupying the enemy lines and cautiously advanced to find ourselves going into a minefield. Now, instead of me being last I was leading and fully aware that the lives of the lads behind depended on me not making any errors. I was down on my hands and knees and it was pouring with rain, probing with my bayonet a path about 18in wide. It was slow progress and suddenly I was prodding something solid. I cautiously began to identify the object and it turned out to be a new type of mine upon which, only a few days before, I had had a lecture: an Italian box mine, about 3ft long and 4in square, and extremely sensitive. The officer came up close behind and told me that I was not to attempt to lift it, just get all the information I could. Being extremely interested, this

is what I was doing when the officer crawled up again to say that we were right amongst the Italians who were somewhat suspicious and sent up flares. As dawn was not far away we decided that we'd better go back while we could, so we crawled to the ditch on the edge of the minefield and all dived in just as the enemy machine-gunned the area.

We got back to camp at 4am, soaking wet but hoping to dry out and get some sleep, which we did. The next morning the officer came round to see if we were okay. That officer later had an arm blown off and died from loss of blood before they could get him out of the line. A very brave man.

I have seen two men go mad with too much shelling and bombing. One was the corporal in charge of my platoon; we all new of the problem and did our best to alleviate things for him. He used to ride in the cab with the driver and one day, when a shell landed a bit close, he was out of the cab and sat on the front wing. The next shell was even closer still and with an unearthly scream he was running so fast we couldn't catch him.

I have been hysterical myself under shell fire and ran about until I dropped. I lay where I was until darkness fell and then set off to try and find my own lines. Luckily I met some of my pals who had also been pinned down by shell fire. About that time I went on another patrol; we were spotted and had to run for our lives. Some of us got back and some didn't. The sergeant was wounded; luckily he had a compass and he more or less crawled back to camp over the next 24 hours.

Moving on we arrived at the Ardennes forest in 2ft of snow. It was bitterly cold. I slept between cattle to get the warmth from their bodies, but if they stood up you had to move pretty quickly.

Having pushed the enemy back we found ourselves at Eindhoven and then Nijmagen trying to reach the British paratroopers stranded at Arnhem. We had to put a wet Bailey bridge over a river and were on duty maintaining it, with an antiaircraft gun crew at each corner. This was only four miles from Arnhem. I was on duty at the time, and moving up from Nijmagen was a squadron of Sherman tanks making a lot of clatter. The enemy knew exactly where the tanks were and as they got nearer the Germans started shelling, surprisingly doing little damage to the bridge.

On the Arnhem side of the bridge there was a couple of cottages in which several off-duty gunners were resting. The front gardens were full of slit trenches. A wagon was picking up the gunners to take them back to Nijmagen for a shower and as shelling increased the gunners jumped out of the truck and into the dugouts; two dived into the same dugout and lay there one on top of the other. A shell went into the dugout and exploded, killing the man on top and taking his head off which rolled down beside the man underneath who went mad and jumped out of the hole screaming. He ran like a deer and that was the last we saw of him. I don't know whether he lived or died.

Advancing towards Arnhem was a slow and difficult task, the enemy knowing our every move. Night was approaching and we all dug in. On the stroke of midnight the enemy blew up the banks of the river and flooded us out.

We later found ourselves moving slowing into position near the river Rhine, in the Reichwald Forest and in excellent German shelters actually in the Siegfried Line. The battle was imminent. We were in battle order, keyed up, nerves on edge as usual; there were about 20 of us in this dugout and we had all been given a double rum. The gun barrage, with thousands of shells going into enemy lines and the Germans replying with equal ferocity, was a terrifying time. We were all sitting tensed up and ready to go when down the steps came our CO and he had certainly had more than a double rum. He stopped a few steps from the bottom and surveyed the motley group; his eyes settled on Robbo. He said "Well Robinson, are you ready for this little party?" Robbo replied "If I had had as much as you sir, I would cross the bloody river on my own." This broke the tension and we all had a good laugh including the officer.

The advance signal came, and we piled into little assault boats to cross the river.

Some time later and deeper into Germany, I was awakened at midnight. Tanks were moving in the next day and both grass verges for a thousand yards had to be swept for mines, close up to enemy lines. We moved off, me acting as disarmer to my partner. Before moving the corporal asked if anybody could judge a thousand yards. We decided to count a thousand paces which would be near it and if we hadn't hit a mine by then it would be pretty safe to assume there weren't any.

The nearest thing we found to metal was the occasional lump of ironstone. When we got well into the 800 paces area, I looked ahead to see a black forest. I was scared, so I tiptoed across the road and stopped the team. The corporal, whispering, asked why I had stopped, and I replied, that as we were heading straight into a black forest, and

no one had found a trace of a mine, couldn't we assume there weren't any?

He said that 1000 paces was the figure and we carried on. We weren't making much noise and looking up I saw that the opposite crew had stopped. I went to ask why and the corporal said that I had put the wind up him and we were going back. A board with "verges clear", "51st Highland Division" and our code number painted on it was propped on a pole nearby. It immediately fell over and we looked for something to hold it up.

Everything was dead quiet. We found a stone to do the job and it made the slightest of "clicks" when put in position. Out rang "*Achtung Achtung!*" The Germans opened up with rifles and you could see the sparks coming up off the road where the bullets struck. They evidently had no machine guns or they would have sprayed the road and got us all as we ran for our lives.

I had never run so fast before, or since, and so as not to give our position away, we ran on the grass verges. They brought a 2in mortar into play but couldn't get the range so we got away. Back at our lines, my partner fell down unconscious from exhaustion and sheer fright. He was 44 years old and too old for such escapades.

The enemy was obviously weakening and using teenagers in their fighting forces. If behind a gun they were brave enough to cause problems, but if captured they would weep for their mothers just like the kids that they were.

Now well into Germany, we found ourselves close to Bremerhaven which was used extensively by the Americans as a supply port. Close by we had to build a Bailey bridge, but right across the road where we wanted to work the enemy had constructed a terrific tree trunk barrier dug in about 10ft deep; the 20ft long trunks were impossible to move with our equipment and two heavy duty armoured bulldozers had to be called to winch them out one by one.

The bridge was up and ready for use by 7am next morning. Local people were coming in and out of the town and surrounding areas by the score with their few valuables tied up in blankets on their backs.

About this time, 4 May, the enemy surrendered. We were now on occupational duties and continually on the move. We found ourselves in the city of Hanover where there was a huge music college. Every room was soundproofed; we found one pipe organ and one cinema organ intact and a musical friend and I spent many happy hours there, him playing and me listening.

We were being prepared for demobilization in groups; it took about four days to finalize our papers. One day, about 20 of us were waiting outside the transit camp for a lift. A lorry stopped and picked up ten, and some minutes later another one stopped and picked up the rest of us. About two miles up the road we caught up with the other lorry – it was a blazing inferno with five of the boys draped over the tailboard dead. It turned out that the lorry was loaded with four-gallon cans of petrol and the air was full of petrol fumes. One of the boys had struck a match to light a cigarette and the lorry went up in flames.

I have seven medals and one bar, a few minor wounds and had three enemy bullets in my clothing. I cannot close without mentioning my super pal Ron. We stuck together, worked together and slept together in the same dugout. Today we would be called "queer". A fine man and a superb pal, happily we both survived, a miracle in itself, and 50 years on we still correspond.

Never a day passes without a thought of one or other of those who fell.

These few words, although not always in sequence are factual and were written down as memories return.

A Sapper in Spain

MAJOR A M O MILLER

Major Alan Miller was commissioned into the Corps in 1978. He served as a troop commander with the British Army of the Rhine and 33 Engineer Regiment (Explosive Ordnance Disposal). This was followed by a year at Chattenden as an assistant instructor in mine warfare. In 1986 he was posted to Germany as Second in Command 12 Field Squadron and after passing a commando course, spent two years as the SO3 Engineer in Headquarters 3 Commando Brigade Royal Marines. He returned to bomb disposal for a very enjoyable but different two years as Training Major at 101 (London) Engineer Regiment (Explosive Ordnance Disposal) (Volunteers), shortly after the regiment was reformed. Remaining with the Territorial Army, he commanded 131 Independent Commando Squadron (Volunteers), a unique organization with units in London, Birmingham, Hull and Plymouth. After this most demanding of appointments, he had the reward of being selected to attend the Spanish Army Staff Course in Madrid.

HALFWAY through commanding 131 Independent Commando Squadron (Volunteers) I started wondering what job I would do afterwards provided of course that Phase 3 redundancy didn't get me first. A couple of years in the sun seemed a good idea especially from the wet and cold of a London winter. A letter was sent off to the Military Secretary (MS) via PB 7 (Personnel Branch 7) requesting a staff job in Gibraltar. Nothing happened for a while and I had temporarily forgotten about it, due to various exercises and running around the UK and Norway, when the phone rang one Sunday morning during a TA training weekend. The administration officer poked his head round the corner and said that PB 7 was on the line. I immediately thought I was about to be told to report to Brize Norton for a flight to somewhere unpleasant – who had ever heard of PB7 working over the weekend?

"Hello Alan – it's Nick. MS haven't got a job in Gibraltar but they've selected you to attend the Spanish Staff College instead – interested? Ring me back next week with your answer."

After I had recovered from the shock I discussed it with my wife who immediately dug out the sun tan lotion. A quick call to Stanmore confirmed that I hadn't been dreaming and so, regardless of the fact that my only knowledge of Spanish was *una cerveza por favor* (a beer please), said that I was willing to accept the challenge.

After four months of language study and with the colloquial exam behind me, I decided to put my embryonic command of Castillian Spanish to the test. This involved flying to Jerez (of sherry fame) in southern Spain to join the Spanish Marine Corps as their liaison officer. My function was to act as their link with HQ 3 Commando Brigade Royal Marines, the controlling amphibious HQ for Exercise *Dynamic Impact*, the 1994 NATO amphibious and naval exercise.

For me this was an excellent opportunity to see the Spanish military in operation. More importantly I was able to practice my Spanish, and experience the Spanish way of life on board ship and in the battalion. Flying home on 16 May, I was back in Spain two weeks later for the "in-country" phase of my language training.

This involved a month's language course at Salamanca University, and I was accompanied by my wife, who was also entitled to some language tuition. The time we spent in the beautiful and historic town of Salamanca was a memorable experience for us both, and at weekends we hired a car and explored large chunks of northern Spain and Portugal. I also managed to visit the Salamanca battlefield some 7kms southeast of the city. The site is virtually unchanged from 180 years ago and I had the satisfaction of finding a Napoleonic spur at the base of the Greater Arapile, scene of the

Maj A M O Miller
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heaviest fighting during Wellington's significant victory fought in the July heat of 1812.

Soon I returned to Spain for my "official" attachment with the Spanish Army, a week with the Spanish Parachute Brigade based in Alcalá de Henares. This old university town, some 25kms east of Madrid, is reputed to be the birthplace of Cervantes and the façade of the university is famous for its plateresque-style of intricate carved stone.

I stayed in the officers' mess or *residencia* and each day visited a different unit – the three infantry battalions, the engineer battalion (which includes signals) and the artillery battalion, which had the 105mm British light gun on trial at the time.

For parachuting, the Spanish use a version of the American static and steerable parachute, packed by soldiers in an impressive room in a 17th century convent. Each morning we emplaned at the huge former American air base at Torrejon, jumping from Aviocars and the smaller Nurtanio aircraft onto a drop zone (DZ) 70kms north of Madrid, called Casas de Uceda, a barren plateau between two small villages. The ground had just been cultivated which made for a soft but very dusty landing! Parachuting was only possible in the morning because by midday the fierce heat whipped up strong winds.

Adjacent to the DZ was a military training area – rugged, hilly, with very difficult terrain through low scrub and thorn – typical Spain away from the cultivated expanses of the valleys and plains. On a visit to an engineer unit using the area, the battalion second in command showed me work in progress – building range roads and a hutted camp. My question concerning the lack of a damp proof membrane for the concrete bases was answered with the reply that the water table was 30m below. He also told me that the training area was full of wild boar *(jabali)* and that in the spring they had shot over 40 to keep numbers under control.

I noticed that all officers and SNCOs on exercise carried their own personal pistol and again another innocent question concerning whether they carried live ammunition, even while parachuting, was greeted with the riposte "what was the point of carrying a sidearm if you didn't have ammunition for it?!"

By now it was mid-July and very hot – 40°C by midday. A strong image remains in my mind of driving back from the DZs through the dry, burnt farmland of Castilla watching the miniature whirlwinds or dust devils – called *térmicos* in Spanish – chasing themselves across the cornfields. Also of watching vultures feeding on some animal carcass in a field by the road. Spain is a land of great contrasts and is still wild in a way only found in remote corners of the British Isles. It surprises many to find out that in some parts of Spain, there are still wild bears and wolves. It is the second most mountainous country in Europe after Switzerland, and twice as big as the UK with half the UK's population. Distant mountain ranges are an integral part of nearly all Spanish landscapes.

I returned to the UK to pack up the house, put things into storage and carry out final visits to Camberley and Warminster to update myself on the latest doctrine and tactics that I knew I would require in the forthcoming months.

In August, my wife and I caught the ferry from Portsmouth to Bilbao, and drove to Madrid. It took us a few days to settle in, especially as we didn't know anyone, and also to get used to the fierce dry heat. The city in August is virtually deserted; most of the locals spend the month in their summer homes on the coast.

Work at the staff college started the following week. The course for Spanish students lasts two years. There were six foreigners, two of whom, the Moroccan and the Tunisian, had already done the first year; the four students from NATO countries – myself, a German lieutenant colonel, a Frenchman, and an Italian – joined for the second year. There were 50 Spanish students, 47 from the infantry, cavalry, engineers (which included signals) and a large number from the artillery, two Guardia civil officers and an officer from the logistic corps. All were newly promoted *comandantes* (majors) aged about 35 or 36.

My biggest preoccupation was the language. How would I cope? It was all very well sitting a colloquial test in London and being a liaison officer on exercise but what about lectures in tactics, strategy, defence policy and worse still, animated group discussions with everyone suddenly looking for some erudite explanation on the British position on nuclear deterrence? I had good reason to be concerned but all was not lost due to two factors. First was the fact that each foreigner was assigned a *padrino* (literally godfather) who sat next to his hapless charge in class and whose job it was to answer any queries and generally help out as much as possible. I often found myself echoing Manuel from "Fawlty Towers" with my constant *"Que? Que?"* My *padrino* was a gunner called

Juan who proved to be an excellent chap, so much so that he eventually came top student winning the right for a private audience with the King and the choice of any job he wanted. Second was the innate courtesy, patience and consideration of the Spanish. This combination of factors enabled me to overcome initial difficulties with the language, gain confidence and after a couple of months join fully in all aspects of the course.

