THE ROYAL ENGINEERS JOURNAL

AUGUST 1997 VOL 111 NO 2

Guidelines for Authors

The Editor is always pleased to consider articles for publication in the *Journal*.

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

Length. Approximately 4500 words plus illustrations.

Copy. Ideally one copy of the text should be submitted, together with a head and shoulders photograph of the author plus a short pen picture.

Clearance. Articles must be cleared by an author's CO where applicable.

Computers. Articles submitted on 3½in discs, or through the e-mail (see bottom opposite page for address), are very welcome. Please ensure that text is typed with no formatting, ie LH justified only, and please **NO** caps-only headings – all upper and lower case.

Copyright. If an article has been published elsewhere before being submitted to the Institution, copyright clearance must be sought by the author; where necessary copyright clearance on photographs, maps or illustrations must also be obtained prior to submission.

Photographs should be of good quality with sharp definition, and don't forget to add appropriate captions. Please do not submit laser/photo copies of photographs for publication.

Rewards can be generous. The Publications Committee has about £350 in prize money to allot for each issue plus valuable annual prizes. All authors receive £20 to help cover costs.

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

Contributions should reach the Editor by:

13 October for the December 1997 issue
Early February for the April 1998 issue
Early June for the August 1998 issue

Submissions before the deadline are particularly welcome.

INSTITUTION OF ROYAL ENGINEERS

Established 1875
Incorporated by Royal Charter 1923

Patron: HER MAJESTY THE QUEEN
Chief Royal Engineer: General Sir John Stibbon KCB OBE

COUNCIL

PRESIDENT

Major General A D Pigott *CBE* ... 1997

VICE PRESIDENTS

Major General D A Grove *OBE* ... 1995
Colonel C W Pagan *MBE TD DL* ... 1997

MEMBERS

Ex Officio	*EinC(A)*	Brigadier I D T McGill *ADC*	
	D Engr Sp	Brigadier C C Galloway	
	D Mil Svy	Brigadier P R Wildman *OBE*	
	Comd Engr LAND	Brigadier A S Craig *OBE*	
	Comdt RSME	Brigadier R Pridham *OBE*	
	Regt Col	Colonel R J Sandy	
	Col RE MCMD	Colonel P A J Sheridan	
	CRE 3 (UK) Division	Colonel J S Field *CBE*	
Elected		Colonel M B Mounde *MBE*	1995
		Colonel M J Payne	1997
		Lieutenant Colonel B H Stafford *BEM*	1995
		Lieutenant Colonel J D Wootton *MBE*	1995
		Lieutenant Colonel E J N Brookes *TD*	1997
		Major A Keeley	1997
Coopted (non-voting)	*Corps RSM*	Warrant Officer Class 1 I L George	
	Secretary	Colonel M R Cooper	1994
	Treasurer	Lieutenant Colonel R F Wilsher	1996
Corresponding Members		Colonel P Lilleyman *MBE*, BLO Fort Leonard Wood, USA	
		Lieutenant Colonel M S Norbury, BLO Pionierschule, Munich	
		Major R C F Braybrook, BLO Engineer School, Angers	
		Major M J Cox, Exchange Appointment, Australian SME	
		Captain A P J Barr, Exchange Appointment, Canadian SME	

BUDGET, INVESTMENTS, MEMBERSHIP, SCHOLARSHIP, MEMORIAL AND PUBLICATIONS COMMITTEE

Chairman	Colonel C W Pagan *MBE TD DL*
Vice-Chairman	Colonel R J Sandy
Members	Colonel W M Davidson
	Colonel J S Field *CBE*
	Colonel P A J Sheridan
	Colonel M J Payne
	Colonel I S Mercer *CBE*
	Lieutenant Colonel J D Wootton *MBE*
	Major A Keeley
	Warrant Officer Class 1 I L George
Secretary	Colonel M R Cooper
Treasurer	Lieutenant Colonel R F Wilsher

INSTITUTION OF ROYAL ENGINEERS' STAFF

Secretary:	Colonel M R Cooper	Tel: ATN 766 (BT 01634 842669/82) 2298.
Assistant Secretary:	Mrs J D Scanlan	Tel: ATN 766 (BT 01634 842669/82) 2299.
Administrative Officers:	Mrs M Bassett/Mrs J Ellender	Tel: ATN 766 (BT 01634 82) 2298.
Fax:	ATN 766 (BT 01634 82) 2397	*e-mail:* inst-royal-engrs.demon.co.uk

All correspondence in connection with editorial matters should be addressed to the Secretary, Institution of Royal Engineers, Ravelin Building, Brompton Barracks, Chatham, Kent, ME4 4UG

The Institution of Royal Engineers is Registered as a Charity Number 249882

Editorial

THE leading article in this issue of the *Journal* is the Engineer in Chief's annual report to the Corps. Ever since these reports were first published in 1992, it has been the custom to drop the editorial. Not one to dismiss customs lightly, I was very happy to go along with this one. However, it was pointed out to me that omitting the editorial was probably an excuse by an overworked editor wanting to sit back and relax for a while. What prompted me to change my mind, apart from guilt, was that I really enjoyed the contributions and range of articles in this issue.

Going back to the Engineer in Chief's annual report, two interesting points emerge. The first is that the Corps is the only capbadge, apart from the Army Air Corps, which is fully manned. The second is that the operational inter-tour interval of engineer units has been about 12 months, much less than that of any other arm or corps. Despite its relatively small size, the utility of the Corps in support of UN and NATO peace operations is unquestionably high. Those who will be conducting the new Defence Review must surely not ignore it.

The ban on the use of land-mines has had much publicity in the press recently. I use the word "land-mines" to make the point that many commentators and an uninformed public appear to draw little distinction between anti-personnel and anti-tank mines. *Rabbits Foot or Reality?* supports the need to ban anti-personnel mines on humanitarian grounds. With evidence of up to 100 million uncleared mines, mostly in the poorer countries of the world, such a ban is difficult to refute. The legacy of war is of course not just the danger of mines; but the very nature of mines, which makes them so effective in war, also makes them so much more deadly in peace.

The theme of three of the articles is about business. *Who Knows Wins* emphasises the similarity of roles and qualities of the successful chief executives in business and the accomplished military leaders and strategists of the past; *Transferable Talents* examines the similarity of skills required in both civilian and military organizations, and is good reading for anyone contemplating a change of career; and *The Essence of Business* is a collection of pithy and perceptive sayings that could be applied equally well to the business of the Army as they do to the commercial world.

This year is the 50th anniversary of Partition, the separation of India and the creation of the new state of Pakistan in 1947. *Transfer of Sovereignty* is a vivid and harrowing account of how ordinary people suffered in the process. It is a story of epic proportions which has remained largely untold and forgotten.

Is the Grass Really Greener Over There? is required reading for any qualified civil engineer or anyone contemplating attending a Professional Engineer Training course. It gives a great insight into the management of a large civil engineer construction task and the contribution which a Sapper officer can make to its success.

For those of you who were unable this year to attend the joint professional meeting with the Institution of Civil Engineers in London, a resumé of the presentation is given in *Building the Peace.* It was British military engineers who took the lead in the reconstruction of much of the land communications infrastructure in Bosnia. The way forward is to improve military/civilian cooperation in this multi-billion pound enterprise for the benefit of all concerned.

The Engineer & Logistic Staff Corps RE (V) traces the origins of this little known organization, the members of which are shown in the *RE List.* The extraordinary diversity and wealth of talent the Staff Corps can bring to bear on engineering problems confronting the Corps in operational theatres has been called upon on many occasions throughout its history.

Some readers will be aware that the Council of the Institution is carrying out a review of the role of the Institution. There has been a number of them in the past, in the 1960s, 1970s and 1980s. It is important that we continue to question how the Institution can improve the support it gives to the Corps and its members. I would like to draw the attention of members to a notice in the August issue of the *Supplement* inviting them to give their views and comments on some changes which are being put forward for consideration.

ISSN 0035-8878

THE ROYAL ENGINEERS JOURNAL

© Published in April, August and December by the Institution of Royal Engineers, Chatham, Kent, ME4 4UG

Printed by Staples Printers Rochester Limited, Neptune Close, Medway City Estate, Frindsbury, Rochester, Kent, ME2 4LT

Volume 111 August 1997 No2

Contents

Annual Report to the Corps by the Engineer in Chief

Introduction

THE Corps of Royal Engineers has been successful throughout the past year in delivering everything asked of it. Morale is generally sound because our soldiers recognize that they are carrying out worthwhile tasks, on operations and training, and that they have an enviable utility. Our tour interval has remained at between 11 and 12 months, but this is set to rise to 21 months by the middle of 1998 if no unforeseen commitments arise.

After almost two years as EinC(A), my greatest concern now is the Corps' longer-term sustainability, not so much from the operational pressures but more because of the never-ending cycle of budget cuts and efficiency targets affecting our training base. Anyone now running a budget well understands the case for "just in time" rather than "just in case" training but we are taking risks, particularly with our individual training, which may not be quantifiable for some years. Any engineer worth his salt recognizes the need for a safety factor when designing a structure; the more uncertain are the factors such as the suitability of the ground, the type of loads and the strength of the materials, the less predictable will be the behaviour of the structure under loading. Nothing is more uncertain than war or operations and we can never train enough in preparing for them; our safety factor needs to be as high as possible. Reality dictates that it will be as high as we can afford.

Outline Organization of the Corps

THIS year has seen the final changes to the Corps' Orbat brought about by *Options for Change*. 67 Gurkha Indep Fd Sqn disbanded in December 1996, while 255 Mobile Civilian Plant Group closes down in September this year. The following comparison of regular squadrons before and after *Options* is a reminder of the extent of change, even though at 8637 all ranks (less Gurkhas), we remain nine per cent of the Army's trained strength[1]:

Type	Pre-Options	Post-Options
Wheeled Fd Sqn	19	10
Mechanical Fd Sqn	13	7
Armd Sqn	3	5
Fd Sp Sqn	10	4
Plant/Fd Pk Sqn	6	2
Fd Sqn (EOD)	2	3
Amph Sqn	3	1
Training Sqn	12	7
HQ Sqn	0	10
Totals	68	49

The Corps' post-*Options* family tree is shown on pages 102 and 103. Recent changes include the activation of 412 Amph Engr Tp (V) at Hameln, an integral part of 28 Engr Regt's capability. We welcome also HQ 29 (Corps Sp) Engr Bde, an ARRC intermediate HQ that will command RE Corps Troops on an ARRC deployment. I am also pleased to report the retitling of the RE Air Support Group as HQ 12 (Air Support) Engineer Brigade. Both formations are commanded by colonels. Another addition to the Army's Orbat is the Civil Affairs Group. Although this is an All-Arms organization, their role mirrors many Sapper activities. In recognition of this, the Civil Affairs Group is being sponsored by the Royal Engineers in LAND and by CVHQ RE. It is described in more detail later.

Change is continuous as we pursue our organizational aspirations. Regular establishments are being revised to reflect the changes brought about by the REESR (Royal Engineers Employment Structure Review). At the same time we are hoping to establish resources for BGEs (battlegroup engineers), though at this stage the enhancement will be at war establishment only.

Operations

THE past year has continued to see half the Corps training for, or deployed on, operations. This level of operational commitment severely stretches the Corps and other aspects of effectiveness have suffered, such as support to All-Arms collective training, equipment care and some force projection/sustainment exercises overseas. The reduction in force levels in Bosnia will give welcome relief to the operational tour plot (OTP) interval, until recently an average of just under

[1] The TA Orbat changes as a result of *Options* are not shown, but the RE TA comprises 9.7 per cent of the Army's TA.

12 months. Our activity levels now provide an OTP of 16-17 months, which had looked like improving to a new average of 21 months by the middle of next year. However, the recent sudden decision to commit 5 Fd Sqn to support 1 Prince of Wales Royal Regiment (PWRR) in Northern Ireland for six months from November 1997 will delay the time when the OTP interval reaches 21 months. Some squadrons will remain under more pressure than others as we pick up collective training commitments again. The exposure the Corps has had in an All-Arms environment has ensured the chain of command takes note of the value of the Corps' capabilities, and leaves us well placed to compete for scarce resources in future long-term costing rounds.

Overcoming manning difficulties for operational tours has always been a significant hurdle for commanders to overcome. Two factors have reduced the height of this hurdle. Firstly, only tours in Northern Ireland and the Falkland's require a minimum manning strength (MMS). Elsewhere a "best effort" policy is accepted, provided the required capability is delivered. Secondly, the RE TA has been able to provide many individual reinforcements to fill critical shortfalls. I am grateful to the TA for the help it has given. These developments have helped maintain the minimum levels of attendance on career courses necessary for our long-term future.

This year has seen the evolution of formal contingency force groupings and the establishment of the Permanent Joint Headquarters (PJHQ). PJHQ now commands deployed operations and HQ LAND provides resources and advice, in particular special-to-arms advice. LAND maintains forces at newly defined readiness states. Assigned and earmarked forces would be assembled to meet the needs of particular operations with the Joint Rapid Deployment Force. The Corps provides elements of 9 Para Sqn and 59 Indep Cdo Sqn; an air support squadron, an EOD section and elements from Military Works Force and Military Survey as assigned elements at short notice to deploy. Two close support squadrons and an air-mobility troop are earmarked at reduced notice to move. These elements, which must be replaced if deployed, are not available to the OTP, increasing pressure on other units.

Aardvark.

Operation *Resolute/Lodestar*. Operation *Resolute* drew to a close in December 1996 with 22 Engr Regt the last roulement into the IFOR structure. The revised international mission has been taken over by the Stabilization Force (SFOR), which is half the size of IFOR. The British contingent is under command of PJHQ, on Operation *Lodestar*. The type and rate of engineer taskings has remained much the same, although the engineer main effort has shifted towards recovering or relocating redundant military infrastructure and a major countermine monitoring effort (16 teams). The RE commitment, rouled on a six-month cycle, consists of the following elements:

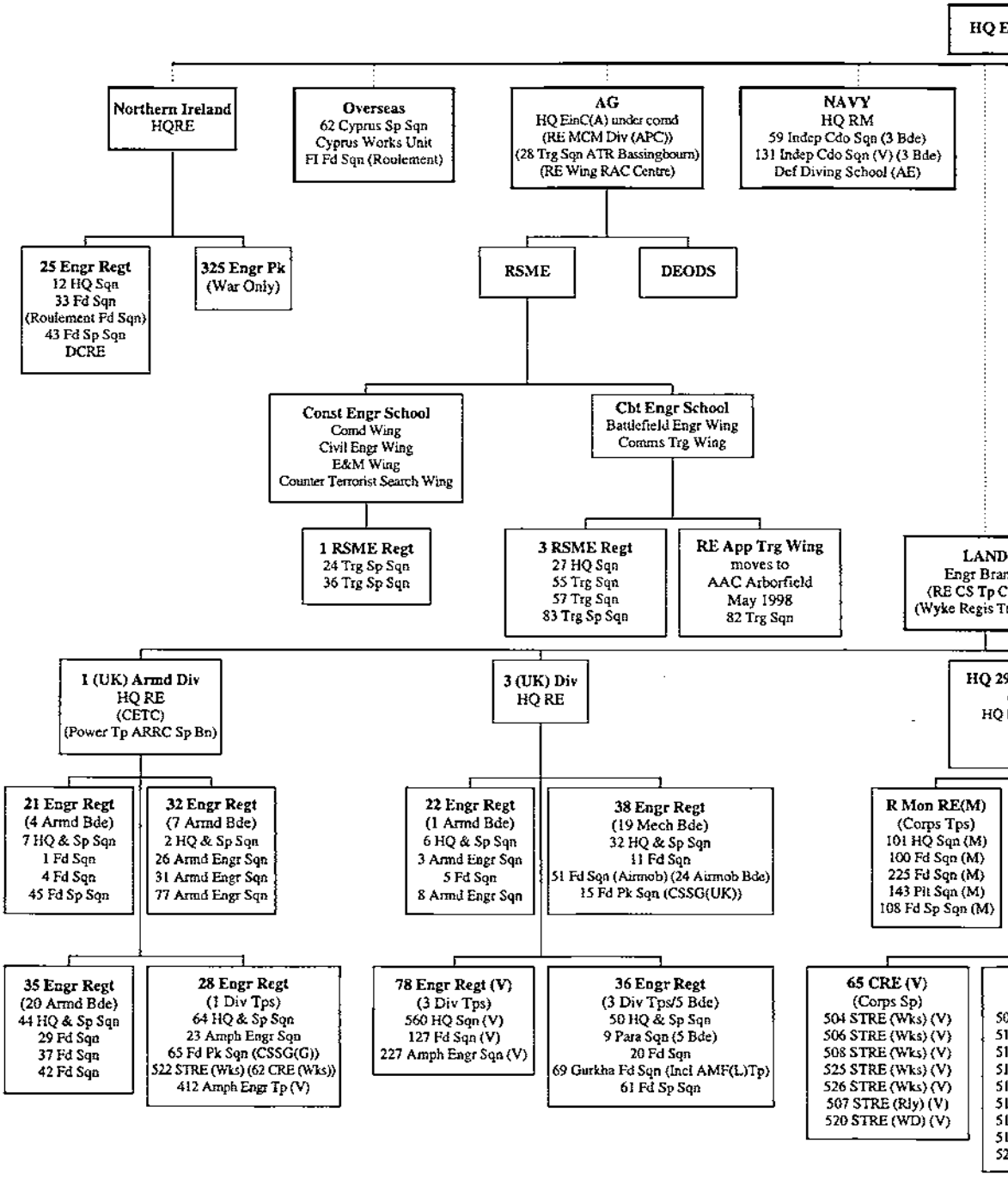
HQ SFOR RE Cell (Sarajevo, including a survey detachment)
RHQ as HQ RE in HQ MND (SW) (Banja Luka)
A mixed mechanical/armoured squadron
A wheeled field squadron
A field support/park squadron
A STRE
Two EOD detachments

21 Engr Regt is currently in theatre; they will be rouled by 38 Engr Regt in September 1997. HQ LAND are in the process of synchronizing roulement dates so that a complete regimental group can roule at once, based on a single unit. It is intended that engineers from 1 (UK) Armd Div will supply the summer roulement and from 3 (UK)Div/LAND will provide the winter one. There is a possibility that the Bosnian commitment may alter again in mid-1998 when the SFOR mandate is reviewed.

Operation *Descant*. Following the breakdown of the IRA (Irish Republican Army) cease-fire in

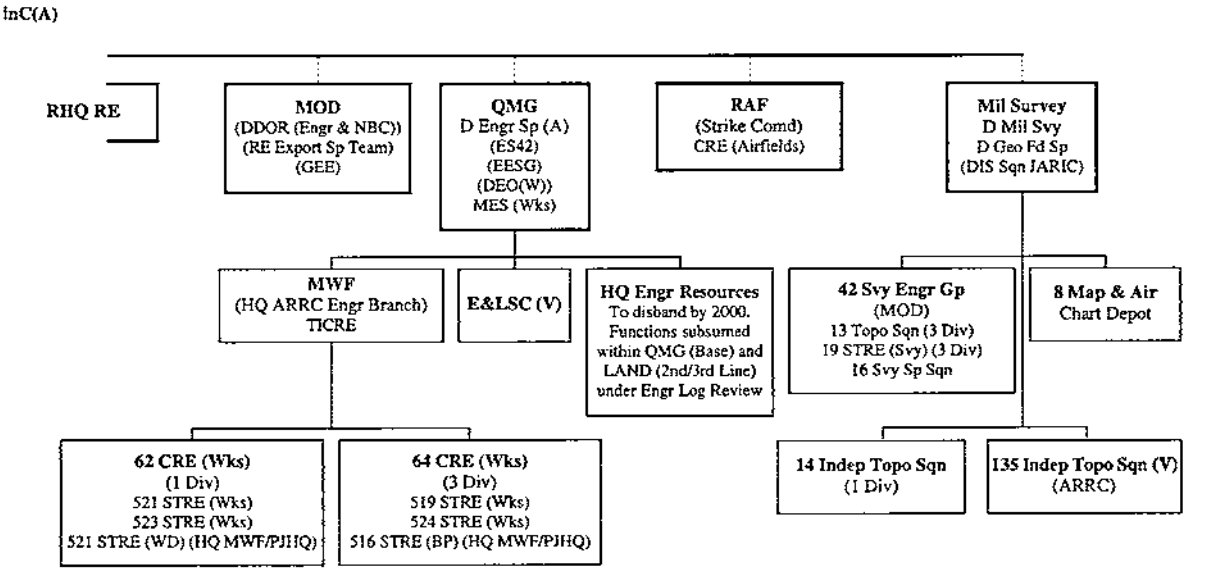
Annual Report to the Corps (p101)

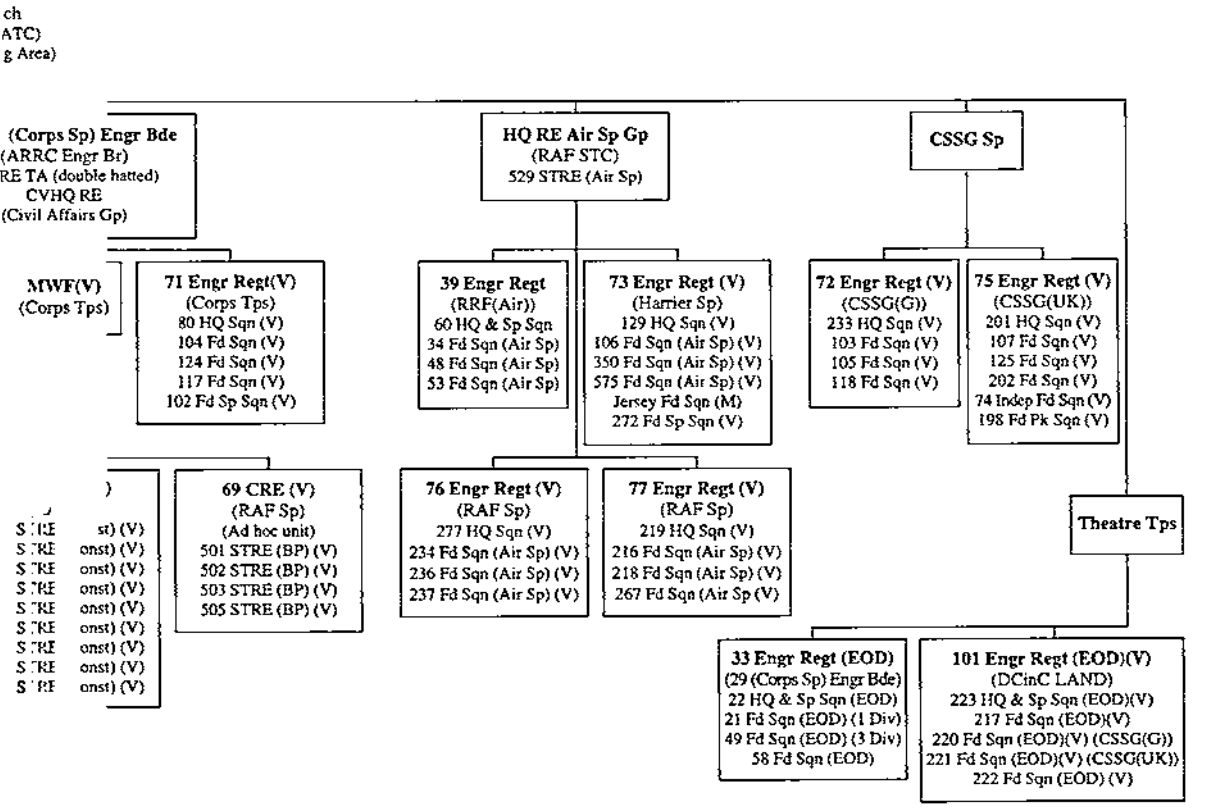
Serving Corps of Royal

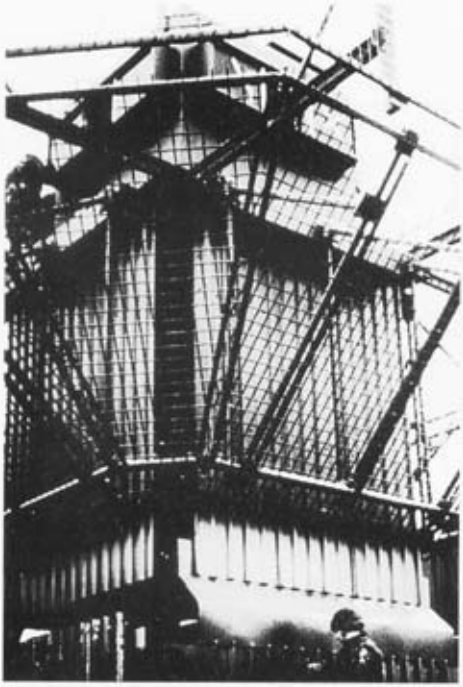


Text in brackets indicates the role, the affiliated formation or an RE element in a non-RE organization.
Squadrons are shown in their peace deployment. R Mon RE(M) and 75 Engr Regt (V) may exchange roles.

Engineers – Family Tree







Northern Ireland – sangar erection, South Armagh.

early 1996, 25 Engr Regt has been fully committed to supporting operations. A roulement construction/search squadron is provided by LAND to Northern Ireland under operational command of 25 Engr Regt, every March and September. These have included 53 Fd Sqn (Air Sp), 23 Amph Engr Sqn and 59 Indep Cdo Sqn. The roulement squadron remains housed at Long Kesh (Maze), although a new build is well underway in Antrim to collocate it with the rest of the regiment sometime after 20 Sqn take over in September. The roulement squadron provides most of its effort within 8 Inf Bde area on protection and construction works, and has been a major force in inter-community relations initiatives. The overall priorities for the 25 Engr Regt group have been search, support to the containment of civil disorder, disruption and disturbance, and diving and construction. 5 Fd Sqn will shortly start a six-month tour in the infantry role, in support of 1 PWRR.

The Falkland Islands. The current commitment in the Falkland's is a large squadron, on a four-month roulement, under RAF command in the air support/construction role. The current need for a MMS, which is more than a squadron can provide, places a considerable strain on the sponsor regiment in making up the numbers. We are seeking ways to produce the required capability at less than the current MMS. The number of specialist skills required to be mastered before deployment, the variety of tasks in theatre and the size of the equipment husbandry task makes a tour in the Falklands challenging. The tour has been carried out by 51 Fd Sqn, 4 Fd Sqn and 1 Fd Sqn over the last 12 months.

Cyprus. Whilst 62 Cyprus Sp Sqn carry out tasks in support of HQ British Forces Cyprus, 36 Engr Regt continues to support the UN force in Cyprus with a 13-man detachment. A small troop from 71 Engr Regt (V) deployed on 3 February 1997 for ten weeks to assist 62 Cyprus Sp Sqn in the demolition of a camp on the cease-fire line at Pergamos. The Corps has a significant presence in the J4 estate area, which has been restructured during the year into a more robust, effective organization.

The Middle East. The RE Air Sp Gp continues to provide support to the RAF, including the in-role air support squadron for the Joint Rapid Deployment Force. During Operation *Colmar*, 34 Fd Sqn (Air Sp) deployed to move all the life support, operations support and aircraft accommodation of Operation *Jural* (the policing of southern Iraqi air space) to within Saudi Arabia. The squadron was required to ensure a full capability at Dhahran airfield until the new facilities at Al Kharj became operational.

EOD. 33 Engr Regt (EOD) shoulders a large number of operational commitments. It has a significant mainland counter-terrorist search burden, detachments deployed in each operational theatre, a high readiness Joint Rapid Deployment Force section and a huge backlog of explosive ordnance clearance (EOC) tasks at home and overseas. It also contributes to high readiness nuclear accident response organization teams, Home Office counter-terrorist contingency operations and supports brigade training.

Annual Report to the Corps (p104)

EOD is a dynamic area in which the Corps has a leading role to play, following the promulgation of MOD policy that the Corps should lead in all aspects of EOD on deployed operations.

Other Operations. A steady stream of operations has been called in response to world events, each involving staff effort to produce a force package leading up to actual deployment. The operations which were mounted, aborted or put on hold to await a trigger included:

Operation Colmar – RE Air Support (infrastructure support).

- Operation *Helvin* stood by sections from 33 Engr Regt (EOD) and 9 Para Sqn to assist with a planned non-combatant evacuation operation in Albania.
- Operation *Caxton*, would have deployed staff expertise in the event that the volcano on Monserrat erupts. A multidisciplinary, troop-level package could have been deployed to assist with disaster relief. The operation was stood down and was not re-activated when the volcano did erupt.
- Operation *Purposeful*, the humanitarian assistance to refugees in eastern Zaire/Rwanda was recced, planned, but not undertaken. The RE element, which was on standby, would have been 9 Para Sqn, an EOD section, elements of MWF (up to 25 personnel) and up to one field squadron (air support).
- Operation *Determinant* was the name given to the potential non-combatant evacuation operation in western Zaire. A section from 9 Para Sqn and an EOD section were stood by. The operation has now been stood down.

Exercises and Projects

With the size of our operational commitment, it is not surprising that the Corps has found difficulty in resourcing the full range of Sapper and All-Arms exercises. This has been compounded by pressure on air transport and combat arm units. Exercise *Medicine Man 1* for 1997 was cancelled completely, but the following BATUS (British Army Training Unit Suffield) exercises have been able to be fully supported now that the Bosnian commitment has reduced. We have provided troops to support ten tactical engagement simulation exercises on Salisbury Plain. Tactical engagement simulation exercises are exciting training opportunities to combine tactical training with objective umpiring through the use of weapons-effect simulation. The Corps has provided engineer support to major battalion group exercises in Kenya (*Grand Prix*), the USA (*Trumpet Dance*) and Canada (*Pond Jump West*). On one of the latter exercises the support was provided by a troop from Royal Monmouthshire RE (Militia).

In order to maintain the full range of our military engineering capability, we place a high priority on special-to-arms exercises. 5 Fd Sqn, having contributed to *Medicine Man 6*, refurbished the Suffield training area on Exercise *War Paint*. 1 Fd Sqn completed tasks on the military estate in Cyprus on Exercise *Pine Stick* and 9 Para Sqn undertook a range of work in Kenya on Exercise *Oak Apple*. 34 Fd Sqn were congratulated by Directorate Engineer Support (Army) (D Engr Sp(A)) on the high technical standards they achieved on Exercise *Sail Fish* in Belize.

Operation Purposeful – MLC 10 EWBB.

Above and below: Exercise Oak Apple.

whilst 15 Fd Sp Sqn refurbished infrastructure facilities in Gibraltar on Exercise *Eighteenth Shot*. 69 Gurkha Fd Sqn sent a troop to Norway on Exercise *Northern Quest*. 33 Engr Regt (EOD) carried out several EOC tasks in the UK, Cyprus, Kenya and Belize. A range of smaller exercises included a troop from 29 Fd Sqn on Exercise *Crab Apple* in Kenya, teams lead by MWF carrying out public utilities team training on Ascension Island and Cyprus, and the deployment of individual tradesmen as far afield as Hong Kong to carry out priority tasks. 19 STRE from Military Survey deployed to Norway on Exercise *Trig Norge*, and at present a detachment from 19 STRE is in Mozambique on a survey task.

The Corps has a continuing commitment to assist in the improvement of UK training facilities. These projects represent valuable training opportunities that are only undertaken when operations and other key training allows. Following successful squadron projects at Warcop, Catterick, Salisbury Plain and Minley, no project was undertaken in 1996. This year 22 Engr Regt will be constructing a demolition training bridge at Tidworth. Future projects, subject to the availability of units, include work on ranges at Lydd, Ash, Catterick and Otterburn. Some of these projects may be contracted out, though MWF may manage the projects on behalf of LAND.

Reserve Forces and the TA

The last 12 months has proved again the extent to which the RE TA is an integral part of the Corps and has been able to relieve the pressure on regular troops. RE TA units have found 132 volunteers to serve on special S-Type engagements with regular units on operational tours. In addition, RE TA units have taken on 70 troop-weeks' worth of regular taskings and commitments that would otherwise have been turned down or cancelled. For example, 131 Indep Cdo Sqn (V) was able to support Ex *Ocean Wave*, a major commando group exercise in the Far East, coinciding with the handover of Hong Kong. In addition, a detachment from 71 Engr Regt (V) undertook the demolition of Pergamos Camp in Cyprus. An important element of our amphibious engineering capability has fallen into place with the activation of 412 Amph Engr Tp(V) at Hameln. The troop will be an integral part of 23 Amph Engr Sqn's ability to provide the Corps' M3 bridging capability.

Whilst LAND Engr Branch seeks to make the most of RE TA capabilities, a quantum leap in the delivery of that capability is being engineered by HQ RE TA. This HQ, based at Buller Barracks, Aldershot, is now the focus for RE TA activity and development. HQ RE TA is also double-hatted as HQ 29 (Corps Sp) Engr Bde, which will now subsume the former's duties and title. One of the first big issues to be addressed is how to improve recruiting and retention in the TA. Potential recruits are already forgetting the Cold War threat and are looking more closely at the importance of their family life and the increasingly competitive world of employment. The TA must also stand comparison with competition from a diverse and sophisticated leisure industry for a potential recruit's time. The first answer is to market the TA career better.

The Military Engineer (V) concept has been developed to optimize the transfer of skills between the TA and civilian employment, to provide a clearly understandable, modular system for

progressing through a TA career and to allow more time for priority training by holding back that training which can wait until after mobilization. Hand-in-hand with this will be a review of the rank structure in TA units to provide viable employment career pyramids and to limit the opportunity for unearned promotion by minimizing the number of rank ranged posts. A trial is being conducted this year on 71 and 72 Engr Regts (V), with implementation in the balance of the RE TA in 1998 and 1999. The initiative has been well received by the TA and LAND for its potential to revitalise the whole of the TA; another example of the Sappers leading from the front. The future for the TA as a whole remains under study. The One Army concept remains true, illustrated by the transfer of important capabilities (Multiple Launcher Rocket System, M2 etc) to the TA. However, the MOD recognizes that, short of a regional conflict requiring mobilization, the TA is at its best providing individual volunteer reinforcements to fill specialist positions or to backfill UK military posts.

Cyprus – demolition of Pergamos Camp.

The RE TA continues to be an invaluable source of technical expertise to the Army and the Corps. In recognition of the number of disciplines required to cover logistic engineering, the Engineer and Transport Staff Corps has been retitled the Engineer and Logistic Staff Corps and expanded its area of interest to provide advice to the Royal Logistic Corps. The Engineer and Logistic Staff Corps, which will remain a RE unit, draws its membership from the highest echelons of the engineering and logistic professions. We are fortunate to enjoy their expertise and ready advice, and a recent example was a sudden consultancy on the engineering implications of the proximity of a hot mineral water spring adjacent to HQ ARRC at Sarajevo.

This year has seen the birth of the Civil Affairs Group, a 60-strong specialist TA organization which, although all-arms by capbadge, will be RE sponsored. The *Options* process of the early 1990s recognized the need for a civilian-military liaison organization to enable commanders to maximize the support available from the civilian infrastructure during an operation. This was a low priority at the time, but the increased likelihood of future operations similar to those in the Former Yugoslavia has lead to the creation of the Group, including a small regular staff element. The Group will provide a staff cell at deployed formation HQs and multidisciplinary field teams that will interface between commanders and the local infrastructure. It will recruit from those with expertise in administration, law and infrastructure at a regional and national level, complementing and reinforcing the Corps' capability.

D Engr Sp(A)

Since the nucleus of D Engr Sp(A) extracted itself from HQ EinC(A) and moved to Andover in late 1995, the directorate has concentrated on implementing the Engineer Logistic Review. The review had concluded that engineer resources should join the single supply chain, base activity should be absorbed by existing service providers and that second/third line functions should be transferred to LAND. Sappers should be embedded throughout the logistic chain to ensure that customers received services and resources in an appropriate form and in a timely manner. Implementation is under way, with each transferred function the subject of a detailed project plan agreed between D Engr Sp(A) and the receiving organization. The way is being led by the movement of engineer resources staff from Long Marston to Andover and the collocation of the Engineer Supply Operation Centre with the Supply Chain Operations Centre at Bicester. The more complex projects continue to be developed, including those with a political angle that should be resolved shortly. Implementation of the review should be complete with the closure of Long Marston in 1999.