The course itself was in three parts – tactics and logistics, organization and strategy. Each subject had a team headed by a lieutenant colonel and a number of assistant instructors who were majors. Tactics was set at corps level based upon American doctrine adapted to the requirements and organization of the Spanish Army. Organization dealt with the responsibility of the Spanish Army within the Spanish constitution of 1978 and the detail of defence policy and planning. Strategy involved studying international relations and the principles of armed conflict with a heavy emphasis on military thinkers such as Clausewitz, Foch, Beaufre and Liddell Hart. In fact one of the essays I had to write was on the influence of these military thinkers on current British military doctrine – gulp! Throughout the course I was expected to comment on any aspect under study particularly within the organization and strategy subjects. During the group discussions, or *seminarios,* each foreigner had to present a 20-minute resumé of his country's approach to whatever subject was under discussion at the time. This ranged from manning policy, to Britain's opinion on the present-day Russian strategy – that was a poser and involved several faxes to the Conflict Studies Centre at Sandhurst, normally beginning with "Help!" and ending with "Thanks."

The course was hard work with frequent exams and essays but all was not grim study. We had a number of week-long trips. The first was on a major NATO CPX (command post exercise) where I suddenly found myself very much in demand for answering the phone and translating American English into Spanish and vice versa as part of HQ ACE Rapid Reaction Corp's Exercise *Arcade Fusion.* This was given considerable priority by the Spanish. The course was divided into two with the students who were able to speak English flying to Germany and the rest, which included us foreigners, located in a tented HQ in the Spanish Rapid Reaction Division barracks in southern Madrid. Another trip, to Barcelona on a corps-level logistic exercise, was most notable for visits to an excellent vineyard specializing in Spanish Cava. We also visited Granada, a setting for low-intensity operations. My syndicate was lucky enough to be given an official guided tour around the Alhambra.

The pace of life and the workload was relentless as Christmas approached with the normal build-up of social events. Our own drinks' party was a great success thanks to a blazing Christmas pudding and mince pies, new experiences for our Spanish friends. By now I was getting used to the course, Spanish culture and life in general.

The next term was for me the most challenging part of the course as it involved the delivery of two papers called *monografías.* These are similar to the commandant's essays at Camberley and were a considerable task, with each one involving weeks of late nights and unsociable weekends. I deliberately chose two subjects outside the normal experience of the Spanish: "British Experience of Counter Insurgency Operations since 1945", and "Reserve Forces of the United Kingdom."

Responsibility for internal security such as the ETA *(Euskadi ta Askatsuna)* terrorist problem in the Basque country lies with the Guardia Civil, a para-military police force with responsibility for customs, traffic control and rural security. Although part of the army, in peacetime they are under operational control of the Interior Ministry.

Spanish forces have a large immediate reserve of former conscripts, but the British concept of a territorial army is totally unknown.

With the help of my long suffering *padrino* and various friends I practiced the presentation of my *monografías* and on the day they were very well received.

The majority of the Spanish officers on my course were thoroughly professional and represented the top 20 per cent of their promotion year. The regular Spanish Army officer joins for life when he enters the military academy at Zaragoza. His basic training there is four years followed by special-to-arm training lasting one year. Only then does he join his first unit as a lieutenant. The Spanish Army is predominantly made up of conscript soldiers doing their nine months' obligatory military service known colloquially as the *mili.* Many of the better units, like the Spanish Marine Corps, Parachute Brigade, Spanish Legion and Mountain Troops are now made up of what are called "professional soldiers", who join up voluntarily for 18 or 36 months. Within Spanish society there is still a traditional suspicion of the military, and the army in particular, due to Franco's legacy

and the historical influence of the army in Spanish politics. Today, the function and role of the army is tightly controlled by the 1978 constitution and regular officers spend an enormous amount of time studying the army's role within it. The armed forces are very keen to have, and to be seen to have, a proper and useful role. This explains their wholehearted commitment to NATO, the Western European Union and UN peacekeeping operations. They have recently formed their Rapid Reaction Division *(Fuerza de Acción Rapida)* from their immediate response units. They are gradually updating some of their equipment. Within the next year or so they are receiving four battalions-worth of Leopard 2 main battle tanks and by the end of the decade, a purpose-built amphibious ship as part of a Spanish/Dutch collaboration project. These improvements are considered vital and, coupled with a steady increase in the number of professional soldiers to about 50 per cent, will create a far more effective force.

Another, perhaps even more important, change is in their outlook. Since 1989 Spanish forces have been involved in UN peacekeeping operations in Central America (where the linguistic skills of the Spanish are an obvious advantage) and since 1992 in Bosnia. Previously Spanish soldiering was a very sedate, steady affair with static postings for many years and guaranteed promotion of all regular officers to full colonel. An officer's career up to lieutenant colonel rank was governed by his ranking order gained on graduation from Zaragoza. These old ways are gradually changing – albeit slowly to British eyes, but radically so from the Spanish viewpoint in keeping with the other huge social, economic and political changes since Franco's death 20 years ago.

The culmination of the course was a week-long overseas trip, with wives, to Tunisia. This involved attending diplomatic receptions, and numerous visits to Roman ruins and various Tunisian military units, the most interesting of which was to a Camel Mounted Unit in the Sahara! We were treated to an impressive display of dangerous reptiles by a group of Arab soldiers in flowing robes. Next was the obligatory camel ride followed by a lunch of lamb and bread cooked on ashes and then covered in sand. This was nostalgic for the Staff College Commandant as the Spanish had had these types of units in the Spanish Sahara until 1975.

The course ended with the traditional *Faja* Parade. The *faja* is the blue sash worn by staff college graduates, originally designed to distinguish them from other "lesser" officers. It is presided over by the King and attended by the Defence Minister, the equivalent of the Chief of General Staff, and individual service chiefs. The top student is presented his *faja* by the King and everyone else has a selected general or other staff college graduate to tie his *faja* formally in a solemn ceremony. My sponsor was the Military Attaché. A serious bun fight followed, with the opportunity to meet the King socially and of course there was a photo session.

My final commitment was a day spent at the Spanish Engineer School situated 30kms west of Madrid in a lovely campus-style barracks on the foothills of the Guadarrama Mountains. Here I gave a lecture on the tasks, organization and equipment of the British Royal Engineers – *Ingenieros Reales del Reino Unido*. For once I felt totally at home with the subject!

All in all my tour in Spain was an incredible experience and a privilege, thoroughly worthwhile and one I am very grateful to have had. Both my wife and I became totally engrossed in the fascinating culture and history of Spain. All my course companions and their families were extremely welcoming and we made many good friends. The Spanish officers had a great respect for the British Army and were keen to hear how we do our business. I had a unique insight into another NATO country, the opportunity to learn a language and yes, a posting in the sun!

The author, with Comandante I. Dolz Del Castellar, the senior student, speaking to the King, at the *Faja* Parade.

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BRITENGBAT in Bosnia – Operation Grapple 5

CAPTAIN T R URCH BEng

Captain Tyrone Urch was commissioned into the Corps in 1984 and after completing 83 Young Officers' Course was posted to 5 Field Squadron, 26 Engineer Regiment in Iserlohn. After this tour, and three years at university, he managed to obtain an upper second honours degree in civil engineering at the Royal Military College of Science (Cranfield). He was then posted to 12 Field Squadron, 25 Engineer Regiment in Osnabrück where he was the squadron operations officer and deployed to Northern Ireland for their Operation Descant *tour.*

Junior Command and Staff Course was followed by a three-year sentence as adjutant (one year at Junior Leaders Regiment RE Dover and two years with The Queen's Gurkha Engineers in Hong Kong). He is currently serving as regimental operations officer with 28 Engineer Regiment in Hameln and has recently returned from an Operation Grapple *tour in Gornji Vakuf, Central Bosnia. As a result of this tour, Captain Urch has decided to attend the Professional Engineer Training (Civils) course in October this year.*

Background

When I joined the regiment in March 1994, the opportunity to serve on a UN tour seemed remote. At the time, sappers were serving on Operation *Grapple 3*, and other challenging tours in Rwanda and Angola were soon to be undertaken. 28 Engineer Regiment (28 Engr Regt), not being ideally configured (with a peacetime orbat (order of battle) comprising HQ, amphibious and field park squadrons) seemed destined to "sit things out" in Hameln, but, on 18 April 1994, the regiment was warned for Operation *Grapple 5*!

Aim

The aim of this article is to examine 28 Engr Regt's tour from a regimental perspective, detailing some tasks, making observations (inset in italics directly below item concerned), noting lessons learnt and offering recommendations for anyone undertaking future Operation *Grapple* (and indeed other UN) tours.

Training and Deployment

After summer leave, most of the regimental group, comprising a small Regimental HQ Forward (RHQ Fwd), 64 HQ Squadron (64 HQ Sqn), 23 Amphibious Engineer Squadron (23 Amph Engr Sqn), 29 Field Squadron (29 Fd Sqn from 35 Engineer Regiment), Royal Electrical and Mechanical Engineer (REME) Workshop, plus elements of 522 Specialist Team RE (Works) (STRE (Wks) and 33 Engineer Regiment (Explosive Ordnance Disposal) (33 Engr Regt (EOD)), came together to commence an intensive training period. The echelon was based on 64 HQ Sqn and 65 Field Park Squadron. Deployment took place in four packets from 13 to 24 October 1994; the deployment orbat of 28 officers and 358 men (28 + 358) is shown opposite.

This orbat based on three weakly-configured squadrons, *proved adequate but allowed no reserve of engineer effort or strength in depth.*

An increment of a further 14 personnel was supported by Joint Headquarters although has still to be authorized by the Ministry of Defence. This manpower addition will raise the total establishment to 400 (including chief engineer and SO3 engineer operations who remain on the Sector Southwest (Sector SW) establishment).

Training comprised a four-stage build-up involving a regimentally run *Annual Training Directive* (ATD) period, with an obvious bias towards weapon handling, fitness, first aid etc), the mandatory Training Support Command (Germany) (TSC(G)) training package at

Captain T R Urch
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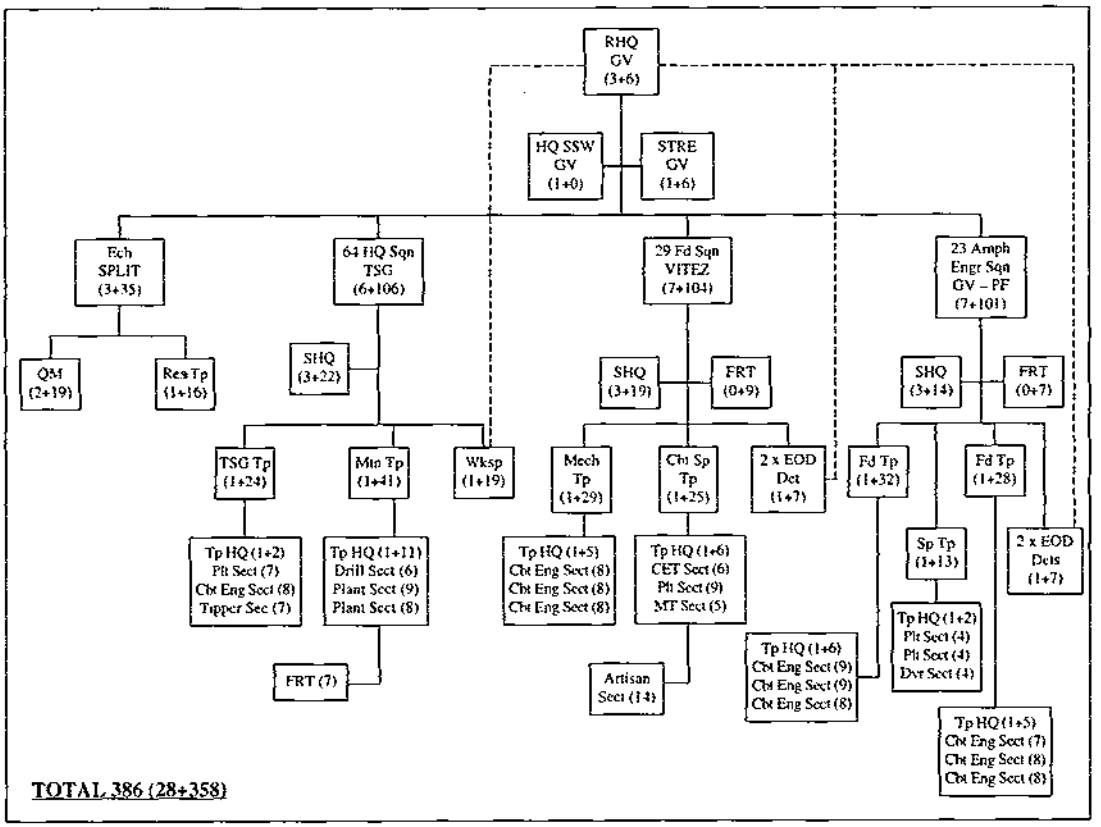


BRITENGBAT – Operation *Grapple 5* deployment orbat.

Sennelager, individual refresher trade training, and collective training with 19 Mechanized Brigade and the other deploying major units (1 Royal Highland Fusiliers and The Household Cavalry Regiment). This progressive training programme proved largely successful for the tour, although the following points, should be emphasized:

- Trade Training. The requirement for tradesmen (especially electricians, fitters and plant operator mechanics (POMs)), to carry out extensive refresher and upgrading training before deployment should not be underestimated.

  Refresher trade training is probably the most important Operation Grapple *preparation for BRITENGBAT units.*

- Technical Awareness. Officers, senior NCOs and section commanders must receive comprehensive project management training in general civil engineering construction techniques and principles.

  This is currently the biggest concern with training at this level of command and is reducing the regiment's overall effectiveness.

- Improvisation. All predeployment training must include elements of improvisation; there are no ideal circumstances in Bosnia and everyone must be prepared to "manage with materials on site."

  It is essential that principles are applied (not drills) as there are no standard templates for UN tours.

Commanders and tradesmen require flexibility of mind in order to overcome the many frustrations due to lack of resources.