The directorate is now in a position to concentrate on promoting engineer support within the

Annual Report to the Corps (p107)

Services and other government departments. QMG has recently conducted a strategic business analysis which, whilst not addressing D Engr Sp(A)'s status in particular, has opened the question of where the directorate should be placed in QMG's top level budget area and what size it should be. I firmly believe that engineer resources and services are critical to logistic engineering; that logistic engineering is critical to sustainability; that sustainability is core business to QMG. Therefore, I have confidence in the arguments in favour of retaining a RE one-star staff organization which will maintain the profile and output of the Sapper logistic capability within HQ QMG. I recognize that the arguments to win over those who have lost sight of the importance of engineer support need to be articulated more clearly. Whatever the outcome of the debate, we must be clear in our own minds of our place in logistic engineering and must ensure that we are at the centre of logistic decision making and implementation at all levels.

Manning

In any part of society, leaders emphasize the importance of human resources. Within the military, these resources are limited and the demands great. The Army is developing a human resources strategy to focus work on how we recruit and retain the soldiers we need, and AG is leading work on articulating the moral component of fighting power so that we maintain the military ethos. This work can only have an impact in the medium term, in particular AG's plan to achieve full manning in the Army by 2002. In the meantime we must look to our own leadership and management skills to maintain full manning in the Corps. As part of the formation of the Army Personnel Centre at Glasgow, Personnel Branch 7 has collocated with Royal Engineers Manning and Records Office to form the RE Manning and Career Management Division.

In general, recruiting and retention have held up such that the Corps is the only capbadge in the Army (apart from the Army Air Corps) that is fully manned. Retention is good, with the average length of service for those leaving as Sappers being six years. Manning control mechanisms have slowly brought our soldier manning strength down to the Manpower Planning Target (97) figure of 7545. However, the component of Manpower Planning Target (97) that allows for non-effective service (eg courses and non-availability for administrative reasons) is inadequate. The Corps places a high priority on individual training; maintaining our throughput on courses has resulted in gapping up to 150 posts, mostly in field units.

We continue to be short of trained drivers, signallers and fitters HVAC (heating, ventilation and air-conditioning). Initiatives are in hand to address these shortfalls, which are beginning to take effect. The introduction of BR90 General Support Bridging (a driver-led specialization) and the move towards Bowman, digitization and computer-based systems will make driver and signaller trades more attractive, whilst increased output from the RSME and a revised REESR job specification will help increase the numbers of fitters HVAC. In the meantime it is essential that we take every care to look after these trades and to retain those employed within them. I remain concerned that 9 Para Sqn and 59 Indep Cdo Sqn are failing to attract enough soldiers to pass their physically-demanding courses. An initiative to attach "blueberets" to fill support posts in the squadrons is addressing operational capability limitations and is bearing fruit in terms of internal recruiting.

1 July has seen the implementation of REESR. The impact on soldiers' careers has been laid out in a rewrite of the Blue Book. I welcome the introduction of longer first tours, the earlier acquisition of Class 1 skills and the requirement to be Class 1 in both combat engineering and in an artisan trade in order to be eligible for promotion to substantive corporal[2].

Along with the rest of the Army, we are finding it more difficult to recruit all the officers we need. We continue to attract high calibre junior officers to the Corps and it is essential that we continue to do so for the future health of the Corps. This is achieved by ensuring that candidates are exposed to a dynamic, interesting and challenging lifestyle during visits to our units and by ensuring that the Corps Selection Committee (through Engineer Recruiting Liaison Staff in RHQ RE) has good feedback on whom to offer a commission. The Army trend is towards offering fewer regular and special regular commissions in the first instance, favouring an increased opportunity for conversion later by mutual consent. Junior officer manning is tight at

[2] The new promotion criteria will apply to those soldiers who join the Corps from 1 July 1997, ie from the implementation of REESR. Certain career streams (eg driver and survey) will not need to be Combat Engineer Class 1.

present, but until the number of regular commission vacancies increases under the new policy, competition for conversion will remain stiff.

The Corps is well manned at major and lieutenant colonel level, though there are some structural imbalances in common with the rest of the Army. Additionally, we have a healthy number of officers in influential E2 appointments. Changes in the field officer reporting timetable and the Staff College cycle will impact on movements, but Military Secretary is confident that no-one will be career fouled by the changes. More seriously, the structural imbalances alluded to, combined with a drop in the number of senior officer posts, inevitably threaten promotions. Solutions to the problem are being actively pursued so that the middle-ranking officer structure can be rebalanced over time.

I am impressed by the number and quality of those warrant officers who apply for a commission. This year I introduced an additional element to the selection process; an assessment board at Minley. This gave the board an opportunity to meet the candidates and to see how they performed intellectually and in relation to one another. The board's decision remained heavily weighted towards the previous record of the candidates, but board members welcomed the opportunity to confirm their judgement. The candidates gave the additional assessment a mixed reception, but regarded it as a justifiable component of the selection process.

Overall, the Corps' late entry officers are at full strength, though changing policies on types of commission over the years and the impact of *Options* redundancies have lead to significant structural imbalances. These are not critical, but competition for conversion and promotion in some years of birth is particularly intense.

An issue which has come to a head during the last year has been the debate over the wider employment of women in the Army. Recent judgements in the UK and European courts have highlighted that current MOD policy on the employment of women is unlikely to be sustainable. Several MOD papers have studied the Army's right to be different to society. However, the new government has yet to express its policy. The Corps must be prepared to accept any women recruits who can pass the appropriate intellectual and physical tests asked of male recruits. Once gender-free physical tests have been brought in, I expect that about five per cent of our recruits could be women. I do not underestimate the cultural changes that a new policy will bring, but I am clear that the change must be embraced positively and without reticence.

Individual Training

Before looking at the detail of individual training, I must briefly cover the Army training system as it applies to the Corps. The AITO (Army Individual Training Organization) has been in place for a year, taking over responsibility for the RSME and Defence Explosive Ordnance Disposal School from me. The flexibility and management opportunities inherent in AITO's agency status have helped make the most of limited resources, but have also complicated relationships with those who are interested in the AITO's output rather than its costs. Training issues are now discussed between the customers (top lever budget-holders), the provider (AITO) and the agent (EinC(A)). HQ EinC(A) also provides special-to-arm training policy and capbadge direction. From 1 April this year AITO has become responsible for recruiting and will become known as the Army Recruiting and Training Agency later this year.

Much of our success in maintaining full manning is brought about by the quality of our training. Adult entry soldiers start with Phase 1 training at the Army Training Regiment at Bassingbourn, where our wastage rate is under half that of other Arms. This has been assisted by the implementation of the Army Foundation Scheme, which provides a variable length introductory course to improve the pass-out rate from CMS(R) (common military syllabus (recruit)). We continue to run our own apprentice training at RSME, but this route into the Corps will be absorbed by the new Army Apprentice College at Arborfield from May 1998. I am concerned that the apprentice course is too short to attract those who are most likely to progress towards being clerks of works. There is already evidence that apprentice recruitment is in decline, though the recent shortfall in apprentices has been made up by an increased intake of adult recruits. My aspiration to extend the apprenticeship to one year is being considered and has wide support.

The setting up of the Army Foundation College at Harrogate in 1998 will re-establish an entry route for 16-year olds into the Army, previously fulfilled by junior leader entry. The college's output will be directed into the Royal Armoured Corps, the Royal Artillery and the Infantry to

address their deep-seated manning problems. It is again my aspiration to see this form of entry feed the Corps, maintaining the quality of the Warrant Officers and Sergeants Mess in the future and making it easier for the Corps to man our parachute and commando squadrons.

Having completed Phase 1 training, our soldiers enter RSME to start their Phase 2 training. Phase 2 training in the RSME is about to enter a period of change, caused by budgetary pressures, the introduction of new employment qualification courses and the development of new training policy.

Over the last five years the RSME has had to face continually diminishing funding. It has juggled hard to meet the needs of the customer in the field army, at the price of paring the school structure, training staff and administrative support staff to the bone. The incessant analysis of RSME business, from contracting out services, through Competing For Quality, PFI (private finance initiative) and SPSI (strategic private sector involvement) to possible collocation has continued apace in a relentless drive to reduce the cost of training.

The latest study looked at the options of concentrating the RSME at either of the current sites, building on a new site, or remaining as they are and was required to take a long term (25-year) view for financial analysis and any migration of functions. After much discussion and soul searching, it has been agreed that the SPSI process should run its course (the target date for the issue of a contract is May 1999). The way forward has been carefully crafted to rule nothing out and nothing in at this stage. In the meantime RSME (Chatham) and RSME (Minley) have been retitled as the Construction Engineer School and the Combat Engineer School respectively. This change more clearly identifies the principal function of each site to those outside the Corps.

REESR is now in its implementation stage. Soldiers recruited from 1 July will follow the new trade structure and all soldiers' records will be altered automatically at RE Manning and Career Management Division to show their new trade titles and appropriate specialist qualifications. Students will leave RSME with new military engineer qualifications whilst those whose trade structures are altering significantly will retain old qualifications until they attend a conversion course, without penalty to their careers. New Phase 2 courses, 2-1 conversion courses and Combat Engineer Class 1 courses are being phased in now. New Phase 3 courses will start from 2001, once REESR Class 2 trained soldiers enter the zone for Class 1 training. The impact of REESR is not just in employment trades. Command courses have been revised to dovetail into the new career structure so that junior commanders become command trained before the appropriate tour. REESR will not address the current backlog in our Phase 2 artisan training, estimated to reach 350 by April 1998. The training shortfall will need additional resourcing and our newly defined training requirement will quantify the backlog more easily.

I have remarked on the importance I place on recruiting and retaining the highest quality junior officers. An in-depth study has been carried out into our troop commander training by the Royal Engineer Training and Development Team. I have since asked the RSME to review the troop commanders' course. It is important that we maintain the momentum of training and the enthusiasm of young officers who are keen to get into field units at the earliest opportunity.

Training policy, overall, is being revised in order to bring more objectivity to the resourcing of training. Considerable work has been done across the Corps to define our Statement of Training Requirement. We have calculated the Long Term Steady State Requirement which, in conjunction with the Statement of Training Requirement, defines the target annual output of training organizations. This process will enable us to define our funding requirement more accurately and help quantify the effect of changes on operational capability

We continue to pursue recognition of military training with civilian qualifications. National (or Scottish) Vocational Qualifications (S/NVQ) are becoming the most recognized civilian scheme. S/NVQs are also applicable to management skills. Level 1 equates roughly to CMS(R), Level 2 to Class 2, Level 3 to Class 1 training and Levels 4 and 5 to higher technical and management qualifications. Progress is being led by EinC(A), RHQ RE and RSME, focused through a vocational qualifications officer based at Chatham. Our infrastructure exists, including the RE Vocational and Education Training Trust. The contract for a pilot scheme, involving 114 modern apprenticeships for welders, bricklayers and concreters, and carpenters and joiners trades is in place. The pilot scheme is being developed in partnership with City and Guilds and Kent Training and Enterprise Council. In addition RSME has been granted

Approved Centre Status by City and Guilds to deliver S/NVQs. At the higher level, we have secured MSc (and weapons qualified) earning status for the professional qualified engineer course. We are also investigating the extent to which clerk of works training can contribute towards a BSc and S/NVQ Level 4/5.

Equipment

THE Corps continues to benefit from a coherent equipment programme developed during the Cold War, though there is insufficient funding for the Army to meet all its aspirations for complex equipment in quantity. During the year we have seen the deployment of BR90 Close Support Bridging nearing completion and the start of deliveries of BR90 General Support Bridging. The automotive bridge laying equipment with a pair of bridging vehicles is the equivalent of a medium girder bridge, laid in under 30 minutes with 10 specially trained men. This represents a quantum leap forward in technology, and doctrine is being developed to take advantage of the new capability. Mobility is also highlighted with the initial deliveries of M3 Amphibious Bridging, due to be completed in 1999. M2 will continue in service until the turn of the century, when 227 Amph Engr Sqn (V) will be forced to re-role. M3 has been very well received and is another example of how the same capability in a squadron can be maintained with less equipment and fewer men through the application of technology. Also, Python, an upgrade of Giant Viper, is now available.

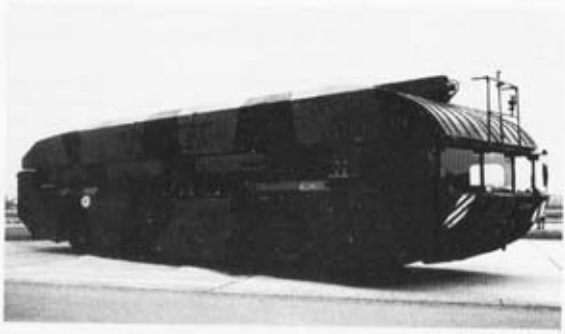
Elsewhere in the mobility programme, we look forward to future engineer tank (to replace AVLB/AVRE) from 2002 and TERRIER (to replace the CET) from 2006. A pier and launching set (for manual builds of BR90), a long span set, a pier set and BR90 trestle will not be available until 2001. Closer to hand is the need to identify a future logistic bridge. It is likely that we will only procure training stocks, relying on PFI to source operational bridges direct from industry when required. Funding exists to introduce a stand-off mine detection capability, with REMIDS (an airborne remote minefield detection system) and MINDER (a short-range mine detection, neutralization and route marking system) in research and development.

The most immediate equipment in the area of counter mobility is the Vehicle Launched Scatterable Mine System, now named SHIELDER. SHIELDER is progressing through trials, but not without difficulty. The planned ISD (in-service date) of 1999 is in balance. The rapid development of international conventions and government policy in this area makes it difficult to predict the final form and mix of mines, but the deletion of victim initiated anti-personnel mines will leave a capability gap.

In the area of survivability and sustainability the cycle of replacing smaller equipment and plant continues. Smaller equipment programmes are vulnerable to delay as they represent attractive savings measures, giving up uncommitted money to save larger projects. However, this can sometimes work in our favour, and money has been found at short notice to fund a small buy of DEUCE, an air-mobile, rubber-tracked dozer with similar capabilities to a D6D medium crawler tractor and a reasonable road speed. DEUCE, if purchased, will be deployed in 9 Para Sqn and air support squadrons. After several years' delay the new field electrical and power distribution system is being issued and is proving to be excellent.

The Corps is determined to ensure that it is well placed to take advantage of advances in Information Technology. HQ EinC(A) continues to push the battlefield engineering and terrain applications programme forward with whatever

BR90 general support bridge.



The M3 Amphibian.

funding can be identified. The aim of the programme is to demonstrate the automation of engineer recce and messaging on the battlefield so that RE Information System requirements can be incorporated into the programme to digitize the battlefield. Funding to achieve this is a high priority in the engineer equipment programme. In Northern Ireland, a project is funded to develop a combined design and resources system. The scope of the project is now being defined, but it is already clear that the end product could be of value to the Corps as a whole and that in Northern Ireland the project may extend beyond its initial concept.

In the future, we will benefit from the following all arms programmes:

- We are likely to receive 32 of the TRACER recce vehicle (ISD 2007).
- Tracked multi-roled armoured vehicle will replace field troop, combat vehicle and regimental recce 430/combat vehicle, reconnaissance (tracked) vehicles (ISD 2006). A wheeled variant is planned, but the extent of its application within the Corps is not yet clear.
- Future command and liaison vehicles will be small armoured vehicles for troop commanders, recce sergeants and armoured rebroadcast vehicles (ISD 2010).

Doctrine

THE principal piece of doctrine being developed this year is BA 2000. The work consists of a series of papers aiming to describe the capabilities likely to be required by the British Army in the first decade of the next century and the structural and doctrinal implications that result. The initial work has identified a spectrum of conflict, encompassing high intensity, conventional warfare at one end and low intensity insurgency at the other.

BA 2000 has not reached any surprising conclusions. Many of the doctrinal cries and aspirations of today's manoeuvrist approach remain valid for the future. The opportunity exists to repackage the resources we have and to redirect operational requirements to meet our future needs. The assumption is that we should organize ourselves for high intensity conflict whilst enabling ourselves to adapt for low intensity conflict.

BA 2000 work has progressed far enough to produce some illustrative orders of battle. A View 1 force might include a fighting recce formation, a deep operations formation (including long range artillery systems, such as Multiple Launcher Rocket System, and an air manoeuvre capability with Apache attack helicopters), two or more armoured manoeuvre formations and a rear operations formation (with light combat power). Engineer support is planned to be provided on the principle that a close support regiment would support a brigade, with the commanding officer as Brigade commander's advisor.

The mix of resources would vary depending on the supported formation's role. Engineer TRACER would be deployed with the recce formation. Armoured engineers would be concentrated in the manoeuvre formations. Heavy plant and amphibious capability would be concentrated in the rear operations formation and formation troops.

Much work remains to be done; how many divisions and brigades, how will engineer logistics work, where will the engineer specialists fit in, how will engineers support air manoeuvre? The aim is to answer these questions by the end of 1997 so that the Army Plan can begin to take financial consideration of the requirement. More critically, the new government is conducting its defence review, the results of which must heavily influence the outcome of BA 2000 and may take effect more immediately.

Engr 2 continues to update engineer doctrine, with the following publications being issued or planned for this year:

- Command of Engineers within the Division.
- The Tactical Employment of Vehicle Launched Scatterable Mine System.
- The Tactical Employment of BR90.
- The Tactical Employment of M3 (draft).
- Engineer Logistics (draft).
- Combined Arms Obstacle Integration (planned).
- Tactical Employment of Aimed, Controlled Effect Anti Tank Mine (ACEATM) (planned).

In order to present an up to date image of the Corps, we have secured funding to update the film "Sappers in Peace and War". Filming, sponsored by Engr 1, will have been completed in October. Release is due in early 1998. There will be three versions: the main feature (about 30 minutes, which aims to inform junior all-arms captains about the roles and capabilities of the Corps), a ten-minute training/recruiting film suitable for inclusion in presentations and a five-minute promotional video for use as an introduction to other material.