The regimental title of BRITENGGP (British Engineer Group) was changed to BRITENGBAT (British Engineer Battalion) on 22 January 1995 to coincide with the change of command from Lieutenant Colonel S F Sherry to Lieutenant Colonel R A M S Melvin MBE. The title change was successful in giving the regiment a perceived clearer role in the eyes of other nations serving in Bosnia. Interestingly BRITENGBAT has 138 more personnel than the British Cavalry Battalion (BRITCAVBAT) and yet, until recently, there remained a

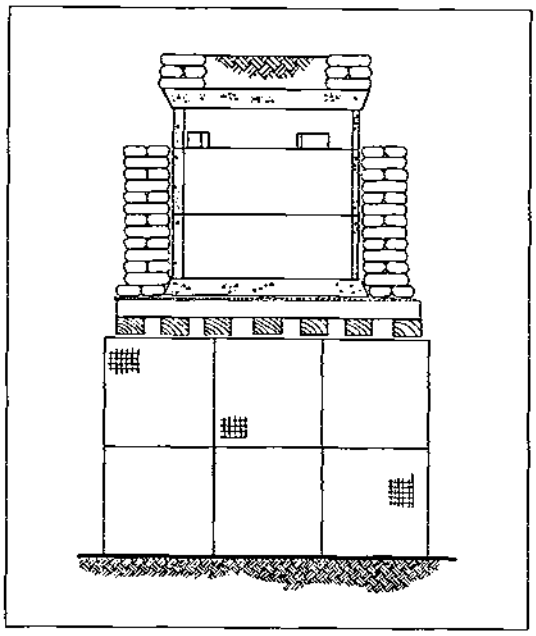


Figure 1. Design for elevated Yarnold sangar (entrance to HQ Sector SW).

belief that the engineer unit was a squadron (plus) group. The retitling of the regiment has done much to remedy this misconception.

Military Information (MILINFO)

As with all peace support operations (PSO) where UN troops must show impartiality (one of the key principles guarding against crossing the "consent line")[1], all intelligence matters are referred to as MILINFO and not G2. On arrival in theatre in October 1994, the military planning options were in favour of withdrawal, especially in the light of President Clinton's threat to lift the arms embargo on the Muslims on 15 October 1994; the pre-advance party flew on 13 October! Improvements in relations between the Croatian Army in Bosnia (HVO), the Muslim Army (ARBiH) and the Bosnian Serb Army (BSA) resulted in the signing of a cease-fire agreement which became effective on 23 December 1994. A full cessation of hostilities was implemented on 1 January 1995 planned to last four months until 1 May 1995.[2] This continually moving "threat pendulum" resulted in BRITENGBAT having to **provide a flexible command structure and apply sound engineering principles at all levels.**

Missions and Tasks

Bosnia Herzegovina Command (BHC) is a three star command comprising three sectors namely Sarajevo, NE and SW; the latter having by far the largest area of responsibility (AOR). Sector SW comprises Turkish (TURKBAT), Canadian (CANBAT2), Malaysian (MALBAT), Spanish (SPABAT), and three British battalions (BRITBAT1, BRITCAVBAT, BRITENGBAT). BRITBAT2, stationed in Gorazde, is OPCON (operational control) to BHC. All non-British battalions have their own integral engineer squadrons which vary considerably in equipment quality and personnel strength/capabilities.
The Sector SW mission is to:

- facilitate the development of a durable peace within the federation,
- enhance humanitarian assistance to the people of Bosnia Herzegovina (BH)

in order to assist all the people of BH to live in conditions of relative peace and security.[3]

Understanding this mission is critical to the modus operandi of BRITENGBAT. The operational centre of gravity of the campaign is the will of the former warring parties (FWP) to fight or to make peace. The aim is to achieve the latter through a parallel approach:

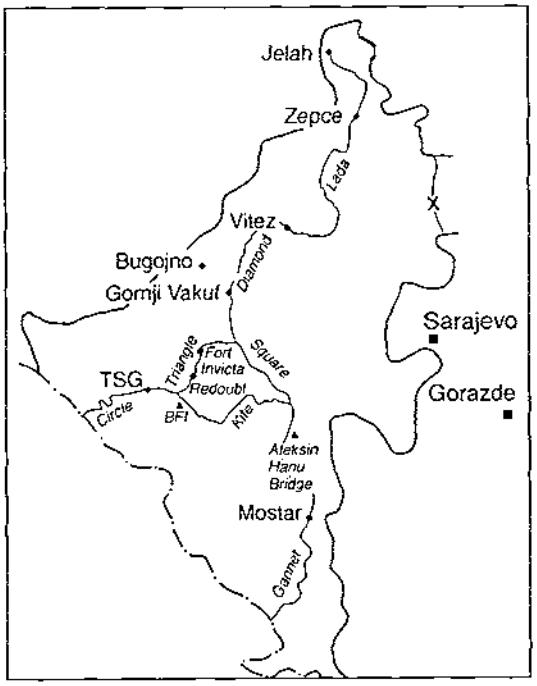
- **Joint Commission Policy Committee.** This policy meeting, chaired by the Commander Sector SW, provides the framework for developing the political structure within the Croat/Muslim federation. It is based on the Washington Agreement signed on 23 February 1994 and has met 28 times to April 1995.
- **Humanitarian Assistance.** This strand of the mission aims to improve living conditions and the wellbeing of the population. UN Security Council Resolution 766 is the authority to assist the UN High Commissioner for Refugees (UNHCR) as the lead aid agency in the former republic of Yugoslavia (FRY).

BRITENGBAT supports this mission by giving close and general engineer support in the main, but not exclusively, to BRITBAT1, BRITBAT2 and BRITCAVBAT. The regiment represents over 40 per cent of the sector engineer effort in terms of

[1] AFM Volume 5, Operations Other Than War Part 2, Wider Peacekeeping, Chapter 2, Paragraph 14.
[2] HQ Sector SW OPLAN 100 (Implementation of the Peace Accord) dated 28 October 1994.
[3] HQ Sector SW OpO 5/95 (Current Operation OpO) dated 14 December 1994.

manpower and equipment, providing key capabilities such as heavy plant (BRITENGBAT has the only graders, rollers and heavy crawler tractors in the sector), a diving team, design cell and EOD expertise. The engineer task priorities are set by the commander/chief engineer and are as follows (in priority order):[4]

- **Security of United Nations Professional Forces' (UNPROFOR) lives (including EOD).** All UNPROFOR bases in Sector SW saw protection levels upgraded. Most notably, the Sector HQ in Gornji Vakuf and BRITCAVBAT's RHQ base in Zepce. This work involved construction of sangars (Yarnold type as well as the more traditional sandbag variants), cover-from-view screens, Hesco bastion blast walls, collective protection (COLPRO) and hardened operations rooms/accommodation. Much use was made of existing references[5] although variations were required to suit particular circumstances; see *Figure 1* for design of elevated Yarnold sangar. EOD played a vital role in support of the commander's priority 1 engineer task by disposing of 147 mines/unexploded ordnance.[6]
- **Construction/Maintenance of UNHCR/UNPROFOR Routes.** The regiment is responsible for maintenance of approximately 490km of primary and secondary aid routes, most notably the mountain routes *Triangle* (1600m) and *Diamond*. Route maintenance has become the main effort for sappers in Bosnia, especially after successive bad winters. An ever-increasing amount of UNHCR funding, reliance on local civil firms and BRITENGBAT heavy equipment will be required on these routes in order to keep them operational. The emphasis during the winter has been on snow and ice clearance (SNIC). This has required, on occasions, sub-units conducting 24-hour operations for extended periods with the resulting degradation of personnel and equipment.
- **Monitoring of Minefield Clearance/Marking (MMC/MMM).** After the death of Sapper Nicholas on 16 August 1994, procedures and operational requirements were reviewed. This resulted in EOD standard operating procedure (SOP) 311 being rewritten. A total of 12kms of minefields was cleared (approximately 700 mines) by the FWP monitored by EOD detachments during Operation *Grapple 5*. A further 15kms were marked prior to possible future clearance this summer. A very successful programme of mines awareness training (MAT) was also conducted both for UNPROFOR troops and local school children. The article by Captain Paul Buttery *Minefield Clearance in Central Bosnia*, which appeared in the December 1994 issue of *The RE Journal* gives an excellent insight into EOD operations. The mines agreement signed by the BiH and HVO Corps commanders on 10 April 1995 bodes well for progress this summer.



Sector Southwest

- **Construction and Maintenance of Camps and Services.** The UN Engineer Operations Section (UN EOS) is still not yet in a position to construct or maintain all UNPROFOR camps in the mission area. Most of this responsibility therefore falls to BRITENGBAT which, during Operation *Grapple 5*, constructed three camps (erecting 299 portacabin-type accommodation and ablution blocks) and maintained a total of 13. During the tour, the emphasis was very much on "winterization" of BRITFOR accommodation and offices.
- **Support to Key G5 Infrastructure Projects.** This will always be central to the commander's mission. Its success revolves around overcoming the FWPs' desire to return to war by offering them something tangible which is not worth losing. This has been achieved to date through projects such as power line repairs, hospital refurbishment, water/sewerage reconnection and route improvements. BRITENGBAT has been instrumental in supporting this strand of the mission. It must not be forgotten, however, that **the end state must be the desire and capability of the locals to undertake these projects by**

[4] HQ Sector SW Ops/O 5/94 Annex D (Amendment No 1 dated 2 April 1995.

[5] Operation *Grapple* Hardening Aide Memoire 2nd Edition (MWF/10012 dated 15 April 1995).

[6] HQ Sector SW SOP 311 Amendment Number 1 dated 22 November 1994.

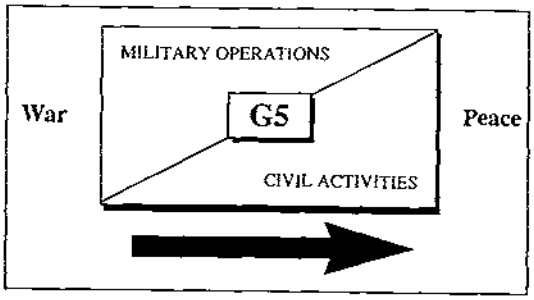


Figure 2. G5 (moving to peace).

themselves, albeit with UNHCR funding assistance and UNPROFOR supervision. The UNHCR is the lead agency for operations in the FRY, and only those accredited by them can receive assistance from UNPROFOR. They currently have 13 government organizations (eg Overseas Development Agency (ODA)) and 98 nongovernment organizations (eg Feed the Children, *Médecins Sans Frontières* and Oxford Committee for Famine Relief (Oxfam) working for them. The aim of G5 can be defined as **the movement towards peace combining military operations and civil activities;** this is summarized in the simple diagram at figure 2.

The CO BRITENGBAT spends an increasing amount of time working with the commander in his capacity as chief engineer, giving engineer advice. He thus devolves much of the responsibility of running the regiment to his RHQ staff. The geographical spread of units and their varying missions requires a sound knowledge of the principles of mission command. Mission command applies equally throughout the entire force spectrum and "is designed to promote a robust system of command to achieve unity of effort at all levels; it is dependent on decentralization".[7]

BRITENGBAT, although not part of the sector HQ, is collocated at Gornji Vakuf and thus works extremely closely with the staff. The good relationships fostered in the predeployment training at Brigade and Battle Group Trainer (Germany) (BBGT(G)) proved invaluable. The HQ is also multinational with a Malaysian deputy commander (colonel), Spanish chief of staff (colonel) and other national officers present in all staff branches at SO2 and SO3 grades. Frustrations at all levels were commonplace and personal qualities such as patience, perseverance and tolerance were fully tested at times. "A commander must, on the one hand maintain the determination to achieve his aim, but on the other, have the mental agility and imagination to adopt to changing circumstances. He requires, as in warfighting, robustness not only in the face of military set back, but also when frustrated by the activities of third parties over which he may have little influence, let alone control."[8]

BRITENGBAT Operations

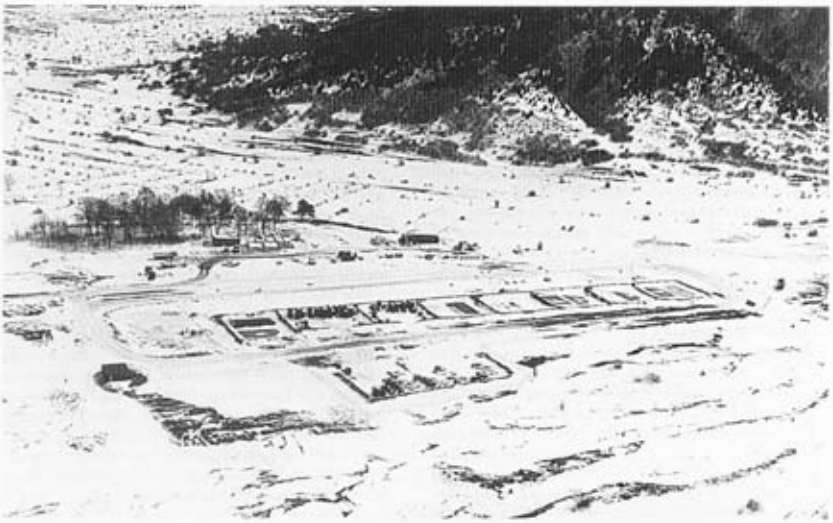
It is not the intention of this article to give a blow by blow account of the regiment's achievements on Operation *Grapple 5*. Rather, a few of the main tasks will be identified in order to allow pertinent lessons and recommendations to be extracted. A full account of 28 Engr Regt's activities can be found in the post operational report.[9]

- **RHQ (3+6).** RHQ Fwd comprised nine personnel, collocated with HQ Sector SW in Gornji Vakuf. This small HQ provided the interface between sub-units and sector staff, as well as acting as negotiator for agencies such as the EOS, UNHCR and the ODA. RHQ also sponsored many visits to the theatre and became hosts for 521 STRE (Well Drilling), 516 STRE (Bulk Petroleum) and A(Allied Command Europe) Rapid Reaction Corps engineer branch.
- **23 Amph Engr Sqn (7+104).** The wheeled squadron deployed a month ahead of the regimental group and was located in Bugojno and Gorazde. The troop in Gorazde gave engineer close support to BRITBAT2 and spent six months improvising and "making-do" due to a lack of engineer stores as a result of convoy restrictions through Serb-held territory. The remainder of the squadron spent six months on a construction tour based in the Gornji Vakuf area. They constructed two company-size bases (including the new engineer base in the Precision Factory which 1 Field Squadron occupied on arrival in March 1995), the medical support troop hospital and a new UN military police accommodation/office complex. Some G5 projects included the demolition of two Muslim minarets which were in a dangerous state and the construction of two non-equipment bridges (NEB) in local villages at Lognica and Hraçnica. In the latter stages of the tour, hardening tasks such as sangar construction and cover-from-view erection were undertaken.
- **29 Fd Sqn (7+101).** 29 Fd Sqn deployed as the mechanized squadron in support of BRITBAT1 and BRITCAVBAT and was based in Vitez with elements in Zepce. The main effort for the squadron became the

[7] Army Doctrine Publication (ADP) Volume 2, Command, Chapter 2, Paragraph 0211.