Regimental Affairs

This year is the 250th anniversary of Military Survey. A full programme of events has been planned. The main programme was launched with the re-measurement of the Hounslow baseline using modern technology on 1 July. Celebrations continue, with the highlight being the anniversary weekend (13 to 15 September), culminating in the granting of the Freedom of Newbury. I am pleased to announce that Her Majesty the Queen has agreed that the Royal title may be applied to the School of Military Survey.

The year has seen the opening of an important stage of the Museum's development: the courtyard displays which present the Corps' involvement in events since the Second World War. This year's special exhibition over the weekend 18 to 19 October 1997 celebrates the 50th anniversary of the act which brought in National Service. For the future, AG is studying the funding of Army museums. I am confident that our Museum will continue to attract MOD resources but it will have to become more dependent on Corps funding. The Museum's own development fund is now nearly £200K, but welcomes continued donations from all sources.

The Institution itself is not immune to scrutiny. This time it is self imposed. The Corps is keen that the Institution responds to the needs of the Corps as it develops. A review has started that will look at the role, objectives and structure of the Institution with a view to broadening and improving its support to the Corps.

Sport and Adventure Training

I can report another successful year of sporting and adventurous activity. Despite the pressure of a busy military programme, it is heartening that commanders have been able to allow all ranks time to participate, compete and win! Our sporting achievements include:

Soccer
- Inter Services Champions – NAAFI Jubilee Cup – 3 RSME Regt (beat 1 Argyll and Sutherland. Highlanders, HMS *Sultan* and RAF Bruggen).
- Army Major Units Cup – 3 RSME Regt.
- Army Minor Units Cup – 42 Svy Engr Gp.

Canoeing
- Devizes-Westminster Race – 2nd Services Team, 3rd overall.

Rowing
- World Veterans Championship – A ¼ RE team won four gold medals & a ¼ share of a gold medal.
- Joint Services Championship Open Single Sculls – Staff Sergeant Johnson won.

Fencing
- Inter-Corps Championship – Major Williams first in foil, Colonel Sutherland first in épeé.
- Inter-Services Championship – Maj Williams first in foil, Colonel Sutherland Champion at Arms runner up.

Cricket
- Army Major Units Cup – 33 Engr Regt (EOD) runners up.
- Army Minor Units Cup – 42 Svy Engr Gp.

Sailing
- Fastnet Race – Culdrose Trophy & Regimental Cup.
- Sydney-Hobart Race – Major Williams and crew 1st military yacht.

Squash
- Army Major Units Championship – 39 Engr Regt.
- Inter Corps Championship – runners up.

Skiing
- Army Championship Princess Marina Trophy – 35 Engr Regt.

Rugby
- Canada tour – Corps team played four, won four.

Water Polo
- Army Major Unit Champions – 3 RSME Regt.
- Runners Up – 39 Engr Regt.

3 Mountains Challenge (a race up/down Snowdon, Ben Nevis and Scafell Pike).
- 59 Indep Cdo Sqn first and second in individual and team events.

Cycling
- World One Hour Military Record – Lance Corporal Murray (46.26km, previously 44km).

Cross Country
- Inter Corps Championship – Corps team second.

Angling
- Army Championship – Staff Sergeant Pegram 1st (coarse), LCpl Eke 1st (game).

Adventurous training may not involve winning, but through ambitious aims, thorough planning and overcoming arduous conditions, members of the Corps have lead the way across the world. We are indebted to the Blythe Sappers and the H&M Trust (which also supports Corps benevolence) for the generous financial assistance they are able to offer adventurous activities. The following is a flavour of the more ambitious events of the past year:

Unit	Location	Activity
21 Engr Regt	Jamaica	Jungle trekking
77 Engr Regt (V)	Spain	Mountain trekking
36 Engr Regt	Austria	Skiing
59 Indep Cdo Sqn	Spain	Rock climbing
57 Trg Sqn	Red Sea	Sub Aqua
RE Air Sp Gp	Germany	Winter survival
14 Topo Sqn	Chile	Scientific expedition
RE Mountain Skiing Club	Norway	Skiing
61 Fd Sp Sqn	Nepal	Climbing
19 STRE(Svy)	Greenland	Scientific expedition
2Lt Chaplin	Nepal	Medical expedition
Cpl Robinson	Italy	World Duathlon Championship
Maj Derben and 2Lt Charles	USA	Yosemite big wall climbing
2Lt MacDonald and LCpl Yorke	Alaska	Climbing
Maj Ainslie	Morocco	Sahara marathon
Cpl Welham	Malaysia	Raleigh International
Spr Sheridan	Nepal	RN/RM expedition

Military Secretary Appointments, Honours and Awards

Major General A D Pigott CBE has been appointed Director General Development and Doctrine and Major General P J Russell-Jones OBE Assistant Chief of Defence Staff Operational Requirements (Land). Brigadier J D Moore-Bick CBE has been appointed Director Army Staff Duties, Brigadier A E Whitley CBE Chief Engineer HQ ARRC whilst Colonel K H Cima has been selected as Director Engineer Support (Army) (designate) on promotion. Colonel C A Gardiner has been appointed TA Advisor to the EinC(A) on the retirement of Colonel R S Eyre ADC.

Over the past 12 months, the number of honours and awards to serving members of the Corps has been: 4 CBE, 4 OBE, 23 MBE, 4 QCB (Queen's Commendation for Bravery) and 25 QCVS (Queen's Commendation for Valuable Service). Military Survey has been awarded the Royal Geographic Society Medal, an award authorized by Her Majesty the Queen.

Summary

The Royal Engineers are well recruited, manned and motivated. Our units on the ground are delivering a high quality capability which is valued by the rest of the Army as well as the other services and anyone else we serve. This has to be striven for and I am very conscious of the commitment and dedication of all ranks towards meeting the considerable challenges that we all face – and the leadership and example of commanders at all levels and in all parts of the Corps.

We will always need to deliver military engineering capability in its broadest sense, as combat and construction engineers both in war-fighting and nation building. Certainly our forefathers did and we have inherited their remarkable ethos. I believe we have the talent today to further develop the Corps' unique reputation but we will always have to fight hard for a share of resources. Provided we continue to attract and recruit the right quality of young officers and soldiers into the Corps and that their essential training is properly resourced, I have no fears about our future.

Transfer of Sovereignty

MAJOR P H JAMES BSc

Philip James enlisted as a sapper, aged 17, and was commissioned in India in 1943, where he served on the North West Frontier in Peshawar, Waziristan, Razmak and Wana. In 1945, he was appointed to a regular commission, transferring to the airborne forces. Returning from India, he was posted to Palestine as adjutant 6th Airborne Division until its disbandment, followed by a Royal Engineers Supplementary course, and marriage. Next came three years in Germany, with 23 Field Engineer Regiment, then Staff College in 1955 and a posting to G(Operations) GHQ Far Eastern Land Forces in Singapore, after which, in 1957, he attended the atomic bomb trials in Maralinga, Australia. Taking three months off, he returned overland with his wife to the United Kingdom, where he took command of 59 Independent Field Squadron.

In 1959 he retired to become, for the next thirty years, headmaster of a preparatory school with final retirement in 1989 to settle in Alderney, Channel Islands.

In January 1947 I was a very young sapper major, aged 22, privileged to be commanding 33 (King George V's Own Bengal Sappers and Miners) Parachute Field Squadron in support of 50 Indian Parachute Brigade, stationed in Quetta, Baluchistan. We understood that there was an intention to give India partial or full independence in 1948. In Britain a new prime minister, Mr Attlee, had been voted into power in 1945 and he was pledged to give self-government to various territories within the then known British Empire.

The Viceroy, Field Marshall Wavell, was liked and respected by everyone, even by most Indian politicians, but on 20 March 1947, he was replaced by Lord Louis Mountbatten, the last Viceroy of India, who was given specific instructions to transfer the sovereignty of India to a national government by 30 June 1948.

The replacement of Field Marshall Wavell, a scholar and a great commander with a deep understanding of India's problems, by the appointment of Viscount Mountbatten, seemed a political manoeuvre to satisfy the aspirations of the new party in power at home. The Mountbattens at that time were largely ignorant of the true feelings and love of the people of India felt by those who had served the country for many years and in many different capacities. Those who knew India, whose families in many cases had served there for several generations and who loved both the people and the country, were aware that our withdrawal was certain to provoke considerable tension and probably communal violence.

The political situation in India had been deteriorating steadily since the end of the war in 1945. The congress party, which represented most of India's Hindus, some 300 million, was unable to achieve any agreement with the Muslim League, representing 100 million Muslims. In August 1946, in Calcutta, a "great killing" had started, yet Nehru and Jinnah remained locked in discord. Perhaps only Gandhi, who moved among the people, appreciated the situation.

The Indian Army had studied peacekeeping duties and how to act impartially "in aid of the civil power." Also, my squadron had been singularly fortunate in having two consecutive outstanding CsRE in the Indian Airborne Division: Eric Kyte followed by "Honker" Henniker. They had ensured that we were well trained, and had given us considerable freedom to tackle commitments in our own way. That training was to be fully tested in the months ahead.

In March 1947 the squadron moved to Ambala, leaving a rear echelon in Quetta. We constructed an airfield with PSP and Sommerfeld track near

Maj P H James
Transfer of Sovereignty p115

Subadar Saif Ali, who saved the lives of several in the squadron on more than one occasion.

Rohtak, and then recced and prepared a series of temporary landing strips and DZs near areas of possible future communal violence in southern Punjab.

Commitments during April and May concerned "showing the flag", in an infantry role, throughout the very interesting rural areas and small villages around Ambala and up to Ludhiana. We were well equipped with wireless communications and jeeps.

During May and June we lived a most enjoyable life, always on the move, sleeping in the open, often supplementing rations with fish, and game which abounded in the open plains and nullah beds throughout this tranquil area. We were made welcome wherever we went; the villagers were delighted to see a protective military presence so far from main roads and railways. Apart from my subadar Saif Ali (Senior VCO) we were a unit of very fit young men, British officers, VCOs, NCOs and jawans (soldiers) who had mostly served together in the squadron for several years.

Saif Ali was a splendid Pathan who everyone in the squadron was indebted to. He saved the lives of several of us on more than one occasion. Subsequently he became a sapper major in the Pakistan Engineers and died about fifteen years ago.

Although we were an all-Muslim unit we also had a detachment of Sikh bulldozer operators, with D4s and mechanical equipment, on loan from 40 Airborne Park Squadron.

During our time in Ambala we were asked to provide the guard of honour for the Defence Minister, Mr Baldef Singh. This was an unusual honour as there were several local infantry battalions available. Baldef Singh perhaps had little knowledge of the armed forces. After inspecting the guard, composed of the pick of our tall Pathans and Punjabi Mussulmans, he enquired of the guard commander what village or district in Bengal were they recruited from. No one looks less like a relatively short dark Bengali than a quite fair skinned, proud, tall upstanding Pathan or Punjabi Mussulman. The guard commander pretended he had not heard the unfortunate "insult", as it was regarded. The men enjoyed many a laugh later and the minister's ignorance was forgiven. Fortunately British officers and jawan sappers possessed a common sense of humour. A close relationship with all ranks of the squadron existed, as was common to most of the best units of the Indian Army at that time.

The squadron received orders late in July to proceed to Amritsar and to become part of the Punjab Boundary Force under General Pete Rees CB CIE DSO MC who had been an outstanding commander of 19th Indian Division in Burma. We were required to act in an infantry role, to help preserve the peace and to assist in the possible evacuation of those who found themselves living in areas which had been allocated to India or Pakistan against their wishes.

Already there had been some isolated incidents of mass killings, particularly in the North West Frontier Province and northern Punjab. Sikh and Hindu women and children had been hacked to pieces or burnt alive by those who had been living with them in peace in the same village for generations. Kahuta, near Rawalpindi, was but one example. Similarly a train had been derailed and attacked by Sikh extremists near Ferozepore.

For those who do not know the Punjab, it was a splendid province the size of many European countries with a native population of about 36 million, almost equally divided in race between Hindus and Muslims. However, there were also five million Sikhs with their holy places located around Amritsar in addition to Patiala and several other independent Sikh states which were far from impartial, particularly in their subsequent supply of arms to Sikh irregulars.

Transfer of Sovereignty p116

The proposed division of the province between two countries was likely to cause migration on an immense scale. This needed gradual and careful planning and execution under an impartial agency which perhaps only the Indian Army was then capable of fulfilling. The Punjab was the land of five major rivers, hence its name from *panch* (five) in Urdu. It was fertile, prosperous and the homeland of many of our million soldiers who formed the much-respected Indian Army that had served Britain so loyally and well throughout the two World Wars. The Indian army was possibly the largest volunteer army in history: not a man in it was conscripted; eighteen active divisions, whose members served with great distinction in North Africa, Italy, Somaliland, Abyssinia, Syria, Persia, Iran, Burma, Malaya and Java. An army equal in strength and commitment to the British army in World War Two.

Map showing places mentioned in article.
– • – • indicates the approximate line of the new border in August 1947.

We were all awaiting some accurate information concerning the likely boundary line.

In the event the British government sent a distinguished and impartial barrister, Sir Cyril Radcliffe, to head the Boundary Commission. With little knowledge of India (having never previously visited the country) he had insufficient time to learn and little did he understand that by moving the boundary line a few miles in certain areas he could have saved thousands of lives. All was set for a holocaust. Not even the atom bomb had caused the death and destruction of civilians on a scale to equal the numbers killed through the expeditious and irresponsible transfer of power in India at such short notice in 1947. In the final reckoning the very hasty plan for the partition of India cost between one and two million lives. And, we inflicted this on our friends, not our enemies!

There have been books and regimental histories published since then to support the view that our representatives acted without forethought and perhaps unconstitutionally in suddenly ordaining 15 August for the transfer of sovereignty in India. Understandably, some who lived through those months in the Punjab still feel dishonoured.

In early June 1947, after political agreement had been established on dividing India into two nations, Mountbatten was asked at a major press conference to give a date for the transfer of power. "I was determined to show that I was the master of the whole event" he is reported to have commented. He was thus encouraged to give a date or seem to be stalling on British intentions, and selected, apparently without consultation, 15 August, being the second anniversary of Japan's surrender.

Larry Collins with Dominique Lapierre wrote in "Freedom at Midnight", published 1975: "Mountbatten's spontaneous decision, on his own initiative, was a bombshell. No one, not even Attlee himself, had suspected that Mountbatten was ready to bring down the curtain on Britain's Indian adventure so precipitously. In Delhi, the Viceroy's most intimate collaborators had had no

inkling of what Mountbatten was going to do." Nor apparently had Downing Street, the House of Commons or Buckingham Palace. It seems incredible that no one, not the governors of provinces, the police nor the commander-in-chief of the armed forces seemed able to recommend an extension. Only the date, a Friday, was subsequently amended to 14 August, midnight, to satisfy the powerful lobby of Indian astrologers. The die was cast.

This left only ten weeks to plan the commitment, starting from scratch; what an incredibly rash decision with its appalling consequences.

On arrival in Amritsar the squadron harboured in an empty meat factory on the outskirts of the cantonment. As the only Muslim unit still present in the Amritsar area, easily distinguished by our red berets and airborne insignia on our vehicles, we were not unduly surprised to become the target for deserters (army and police) who had joined terrorist gangs. Our primary tasks were to save lives, to protect those who wished to leave with their families, and not to become too involved in fire fights. Scores of small villages in the surrounding countryside were being attacked and destroyed each day. Armed bands of Sikhs were bent on exterminating every Muslim in the area in the most hideous manner. Women and children had their limbs hacked off and their breasts amputated before being killed. Pregnant mothers were sliced open. Babies were left impaled on upright spears dug into the ground. Burnt corpses littered the narrow lanes between burning mud-walled homes. Such scenes were our daily sights combined with even worse horrors as we were directed by brigade to follow up "incidents". Local hospitals were overflowing, with dead and wounded even parked outside in bundles. The medical services were quite unable to cope. Occasionally we arrived in time to save a village and to disperse or destroy some of the attackers, but often we only knew of the event when we observed smoke from burning homes some miles away.

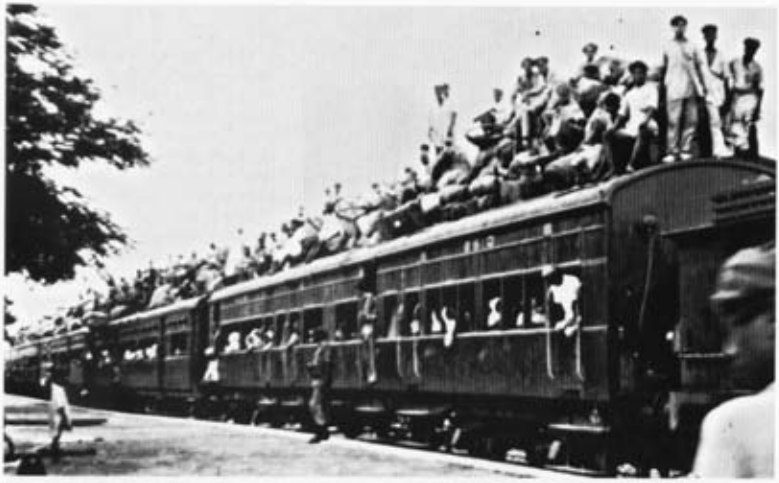
The brigade major of the Amritsar brigade had been on almost continuous duty for weeks; he was a very capable war-experienced officer but the stress and horrors of the Amritsar situation finally caused a breakdown. His replacement was a competent, unruffled Sapper officer, Major Lawrie.

Our squadron had three field troops deployed, with one engaged in protecting the area around Amritsar railway station. The other two troops acted as mobile units to cover roads and railway approaches from Lahore and the south. An officer from the squadron returning down the Mall in Amritsar, witnessed a straggle of elderly Muslim villagers, some already wounded, stumbling and running down the Mall. Wealthy Sikhs dressed in fine clothing rushed out from expensive, elegant houses, together with their servants, to hack at the poor survivors with their swords. Before the officer could interfere, the attackers had run back in to their houses. The police, mostly Sikhs, were unwilling to take any action when informed.

Similar horrors were being perpetrated by Muslims on Sikhs and Hindus in Lahore and in northern Punjab. Trains without a strong escort were stopped by obstructions on the line. Everyone of a different faith to the attackers was then hacked to death before the train was allowed to continue. Bodies and limbs littered sections of the track. Our troops on mobile duty near the railway east of Amritsar attended two such "incidents", arriving only in time to disrupt the worst of the killing. The attackers fled swiftly into the tall crops on either side of the main line. Both Lahore and Amritsar stations witnessed some terrible sights when trains full of dead and wounded eventually arrived.

Amritsar station became a collecting point for Muslims anxious to escape the horrors of communal attacks in Amritsar City. They were loaded onto trains and even the roofs of carriages were packed with desperate refugees. One of the squadron's field troops took over close protection of the station. Two bren-gun posts set up on the high footbridge over the lines reduced sniping during daylight hours but could not prevent some casualties occurring at night.

Despite all the slaughter it was rare for any hostility to be shown to Europeans, civilians or military. When unguarded trains were ambushed Europeans were almost always spared from the slaughter. The following incident, however, proved the reverse. My second in command, Captain Nick Powell, and a troop officer, Lieutenant Bill Image, were directing troops escorting terrified Muslims to relative safety in the area of Amritsar railway station, when they were informed that refugees had been fired on from a police post on the city wall. Climbing into a jeep, they went to investigate. Driving up to the police post, situated in a tower overlooking one of the city entrances, they walked forward and were met with rifle fire at close range from above, and grenades were hurled down at them; both were killed almost outright. The jeep driver and one escorting *havildar* (sergeant) were not hit and



Train loaded with refugees .

drove off to summon help. The police post was reported to be manned by soldiers as well as some armed policemen, with an Indian officer present who participated in the killing.

This slaughter was reported to me on the wireless. I went with the standby troop directly to the area, ready to demolish the rogue post, but was met by a company commander, a British officer, who begged me to let him sort out the situation. He had already collected the bodies of the two officers and sent them under escort to the nearest military hospital. The troops in the post were probably from his battalion, of the Rajputana Rifles I believe. Any attack on the post would involve open warfare between a largely Hindu company and our Muslim squadron. Some soldiers in the city had become unreliable and unstable, a rare event even in those difficult days. The battalion had to be permitted to investigate and deal with those concerned.

It was difficult to prevent NCOs and sappers breaking out that night, particularly our Pathans who could not forgive the unprovoked slaughter of their officers any more than our officers and VCOs could accept the situation. Pete Rees promised to address the whole squadron personally early the following morning. We were to do nothing in the meanwhile as this could start a communal war, and all spent a very anxious night with officers and VCOs on guard duty. General Rees flew in early the following morning. He spoke fluent Urdu and Pushtu, talking to all ranks informally as a friend, making a great impression, with promises to see that the guilty would be punished following a Court of Inquiry. 33 Parachute Field Squadron would be transferred north of the new border into Pakistan as soon as we could be relieved of our commitments around Amritsar.

Nick Powell and Bill Image were buried in the Lahore Military Cemetery shortly afterwards. Their bodies have since been reburied in an official War Graves Cemetery in Karachi.

These two fine young sapper officers were killed serving impartially the interests of Britain, India and Pakistan shortly after 15 August. They were intent on saving the lives of innocent civilians caught up in the civil turmoil caused largely by political mismanagement. I never saw or heard the findings of the hurried Court of Inquiry.

Within 48 hours we were ordered to move into Pakistan, to Sialkot which was to become our base for future operations. The CRE, Lieutenant Colonel M C A Henniker DSO MC, met our convoy and gave us his welcome support.

Transfer of Sovereignty p119

Refugees pouring into Pakistan.
The fortunate ones under strong military escort protection.

All roads leading into Pakistan and northward were crammed with refugees. Those fortunate enough to own bullock carts, horses, buffaloes or camels kept near to the roads and verges, others on foot occupied mile after mile of slowly moving columns on either side of the highway, protected in places by small detachments of soldiers serving in the Punjab Boundary Force. Columns were moving in both directions, Sikhs and Hindus seeking safety in India while Muslims straggled towards Pakistan. Many refugees limped with children in their arms and had bloody rags wrapped around wounds. On the wrong side of the border, those unable to keep up with the column on foot were swiftly hacked to death by the locals, such was the communal madness that the too-swift and largely unplanned division of the country had created.

With our arrival north of the border, our jawans for the first time understood that there was no going back. A few had families left behind in the south: these had to be rescued. An armed escort with a vehicle was dispatched in each case. All rescue missions were successful. Another rescue was of some civilians trapped by events in Srinagar, Kashmir; they included Mrs Henniker, wife of our much respected CRE. Two days later, some happy, tired, and rather battered ladies with their children climbed out of our three-ton vehicles and were reunited with their anxious husbands. Later the six Sikh bulldozer operators, who had served us so loyally throughout our turmoils, became liable to sudden attacks by refugees from India. They required a special armed escort at all times, and it was a matter of honour to us all that they should be returned safely to their unit now in India. We were relieved when all these somewhat hazardous enterprises had proved successful, with no loss of life thanks to the remarkable endeavours of the excellent young officers and men in the squadron.

Civil law and order appeared to have broken down. Many police officers, unless they had committed themselves to service in Pakistan, had been repatriated. Lawlessness was widespread and unpredictable; what remained of civil government in the new border areas of Pakistan seemed anxious to be rid of the Sikh and Hindu population.

Refugees had to be assembled and protected before being escorted to India, leaving their homes and villages empty or burning for occupation by refugees arriving from India. We had to feed them, or let them starve, and this sometimes involved requiring civil storehouses to issue food without the authority of the local government. Attempts by armed police to arrest and charge our officers and myself were seen off by our loyal Muslim troops. We were providing escorts on foot and in jeeps to protect long columns of Sikhs and Hindus wending their way across country to the river Ravi, part of the new boundary between India and Pakistan. Where possible we loaded the elderly, sick and very young onto any vehicle, train or form of transport that could move towards the border. There was never enough space in transport for all those unable to keep up with the columns. Mothers giving birth had to do so beside the column and stand within a few minutes and start walking again with their newborn infants. Any who could not do so, once left behind the escorted column, were promptly hacked to death. Cholera was rampant amongst the refugees, and fields were littered with the dead. We had little sleep, as any lack of vigilance, day or night, resulted in a massacre somewhere in the column or in the refugee camps we had established for the night.

We did our best to provide some clean water and food but could never produce enough. The smell of death followed us everywhere. Only the kites and vultures prospered. Even now so many years

later, it is impossible to describe adequately the unspeakable horrors which the poor villagers of the Punjab were forced to endure during this "transfer of Sovereignty".

The monsoon rains started to turn village tracks into impassable obstacles for most vehicles. Refugees from India as well as those desperate to reach India, poured into our temporary camps. Sikhs had to be kept separate from Muslims. Temporary refugee camps housed 70,000 at Daska, 30,000 at Pasrur, 10,000 at Ujjoke. A column of 40,000 was also on the march to the Ravi bridge from Narowal. Refugees had to walk to the frontier or die of disease and starvation. Some inevitably were killed. This situation was repeated in all districts on both sides along the new frontier.

Despite all that our squadron sappers had seen and experienced in Amritsar, with Sikhs butchering Muslims, never once did they hesitate to protect, feed and assist the Sikh villagers in Pakistan in their hour of need. Nor did they hesitate to open fire on fellow Muslims when essential to prevent columns being rushed by vengeful extremists. I was thankful that the squadron had trained as much for an assault infantry role as for engineer commitments. They remained completely loyal and cheerful throughout, although tested at times beyond reason and sanity. All were desperately tired and suffering from various ailments.

Returning to Britain by troopship in late 1947, I had time to think and to recover my health, both mental and physical, in company with others who had experienced similar duties. Liverpool welcomed us with rain, one policeman patrolling the quay plus a local dock strike. We helped with unloading of baggage. This seemed about par for the course.

On returning previously on leave in 1946 with a troopship packed with British soldiers who had nearly all spent three or more years of war overseas, we had been welcomed by a similar two-man reception, rain and a dock strike. This compared somewhat unfavourably with the draft of returning Italian and Austrian PoW which I had escorted to Naples, where the docks had been decked in flags. The mayor and civic dignitaries, bands and cheering crowds welcomed the returning "heroes". On arrival at Liverpool in 1946 some soldiers with a sense of humour commented that in the next war they would aim to join the Italian Army and surrender as quickly as possible! Once warfare ceases, Britain tends to forget all too quickly its obligation to those who serve her country's causes in distant lands.

Other British and Indian officers, VCOs and soldiers endured similar experiences and horrors in the Punjab, and elsewhere, in 1947. Many have already gone to join their forefathers in Christian, Hindu, Muslim or Sikh Valhallas. Let those who still remain remember the friends who gave their lives and all those who strove so loyally to maintain the honour and traditions of our renowned Indian Army during the "Transfer of Sovereignty".

Building The Peace

COLONEL J S FIELD CBE

This article is a resumé of the author's presentation on behalf of the Corps to the Joint Professional Meeting of the Institution of Civil Engineers and the Institution of Royal Engineers, held in London on 18 March 1997.

Building The Peace

TONIGHT I wish to share with you my experiences in Bosnia and offer a few personal suggestions as to how the military, industry and other agencies can combine their efforts to contribute to building the peace in post-conflict periods in war-torn countries.

I am in a slightly unique position as I was the only RE officer to command the British military engineer effort on both the first UN deployment to Bosnia and the first IFOR deployment.

The geography of Bosnia should be no stranger to you but I would like to highlight the size of the area we are talking about. MND(SW) is about the size of Wales but not quite as friendly! The terrain is rugged; the weather in winter unpredictable, and the infrastructure has been systematically destroyed or looted by the warring factions, sometimes with monotonous regularity as towns, villages and ground was lost and captured. In many places infrastructure that we have come to expect as the norm never existed in the first place.

The process of "building the peace" in a war-torn country normally starts at short notice and planning time is therefore limited. Before I tackle the actual work required during the process I offer four planning considerations which would apply whether you are military, commercial, a non-governmental organization (NGO) or government ministry.

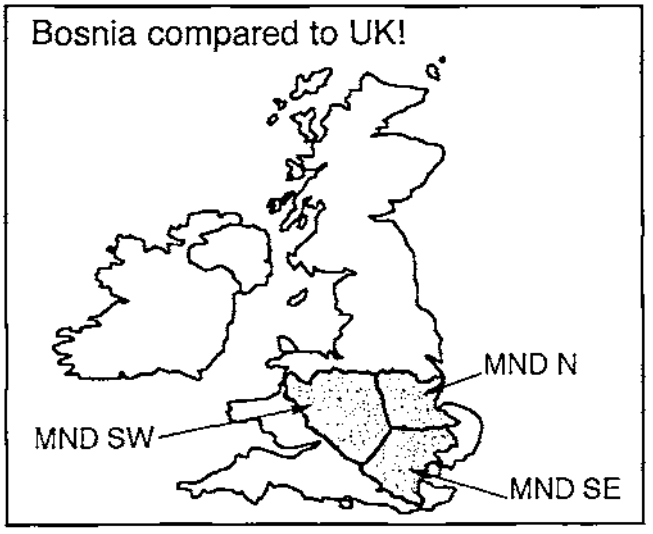
The first hurdle to overcome is the language barrier. If you speak the language then there is no problem but if you don't then very soon you will need to hire interpreters for numerous functions. When attending meetings with locals, no matter what the topic, you need an interpreter who can convey the full meaning of what you want to say. A "translator" is not the right animal as your emphasis, urgency and innuendoes get lost in translation. Working through an interpreter also requires special skills and it took me a little while to get the hang of how fast to speak, how much to say before allowing translation and when to let the other side speak.

One must also be very aware of the allegiance of the interpreter. I sometimes found that part of what I said was either not translated or was changed, especially if the interpreter thought that I might offend the other party by laying down the law or giving them orders.

The second is to establish which currency to use. In some parts of the country there was a plentiful supply of certain building materials, plant and expertise. The colour of money tended to open lots of doors and, in many cases, it was considerably cheaper to buy locally than import either materials or labour.

Deutschmarks were in great demand and as inflation was running at 30 per cent a month, all contractors wanted to be paid in cash! However, handling large quantities of cash brings its own special problems and puts temptation in the way of those handling it. One also has to be very aware of the national Balkan culture that regards bribes and backhanders as a way of life – 10 per cent of a contract fee for the "facilitator" was the norm.

The third requirement is for negotiating skills, which are required in large quantities. Negotiating is a normal, and recognized, competence in



business life but soldiers are amateurs. They are not used to negotiating with anything other than a gun. Under the UN regime, prices very quickly became inflated for all vital commodities, including building materials, and sadly the multinational force of the UN was "taken to the cleaners" with ease by the locals.

When negotiating one needs to bear in mind the **fourth**, and probably most important factor: **an understanding of the history, culture and religion of the country**. For example, when negotiating with a senior VRS (Army of the Republic of Serbska) military official it would be foolhardy to alienate him by taking along a Muslim interpreter; or to try to arrange a meeting on 6 January – the Orthodox Christmas! In somewhere like Bosnia taking sides is dangerous as it creates a wall of hostility, no matter how good the ideas or intentions. The Balkans, in many respects, is the interface between east and west, and traditional European business methods do not always apply.

Let me highlight one aspect of the village culture of Bosnia. In the badly damaged town of Mrkonjic Grad one of the first things to emerge from the ashes after the return of the population was a pavement café. The Mediterranean café culture is a way of life in the area and beer drinking begins with breakfast. In the aftermath of the war, getting drunk before 9am seemed to soften the pain for a depressed population which had lost everything – such activities seemed to take priority over everything, including sorting out their lives, renovating housing, hospitals and bakeries.

You may be wondering what all these have to do with **building the peace**? I can assure you that if you disregard them, then you do so at your peril; you may be the best engineer in the world or may think that you have the ideal recipe for resolving all its problems, but if you do not understand the people with whom you have to deal then your whole operation could founder on ignorance, **especially** in an area like the Balkans.

Let me tell you a story about African culture which was explained to me by an African colleague in Zimbabwe.

Imagine a long winding road between two points A and B. The white man arrives at point A and is impatient to reach point B, his destination. Time is of the essence and he can see that it would be a lot easier to take short cuts along the road. He brings in engineer plant, chops down trees, breaks down the embankments on the roads and gets to point B in record time but he is exhausted, he's wasted lots of money and his plant is worn out.

The black African, travelling the old road with his horse and cart at a leisurely pace finds his path blocked by fallen trees, the road flooded because embankments are broken down, and the journey takes twice as long as normal. Naturally the African is seriously annoyed with the white intruder who has now departed leaving behind a trail of wreckage.

If the white man had taken the time to travel the road alongside his African host then they both could have arrived at their destination, having overcome all obstacles **together**. The locals would not have been alienated and maybe both sides would have learned something from the other. This situation can be transposed to almost any country and the message is worth more than a passing thought.

I remember vividly what was said to me by an HVO (Bosnian Croat Army) officer shortly after my arrival in Bosnia; **"Now that you are here you share our destiny."** This became a sobering prophecy during both of my tours especially when one considers that we deployed to Bosnia for only six months in September 1992, and are still there!

The café culture, "Pegasus café."

Building the peace (p123)

I always had the underlying suspicion that there was an ulterior motive behind nearly every request for help by local officials or the military although at the time it was not obvious. I'm not sure that I will ever fully understand the ethos of the Bosnian culture or what makes the Bosnian tick.

Amid the wreckage of Bosnia, how did we, the military, help to build the peace? What did we do that was so special? Why were we, the military, involved in civilian construction projects at all?

There was a school of thought among the military that saw no reason for us to get involved in any reconstruction work in Bosnia at all and until the IFOR deployment there was no official recognition of the fact that it may have been in military interests to do so. What do I mean by that?

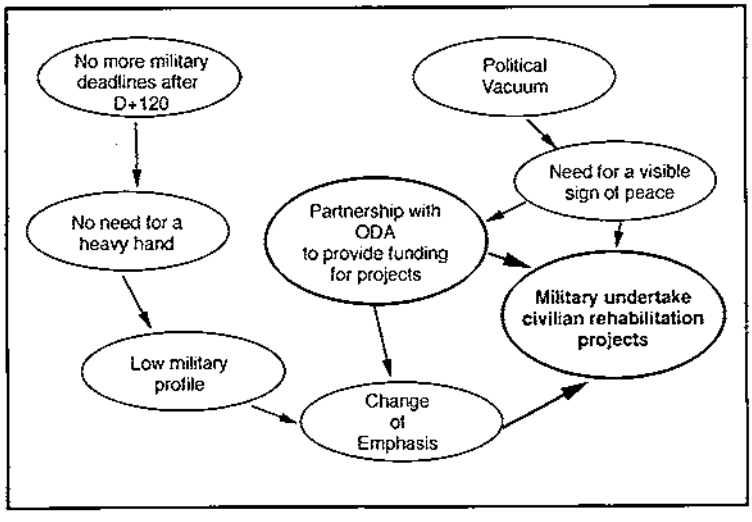
For many years the British Army has used the technique of "hearts and minds" to assist the overall military aim; for example, the campaign in Malaya owed its success to that very policy. However, in recent years, especially on UN operations, anything that was not strictly military could not qualify for UN funding and was seen as a sort of "mission creep" from which we would have the greatest difficulty extracting ourselves at a later date – a sort of sleeve in the mangle. A worry I can appreciate having seen how much the UK has been drawn into events in Bosnia over the last four years.

Even now some of our allies regard the military involvement in civilian reconstruction projects as a no-go area and detrimental to the military aim.

Why this phobia? – and if it is so detrimental to the military aim why did the UK get so heavily involved? The reasons for our involvement are shown in the diagram below: up to D+120 days ("D" being the day IFOR assumed military responsibility) the British engineers had been heavily involved in the business of route repair, the building of military equipment bridges and the construction of camps for our own troops throughout the area. When we passed the 120-day point there were no more formal military deadlines resulting from the Dayton Agreement. The factions had complied with all our demands and were now back in their barracks and consequently there was little need to maintain an overtly aggressive military posture. Therefore, not only was there some engineer spare capacity but the infantry, artillery and armoured units needed to keep busy and minor reconstruction projects were an ideal way of doing just that.