[8] Army Doctrine Publication (ADP) Volume 2, Command, Chapter 7, Paragraph 0723.

[9] BRITENGBAT 3/007D dated 18 April 1995 (including the CO's Executive Summary.)



Arial photograph of BFI1 on Route Kite.

maintenance of Route *Diamond* (including SNIC operations) and the winterization of camps in the British Forces (BRITFOR) area. Snow clearance tasks were assisted by the attachment of a Slovakian snow clearance section which was placed under tactical control (TACON) by BHC. Camp construction included the Fad Factory company base in Jelah and the starting of the Vitez rebuild project. The refurbishment of the Stari Bila school in Vitez by 29 Fd Sqn tradesmen was the G5 highlight of the tour.

- **64 HQ Sqn (6+106).** The squadron was based in Tomislavgrad (TSG) with support troop being based on Mount Vran at Redoubt and Fort Invicta. The main effort for the squadron was maintenance and snow clearance of the mountain pass – Route *Triangle;* a challenging task especially with the additional burden of having to recover numerous civilian and military vehicles from the route. REME Workshop played a key role in keeping the large number of routes clear throughout an extensive recovery area. Other key projects included the complete rebuild of the bulk fuel installation 1 (BFI 1) site on Route *Kite,* and the refurbishment of the extra wide Bailey bridge (EWBB) on Route *Gannet* (originally built by 37 Field Squadron on Operation *Grapple 1*).
- **522 STRE (Works) (1+6).** The team moved from Split to Gornji Vakuf to provide a better level of support to sector operations. This small team provided technical advice for the chief engineer/CO, monitored construction standards throughout the BRITFOR AOR and provided a comprehensive design capability (civil, mechanical and electrical). Other tasks involved provision of a liaison officer (LO) to the European Union Administration Mostar (EUAM) and the completion of site dossiers and "as-built" drawings.
- **EOD (2+14).** EOD operations, although reduced by the winter weather, proved to be a resounding success throughout the tour. The four detachments were deployed in Vitez, Zepce, Gornji Vakuf and Gorazde; one detachment did return to UK for a short time but was recalled when the Cessation of Hostilities Agreement was signed. The programme of MMC, MMM, and MAT, coordinated by OC EOD, gained sector-wide recognition.
- **Echelon (3+35).** The regiment's small echelon comprised quartermaster, regimental administration officer, and resources functions. This lean orbat ensured that all departments were extremely busy giving support to sub-units throughout the BRITFOR AOR.

Lessons Learnt

As with any operational tour a number of lessons was learnt; unfortunately some old ones were relearnt as well. The following are of particular note:

- **Reinforce Success.** It became clear as the tour progressed that the STRE, EOD and Battle Group Engineer Operations Officers (BGEOOs) played critical roles in supporting the sector mission. The

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STRE was consequently reinforced to include a garrison engineer (electrical & mechanical) and a construction materials technician. Further enhancements could include another clerk of work (electrical) and a military plant foreman. EOD manning was adequate although a number of equipment enhancements were staffed to improve operational effectiveness (ie Sight Unit Small Arms Trilux (SUSAT) sights and chemical EOD equipment). The STRE and OC EOD moved to Gornji Vakuf where they could support the chief engineer and sector more effectively. The BGEOO concept was widely accepted by battalion COs as being a great success. The role of the BGEOO is now clearly understood, and the operational effectiveness of all three battalions was enhanced by having an experienced captain placed under OPCON of the BHQ (Battalion HQ).

- **Forward Planning.** Due to the bureaucratic nature of the UN procurement system, forward planning is of more significance than on other operations. The regiment is also configured with three weak squadron groups and therefore does not have an engineer reserve to deploy. It proved very difficult (sometimes impossible) at times to react to changes necessitated by a lack of forward planning. Invariably the only way to create any scope for a reserve force was to reprioritize tasks and move manpower. The material procurement system does not allow stocks to be held because stores are authorized to complete tasks on an individual basis. The establishment of an engineer forward rendezvous (RV) in Gornji Vakuf, some creative stores ordering and sapper initiative has eased this situation somewhat!
- **Recce.** The regimental orbat is too lean to allow deployment of sufficient recce officers. Each sub-unit must have an officer of captain rank, in addition to the recce sergeants with squadron BGEOOs, capable of undertaking engineer recces as well as performing LO and G5 functions. An officer in RHQ should be nominated as the regimental G5 recce officer, capable of advising sector/federation officers on behalf of the CO. An intelligence officer was established in RHQ to perform this important function. Combined arms recces are not new, but are critically important on *Grapple* tours. Engineer recces should be all-informed and include the client (ie battalion representative), MILINFO to advise on security implications, G4 for real estate considerations, UN sector administration staff, the land owner and of course the contractor (RE/EOS). If this basic principle is adhered to, a great deal of time and effort will be saved. The construction of the Fad Factory in Jelah, is an excellent example of how well things can go if all the correct personnel are involved from the outset.
- **Technical Awareness.** The "construction – combat engineer pendulum" in the Corps is swinging in favour of construction and military engineering. The emphasis Corps-wide is of the order 60 to 40 per cent.[10] In Bosnia this proportion is closer to 80-20 per cent. As a direct result of this, there is a technical awareness gap amongst officers (the author included) and senior NCOs of the Corps serving on Operation *Grapple*. This gap needs to be addressed at the Royal School of Military Engineering (RSME), Chatham, on the various career courses attended, but will clearly take time to implement.
- **Project Planning and Construction Standards.** A project, no matter how simple, requires detailed planning. Of course, this can be done mentally for small tasks but care must be taken not, inadvertently, to omit any stages. The full project planning cycle at figure 3 must be followed. Of particular importance on UN operations is the resources/funding check. On a few occasions during Operation *Grapple 5*, the lack of this detailed staff check resulted in delays to the execution of a project. Bosnia is without doubt a "sappers playground" as one philosophical troop commander (who shall remain nameless) described the country! Professional standards are as important there as anywhere, but monitoring them is difficult. The vast number of construction tasks being undertaken, and the lack of qualified personnel to supervise them, make quality assurance a problem. There is also a fundamental clash of construction philosophy between UNPROFOR and the UN. On the one hand UNPROFOR wants to construct on a "build to last" policy while the UN are concerned, understandably, about committing effort and money past the next six-month mandate period. The lack of theatre building construction standards does not help site commanders and safety officers on project sites. That said, the "standards of work must present an advert for the Corps' capabilities. Our tradesmen are taught to a high standard so we should attempt to construct to this standard as a minimum unless there is an overriding operational priority to complete the task quickly or within the limits of available resources."[11]
- **Terminology.** It would appear that operations in Bosnia are to continue, at least in the mid-term. The orbat of BRITENGBAT has been evolutionary and has not changed dramatically since the pioneering days of Operation *Grapple 1* and 2. The regiment should now adopt, whenever possible and practical, standard terminology, instead of inventing "Bosnian specials." This will allow non-sappers to identify more clearly with the regiment's sub-units and capabilities. For example, troops should be referred to by their generic role such as field and plant support troops not by their location (ie TSG troop and mountain troop). We should also use doctrinally correct terms such as engr fwd RV, RHQ fwd etc. This matter was first raised in the CO's Establishment Review.[12]

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[10] Brief by EinC(A) to regimental officers on 27 March 1995.
[11] CO's Technical Directive 3/007G dated 19 February 1995.
[12] BRITENGBAT Establishment Review dated 12 April 1995.

- **Robust Command Structure.** The regiment's Operation *Grapple 5* tour reconfirmed the requirement to maintain and provide the correct level of engineer planning and advice at battalion and sector level. Ranks should be no less than lieutenant colonel at sector level and major at battalion level as well as the BGEOO working in BHQ. There is a requirement for a lieutenant colonel in sector HQ, regardless of whether BRITENGBAT is reduced to two (or even one) squadron groups. There is also an argument for BRITENGBAT to adopt a truly close support deployment concept, whereby the two field squadrons support a battalion each and the headquarter squadron is solely responsible for the routes. This argument was considered, but due to the extensive AORs and the commander's main effort for sappers being on route maintenance, was not adopted. Should UNPROFOR and BRITENGBAT be committed to Operation *Grapple* in the longer term then this approach would be more valid, as long as it was supported by an increase in the orbat for the support squadron.
- **Vehicle Serviceability.** Many of the vehicles and equipments have been in theatre for 2½ years and are in poor condition (28 Engr Regt clocked up 844,939km in B vehicles, 13,440km in A vehicles, 23,617 plant hours and 53,247 generator hours). Most engineer tasks are critically dependent on the availability of heavy plant (ie graders, frame steered dump trucks (FSDT) and rollers) and on C vehicle spares. The vehicle fleet must be rotated regularly (perhaps 25 per cent per *Grapple* tour) if the ability of the regiment to support the sector is not to be prejudiced. The time required for maintaining this ageing fleet, and the subsequent reduction in availability of engineer support should also not be underestimated.
- **Validation.** The final, and arguably most important, aspect of any operational pretraining is validation. It is essential that continual appraisals are made in order to ensure that subsequent training is relevant and indeed of the required standard and design. Visits by Commander Engineer, CO 33 Engr Regt (EOD), Chief Instructor RSME Chatham plus engineers from Terex (for FSDTs) and Aggrecko (for generators) were critical in carrying out this validation.
- **Public Information (PINFO).** At the end of a successful tour, there is nothing more satisfying than seeing the efforts of the regiment recognised. It has been widely noted during this, and previous *Grapple* tours, that sappers have done an outstanding job throughout the theatre. As with other operational tours, however, their PINFO profile has not truly reflected the effort applied by individuals. An active PINFO campaign must be formulated and executed (this includes appointing a dedicated PINFO officer) to advertise sappers in the correct context. The inclusion of PINFO in the project planning cycle should also be adopted.

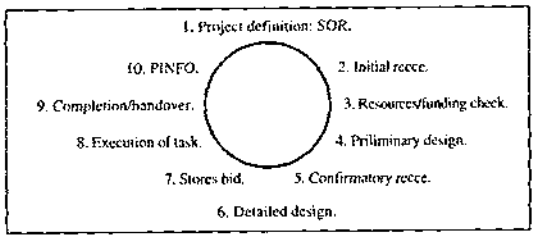

Figure 3. Project planning cycle.

Summary

For me personally, Operation *Grapple 5* was tremendously rewarding. I gained an enormous amount of experience, especially working in a UN multi-national headquarters. The tour was not, however, all "happy contentment"; the frustrations of the UN procurement system and the weather certainly tested morale on more than one occasion. The most significant observation made by the author was **the requirement to be more technically aware in a Corps where the emphasis is turning away from combat engineering;** thus my decision to attend the Professional Engineer Training (Civils) course at the end of this year.

The tour is best summarised by the CO 28 Engr Regt (Lt Col R A M S Melvin MBE) in his post tour report executive summary:

"BRITENGBAT has had a testing and rewarding tour in a challenging operational environment. The terrain, weather and resources limitations in terms of manpower, equipment and material have called for endurance and perseverance by all ranks, requiring considerable foresight, ingenuity and flexibility at command level. The regiment's engineer achievements, whilst not as spectacular as those of a summer tour, have supported directly the sector commander's intent for UNPROFOR activity, including the development of the peace process this winter. 28 Engr Regt can feel justifiably proud of its achievements here in BH."

Where 2?

MAJOR J A R STRONG MA CEng MCIBSE

The author was commissioned into the Corps in 1978 after graduating from Cambridge University. Subsequent to regimental duty tours in Northern Ireland, Germany and Great Britain he attended the Professional Engineering Training (Electrical and Mechanical) Course, undertaking his site attachment at the United States Trident Submarine Base at King's Bay, Georgia. He then joined 522 Specialist Team Royal Engineers (Works) in Willich before commanding 52 Field Squadron (Construction) at Bruggen. This was followed by a staff job in London, for which he was rewarded with his current sunshine tour in Cyprus.

SOME years ago an article in the *Journal* entitled "Whither the Corps?" generated a vigorous exchange of correspondence over the direction in which the Corps should be moving. Since then the very basis of our thinking has been challenged, through the post Cold War restructuring exercise. I therefore offer these reflections in the hope of renewing the debate.

For the Corps to prosper in lean times we must have a strong voice and influence at every level up to the very highest. To achieve this we need to embrace responsibility for a subject area of continuous importance to the whole army, or preferably all three services. Establishments constantly have to be justified against the yardstick of operational necessity and yet battlefield tasks alone are insufficient to guarantee strong influence in peacetime. Skills needed only in war can be assigned to the TA. We need to find a way of demonstrating that our operational skills can be brought to bear equally in peacetime. This would provide an attractive combination in the budget dominated environment.

The Royal Signals have taken the lead with computers, adapting their role to command and information systems, and the Corps of Royal Electrical and Mechanical Engineers have developed their role to equipment support. However our Corps has such a breadth of function across the G3 (Operations) and G4 (Quartering/Logistics) areas that it is difficult to imagine a way of summing up everything into an all-encompassing theme.

Not every HQ has an engineer branch and the influence of the Corps is therefore not always commensurate with its importance. The value of the Corps is rediscovered with each new operation that is mounted, when a force has to deploy at short notice, often to a remote area with poor infrastructure. The increased need for force projection has already adjusted the emphasis in the Corps to an approximately even balance between construction and combat engineering. The ramifications of this are starting to filter down. However, this side of the Corps' activity tends not to be seen in its proper context of operational works services.

The Army thinks of itself primarily as a mobile force, not dependant on barracks for operations. Works is therefore a highly civilianized activity managed by a few G4 staff officers in high level HQs. Despite this prevailing attitude, most modern operations rely on permanent or semi-permanent infrastructure at least in the base area, but often for the whole force. The Corps is not large enough to provide for all accommodation and infrastructure needs on operations and anyway this is not necessary, since many tasks remain appropriate for contractors even in an operational area. What is necessary is effective coordination.