We had read a lot in the press about the $500M that the international community was going to invest in rebuilding Bosnia after the war. Naively, we therefore expected the International Monetary Fund to provide money for the large reconstruction projects required to get the country back on its feet. However, it soon became apparent that the earliest the international funds would become available was not to be until over 18 months after the war ended, ie mid 1997. In addition, there was a political vacuum both locally and from the international community, and it therefore became essential to create **"a visible sign of peace"** by expanding our role into the reconstruction process to fill the void; probably one of the most important aspects of our operation from both a military and political perspective. Our positive involvement also acted as a sort of insurance policy as it showed faith in a lasting peace by the commitment of both money and effort into the rehabilitation process.

If, by assisting in rebuilding the infrastructure, and therefore the broken lives of the population, we could convince locals that life was in fact worth living and that the situation was better than when they were fighting

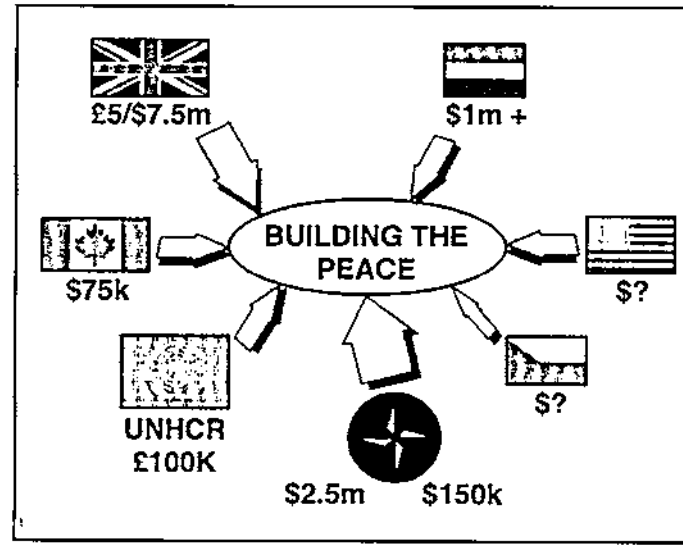


Reasons for military involvement.
("D" is the day that the UN handed over responsibility to NATO.)

each other, then there is absolutely no doubt in my mind that construction work becomes a **military necessity** and at times the main effort rather than just a side show.

If we could achieve even a small improvement in the overall situation then all our efforts would not have been wasted.

So, now that I have established why we got involved, let me describe the type of work we actually did to achieve this visible sign of peace. It would be appropriate at this point to mention that I will only cover the work carried out in the British sector. A considerable amount of work was done throughout Bosnia by a lot of other agencies so what we achieved was only a small part of a large puzzle.



Multinational funding for civil projects.

I should also mention that the atmosphere in which all this good work took place was initially created and then fully supported both in financial terms and politically by our superior headquarters – HQ ARRC, based in Sarajevo, and it is Brigadier John Moore-Bick CBE, who should get a considerable portion of the credit as the architect for all the multinational military engineer work carried out in Bosnia.

Some of you will have seen the articles that appeared firstly in Issue no 5 of *Professional Engineering* in February last year; the 1996 Spring edition of *Engineering World* and in the three consecutive issues of the *New Civil Engineer* in March and April 1996. All these articles covered the work Royal Engineers were doing in Bosnia quite graphically, and the reporters were amazed at what the Royal Engineers had achieved in such a short time with so little money and so few resources.

In March 1996 we formed a partnership with the Overseas Development Administration (ODA), a department of the Foreign and Commonwealth Office (FCO), which provided some £5M for low key construction and rehabilitation projects across the whole of our divisional area. The great advantage of the work carried out with ODA money was that it was done quickly and efficiently, targeting high profile local community projects thus producing tangible evidence of rehabilitation.

Furthermore, we made it our policy to involve the local communities, getting them to assist either with labour or by taking on sub-contracted work. In this way we helped to break the mould of a society that had been surviving on international aid for the previous four years and restored some self-esteem.

There is no doubt that the momentum created by our partnership with the ODA became infectious and the success story of this work, reported so graphically in the afore-mentioned publications, was significantly reinforced within three months with work done by all the other contributing nations' military engineers in our Divisional area in conjunction with various aid agencies.

The low-key work therefore expanded to include military engineers from the Netherlands, Czechoslovakia, Canada, and Malaya. In addition, their national governments became enthusiastic about the provision of money for further larger projects and one after another they started to provide cash.

The diagram above shows the sort of funds being put into projects. There was a considerable amount of NATO funding directed towards engineer works. The figure of $2.65M covered road repair on military supply routes; repairs which were then done by civilian contractors. The $150K covered what was called "gold dust" projects – specific projects targeted by Commander HQ ARRC.

The work we carried out purely in support of the military force tends to get overlooked as something that has little value as a community project.

Nice to be appreciated!

However, there is often a very positive spin-off in terms of benefits to the civilian population. For instance, we were involved in the clearance of rubbish from towns to reduce the spread of disease to our own troops, and removed rubbish and animal carcasses from the water supplies for the same reason. But the spin-off for the local population was enormous. At one time we removed and burnt 3000 dead pigs from the town of Sanski Most because the local Muslims wouldn't touch them. Again, this was prompted by a need to protect our own troops in the area.

The opening of routes by the building of military equipment bridges and timber bridges was, initially, our single most valuable contribution to the peace process. For example the building of the Class 80 double double Bailey at the Bos Novi crossing point into Croatia to permit the Czech contingent to deploy into Bosnia opened up the border. The building of military bridges not only assisted military traffic but also facilitated **freedom of movement** across artificial borders immediately after the peace agreement was signed. And, using local labour to improve our military supply routes, we transformed destroyed roads into thriving trade routes.

Later, the restoration of electrical power, by the reconstruction of pylons and the provision of parts through ODA funding to repair both substations and local distribution lines, was a significant "battle winning" project. Initially this was done to reduce our dependency on generators but this enabled homes to become habitable, bakeries to reopen and light industry to be regenerated. The population was encouraged to return home to the villages and towns and a sense of normality quickly spread throughout the country. These were the "visible signs of peace" we had been endeavouring to achieve.

Under the old communist regime inter-dependency was built into certain aspects of the infrastructure, particularly into the electrical power which was designed with considerable redundancy, using thermal and hydro-electric power stations. Unfortunately, the old national grid has now become unbalanced as the power stations are no longer complementary or in the right place for the new internal borders.

A lasting hazard in many of the world's conflict zones is the legacy of thousands of mines and other items of unexploded ordnance which litter the countryside. Although our mandate did not permit us to become directly involved in clearing mines, we set the priorities and co-ordinated the mine clearing efforts of the factions, making them clear the minefields they had laid. *[A short article about monitoring the clearance of antitank and anti-personnel mines, written by Major Paul Van Vuuren MMM, South African Engineers, appears elsewhere in this* Journal.]

We produced maps showing where minefields were situated, thus reducing the level of danger for everyone, including the local population. We also provided the known location of minefields to a considerable number of NGOs working on housing and primary health projects in our area. The identification and clearance of mines in the area of power stations, water purification plants and underneath pylon lines enabled a lot of repair work to be carried out. Any commercial firms or NGOs contemplating undertaking work in the aftermath of a conflict should ensure that their staff have "mines awareness" training. We insist on mines awareness training in the military and yet still have far too many accidents involving mines and unexploded ordnance.

Using our US Army civil affairs teams we conducted surveys to identify what I called "black holes" in key areas of the infrastructure. The teams collected data on:

- power production and distribution,
- water purification and distribution,
- railways.

Building the peace (p126)

Roads were not included in the survey as the road system had largely been opened up by the military already using an imaginative NATO funding programme.

Let me turn my attention briefly to some suggestions as to how I believe we could have made a far greater contribution if we had not had to make our plans on the hoof. Or if all the agencies had not had different agendas in Bosnia.

Firstly, I believe that the military should continue the very successful working partnership with the ODA. This will ensure that we both get greater value for our money and efforts as well as producing rapid results in the aftermath of any conflict where the British are involved.

Secondly, we need to work more closely with the UN and the UNHCR so that we have a better understanding of their funding procedures, political constraints and aims. This would be best done as a twin track approach. Continuing the links the FCO has established and by embedding military personnel in more UN operations.

Thirdly, I believe that the military should have far closer ties with British industry in such operations as we are undertaking in Bosnia. I envisage these ties being physical, with industry providing advisers to the military in specialist areas. I believe that closer ties are essential so that both sides can appreciate the capabilities and limitations of the other. One agency that could assist in this is the Engineer and Logistic Staff Corps.

I feel that in some military minds there is an inbuilt fear and distrust of **NGOs** – some see them all as being yogurt-eating tree huggers who live underground near the Newbury bypass! This view was brought into sharp relief when I attended a mines awareness meeting in Bosnia when we were all invited to clap hands for peace! I felt a little out of place with a pistol on my belt. There is no doubt that there are many NGOs doing very valuable work in the aftermath of conflicts, normally staying on long after the military leave, so I recommend that we learn about the main "movers and shakers" and incorporate them into our training.

For example, my personal knowledge of organizations such as **Red R** (Register of Engineers for Disaster Relief) is limited but, as engineers, we pursue the same ends so need to be able to work together.

The final piece of the jigsaw is the very important part played by local communities in the theatre of operations. It is absolutely essential to get locals involved in as many ways as possible. These are the people who will have to make it all work when we leave and the earlier they get involved in the process and the decisions about their future the greater the likelihood for a lasting peace.

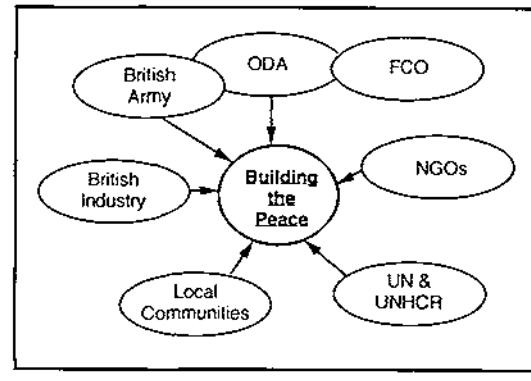
The diagram below indicates that all the elements are interlinked and it is important that they are. We must all pursue the same aim – that of **building the peace**. We cannot all afford to follow different agendas, which tends to be the case at the moment.

On the military/civil level, joint professional meetings help the cause and we do have the Engineer and Logistic Staff Corps. Tonight we also have the talk on Red R so we are on the right track.

I believe that the Department of Trade and Industry (DTI), with the blessing of the FCO, took a party of industrialists to Bosnia to see what opportunities existed, but they did not come anywhere near the British sector.

Like most other high-priced visitors to Bosnia they focused on Sarajevo where there seems to be a fixation for the military, the press, the aid agencies, the High Representative and the World Bank – but especially the press. With so much attention focused on one place it was difficult to convince others that good things were happening elsewhere in Bosnia. Martin Bell summed it up rather well in his book "In Harm's Way": "The press are not always where the news is but the news is always where the press are."

I would have been delighted to host British industrialists and show them what needed to be done. Likewise, a worldly-wise businessman on my right hand would have been worth his weight in gold to give advice and steer me through the jungle of contracts, negotiations, fixing penalty clauses, quality control and the odd engineering project.



Building the peace.

Lieutenant Stott's Landrover after hitting a landmine near Sanski Most.

I appreciate that in war-torn areas there will inevitably be a reluctance by firms to rush to invest money in projects in a country that could easily become unstable. Therefore, the importance of building the peace at an early stage cannot be over-emphasized. Anything that we can do to provide the right conditions for future growth must be the right way forward. As I've mentioned, I would like to see this happen as more of a partnership with all the agencies involved, rather than each agency pursuing its own agenda.

Where do we go from here?

We need to build a stronger bridge of understanding between the military, industry, NGOs and other agencies. This can be achieved by networking both officially and socially. In the interests of closer co-operation, members of industry and NGOs need to forge closer links with the military. Likewise, military commanders need to broaden their knowledge and understanding of all the other agencies involved in peace keeping operations, both benign and hostile.

I leave you with an observation. Who would have thought in 1990 that the British Army would have taken part in the Gulf War, deployed troops to Cambodia, involved most of the Army in Bosnia with both the UN and IFOR, as well as deploying on UN operations to Rwanda and Angola; all areas which required large infrastructure works, and in some cases still do.

The UK has established military training teams in many countries, we have been involved in disaster relief operations around the globe – and as I see it, the military provides an excellent springboard for industry and other agencies for future work. Forging stronger links in peacetime can benefit everyone, including the United Kingdom and, more importantly, the populations of those countries we are trying to help.

Where next? Albania; Cyprus; Nigeria? I look forward to closer co-operation in the future in order to help **build the peace**.

Building the peace (p128)

St George's Church and Its Lych Gate

JOYCE PROCTOR

The following is an edited version taken from an article published in August 1996, in The Beam, *a magazine produced by the British Association, of Singapore. It is reprinted here with kind permission of the editor, Rebecca Muldowney.*

St George's garrison church, set back amongst the trees in Minden Road, Singapore, replaced the 19th century church which formerly stood on a site nearby, and whose first ordained minster was appointed in 1871. The building was gazetted as a national monument on 7 November 1978 and, in the *Straits Times*, was listed recently among the many monumental treasures of Singapore. It is very attractive with its unusual carved brickwork – evidence of the skills of a Lieutenant Colonel William Henry Stanbury of the Royal Engineers, who was also a fellow of the Royal Institute of British Architects.

My attention was drawn to the lych gate of this church when I read an article in *The Times* newspaper whilst on home leave in 1995. It was written by Elizabeth Smith, niece of Captain Cecil Pickersgill of the 287th Field Company, Royal Engineers.

Captain Pickersgill was captured by the Japanese in February 1942 and held in Changi Prison; he later died working on the Burma railway. In civilian life the captain had been an architect, and so it seemed natural for him to put his skills to work. The idea of an English-style lych gate was formed with the hope that it might stand at the entrance to the prison cemetery. His niece writes that, having shown his plans to the camp commandant, he was given permission to go ahead.

Using barbed wire for nails, the whole thing was completed by December 1942, and stood at the entrance to the cemetery as the captain had planned. Although this particular cemetery was designated the "British Cemetery", eight Dutch officers, 58 Dutch soldiers and one Dutch civilian were buried alongside 41 British officers, 472 soldiers and one nurse.

The interior of the lych gate incorporated a carved frieze in old English lettering: "To the glory of God and in memory of those who laid down their lives for King and country", plus the national symbols of the four countries of the United Kingdom, the rose, thistle, leek, and shamrock, carved by army craftsmen imprisoned at the time.

After the war, the lych gate was abandoned, but in 1952 was salvaged and moved out to Kranji.

In 1971, following the withdrawal of British forces from Singapore, the church was handed over to the Anglican Diocese, and the lych gate dismantled and shipped to the United Kingdom, where it was re-erected and stands today at Bassingbourn Barracks, Royston, Cambridgeshire.

The lych gate as it stands today. It has two plates attached and engraved as follows:
Plate one: This lych-gate was made by members of the 18th Division in 1942 to beautify the prisoner of war cemetry at Changi.
Plate two: The lych-gate was re-erected and dedicated on this site [at Kranji] on 14 Dec 1952.

Joyce Proctor
St George's Church and its Lych Gate (p129)

Is The Grass Really Greener Over There?

MAJOR T R URCH BEng(H)

Major Ty Urch was commissioned into the Corps in 1984. Since then, a varied and extremely enjoyable thirteen years has seen him serve in Germany, the United Kingdom, Hong Kong, Nepal, Northern Ireland and Bosnia-Herzegovina. The author is a civil engineer graduate who attends the first Advanced Command and Staff Course at the Joint Services Command and Staff College, Bracknell, in September 1997. He is currently finishing the Professional Engineer Training (Civils) Course as an option to reading a Masters degree on Division 1 at Shrivenham. For the last 18 months Major Urch has worked on site as a "civi" for Balfour Beatty on the Heathrow Express Rail Link and most recently as a design engineer for Sir Alexander Gibb and Partners.

Introduction

Two years ago I was serving in Bosnia-Herzegovina with 28 Engineer Regiment on Operation *Grapple 5*. My appointment as Operations Officer ensured that my finger was well and truly secured in a number of pies, and on more than one occasion I remember wishing I was better prepared for the tasks that lay ahead. I vividly recall the frustration experienced by many (myself included) trying to plan, resource and execute numerous missions in support of the UN with subunits spread across 250km of the Balkans. It was during the latter period of the tour that I seriously considered attending the Professional Engineer Training (PET) course in an attempt to qualify as a Chartered Engineer, thus improving my understanding of engineering principles and their application by me as a military engineer. I admit that having been selected for Staff College that summer, the decision to step out of the "green machine" for two years was somewhat easier to make. Had I not been selected I often wonder if I would have been so bold; somehow I doubt it.

This article is written on reflection after being seconded to the UK construction industry for the last 18 months. The majorty of the paper discusses my attachment with Balfour Beatty during 1996, explaining some of the memorable events and experiences during that time. I aim to highlight one or two of my personal successes and near misses (hopefully more of the former than the latter!) in order to draw together some lessons which, I feel, have benefited me enormously. I will attempt to draw some parallels between military and civilian life and illustrate the benefits of our training, even in unfamiliar circumstances. This is not an article full of technical jargon, although there is a smattering for those so inclined, rather it is a collection of experiences that many may be able to relate to.

Background

The PET course itself comprises four phases of training. The first, and without doubt the most painful, is a six-month academic "beasting" at the RSME Chatham. The course is mainly theoretical covering structures, instruction in design principles using British codes of practice (eg steel and reinforced concrete), soil mechanics, contract law and procedures. This phase is the foundation course for the subsequent attachments to industry and prepares most Sapper officers, regardless of age and experience, for life "outside the wire". The official age limits for attending the course are diverse. I was 30 years old (nearly ten years post-graduation) and I must confess that mental application on such a grand scale was quite a challenge on occasions.