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Unfortunately formation staffs are not usually up to speed with operational works procedures. This can impair the ability of the Corps to provide support in the most efficient way. It is therefore logical for the Corps to build up expertise in this area so that it can carry out this function.

A number of RE officers, both chartered engineers and mainstream, have taken on G4 Quartering staff jobs in recent years and their engineering background has proved a definite advantage. With the reduction in weapons staff jobs and the advantage on operations of RE officers with this experience, G4 Quartering would be a worthwhile area to target. In the longer term the function could be taken on completely by the Corps within engineer branches, using a mix of serving officers, retired officers and civil servants.

This would not be a return to the days of RE Works Services as the current organization of Establishment Works Consultants (EWC), Works Service Managers (WSM) and Project Managers would continue. However, technically based staff supervision would avoid over reliance on the impartiality of commercial consultants. There would also be a much smoother transition to military works arrangements on operations, since engineer staffs would be well used to the normal procedures and in a better position to take advantage of the relaxations permissible on operations.

Under current arrangements responsibility for works at the top level is exercised by top level budget holders (TLBs) against a background of policy dictated by the Office of Management and Budget. There is a lack of high level military input which is a gap the Corps could fill to the benefit of the Services as a whole. It would also strengthen the case for the Corps' professional head to be two-star.

Such moves would mean focussing staff expertise within the Corps rather than continuing the current approach of maintaining a broad skill base. However, I believe that too much diversity can mask our true function and make us vulnerable to further reductions. The operational function of the Corps is developing more in the direction of G4. We should capitalize on this to increase our standing and strengthen our influence within the Army.

Engineer Standards in Bosnia – Windows of Opportunity

MAJOR F J GREEN BSC CENG EURING MICE

Frank Green returned from Bosnia late April this year having commanded the Operation Grapple *Specialist Team Royal Engineers. This article concentrates on issues which became apparent during that tour.*

INTRODUCTION

By the time this article is published Operation *Grapple 6* will be nearing completion – assuming the UN's Mission (the term "mission" used throughout this article refers to the UN's organization and undertakings) in Bosnia remains there – and BRITENGBAT (British Engineer Battalion) training for Operation *Grapple 7* will be proceeding apace. We have come a long way since the pioneering days of Operation *Grapple 1*, yet there exists a conflict between UN Mission engineering standards and our own Ministry of Defence (MOD) adopted, mandatory standards. This creates a dilemma for the engineer commanders on the ground who have legal and moral responsibilities to work to UK national standards, or higher, where the operational situation permits, but who are constrained by UN policies dictated principally by budgetary and procurement restrictions. The quality of our engineering in Bosnia is high and although there is room for improvement, we have every right to comment on and pursue this issue with the UN. However, although the British Army has positions of influence within the Mission, on the engineering side we lack representation at a high policy-making level. This short article, which has the support of Colonel Engineer Services, aims to promote discussion on the engineering standards applied in Bosnia and propose a way of influencing UN engineering policy in order to bring about improvements.

ENGINEERING STANDARDS

THE MOD and the Corps have adopted the 1974 Health and Safety at Work (HASAW) legislation which demands high standards of construction management, planning and workmanship and standards, which are being raised a rung by the introduction of the Construction Design and Management (CDM) Regulations. The technical side of the Corps – principally but not exclusively, MWF (Military Works Force) and independent specialist teams such as 522 STRE (Works) from Hameln – have adopted the design standards and practices set by British Standards and in the Codes of Practice. If we do not have the capability to design and build to these standards we lose credibility with the rest of the construction industry, both at home and abroad. Our professional reputation has attracted requests to undertake work worldwide; our capabilities have resulted in close

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ties in Bosnia with organizations such as the Foreign and Commonwealth Office (FCO), the Overseas Development Administration (ODA) and European Union Administration, Mostar (EUAM). The standards which are demanded by the MOD and the Corps are thus instrumental in furthering our engineering influence at home and abroad, and our capabilities are opening doors to wider opportunities within the UN's Mission in the former republic of Yugoslavia. If these opportunities are grasped we could exploit them by installing qualified sappers in appropriate positions, appointments from which we could influence the UN Mission engineering policy. In doing so, we could set a precedent whereby the technical side of the Corps supports our future deployments on this and other UN peace-keeping missions at an appropriate, policy-making level.

There is a lack of common engineering standards across the Mission and sadly, all too often an absence of basic engineering principles in some of the work being done, for example pouring concrete road slabs without the addition of bending reinforcement. The influences which have created this situation include a six-month mandate approach to contracts and construction horizons, cyclic resource contracts with associated procurement and delivery patterns and the dubious capabilities of some national contingents' engineers. The UN is beginning to address these issues – the introduction of systems contracts spanning the mandate should, for example, assist in developing a longer-term approach with medium-term planning horizons – and it is at this early stage in the policy formulating cycle that we should be represented in positions which can bring about changes to the UN's approach.

Mission Standards

First, the two strands to policy and standards – the UN Engineering Services (ES) organization and ourselves, the Force (Military) Engineers.

UN ES have their HQ in Zagreb and work in conjunction with the Force Engineer's staff. Headed by John Crocker the ES organization has branches known as Regional Engineer Units (REUs) in each sector, supporting the military effort and covering battalion AORs (areas of responsibility). This support includes:

"... the construction, refurbishment and maintenance of living and working accommodation, the provision and maintenance of engineering services (power, water and sewerage) and camp infrastructure (roads, hardstanding, parking, etc) and the management and distribution of engineering materials, equipment and stores, including field defence stores and equipment."

There are also specialist departments which look after water and sewage issues, fuel, fire safety and so forth, grouped together in Engineering Support Services (ESS), a section headed by Mike Young, a retired PQE (professionally qualified engineer) officer and MIEE (Member, Institution of Electrical Engineers). The ES organization was developed because not all military contingents have the resources to look after their base infrastructure and the associated links to the civil infrastructure; they are vital for many reasons and not only because, being the account holder, they control the budget.

The ES technical staff originate from different cultures and therefore different engineering backgrounds in much the same way that the national military contingents do. Their approach to engineering differs and their individual standards inevitably vary. They consist mainly of tradesmen with a sparse smattering of professional engineers and engineering managers. Engineering standards are presently set in the field by:

- Sector chief engineers.
- National contingents – squadron commanders, detachment commanders etc.
- UN ES sector engineers, regional engineers, and foremen.

There are also guidelines laid down by the UN High Commissioner for Refugees (UNHCR) for route repair. Financial constraints restrict the scope for permanent repairs which inevitably reduces the standard of work – pavement repairs are not to European standards as a result, although this was being addressed on *Grapple* 5 by BRITENGBAT inviting infrastructure investment from aid agencies.

The UN Protection Force (UNPROFOR) Engineer Standard Operational Procedure (ESOP) (draft) promulgated by the ES Chief Engineer's office is the furthest the UN had got to by April this year towards formalizing engineering standards across the Mission. The draft document did not include the Force Engineer's input which had not been produced. The draft covered many of the vital areas such as project management, industrial safety, works management and so forth but was developed without our technical input. It was a capable document

geared to the ES sphere – aimed at camp infrastructure operations – yet we require a far greater professional military engineer input if we wish to influence future UN engineering standards across the spectrum of engineering works in which we are involved. This goes beyond camp infrastructure and impinges upon the infrastructure of the country, in particular its roads, railways and power stations which assist in furthering our peacekeeping efforts.

The day-to-day camp construction and maintenance works are overseen by the REU foremen and this is where the approach and standards can differ dramatically and where we have in many cases been forced to compromise our own standards. On the electrical side, Mike Young is proposing to adopt the IEC (International Electrotechnical Commission) standards for the Mission, rather than any national contingent's own recognized standards. Where, you might ask, does this put us in terms of adherence to MOD and Corps' policy – the HASAW Act, the Electricity at Work Act 1989?

Corps Policy

The Corps has adopted the 1974 HASAW legislation and intrinsic to these regulations are standards of planning and construction practices commensurate with a safe working environment. The Royal Engineer Technical Directive (RETD) No 9, *The Corps Health and Safety Policy Statement*, notes that unit commanders have specific legal obligations under this Act and further, that there is no crown exemption from the Act. In particular, it is MOD policy that the same standards will be applied overseas in addition to accepting and applying the health, safety and environmental legislation of the host nation, if this is higher. The crux of the requirement is that "Commanding Officers are to comply with the provisions of the HASAW Act, as far as is reasonably practical without degrading operational efficiency, to ensure the HASAW of all personnel under their command".

We have a duty to care for and a legal responsibility to ensure that our soldiers are living and operating in as safe a working environment as possible and in general we achieve this. Of course there is always room for improvement and enhancements to the current STRE orbat – two clerks of work (electrical) rather than one – will help. There is however a limit to the number of electricians the Corps can provide; and the manning of power stations, or operation of and in other electrical installations, in accordance with current Corps' policy (as set out by the Royal School of Military Engineering), has been difficult to achieve. Wider discussion of this latter issue is clearly outside the scope of this article, but it needs to be addressed; the onus of satisfying our own directives should not, in this case, rest with either the squadron commander or indeed the commanding officer when the stated MOD policy is incompatible with the UN's.

Sector Level Engineering Standards

The standards of engineering at sector level vary enormously. This applies both to the UN REUs and to the military engineer contingents and reinforces the need for uniform standards. The UN ES staff are notorious for their cavalier approach to site discipline – craning loads without guidelines for example – and their approach could easily become the accepted manner of conducting engineering works in the Mission. The design of COLPRO (collective protection) is another compelling example; some structures would fail under direct or near artillery impact and cannot be regarded as being fit for use. MWF has produced a guide to the design and construction of COLPRO, based on practical experiments undertaken by RARDE (Royal Armament Research and Development Establishment), which could be adopted as a Mission standard. This would then bring peace of mind to the occupants and economies of scale to procurement. As engineers, we have a good reputation in the Mission. After all, our tradesmen are trained to a high standard and can produce work to exacting specifications, but sometimes because of operational imperatives and occasionally, because of our own failings, we fall short of technical excellence. A common theme has been a tendency to rush construction tasks to completion and a failure to apply project planning tools to the best advantage. Steps have frequently been missed out and although operational imperatives must rule, there have been instances where poor planning and setting-out has resulted in howlers such as bends being installed at manholes, and more significantly cables being cut by machines during excavation.

Mistakes are made on construction sites, but there are grave implications when work of this standard is accepted instead of being stripped-out and corrected; our tradesmen and junior

management have in some instances learned inappropriate lessons, and of course the need for maintenance and remedial works becomes an increasing burden.

Quality assurance procedures are necessary in Bosnia and the UN should be promoting closer scrutiny of engineering works. This is becoming increasingly important as UN ES is experiencing manning and recruiting problems, whereas we look set to increase, dramatically, the number of British troops in Bosnia requiring engineer infrastructure support.

Zitomislici Bridge pile foundation failure April 1995.

The Opportunity to Influence

The present STRE establishment does not enable close supervision of all works being undertaken during *Grapple* tours, which would require an increase in the order of battle to enhance the on-site independent scrutiny of standards. At a higher level, opportunities exist to influence the engineering standards policy being set in the Mission. We lead the field with our professional design capability and our construction methods and this has been recognized by both the Mission ES Chief Engineer and the Force Engineer. The combination of talents held by senior clerks of work or garrison engineers are just what is needed to operate the REUs. The Chief Engineer, Deputy Chief Engineer and specialists like Mike Young, understand what the clerks of work can offer and are crying out for this expertise. Equally, a 12-month attachment to the Force Engineer's staff, or UN ESS as a professional adviser, would be a career enriching experience for a PQE officer or garrison engineer and bring wider experience back into the Corps. These latter positions would be at the hub of Mission policy direction and we should consider pursuing these opportunities further. The UN has already approached the MOD to provide infrastructure specialists as a result of the STRE's reputation and, if we were in a position to capitalize on this, it may become the gateway to similar appointments in HQ UN, New York.

Conclusion

There are manning constraints in capitalizing on the opportunities which have been outlined in this article and these may prove too difficult to overcome. Quality engineering is needed in the Mission for many reasons not least of which is the moral responsibility we have in safeguarding the lives of our soldiers. We can improve our own efforts in the Corps by developing our quality assurance techniques but it is at the higher levels in the Mission, where policy decisions are made, that we need to be represented in order to influence engineering policy. UN peacekeeping duties are likely to become increasingly a major Corps' commitment and we should continue to develop our professional influence in the UN if we are to work to the engineering standards adopted by the MOD.

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The History of Locomotive WD42 – "Overlord"

MAJOR M G WHITE MSc

Major Martin White was commissioned into the Corps in 1950. His early service was with field squadrons in Korea, the Middle, and Far East. In 1960 he attended the Long Transportation Course, graduating in 1962. A number of transportation postings followed in the United Kingdom, Aden and Bahrain, Singapore and then back to the Middle East to Abu Dhabi. By this time he had been transferred to the Royal Corps of Transport, and had the opportunity of studying for a Master of Science degree at Southampton University. He took early retirement to join the Army Railways as a principal in the civil service, finally retiring in 1991.

I BOUGHT locomotive Number 202 just as she had been made redundant from the army. The army has a strange habit of renumbering locos, so if you want to trace the origins of one you have quite a difficult job on your hands, but before retiring I had made a study of this class of loco and hence was aware that No 202 was originally WD42, a locomotive with a distinguished history.

She was one of a batch of 20 locomotives built by Andrew Barclay, in Kilmarnock, during 1943, with a small diesel engine built to a simple design using commercially available parts. The engine was a Gardiner 6-cylinder normally aspirated 153 horse power diesel, with a Wilson gearbox. Officially the classification was: Loco Shunting Standard WD 150 horse power 0-4-0D.

Fifteen of these were concentrated at Longmoor for use during the invasion of Europe, and WD42 was loaded onto a specially adapted tank transporter trailer and thence onto a landing craft tank (LCT) for shipment over to France. The picture opposite shows WD42 coming ashore on 14 June 1944 on Nan beach in the Juno Sector, on a trailer towed by a caterpillar D8 tractor. She was the first Allied locomotive to be landed in France. Initially the line had to be cleared by propelling three wagons along it to ensure it was clear of mines. WD42 then worked over the "Chemin de fer du Calvados" (a beach railway which sadly no longer exists) and finally she went to 102 Transportation Stores Depot, Bayeux.

I traced the original driver, Sapper Charles Knibb (now retired), and invited him to the ammunition depot at Kineton. There he was reunited with WD42 and drove her around the depot to show that the old skills had not been forgotten.

After the war WD42 had an interesting career. Having been shipped back to the UK, she went to the army rail workshops at Bicester for a general overhaul, and was then sent, together with another five, to the Middle East in February 1952. They were named (unofficially) after the seven dwarfs from Snow White – it is not known what WD42's nickname was!

Returning to the UK in 1955, she spent some years at Featherstone (Wolverhampton), Ruddington (Nottingham) and Sinfin Lane (Derby), finally working at the RE Stores Depot, Hessay. By 1987 she was an old (and tired) lady.

Once bought by the present owners, however, restoration was undertaken immediately and the result can be seen in the lower picture.

WD42 has been on display at various preserved military vehicle shows, and is registered with the Military Vehicle Trust. Her big day came in June 1994 during the celebrations to mark the 50th anniversary of D-Day. In May she was on display on Southsea Common, and

Major M G White
The history of locomotive WD42 - Overlord p204

after the show was taken over to France to the town of Carentan, not far from where she had been stationed in 1944. Having loaded up at Southsea we travelled via Brittany Ferries Truck Line to Cherbourg, and thence to Carentan. I had arranged for unloading to take place at a siding in a peat factory, about 12kms from Carentan. The owner of the peat factory was not cooperative but I had managed to persuade him to "be kind to the British." The inspection of the loco took place at the peat factory, and the senior inspector (an elderly gentleman) insisted that he had seen this engine landing in 1944. Whether he had or not I really do not know, but he was longing to have a drive! This he did, and we were then the proud owners of a *Société Nationale des Chemins de Fer* (SNCF) mainline running certificate, perhaps the only Ministry of Defence locomotive to have one in 1994.

Our operating procedure was to run for six hours a day from the siding at Carentan, about 2km down the track and back. This saved us having to go out on to the main line, with all the attendant difficulties of having to ring the controller to get clearance. We took as many passengers as possible on each trip, packed on to the footplate. The French thought this was great fun and cheered all the time.

The crowning glory of our trip was the laying of a wreath of poppies at the little war memorial at Carentan in memory of the SNCF railwaymen who died during the liberation of the town. This little act of remembrance was very well received by both the town and the SNCF. We made a ceremony of the occasion, and paraded in suits and medals. The "exhortation" was given in English but in tones loud and clear. The essential import of the message was clear.

We celebrated D-Day and Carentan Liberation Day, as guests of the Mayor, with superb civic luncheons at the Salle des Fêtes.

Eventually time came for us to depart. We took WD42 down the line for a last run, about 12km to Baupte, where there was a superb loading site built by the Germans when they needed the peat as fuel. The low-loader arrived on time and we loaded the loco with no trouble at all.

The whole undertaking worked as planned, although it had not been easy but then, very little that is worthwhile in this life is easy; at one stage I had to write to Monsieur Jacques Fournier, who was *Directeur Général* of SNCF, personally, to ask him to intercede on our behalf with the bureaucrats! As in 1944, a firm commitment to the "aim" and a determination to see everything through to its logical conclusion ensured that WD42 did more sterling work for the three week visit – a nostalgic return for an old veteran who ran "as sweet as a nut" for the whole of her trip.

WD42 arriving on Nan beach, Juno sector, on 14 June 1944.

Acknowledgement must be given to the Royal Logistic Corps for supplying six boxes of compo; to 17 Port & Maritime Regiment for assistance in transporting the rail to Southsea; to both the Royal Engineers and Royal Logistic Corps for publicity in their respective Corps journals; and to members of the Hunslett Engine Company (Leeds), (who bought up Andrew Barclay and thus claim to represent the manufacturers) who sponsored the movement of the locos to Southsea and then Carentan, and who also presented the bell which can be seen on the front of WD42.

WD42 as she looks today.

The Bijela Challenge

MAJOR L F WASTIE BSc

Leslie Wastie was commissioned in 1984 as an Army Air Corps Officer. After a period of 18 months, including an attachment as a troop leader, and some flying training, he joined the Corps in September 1986. His regimental service has been varied, supporting 7 Armoured and 1 United Kingdom Mobile Force Brigades. This was followed by a tour at the Defence Nuclear Biological and Chemical Centre, during which he spent four months on Operation Granby. *He then undertook a tour at United Kingdom Land Forces Engineer Branch and assumed command of 61 Field Support Squadron in January 1994.*

We blast out the rock an' we shovel the mud,
We make 'em good roads an' – they roll down the mud,
Reporting Her Majesty's Engineers,
With the rank and pay of a Sapper!

We make 'em their bridges .....

The Seven Seas, Kipling 1896.

Introduction

Over the period 21 April to 25 October 1994, 61 Field Support Squadron deployed as part of 36 Engineer Regiment group in support of 7 Armoured Brigade on Operation *Grapple 4*. On arrival in theatre, after an intensive three-month period of all-arms and special-to-arms training, it was clear that the summer construction season would present a considerable challenge.

The main base for the squadron was Tomislavgrad (TSG) in Bosnia Herzegovina (BH), some two hours by road from Split on the main supply route (MSR), Route *Circle*. A troop commander, staff sergeant and a large section joined the unit from 5 Field Squadron, making a total sapper strength of 107, less resources troop. However, the squadron routinely fed 210 men following the closure of the TSG school site nearby, the former location of a British recce squadron and convoy rest location.

The squadron's engineer area of responsibility (AOR) was different from that of the UN battalion and stretched from the BH border northeast to the Makljen Ridge on Route *Square* north of Prozor, south to Slatina near Jablanica, southwest to Posusje and on to the border.

It had become apparent during the OC's recce that the MSR, a wet bound macadam road, would need extensive maintenance during and after the heavy spring rains and the 32 to 42km stretch otherwise known as Orasac to Varvara, would require extensive widening and upgrading.

This stretch of road was carved out of the hillside overlooking Prozor, by 35 Engineer Regiment on Operation *Grapple 1*. To complete the task the troop had to undertake extensive blasting and import 9500 tonnes of rock fill and wearing course over an average haul distance of 17.5kms.

Shortly after our arrival in theatre a full report was compiled and orders given to Mountain Troop and the Rock Drill Section, to widen and resurface the road. The experience gained on this project proved invaluable. Work along the route during daylight hours was made more complicated by traffic (3500 trucks a week by the end of May) comprising mainly of UNHCR (UN High Commissioner for Refugees) and NGO (nongovernment organization) convoys which ploughed relentlessly up and down. Night traffic was limited due to banditry so, with

Major L F Wastie
The Bijela challenge p206

appropriate security, and following the CO's direction of no more than one month's night work, the troop embarked on night routine.

Operation Lifeline

In June 1993, 1 Field Squadron (1 Fd Sqn), the then Operation *Grapple* 2 field squadron group, produced a report for the construction of a 280ft DDR EWBB (double, double, reinforced extra wide Bailey bridge) across a gap that became known as Bijela 1. The gap is located on the main low level route, Route 17, into Central Bosnia and follows the River Neretva from the coast through the cities of Mostar and Jablanica.

UNPROFOR (UN Protection Force) had previously named the Route *Gannet* and, along with a number of other routes, it made up the concept of a lifeline route, primarily for the passage of humanitarian aid. No sooner was this route put into use, than the Serbs destroyed the two southern spans of Bijela 1. Shortly after the interest shown in bridging the resulting gap by 1 Fd Sqn, the Muslims destroyed the remaining three spans, cut one pier, and damaged another as well as demolishing the Jason bridge which became known as Bijela 2. The gaps were 170 and 72m respectively. Ironically at the time the author, then SO2 Engineer Operations (Operations and Doctrine), was briefing the staff at Joint HQ on 1 Fd Sqn's proposal to bridge Bijela 1.

Route *Gannet* and Route *Dolphin* were sustaining the movement of 2200 vehicles a week. In order to bypass the two Bijela sites, a 7km ferry journey up river had to be undertaken, which took 1½ hours, with the aid of two Slovakian PMS ferries. Route *Dolphin* was a very poor road on which Spanish engineers were working hard. It followed a pylon line over a very steep ridge, to the west of the Neretva Valley.

With the advent of a partial peace in April/May 1994 and the first signs of a HVO/BiH (Bosnian Croat Army/Bosnian Muslim Army) BH Federation, the pressure mounted fast to increase the flow of aid and freight into central and northern Bosnia. By the end of April/early May the pressure on Route *Triangle* in the west began to rise to ridiculous levels resulting in traffic jams in Prozor, a particularly sensitive area, and it became increasingly difficult for the squadron to maintain and upgrade the route.

Options for the Bijela Sites

Although the two Slovakian ferries were working hard, they could not provide the high through-put now required and so a number of options was considered:

Ferries. An additional PMS ferry was available in Split, and after a period of frustrating staff work it was made available, but the Slovakians appeared unwilling to bring it into operation. The Royal Fleet Auxiliary ship in Split had two Military Engineering Experimental Establishment floats for port operations. However, this was not a real option and was dismissed early for a variety of reasons. The Spanish offered ferry equipment but for one reason or another it did not arrive. The idea of additional ferries was therefore dead in the water, so to speak!

Bridging. The UN had, over the course of the operation, seen a variety of equipment bridges in use including EWBB at the Aleksin Hanu site just south of Jablanica. The Slovakians had a bridging company in theatre with a number of ZM16 communication bridges and equipment piers. However, both sites were beyond the reach of the Bailey bridge and, for the ZM16 equipment, the Salakovac reservoir water levels on that stretch of the river Neretva would have had to be lowered by 16m, which would take three to four months to achieve due to damaged sluice gates. As this time delay was unacceptable to BH command, further alternatives were sought.

Blasting. Following up a suggestion by a local BiH engineer, the regimental Military Plant Foreman (MPF) (who by this stage was developing his recently taught blast design and shot firing skills with the newly trained rock drilling section on Route *Triangle*) was tasked by the CO to investigate the feasibility of blasting a short (230m) bypass road round the inlet of Bijela 2. If this could be done, then the ferry journey would be limited to Bijela 1 and the time taken cut by two thirds. Initial reports indicated that it could be done, subject to availability of the necessary explosives. Luckily about half the requirement was available from our own stocks, and a local source of explosive called Vitazit, was found in Vitez.

Bijela 2 Bypass

The squadron was to construct a medium load class 60 one-way single-lane track with passing places round the Bijela 2 demolition, and assist in the construction of ramps at Bijela 1 for a PMS (Slovakian) floating bridge. The work was to be completed by 10 June 1994, working round the clock for three weeks.

To bypass the gap a ledge was blasted in the cliff face on either side of the inlet. In total, 2.5 tonnes of explosives were used to produce 70,000 tonnes of bulk fill material. Drill holes varied in depth from 0.5m to 3.5m. A wearing course of 450 tonnes of alluvial deposits (40mm to dust) was imported from a local borrow pit, using the

Bijela 2 demolition site before work began.

Malayan Battalion's frame steered dump trucks. The Plant Detachment then constructed a 150 to 250mm pavement over the ledge designed to enable heavy articulated lorries to pass.

Working in shifts, blasting began at 0500 with the apprentice shot firers (the two section commanders) emerging bleary-eyed to charge the blast holes drilled only a few hours earlier. After receiving an all-clear from the safety boat, the first blast of the day was fired which served as an early call for the Spanish camp half a mile down the valley at the Bijela 1 site. The MWE (medium wheeled excavator) was then brought up to remove any overhang, thereby allowing the rest of the detachment with heavy crawler, medium crawler and medium wheeled tractors to clear the site in safety for the drill section to start the whole process again. Throughout the task the drill team took on the appearance of space-age ghosts with a fine covering of white rock dust on goggles, helmets and face masks. Daytime temperatures were rarely out of the nineties adding to the fatigue and discomfort.

Bijela 1

On 1 June 1994 a meeting was held to reappraise the situation and consider all the options for Bijela 1, and the decision was taken to proceed with the conversion of the PMS ferries to a floating bridge. Following a site visit by the Sector Southwest Chief Engineer, the CO Lieutenant Colonel D R Burns MBE, to inspect the northern ramp, it became obvious that the Spanish engineers were not going to complete the southern ramp in time. Orders were therefore given for our troop to gear up to even longer working days for the remaining week; they moved a further 18,000 tonnes of rock with half a tonne of explosive while concurrently constructing a 27m double culvert at Bijela 2. Both ramps and the bypass were completed on time.

Meanwhile the Slovakians were inloading their additional bridge sections and, once the ramps were complete, they put the pontoon bridge in within 18 hours.

Blasting Skills

Throughout Operation *Grapple* tours, the need for a MPF with qualifications in blast design and shot-firing has been essential, and this was convincingly demonstrated through the work undertaken on Route *Triangle* and Route *Gannet* over the period described above.

The courses required have been reviewed by the Royal School of Military Engineering and these skills will, in future, be included during this training. It can honestly be said that before deployment on Operation *Grapple 1* the Corps had to some extent lost the skill of rock drilling and blasting. This position has now been rectified

Bijela 2 bypass in use.

Conclusion

Bijela will be remembered by all involved as an enjoyable task where 24 sappers, with very limited drilling experience, having only recently deployed to the theatre and in hot arduous conditions, demonstrated outstanding professionalism. The opening of Route *Gannet* greatly increased UNPROFOR's ability to ensure the delivery of humanitarian aid along the only low-level route into central and northern Bosnia. In the three weeks that followed its completion over 16,500 vehicles crossed "Cook's Bypass", so named after WO1 Cook, the MPF who had been so instrumental in the success of the task.

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Memoirs

BRIGADIER E F E ARMSTRONG CBE

Born 27 December 1899, died 3 February 1995, aged 95.

Edward Francis Egerton Armstrong was born at Gwalior, Central India, returning to England when he was five. Later he was to spend over 20 years serving in India, most of the early years being with the Bengal Sappers & Miners.

He was known by many friends and by brother officers during his long and varied career as "Effie", from his initials – a rather unlikely name, but one by which many people knew him and respected and loved him. Educated at St Bees School, Cumberland, King Williams College, Isle Of Man, RMA Woolwich and later Kings College, Cambridge, he was commissioned into the Corps in September 1918.