Major T R Urch
Is the grass really greener over there p130

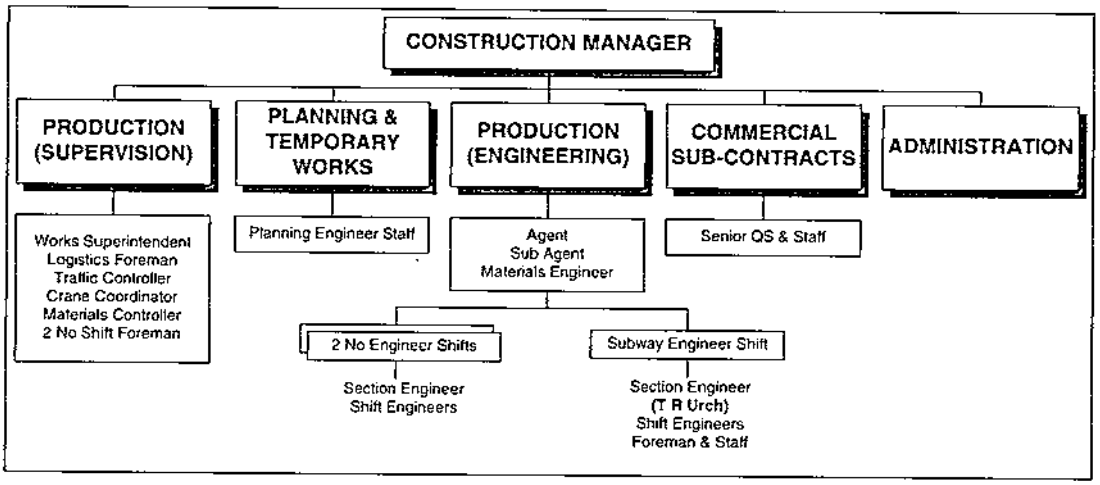


Figure 1. Construction site orbat.

Having overcome this mental hurdle apparently unscathed, the experience of work on site and in the design office beckoned. Phase II is a ten-month attachment to a large civil engineer contractor in either the UK, USA or Australia. "Did I really choose to stay in Blighty?" I kept asking myself after receiving numerous letters from fellow course officers abroad making constant reference to barbecues, sand, shrimps and surf? After the pressures of working on site, the move to the design office for Phase 3 of the course can be quite a shock at first. The pace of life is less frantic and provides an excellent opportunity to recoup a little quality of life and prepare for the Chartered Professional Review (CPR)[1]. Finally, a week or two is spent back at the RSME learning how to be a soldier again and exchanging lightweights that appear to have shrunk whilst hanging in the cupboard over the previous 18 months. The course validation is complete when officers sit CPR in the October before taking up their new military appointments, normally on the Professionally Qualified Engineer roster.

Secondment to Balfour Beatty

The choice of attachment is dependent upon personal preference, geographical location and the commercial climate within the construction industry, although officers' preferences to serve overseas are confirmed by the Chief Instructor Civil Engineering Wing. My decision to work for Balfour Beatty led to one of the best years I have spent in the army to date. Working on site as a section engineer exposed me to life as a civilian on a high profile civil engineering project, where I gained tremendous experience and was given particular responsibility not possible within a military environment. On the other hand, my learning curve was not always vertical, and I was convinced that my leadership, man-management and communication skills, taught at our various centres of excellence, were far in excess of those possessed by most people I worked with. It was clear from an early stage that this was to be a mutually beneficial arrangement.

My employment as a section engineer within the engineering production team[2], probably needs a little amplification, as most of us in the military are not familiar with the "civi" construction site orbat (order of battle); see Figure 1. Not surprisingly, the section engineer does not equate easily to any military appointment. He is responsible to the agent (cf officer commanding) for the technical control of the works. This includes setting out, monitoring quality, resourcing the project and ensuring the work is carried out according to the specification and in line with the current programme. He is assisted by a number of site engineers depending on the size of the contract. It is the general foreman (GF), however,

[1] CPR is the process through which individuals are selected to become Chartered Engineers (CEng) and Members of the Institution of Civil Engineers (MICE).

[2] Performs a similar function to the G3 Ops branch in a headquarters, but without the NBC!

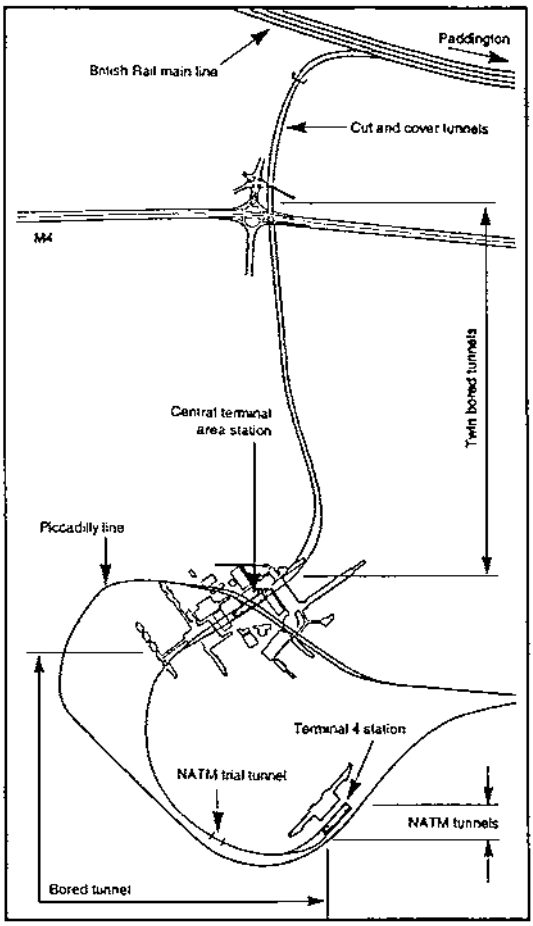
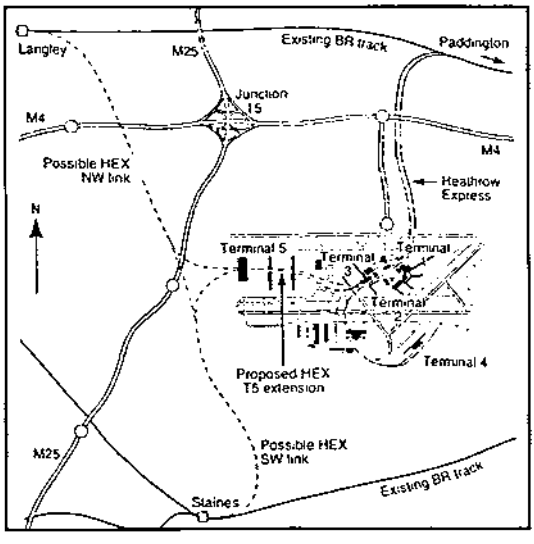


Figure 2. Heathrow Express (above) and possible future developments (below).



who is responsible for actually constructing the works. In military jargon, the GF is probably a cross between a technical quartermaster, officer commanding and sergeant major. He is a key player, being responsible for carrying out the "hiring and firing" as well as having a significant part to play in the mission analysis process. The adversarial relationship between the GF and the other engineers was also quite an eye opener. It was clear from day one that the two were from completely different breeds; on one hand was the young inexperienced engineer and on the other, the wise battle-hardened foreman. You may think that sounds familiar, but I can assure you that there was no love lost between them, and junior engineers were offered little sympathy whilst learning their trade; a luxury I certainly appreciated as a young "one-pip wonder." The GF can probably be best described as "the sergeant major from hell who blames you for everything and forgives nothing!" Fortunately for me, the GF at Heathrow was an ex-Sapper training NCO from the 1950s and we got along famously.

The Heathrow Express Rail Link

For those who have travelled along the Piccadilly Line from London, the new Heathrow Express Rail Link will prove to be a quantum leap forward, both in style and service. The project comprises a twin-track rail connection from the existing main line station at Hayes, through the Central Terminal Area Station (CTA) for Terminals 1, 2, 3 and then to Terminal 4 on a single track line. The rail link is a combination of existing Railtrack infrastructure, cut and cover tunnels, surface-laid track and traditional tunnels using a number of techniques. Provisions have been made for a connection to Terminal 5 pending the result of the on-going public enquiry. The British Airways Authority (BAA) mission statement is "to provide a high speed, executive rail link as of 1 June 1998 from Paddington Station which will run four times an hour with a journey time of 16 minutes." An outline for the current scheme also showing possible future expansion can be found at Figure 2. Anybody who has flown from Terminal 3 in the last two years cannot have missed Balfour Beatty's extensive white and blue cover-from-view hoarding around the CTA site.

Despite a £1.2M tunnelling trial in the London clay near Terminal 4, a sudden progressive tunnel collapse of the sprayed concrete lining

Photo 1. Front page headlines on 22 October 1994.
Photograph courtesy of Balfour Beatty Civil Engineering Limited.

(SCL)[3] occurred on 21 October 1994; this event made worldwide headlines *(see photo 1)*, closed Heathrow Airport completely and stopped all SCL tunnelling operations in the UK for several months. This latter restriction has had a serious knock-on effect for projects such as the Jubilee Line Extension (JLE) at Westminster and London Bridge. The subsequent ground stabilization programme around Heathrow required approximately 15,000m^3 of concrete to be pumped into the tunnels and main access shaft in an attempt to stop settlement. This resulted in the majority of readymix companies in West London being committed to supplying concrete to Heathrow for ten days. Post collapse, a solutions team was formed whose brief was to develop a plan for the recovery of the CTA station. The contract being used by BAA and Balfour Beatty is new and radically different from previous confrontational forms. The New Engineering Contract (NEC) is allowing the client, contractor and designers to work together as partners in an atmosphere of "no-blame" to achieve BAA's mission statement. Considering the scale of the disaster in 1994 (for which no blame has been apportioned to any party), this is a fantastic achievement, and working within such a framework was enlightening.

[3] This tunnelling technique (unlike full face boring as used on the Channel Tunnel) is also referred to as the New Austrian Tunnelling Method (NATM). It involves advancing forward using excavators and sealing the face by spraying concrete (with no aggregate) onto arched steel reinforcements ribs.

The Recovery Works

The recovery process after the collapse was both thorough and swift. Within 24 months the entire CTA station had been back-filled and redesigned with civils reconstruction approaching 75 per cent complete. An aerial photograph *(Photo 2 over the page)* shows the scale of the construction project. The following notes are a summary

Is the grass really greener over there (p133)

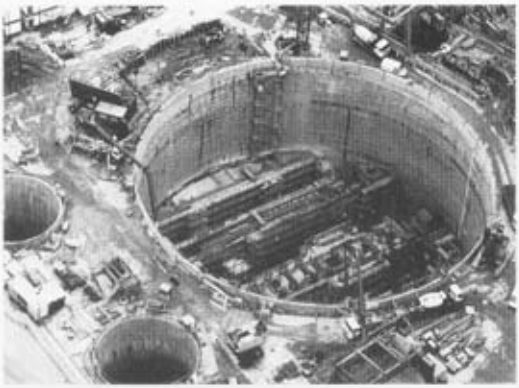


Photo 2. Construction of CTA station.
Photograph courtesy of Balfour Beatty Civil Engineering Limited.

of the construction stages that Balfour Beatty has been responsible for over the last two years:

Ground Reinstatement. The entire site was stabilized by pumping concrete of all grades and quality into the shafts and down through holes bored in the road surface. The excavation also became a free land-fill site for West London.

Cofferdam Piles. In order to protect the future excavation works a circular cofferdam[4] was constructed which was 60m in diameter and 30m deep; the largest of its type in Europe. This structure surrounded the majority of the soil in the collapsed zones. Phase 1 of the cofferdam construction was the boring and concreting of a ring of 182 secant piles (1200mm in diameter)[5] to a depth of 40m. This was achieved complying with extremely stringent 1:200 vertical tolerances which, in itself, was a major feat of engineering.

Concrete Lining. In order to prevent the piles from being forced inward during the subsequent excavation of material from inside the cofferdam, a series of reinforced concrete lining rings was cast as the excavation progressed, rather like a large pack of polo mints. These rings acted as circular props in compression developing huge internal forces in the order of 10,000kN each (1000t) and were critical to the safety of all working within. Photo 3 shows the inside of the cofferdam during excavation with the completed piles, concrete linings and new running tunnel in the background.

Excavation. The excavation process was carried out in parallel with the construction of the lining rings. It was critical that the removal of material never exceeded a set rate, as unacceptable inward deflections on the concrete piles could well have resulted in a failure of the cofferdam integrity. This intensive operation was hindered because the concrete that had been pumped into the tunnels and shafts during the stabilization operation also had to be broken out and removed. Work was further complicated by the requirement to locate and safely remove seven items of plant (eg wheeled excavators, dump trucks, front-end loaders) that were abandoned during the evacuation 18 months earlier, mercury pressure cells cast into the tunnel linings and an oxy-acetylene gas burning set, all of which were entombed in 5m of concrete. I was tasked with writing the method statement for this operation and a few pertinent observations and lessons learned are included later.

CTA station. The CTA station was constructed as a series of vast reinforced concrete slabs, walls and boxes. It is difficult to describe the enormity of the project, but as an indication, some of the walls were 20 x 7 x 8m with over 1100m^3 of concrete being poured continuously. This is equivalent to 183 concrete truckloads for a single wall. The base slab was even bigger with over 4100m^3 of concrete being required which contained 1100t of steel, all placed and fixed by hand. A schematic drawing showing the construction of the cofferdam lining and CTA station is at Figure 3.

Terminal 3 subway. For the latter months of my secondment I was tasked with supervising the construction the new £1M Terminal 3 subway link. This task exposed me to a minefield of commercial, technical, and leadership challenges, the likes of which, I had never been exposed to before in the military.

[4] Cofferdam – a temporary dam, most commonly driven steel sheet piles or bored holes filled with concrete, built to exclude water and thus give access to an area which is normally submerged or waterlogged.

[5] Secant piles are formed by boring and concreting alternate piles (female), then following behind cutting the male piles in between and into the female ones while the concrete is still "green", thus forming an interlocking waterproof wall.

Extraction of the Oxy-Acetylene Gas Bottles

As outlined earlier, the tunnel collapses in October 1994 required a considerable quantity of concrete to be pumped into the tunnels and access shafts. The original main shaft, which was 20m in diameter and 30m deep, contained plant and equipment which had been abandoned

Is the grass really greener over there (p134)

during the evacuation, and which was now entombed in concrete. Of greatest concern was the presence of an oxy-acetylene burning set, which if punctured during the breakout operation, would have had a catastrophic effect within the cofferdam and resulted in an almost certain loss of life. For reasons that are still not abundantly clear to me, the responsibility for the safe location, removal and disposal of the gas bottles, fell to me. This may have been because a Royal Engineers major inspired confidence and appeared ideally suited to the task, or perhaps because I was the last in line to step backwards when volunteers were called for.

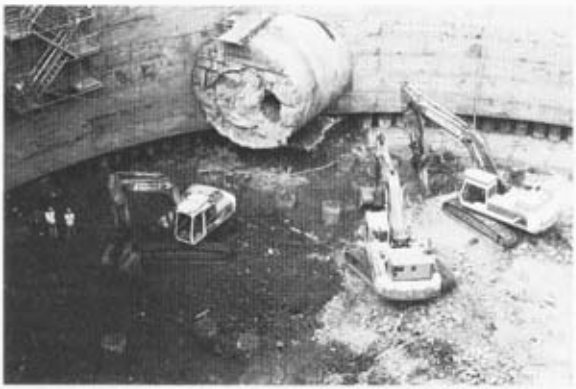


Photo 3. Excavation and lining construction.
Photograph courtesy of Balfour Beatty Civil Engineering Limited.

It is beyond the scope of this article to discuss all the details of the operation, but it may be useful to draw on a few selected experiences in order to demonstrate and confirm the value of military training, even in totally unfamiliar circumstances. My lack of experience in such a situation required a complete back-to-basics approach, applying some of the well proven principles of the military formal estimate[6]. Firstly I carried out a type of mission analysis whereby I assessed the requirements of Balfour Beatty, BAA and other key players such as the Health and Safety Executive (HSE). This process clarified the constraints that we had to work under as well as identified what decisions were required and when. Secondly I evaluated the factors affecting the operation. These varied, not unsurprisingly, from the more normal military factors, but did include an assessment of the environment (BAE – battlefield area evaluation), Balfour Beatty capabilities (own forces) and logistics (CSS – combat service support). I made a command decision not to consider the enemy, surprise and security paragraphs because of bad army public relations (PR) concerns! On completion of this stage and having

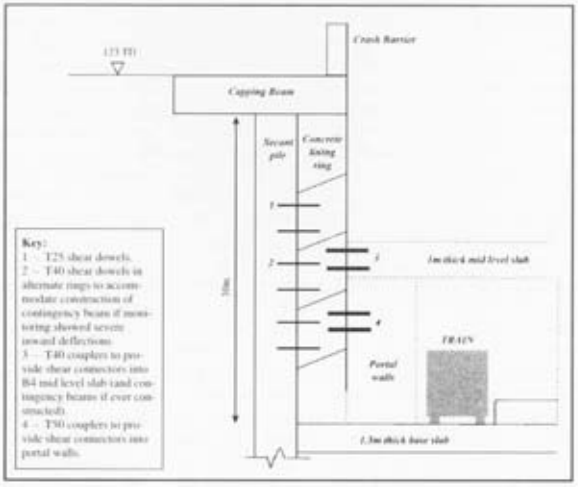


Figure 3. CTA station construction.

[6] Army Doctrine Publication (ADP) Volume 2 – Command (Chapter 8).

Is the grass really greener over there (p135)

considered the courses of action, I prepared an outline plan for comment and started further work and detailed planning. Throughout the period prior to the actual breakout operation, the training received at the RMAS and the RSME was to prove invaluable.