Effie was to have three tours with KGV's Own Bengal S&M and for the first two he was mainly with the field troops, first under Captain O L Roberts (later General Sir Ouvry Roberts) and then in command at Risalpur and Roorkee. In 1930 he assumed command of 5 Field Company which took part in the Khajuri Plain operations, a largely engineer activity once the plain had been secured; the company built a notable Inglis bridge across the Khajuri river during the period and Effie won the Institution of Royal Engineers' Montgomerie Prize for his article about this project. Though returning to Roorkee in 1937 as Superintendent of Instruction, after completing a Staff College course, most of his last tour was to be in staff employment in Army Headquarters (AHQ) in Delhi. He was an efficient commander, popular with his Indian troops and well liked by his fellow officers at Roorkee. One friend remembers that he was known as "the politest man in Asia." Also a keen horseman, he greatly enjoyed opportunities for polo and was a member of a regimental side that won several local tournaments in northern India.

JH remembers that the first time he met Effie was in Peshawar in 1930. "I had been taken to India for six months when I was eleven because my father, who was CE there, wanted me to see the sort of work he was doing and then follow in his footsteps.

"I remember Effie as a very tall, good-looking and energetic man who took the trouble to listen to me and answer my questions. In those days not many young officers could be bothered with small boys.

"In 1933 Effie came to stay with us in my grandmother's large house on the Isle of Wight and I am quite certain of the date because in my book shelf is a copy of "The Complete Works of William Shakespeare" and inside it I had written: 'From E.F.E. Armstrong, Christmas 1933, by Book Token.' It is bound in imitation red leather with a splendid gold portrait of Shakespeare printed on the front. It has been a treasured and invaluable possession ever since, and I remember going to a bookshop in Ryde and getting it with my five shilling book token. Five shillings was an enormous sum in those days, certainly to me it was.

"The next time I met Effie was in very different circumstances. Just before the end of the Second World War I was sent to Burma and, as a staff officer, given the job of finding and rounding up all the soldiers of the East African Forces serving there, and sending them home. My office was in Rangoon University, which was also the headquarters of the Army Command. Soon after my arrival I was told to go and introduce myself to the Brigadier General Staff, whose office was on the ground floor. Above the door was his name – Brigadier E F E Armstrong. I knocked and went in. He looked up from his desk and said "Jock!", so welcoming and friendly. I can't imagine how he knew who I was because he hadn't seen me for about twelve years, and I must have changed a bit. It was wonderful to see him because I knew he would always be extremely kind and helpful and in many ways make my life as easy as possible. He was an unfailing source of help and advice, not just to me but to all his staff who thought the world of him.

"Unfortunately, I had to go back to Nairobi and I didn't see him again, but he was one of those people – and one doesn't meet many of them in a lifetime – that one never forgets. He had such charm and a natural authority that made it unnecessary for him to assert himself. When he gave an order it was obeyed at once and without question, because it was right. I had a very great admiration for him."

In 1940 he became liaison officer between AHQ India and the Indian troops in North Africa and then successively Assistant Commandant of the Quetta Staff College, GSOI 7 Indian Division, and Brigadier Engineer Staff to the Engineer in Chief (Major General H E Roome). After a short leave

in the UK, his next appointment was as 2IC of 89 Brigade, 7th Indian Division, and with them he took part in the advance into Burma, via Meiktila and Rangoon. Then appointed BGS 12 Army he negotiated, on behalf of the GOC Allied forces, the surrender of the Japanese forces in Burma, receiving the sword of the Japanese General commanding 31 Japanese Division at the surrender ceremony. It was unfortunate that the sword was stolen during a burglary on Effie's house a few years ago, which was a great blow to him. He was Mentioned in Despatches for services in North Africa and in the Burma campaign, and was honoured with an OBE in 1944 and promoted to CBE in 1946.

In 1946 he returned to the UK to serve as DMS(B) in the War Office, and during this tour married Vera (neé Marshall) who did so much for the Girl Guide Movement both in Britain and in India. He was to return once more to India after independence in 1949, to spend three years at Barrackpur as Commander British Gurkhas in India. He returned to Britain in 1952 to take up his last service appointment, as Commandant War Office Selection Board and was also appointed ADC to HM The Queen, finally retiring in 1955.

His first civilian post as Warden, Loughborough College of Technology, did not satisfy him and, as he and his wife wanted to return to the London area, he resigned that post after three years in 1958. Selected in 1959 as the first Organizer, Conservation Corps, under the Council for Nature, with their HQ in London (Queens Gate), he set up the organization, which carried out nature conservation tasks all over Great Britain. Retiring to Gloucestershire in 1966, he looked after the Conservation Corps there. He was also Chairman, and later President, of the Stroud and Tetbury District Scouts, and President of the local branches of the British Legion and the Burma Star Association, entertaining members every summer in his garden, of which he was very proud.

Effie was an officer of considerable charm who was liked by everyone and he will be sadly missed by his many friends, one of whom writes "I knew Effie from the year 1927 when he was serving with the 1st Field Troop at Risalpur and later at Roorkee. Others can write of him as a distinguished soldier, but I remember him as a loyal friend to my husband and myself, always courteous, kind and helpful and our friendship lasted for life. His passing and the passing of his generation of remarkable Sappers has left the world poorer and I feel grateful for having known him".

A very much beloved and upright character, he was highly respected by all who came into contact with him. He was witty and courteous always and, despite being latterly very deaf, remained absolutely alert and interested in people and events and good causes, right up until the final weeks when his life drew to a close.

MBA JPdeCM EENS MCPP KGL JH

Memoirs in Brief

Brief memoirs are published under of distinguished men who served the Royal Engineers.

Archibald Dearman Hamilton OBE BA FRICS. Principal Surveyor Lecturer at the School of Military Survey, Royal Engineers, died on 25 March 1995 within 14 days of his 91st birthday.

Born on 8 April 1904, Archie was educated at St Edwards School in Oxford and at Queens College, Cambridge where he gained a first class degree in geography. After a brief spell as a young teacher at King William's School on the Isle of Man, he accepted a post of Junior Assistant Surveyor in northern Rhodesia. The pay was £400 per annum and a tent was provided for his accommodation. His tasks included township surveys, road alignments and latterly, he set up and managed a training organization to teach local Rhodesian students the skills and responsibilities of cadastral surveys.

At the outbreak of the 1939-45 war he was retained in northern Rhodesia and was appointed as Acting Commissioner of Lands, Mines and Surveys. He had "... confidently expected to be mobilized ..." but his new appointment meant that he essentially ran the department while other members of the staff were released for active service. At the same time, he joined the local defence force responsible for the protection of the various northern Rhodesian mining installations

and held the rank of sergeant major. One of his many responsibilities included instruction on how to operate their unit's temperamental Lewis gun.

After the war he returned to England in 1948 to accept a post as Principal Survey Officer at the School of Military Survey Royal Engineers which was, at that time, located at Longleat. His role as an instructor in cadastral surveys included the administration and supervision of the many students both military and civilian from this country and from overseas. Later that year, the school moved to Hermitage where it is presently located.

Archie retired in 1968, having devoted his career to acquiring and practising survey techniques and procedures; and then to the application of his experiences to the education and training of others for some 20 years at Hermitage. Students from 33 countries received his wisdom, many of whom subsequently reached positions of prominence in their respective national survey organizations. On his retirement he initiated what has since been known as the "Hamilton Prize", awarded since November 1968 to the best overall student in recognition of academic and practical achievements while on the Army Survey Course.

For his outstanding contribution to military survey and overseas service, he was appointed OBE in 1968. He is survived by his wife Joan, his daughter Joanna and his son Nigel.

Sir Douglas Clark Bt. Sir Douglas Clark, 4th Bt, who has died aged 76, was awarded a MC in Italy in 1945 and was also Mentioned in Despatches.

"This officer has proved himself to be an outstanding Company Commander," recorded the citation for his MC. "His great energy combined with the soundest engineering knowledge and organizing ability have been directly responsible for the completion on time of many of the heavy bridges on the Army axis.

"His leadership has been outstanding throughout and in particular on two occasions, when his company was acting in a divisional role, his bearing was exemplary under very trying conditions.

"One was in April 1944 when his company was under command of 78 Division and the second was in May when during the Cassino battle his company went to the assistance of 4 Division and built an assault bridge across the Rapido.

"His example on these and many similar occasions has been of the highest order and the successes and the steadiness of his company are very largely attributable to his influence."

Colin Douglas Clark, who succeeded his brother to the baronetcy (created 1917) in 1991, was the son of Sir Ernest Clark, 2nd Bt, and was born in Belfast on 20 July 1918. He was educated at Eton and Trinity College, Cambridge.

Clark joined the Army in 1939 and after being commissioned into the Royal Engineers served in the Middle East and Italy.

After the war he returned to industry, becoming managing director of G Heyn & Son, Belfast, director of the Ulster Steamship Co, of the Northern Irish and Scottish Investment Trust Ltd, and other companies. He was a member of the Belfast Harbour Commissioners from 1961 to 1979.

Douglas Clark had been a keen all-round games player in his youth, having played cricket for Eton and rowed for 1st and 3rd Trinity. He was an enthusiastic horseman and rode to hounds.

In later life Clark was an unobtrusive supporter of various charitable organizations and was a Samaritan. He was an exceptionally talented gardener.

He married in 1946, Margaret ("Margy") Threlfall. They had a son and two daughters.

MAJOR GENERAL W M BROOMHALL CB DSO OBE

Correction to memoir printed in the April 1995 *Journal.*
Please note that on page 103, left hand column, line 4, "the Arab League" should have read "the Arab Legion". We apologise for this error.

Correspondence

ONE MORE RIVER! SOME PERSONAL REMINISCENCES ABOUT BURMA

From: Major A W K Condon

Sir, – I much enjoyed reading John Constant's personal reminiscences about Burma in the April 1995 issue of the RE *Journal*.

May I however be allowed to correct his statement that the original Bailey pontoon bridge over the Chindwin at Kalewa was built (in December 1944) by sappers of 19th Indian Division. In fact it was built by 33 Indian Corps Troops Engineers and in particular by 361 Bengal Sappers and Miners Indian Field Company in which I was at the time commanding the Hindu platoon – 67 *jawans* plus my splendid Garwhali Brahmin *jemadar*, Raghubar Datt and myself! It was named GRUB Bridge, I remember, in honour of the youngest son of our CAGRE, Colonel Bill Seymour-Williams.

The much heavier pontoon bridge which eventually replaced it was built I believe by the Army Troops Engineers of XIV Army, but by that time 33 Corps Troop sappers were a long way down into central Burma with 2 Division, 20 Indian Division and others. Yours etc – Tony Condon

HANDS UP ALL SCAREDY CATS!

From: Colonel I T C Wilson MBE MC

Sir, – I enjoyed Brigadier John Hooper's article "Hands Up All Scaredy Cats" about fear – or was it about courage – it must have taken some courage to write it. Perhaps the developing trend of replacing a stiff upper lip by counselling, should require "the control of fear" to become part of the military curriculum.

Fear arrives in various forms. A sudden threat to life and limb as happens sometimes when driving, or maybe on an internal security patrol, is one form; the apprehension of advancing to a place where someone may try to kill you, is possibly the other end of the fear spectrum. The former is a shock, worst when totally unexpected, and can cause momentary dulling of the senses, at the time when immediate reaction is often needed. As for going into action, soldiers are seldom at their peak of freshness; an early reveille, uncomfortable approach march, be it by foot, vehicle or aeroplane, heavy loads and lack of hot food all contribute to tiredness before the start line, and the will-power required is perhaps greater. John draws the parallel between fatigue and fear. But, he discounts the "well of courage" theory propounded by Lord Moran, attributing diminished courage only to fatigue. Certainly fear causes tiredness, but ultimately tiredness can dispel fear. I remember once being so tired, cold, wet and miserable that, when mine clearing and coming under mortar fire, I just watched the bombs explode without caring. Over a period of days – perhaps weeks – the reaction to danger does drain resolution like a discharge from a battery. Part of the feeling is wondering when your luck will run out. However, the battery of courage will recharge slowly. One legendary commander (I can no longer remember who) once commented about everyone being capable of bravery, but the important thing was to go on being brave longer than the enemy. Fear seems easiest to control when involved in a group activity – Gunners score here – and hardest when alone in bad visibility.

A year or so ago, I was invited to talk to the local Women's Institute about self protection. I emphasized the unexpected shock aspect of an assault and advised my audience to realize that it can deny ability to think or move, and the way to beat this paralysis by fear was to anticipate it, and it might help to imagine scenarios in advance (knowledge dispels fear!). So it should be for soldiers. I do not know how to overcome apprehension except to realize that it is an entirely normal sensation. Perhaps the old general's recommendation that "young officers should have a good fright once a day" is the answer, preferably not on the road! Yours faithfully – I T C Wilson

A SHORT HISTORY – THE ROYAL ENGINEERS. (April 1995 Journal page 105)

From: Major N R Assiter FRICS

Sir, – I take issue with Captain Simmons regarding his unit in Gibraltar. The Penmaenmawr Quarry Company, along with many other civil engineering companies founded its own construction company in 1940 – it was 681 Construction Company RE. The CO was Major Charlie Darbyshire – the owner of Penmaenmawr Quarry Company. In late 1941 681 Coy was in Dover working on coast defence gun sites (4ft 2in), a hospital under the castle, etc. Gibraltar called and about 50 per cent of 681 Coy was dispatched with the Canadian drillers. I was posted from No 2 Railway Training Battalion (in

Derby) to reinforce and bring 681 Coy up to strength. I was the senior subaltern and Charlie Darbyshire stayed with us until we were posted overseas in April 1942 – part of Force X building an airfield and flying boat base on Vaaja Island in the Faroe Islands. The airfield is in use today and I have recently been asked to go back to the Island to renovate/rebuild the control tower.

It is interesting to note that, without any communication between the two parts of the company, we both used high pressure water jets – we to remove all the peat from the rock surface prior to cut and fill for the runway. Sincerely, – Norman Assiter

THE BATTLE OF CASSINO MAY 1944

From Mr V T Lovell

Sir, – Having read the article by Lt Col A P de T Daniel MC ("The Battle of Cassino May 1944") in the RE *Journal* September 1951, I wish to point out the following errors:

- The bridge was 90ft D/S not 80ft. See p295.
- The launching nose was not dismantled, only the sway bracing and the transoms, were removed. See p300.
- The OC 7th Field Company RE (Maj Low) was manhandled into the back of a Jeep by the CRE and Sgt Riordan. See p297.
- Page 299 Quotes: "Most of 7th Field Company RE now left the site at midnight" – not so.
- Chronology barrage at 2200hrs on 11 May (see p292/3). Author states "Free day on 10th, moved to 'lying-up area' next day (11th) and CRE visited (12th) to wish the sappers luck".
  Page 293 states "H hour was at 2200hrs 12 May".

With respect Sir, – V Lovell, Ex1876538 Spr V Lovell, 8 Sect, 2 Pln 7th Fd Coy RE.

VE DAY

From: Major General P C Shapland

Sir, – the letters in the April 1995 issue of the *Journal* from postal officers on how they heard of VE Day reminded me of my own experience.

I was serving in India with Queen Victoria's Own Madras Sappers and Miners and in May 1945, was in charge of a cadre course of potential *Jemadars*. In early May, we were in our jungle training camp in the Belgaum Jungles, chosen because the jungle was very similar to that in Burma. The camp was about 15 miles from the town of Shimoga, itself some 200 miles north-northwest of our depot in Bangalore. We had no wireless and no telephone communication with the outside world.

Our only link was provided by my ration NCO, *Naik* 80. I should explain that in the Madras Sappers, we referred to our other ranks by their last two numbers because of the similarity of their surnames. 80 was an educated NCO who spoke English and Urdu as well as the four languages of those whom we recruited into the Madras Sappers – Tamil, Telegu, Malayalum and Kanarese.

Every two or three days, 80 would go into Shimoga to collect fresh rations and any mail which had arrived for us from Bangalore. On 8 May, he made one of his trips to Shimoga and, following his usual practice, reported to me on his return. He told me what he had managed to collect in the way of fresh rations and handed over some mail and messages which arrived from Bangalore. I thanked him and asked if there was anything else, to which he replied "Oh yes Sahib, there is a rumour in the bazaar that the war in Europe is over".

So, I heard of VE Day. Yours sincerely – Peter Shapland.

TWO DAYS BY THE UPPER TIBER

From: Dr E Lightfoot CEng FICE FIStructE MSc(Eng) PhD MA

Sir, – I have just come across an old diary containing further details of the actions of Friday 11 August 1944, reported by me in the RE *Journal* issue of August 1994. I quote:

> "Corporal Race actually dealt with mine, under my instructions, Sergeant Pearson holding torch. Igniter set for 19 days, 19 hours, 20 minutes, still going, at half-cock(?). Written on doors 'ab 21.7.44 ... 13/14HD'.
>
> Next task to clear roads and lanes down to Tiber fords. Last one ... heavily mined. In lifting Lance Corporal Goddard was blown up. ... When he blew up, myself, Sergeant Pearson and Italian were 30yds forward looking for schüh mines."

It seems likely that the J-Feder was set on 21 July to fire on 13/14 August after its limit of 24 days, but that it had, in fact, stopped after nearly 20 days, ie two days before we discovered it. Perhaps the German sappers did not know how to set it for a shorter period. I had recalled the date as 31 July 1944 rather than 21 July 1944; however, I had completely forgotten about Sergeant Pearson being present at the disarming and at the later mine clearance. He was really excellent on this day and on many subsequent occasions. Yours sincerely – E Lightfoot.

CENTURION AVRE CENTREPIECE

Colonel J H Joiner BSc FIStructE MICE

Sir, – I trust that the description of the new Centurion AVRE Centrepiece on page 112 of the April *Journal* is incorrect in stating that the silver plate on one face of the plinth shows the No 8 Bridgelayer, since this is in no way a variant of the Centurion Tank.

The No 8 Armoured Vehicle Launched Bridge, or No 8 AVLB, commonly called the No 8 Tank Bridge, is of course launched from the Chieftain Bridgelayer, FV 4205, which is based upon the Chieftain MBT chassis. It is the No 6 Tank Bridge that is the Centurion variant, being launched from a modified Centurion Mark V chassis, known as the Centurion Bridgelayer FV 4002.

On the subject of AVLBs, may I make a plea, without wishing to appear pedantic, for the correct use of this acronym. It stands of course for an Armoured Vehicle Launched Bridge, and the term was first introduced with the commonly named No 8 Tank Bridge, since of course the bridge was never launched from a tank but from a modified tank chassis, or armoured vehicle. Of late the acronym AVLB has often been used incorrectly to described the Chieftain Bridgelayer. Thus an article on the Gulf War speaks of "AVLBs modified to received chain mail", and another article refers to the new Close Support Bridges (ie the new "Tank Bridges") being launched from the existing Chieftain AVLB! Yours sincerely – J H Joiner.

Reviews

ZULU
Isandlwana and Rorke's Drift
22-23 January 1879
IAN KNIGHT

Published by Window & Green London, 5 Gerrard Street, London, W1V 7LT – Price £35.00
ISBN 1 872004 23 7

THE 1879 Anglo Zulu War was contrived to destroy the military power of the Zulus as a preliminary gambit in a policy ultimately intended to encourage the Transvaal and Orange Free State to accept federation with the Cape and Natal colonies under British rule. The Zulu nation defended its land against a seemingly well armed invasion force under an experienced officer enacting a bold if risky plan. Surprisingly, though not so with hindsight, they inflicted a convincing defeat on the British main force at Isandlwana. Though a reinforced second invasion succeeded, the Zulu War exposed weaknesses at the tactical, operational and strategic level in the army which not only helped bring down the Disraeli government in 1880 but bolstered the confidence of the Boer republics in their defiance of London at the outset of the Anglo Boer War of 1881.

There is quite a story to tell from a rich legacy of good primary sources, all well known to the author. The problem is what to edit out. Ian Knight chooses to cover the two best known of the many battles and the dramatic core of the campaign, the disaster at Isandlwana and the consolatory triumph of the defence of Rorke's Drift. They were actually dispersed actions of a near continuous battle fought over an 18-hour period. Zulus expecting to cut off and envelop the rear of the camp at Isandlwana went on to attack Rorke's Drift. The key characters are well developed in the narrative, and we are given shrewd insights into the flawed composition of the force and the uneasy integration of the imperial and colonial forces. An objective attempt is made at analysing Lord Chelmsford, his background, past experience and unusual style of command.

Then we plunge into the controversy; Chelmsford's expedient strategic plan, with all its risks, his lack of caution in the advance beyond Isandlwana, the resultant exposure of his main force and its supplies. The apparent deficiencies in the arrangements for the defence of the camp are explored, though perhaps not to the extent that they might have been. At what was the worst possible tactical moment for Chelmsford, the Zulu main force was discovered resting within five miles of the camp and launched itself into a spontaneous attack on a dispersed and uncoordinated defence.

This was not perceived as the real and overwhelming threat that it became, until too late. Durnford, formerly CRE Natal and commanding a mounted column recalled to the main force, appeared at the critical moment and he and Pulleine, commanding the camp, jointly managed to misread the location and extent of the Zulu threat and misconstrue each other's orders. We have neither convincing documentary evidence nor adequate eye witness accounts to explain exactly how this occurred and it remains an area of speculation and contention within which the author treads carefully.

Against a British failure to coordinate a defensive line and concentrate and sustain adequate firepower the Zulus mass and manoeuvre, despite serious casualties. They outflank and isolate the defence and gain the tactical initiative, forcing the hard pressed companies of the 24th Foot to fall back in disarray and fight a grim withdrawal as they are destroyed in detail. All except a few mounted men are killed, striving to reach the Fugitives' Drift on the racing Buffalo River. Unfailing and desperate courage was not enough to save them.

Obviously comfortable with his mastery of the events at Isandlwana, Ian Knight turns to the smaller scale action at Rorke's Drift. Regrettably this is perhaps the weakest chapter in the book. Instances of lack of attention to important detail catch the eye. For example, there is a very odd diagram showing the Zulu main attack sweeping wide into open fields of fire rather than along the covered approach which led onto the blind spot of the defence. Not only can the visitor trace this route even today, Chard showed it repeatedly in his own sketches of the developing battle. Regardless, the book otherwise finishes well and the closing chapter is neatly handled, covering the poignant circumstances of the burial of the dead at Isandlwana and reaching interesting conclusions on its continued impact on Zulu and settler history.

This is a book for the reader who knows the basics of the story and wants more detail. It is illustrated with well chosen black and white photographs, some generally good explanatory maps and diagrams and eight good colour plates. The large format seems designed to show these off, but generates a correspondingly large binding which does not fit easily into small book cases.

All that said, this is a fairly balanced and comprehensive account which tells a complex story in a way which holds the attention of the reader. The author is the most prolific and experienced modern writer on this subject and is always worth reading. There are substantial numbers of enthusiasts interested in the Zulu War who seem to prefer to have the story told in a factual way, with its own accepted conventional wisdoms. They will buy this book. Let us hope for Ian Knight's sake that they have £35 to spare.

MCMcC

THE BRITISH IN THE MEDITERRANEAN

Peter Dietz

Published by Brassey's, 33 John Street, London WC1N 2AT, Price – £29.95
ISBN 0 08 037716 5

This is a useful book giving a slightly unusual perspective on the Mediterranean as a whole, seen from the point of view of the British and their interest in the area. The approach is historical and anyone who has served in Cyprus, Malta or Gibraltar will be entertained by the snippets of cultural and social colour enlightening the main story, which is essentially political. The military accounts have appropriate sapper content, particularly in Gibraltar.

The obvious problem for the author of such a book is to decide how far from the shores of the Mediterranean his account should reach. Tangier, Gibraltar, Minorca, the Ionian islands, Cyprus and Egypt and Britain's involvement in them are essential mainstream topics but it is difficult to separate, say, Egypt and Sudan or Turkey and the Crimea. Peter Dietz takes us to Khartoum (in the 19th Century) and Baghdad (in the First World War) – fair enough in view of their influence on the main significance of the Mediterranean to Britain, the route to India. But the underbelly of Europe aspect is tantalizingly sketchily treated, Gallipoli touched upon and Salonika not mentioned.

However, you cannot have everything and a particular strength of the book is the sequence of chapters dealing with the Second World War and its aftermath in Palestine and Suez. The causes and effects on Britain's relations with France, the USA and the Arab world of the events of 1956 are presented with admirable clarity and the idea emerges that over the years British people acquired an emotional attachment to the area which had some influence on events mid-twentieth century.

There are one or two surprising quirks and inaccuracies (a strange reference to William III ruling Britain and Holland after Queen Anne, for example). The book is also let down by an inadequate index. But by and large it is workmanlike (if on the pricey side) and rather more than useful background

for a holiday trip, for which it would certainly be handy as a serious foil to the latest Patrick O'Brian.

GWAN

WINGATE AND THE CHINDITS. REDRESSING THE BALANCE

DAVID ROONEY

Published by Arms and Armour Press, Villiers House, 41/47 Strand, London, WC2N 5JE – Price £17.99
ISBN 85409 204 9

As the title implies, the purpose of this book is to put the record straight regarding Orde Wingate and the Chindits. David Rooney, in researching his earlier book "Burma Victory Imphal, Kohima and the Chindit issue" was struck by the contrast between the worldwide tributes (including one from Slim) following Wingate's death in March 1944 and subsequent disparaging accounts, notably those of Slim in "Defeat into Victory" (1956) and the author (Kirby) of the "Official History of the War against Japan" Vol III (1961). Rooney decided to investigate the background to these inconsistencies, with a view to arriving at a balance assessment of this controversial commander and the achievements of his forces in Burma. His conclusions, after much careful research, are somewhat startling, as the following extract from the final page of his book shows:

> "If a group of professional historians were asked to list the cardinal sins of a historian, they would probably include: using selective evidence; suppressing evidence contrary to their thesis; altering original documents; misquoting statements to alter or reverse their meaning; asking loaded questions to trap witnesses into mis-statements; manipulating witnesses to withdraw previous statements; and destroying documentary evidence. There is now incontrovertible evidence that Kirby did all of these, and through the "official" history did grave and lasting damage to the reputation of Orde Wingate and the achievements of the Chindits.
>
> Instead of the petty destructive and dishonest commentary of Kirby, which has had so much influence since it was written, Wingate should now be remembered as an outstanding wartime leader, a brilliant and original military thinker whose reputation spanned the world, a meticulous planner and organizer, and a fearless and inspiring leader."

Rooney does not gloss over Wingate's faults – he was "often a difficult, prickly, contemptuous, outrageous and impossible colleague" and those aspects of his character naturally did not endear him to senior staff officers at GHQ New Delhi and SEAC. In particular, he fell foul of the future official historian, Major General Woodburn Kirby, who was Director of Staff Duties and then Deputy Chief of Staff at Delhi. Rooney's researches reveal how Kirby and his chief assistant, Brigadier Michael Roberts, used their influential positions to denigrate Wingate and the Chindits, even to the extent of persuading Slim to include in "Defeat into Victory" a highly dismissive description of Wingate and his campaigns. The prejudiced views of these two editors had widespread influence on later historians and authors, who naturally turned to the "official" history for accurate and unbiased information. David Rooney does indeed redress the balance – and unbends some bent history.

HNFP

Abbreviations used in this Journal

ACE	Allied Command Europe	km/s	kilometre/s	RN	Royal Navy
AMF(L)	ACE Mobile Force (Land)	KVA	kilovolt ampere	RSM	Regimental Sergeant Major
CO	Commanding Officer	LANDCENT	Land Central	RSME	Royal School of Military Engineering
CRE	Commander, RE	m	metre/s	SNCO	Senior NCO
EOD	Explosive Ordnance Disposal	mm	millimetre/s	ss	Steamship
etc	et cetera	mph	miles per hour	TA	Territorial Army
FARELF	Far Eastern Land Forces	mpg	miles per gallon	UK	United Kingdom
ft	foot or feet	NATO	North Atlantic Treaty Organization	UN	United Nations
GHQ	Garrison/General Headquarters	NCO	Non Commissioned Officer	USA	United States of America
HMS	Her/His Majesty's Ship	OC	Officer Commanding	(V)	Volunteers
hr/s	hour/s	orbat	order of battle	WC/s	Water Closet/s (toilet/s)
HQ/s	Headquarter/s	ppm	parts per million	WO	Warrant Officer
in/s	inch/s	RAF	Royal Air Force	WW1/2	World War One/Two
JNCO	Junior NCO	RE	Royal Engineers	yd/s	yard/s
		recce	reconnaissance		