The operation to locate and remove the gas bottles started with a desktop study, which was essentially an intelligence gathering operation. This involved interviewing tunnelling operatives who were on shift during the collapse, obtaining archive photographs and retrieving numerous incident reports. Using this information to locate the burning set in plan to within 1m, the breakout operation proceeded in vertical lifts until we were within 2m of the top of the gas bottles. Using a combination of mechanical methods (eg excavator breakers, hand-held breakers and drilling-splitting techniques) we were also able to progress to within 3m of the cylinders. During the writing of the method statement and conducting the risk assessment, I tried to formulate a plan based on sound military judgements such as safety distances for steel cutting charges and the clear-cordon-control principles applied during a terrorist incident. My draft plan to stop work and evacuate the surrounding area was not approved by BAA or Balfour Beatty as it implied that the procedures adopted were not fail-safe. My plan had to be totally safe, allowing current works to proceed. This highlighted a fundamental difference in military and civilian thinking and was, in my opinion, commercially driven. Accurately locating the cylinders within the remaining concrete block was now a priority as it was far too heavy (200t) to be lifted out of the 30m deep cofferdam. I proposed a ground radar technique for this function having seen this work very successfully in Northern Ireland. The cost was extremely high (in the order of £10,000 for a 12-hour shift) but proved good value after locating the cylinders to within 100mm. The majority of the remaining concrete was removed during a series of closely controlled operations, involving three hold points, each of which required two signatures (mine and the project manager's) authorizing further progress. After a further 12-hour shift, the gas bottles were eventually removed surrounded by 500mm of concrete weighing approximately 5t. They were subsequently transported to a deep landfill site where the location was recorded in order to ensure Balfour Beatty complied with their duty of care responsibilities.

On reflection, the gas bottle breakout seems quite straightforward. The high profile operation was, however, carried out under demanding conditions which required high level approval from BAA and the HSE. By applying sound military principles, a plan was formulated that reduced a potentially hazardous event, to one that was almost risk free.

Observations and Lessons Learned

Communication. However brilliant a person's analytical powers are, they are of little use if he cannot communicate his intentions to others both orally and on paper. In the Army, we are trained to think on our feet, making objective decisions under pressure once in receipt of enough information. It is worth noting that in civilian life, as on operations, you rarely have the luxury of being in receipt of all the information you require. In particular I noticed fundamental breakdowns in communication between engineers and operatives, as well as a poor passage of information in all directions. One of the ways I attempted to rectify this was by holding impromptu site briefing for operatives where I explained the bigger picture and the Commander's Intent. It was quite obvious that the workforce was better motivated when told not only what to do, but why.

Command Qualities. One of the primary qualities of a commander is leadership. Contrary to popular belief, however, the military are by no means the only holders of leadership attributes. On site, many individuals possessed qualities such as professional knowledge, intellect, engineering vision and judgement. Of those people who did command, as opposed to manage, some commanded through fear and a small number through respect. I felt the majority, however, lacked key qualities such as self confidence, integrity and example. On site, mistakes will always occur, and the aim is to reduce them to an acceptable level. I recall one particularly fraught evening when I signed an authority to pour concrete for one of my shift engineers without carrying out a visual secondary check. The following morning, it was clear that the wall had not been set out correctly by him and the foreman proceeded to give me a "verbal lashing", the likes of which I had never experienced before! I felt responsible for this error and considered that without immediate effort on my behalf to rectify the situation, my credibility may have suffered. I therefore spent the majority of a

12-hour shift operating a pneumatic hammer breaking out the wall prior to recasting. By all accounts this hands-on approach was "good form" and was the topic of many a conversation in the site canteen.

Negotiating and Mediation. Linked with communication is the ability to negotiate and mediate. Negotiation can be defined quite simply as diplomatic bargaining, normally in an attempt to secure a better position for yourself, where as mediation is acting on behalf of two or more parties in order to achieve the most favourable result for them all. I found that specific training in these areas prior to operational tours in Northern Ireland and Bosnia put me in an excellent position when dealing with argumentative members of the Balfour Beatty production team and difficult sub contractors. The value of having team members who possessed the right temperament and training to achieve a "win-win" situation was obvious. I was also heavily involved in hosting and briefing television crews and members of the technical press (eg *New Civil Engineer* magazine); this was made easier having received specific media and PR training prior to deployment to the Former Republic of Yugoslavia.

Photo 4. Balfour Beatty safety award recipients. Author third right. Photograph courtesy of Balfour Beatty Civil Engineering Limited.

Information. The desktop study proved to be critical in providing the majority of the data upon which I produced my courses of action. Such a study should be done in as much detail as is reasonably practicable within the time and resource constraints. I held a number of Hazop (hazardous operation) meetings which acted as brainstorming sessions to ensure all eventualities were considered. A major input to these discussions came from the operatives themselves, which reminded me once again of the value of talking to your soldiers to ascertain their views and ideas before committing them to something. Unlike in the military, however, orders do not exist and if the foreman does not like the way a task is proposed to be completed, he simply does it his way unless he can be convinced otherwise.

Decision. There comes a time when you must make a decision; it is after all what we are paid to do. Once you have made that decision it must be communicated in a clear and timely fashion in the form of a plan which should be flexible, and yet not open to abuse or misinterpretation. I was convinced that my plan would work if the method statement was adhered to, and on several occasions I had to defend it rigorously against foremen who were convinced that there were alternatives, despite having agreed to the final plan themselves. Having made my decision I was not going to change it because of someone's last minute whim.

Praise Where Praise is Due. Strong leadership involves knowing when to give praise and also when someone requires educating in the errors of his or her ways. I was pleasantly surprised, not only by the interest shown by senior management in the operation, but by the personal congratulations they offered to all ranks after the successful operation. I was fortunate enough to be one of the four members of the Cofferdam production team (along with the banksman, plant operator, and foreman) who received a Balfour Beatty Safety Award for their part in the task; see Photo 4.

Ready for Anything?

It would I feel, be prudent to mention that military training is not the panacea for everything on site. There are many things that we are not particularly well qualified to do, and any thrusting officer would do well to heed the advice and

Is the grass really greener over there (p137)

experience of others more able. Firstly, in my experience up to and including SO2 (staff officer grade 2) level appointments, there is little that can prepare you for the commercial, legal and contractual pressures of civilian life. Secondly, our lives in the military rely, quite literally, on mutual trust and understanding, but this quality is seldom present on civilian sites, often making working relations strained. Finally, the concept of teamwork is worth mentioning. Although personnel work together in a team, the fluid nature of the construction industry detracts from management really getting to know their workforce. Rarely did any feeling of camaraderie or bonding take place which would have allowed significant barriers to be broken down for the benefit of the individual and team need[7]. This was further exacerbated, understandably so, by the continual reference to financial incentives and bonus payments

Summary

Despite my observations in the above paragraph, my year with Balfour Beatty was extremely memorable. The work was stimulating, rewarding and challenging. There can be few, if any, comparable opportunities within the military where one can receive such engineering and commercial responsibility. I learnt a great deal about myself, about working with others in highly confrontational situations and, of course, about civil engineering. In answer to the title of this paper, "Is the grass really greener over there?" I would have to say no. In my opinion, the value of true friendship, teamwork and trust cannot be equalled outside the military and, for the foreseeable future at least, that will keep me in uniform. In summary, a few closing thoughts are relevant:

Mission Command. The principles of mission command are unity of effort, decentralisation, trust, mutual understanding and timely, effective decision making.[8] These principles do not apply in the UK construction industry, because projects are closely controlled from a central organization. I believe that the troop commander's counterpart on site, the shift engineer, is not given the responsibility to make decisions, which stifles initiative and results in friction within the team. The fact that the shift engineer's quality of life and pay are also fairly low does not encourage him to seek such responsibility.

Sapper Tradesmen. I do not think anyone would argue that our tradesmen in the Royal Engineers are well trained, highly motivated and extremely proficient. The numerous glowing reports from Bosnia, Rwanda and Angola are a testament to their achievement. Although in my opinion, our Sappers are not as skilled as the majority of their civilian counterparts, I would still employ them in preference due to their ability to understand the Commander's Intent and their ability and willingness to accept such diverse responsibility.

[7] John Adair's Theory on Leadership – the Team, Task and Individual Needs.

[8] ADP Volume 2 – Command (Paragraph 0211)

Rabbit's Foot or Reality?

BRIGADIER J H HOOPER OBE DL FIMGT

I RECENTLY attended the Fourth International Non-Governmental Organisation's Conference on Land-mines which was held in Maputo, Mozambique. As Mozambique is severely contaminated with land-mines of all sorts I took the opportunity to bring myself up to date on a few matters to do with demining and to have a good look at dogs engaged on mine detection work. (They can't uncover and disarm them yet but they are hot stuff at finding them!)

The conference was convened by the International Campaign to Ban Land-mines (ICBL). It attracted around 400 delegates and, predictably, a fair number of the brown rice and sandals brigade, all terribly well-meaning but a few incredibly ignorant on the subject of land-mines. There were also some very knowledgeable deminers present and the net-working which went on during the formal sessions was invaluable. Enough of the conference.

On my way to Maputo I stopped in Harare, Zimbabwe, where I was wonderfully well looked after by Colonel Tony and Mrs Anne Reed Screen. Tony is Defence Attaché Zimbabwe and a few other neighbouring countries. In Harare I was able to see polycarbonate visors for deminers being made to the Warwick University Development Technology Unit's (DTU) specifications. (See article in August 1996 *Journal* and letters in December 1996 and April 1997 *Journals*.) They are better than other commercially available visors and cost less than half the price elsewhere. They work too, as tests against a variety of anti-personnel mines have proved. Furthermore, deminers like them. One version even has a solar-powered fan blowing air over the face of the deminer to keep him or her cool. (Yes there are quite a few female deminers in nearly every country.) It's a great success story for DTU as the visors are being made in Cambodia as well as Mozambique.

However, this article is not about the conference, my trip to Mozambique or the Warwick DTU successes, but is written to take up a point made in a booklet largely written by Brigadier Paddy Blagden. The booklet is "Anti-personnel Land-mines, Friend or Foe? A study of the military use and effectiveness of anti-personnel mines." Commissioned by the International Committee of the Red Cross (ICRC), the study's conclusions were unanimously agreed by a meeting of military experts who also contributed additional material to the study, and endorsed by other senior military officers including three UK generals (of whom our own General Sir Hugh Beach is one), together with (to date) a total of 53 senior serving and retired officers from 19 countries. However, a very real problem is succinctly put by Brigadier Paddy on page 20 of the booklet, and I will quote it in full.

> "A subject seldom addressed in training or operational planning for mine warfare is the long term effects of mines on the social and economic fabric of the victim country. This facet of mine warfare comes as a shock to engineer troops formerly involved in mine laying and minefield breaching, when they become involved in humanitarian mine clearance and are faced with the damage that minefields cause. Most had no conception of the long term effects and human suffering caused by the laying and non-removal of land-mines. [My underlining follows] Although it is unrealistic to expect such training to be given at mine-layer level, political leaders, commanders, staff officers and advisors ought to be aware of the downstream effects of their mine warfare plans."

The question I ask is: "Are you as advisors or staff officers or commanders aware of the effects of your mine warfare plans?"

Please let me fly off at a tangent here for a moment. Do you remember the "Tank versus Tree" argument? When General Griff Caldwell was Corps Commander Royal Engineers 1st British Corps and I was his GSO 2 in the late sixties, the received wisdom was that if we laid barrier minefields between the woods and utilized a few water obstacles we would have an effective, more or less continuous, barrier to the Eastern Bloc tanks. "Tanks do not go through woods" was the cry and between the woods and the barrier minefields we would force the enemy into killing zones. General Griff had some doubts about this as indeed did I and he did a deal with the German authorities to the effect that if we, Sappers of 1 British Corps, did most of the earthworks for a new airfield near Osnabrück, the Germans would let us test tanks

against the trees in the wood which had to be removed in the airfield construction.

I left before the full results were out but gathered that, essentially, if the trees were so big the tanks could not knock them over they were so widely spaced that tanks could get between them. Conversely, if the trees were so dense that tanks could not avoid them they were so thin the tanks could knock them down.

Time passed, and when I became CRE 1 Armoured Division in the early 1970s, I prevailed upon the CCRE to let me loose on the subject of "obstacles" during Exercise *Makefast* as I had spent a lot of time riding through German woods which had reinforced my doubts about the ability of woods to stop tanks. My cavalry friends views were also revealing: "We don't like driving through woods but if it is a question of driving into a killing zone or filtering through woods we'll take the woods." As a result of an inspired presentation by my staff, we caused the engineers of NORTHAG to think again about woods as obstacles and the received wisdom on the subject went out of the window.

Shall we have a look at the received wisdom concerning anti-personnel mines? It all comes down to the wisdom received from QMSIs, AIs, SIs and CIs which we imbibed like mothers milk without a murmur. "We need anti-personnel mines to stop the enemy lifting our anti-tank mines" and in the same breath "we must cover our minefields with direct fire." We need both? My trouble was that I queried far too much received wisdom during my career but, funnily enough, never queried the anti-personnel mine requirement until now. I was one of those who "had no conception of the long term effects and human suffering ..." I do now. And I have seen enough people hopping about on one leg to last me a lifetime.

"Anti-personnel mines are designed to cause non-fatal injuries so that the enemy is left screaming on the battlefield causing considerable distress to his comrades, requiring two of them to carry him away and sapping the morale of the remainder of the force." Yes, they do cause, generally, non-fatal casualties (and they are not nice) but they don't cause such distress that the attack is halted. Read Major Lyall's comments in the April 1997 *Journal*. In his Wadi Akarit article he says "Somehow, in the stress of all that was happening one does not stop to think about mines." And just how many casualties do anti-personnel mines cause? There are no facts but plenty of theoretical calculations based on what? By the way, what happened to that mine which shot a bullet into the victim's foot. That would have stopped a chap running and made him a casualty. It probably would not have cost him a leg or even worse. Neither would it, at least not quite so blatantly, infringe the provisions of the "convention on prohibitions or restrictions on the use of certain conventional weapons which may be deemed to be excessively injurious or to have indiscriminate effects" which anti-personnel mines most certainly do.

The facts are that a determined enemy is not even slowed down by anti-personnel mines let alone stopped. Read Dan Raschen's book "Send Port and Pyjamas" about Korea or ask Jimmy Nobbs about Korea. I well remember Jimmy telling me about the North Koreans and Chinese coming straight through our minefields *without* the slightest hesitation. Read the account of the attack on Mount Longdon in the Falklands ("Green Eyed Boys" pages 128 and 129.) when Corporal Milne went up on a mine. Sgt Des Fuller said "The thing going through my mind was, 'what do we do now?' It was no good getting our bayonets out and probing for mines ... I don't know who gave the order to go forward ... but we just upped and ran like ... for the nearest bit of cover." Lieutenant Mark Cox says of the same incident "After Brian Milne stepped on the mine, I looked at this peat bank and knew that I could quite happily spend the next eight hours lying there and come out unscathed". In fact he did not stop but went on. And did the extensive Iraqi minefields of some nine million mines stop any of the allied advances? They were bypassed. Mind you there have been plenty of minefields laid in the "wrong place" as the tactical picture changed, again see Dan Raschen's book on this point.

"Anti-personnel mines prevent the enemy lifting our anti-tank mines." Are we seriously thinking about clandestine anti-tank minefield breaches these days? If not, we are going to use mechanical or explosive breaching so what's this about anti-personnel mines preventing the enemy lifting the anti-tank mines? Who is going to waste time, money and effort laying anti-personnel mines for this purpose? Incidentally, I seem to remember being told that if we laid one Mk 7 anti-tank mine per yard of front we would knock

out 70 per cent of the enemy tanks in a random attack. I wonder who worked out the track width, pressure plate width, frontage and number of tanks, bumps in the ground, mines unarmed as the fuze cover plate was too hard to unscrew and so on to come up with that. I uncovered dozens of Mk 7s on an FTX in the sixties and found only about two thirds were armed. I cannot remember seeing that in any report except mine. So what is the theoretical calculation on anti-personnel mines worth, if there is one?

Let's have a look at randomly delivered mines. If you know where the enemy is surely you will shell him. If not where are you going to place mines. The field would have to cover a huge area to achieve any significant effect. Has the cost in terms of logistic effort been worked out? "Oh, yes, but these are self destruct or self neutralizing and we can have a ten per cent failure rate." I am quite happy to lay an anti-personnel minefield and only arm ten per cent of the mines in it and invite the boffin who dreamt this up to walk through it. Any takers?

I could go on. It is easy to rubbish the received wisdom on the beneficial effect of anti-personnel mines but what would I do as an engineer commander trying to do my best for my tactical commander? If anti-personnel mines are available have I any right not to use them even if they are of only minute benefit? Have I any right to deny my own side its rabbit's foot? Would I take the lucky rabbit foot away from one of my soldiers before he goes into battle because I know it is no good at all? We have a bit of a problem here.

I do not know the answer. If anti-personnel mines are available can the engineer commander take the ethical stance, that the minute possible advantage to be gained by their use is totally outweighed by the untold harm the unrecovered mines will inflict on innocent victims after the conflict, and refuse to use them? Has he the right to take that stance on behalf of his troops?

Of course, you say, we will mark our minefields. Want to bet? You are short of time and men and you are definitely going to mark the minefields in the approved conventional manner? I saw only one marked minefield of the hundreds in Cambodia and only one in Mozambique (and even then some mines were outside the wire, moved by flood and erosion). But local victims do a cost/benefit analysis and go into the minefields to collect wood, to recover animals or for other life or death economic reasons. If the minefields are subsequently marked as a result of a post conflict survey the wire, stakes and signs are pinched. They represent considerable wealth to penniless local inhabitants.

As I say, I do not know the answer to the engineer commander's dilemma but what I do know is that if there is a total ban on anti-personnel mines they will not be available for him to use and the anti-personnel mine quandary is resolved. Currently 53 states unilaterally support a global ban on the production, stockpiling, transfer and use of anti-personnel mines. Twenty-one states support a ban and have renounced the future use of anti-personnel mines by their own forces. Seven states support a ban and have suspended use of anti-personnel mines by their own armed forces and 15 states support a ban and are destroying their stocks of anti-personnel mines.

If the last paragraph does not give you pause for thought and you might care to claim, as do the US military forces, that mines are a "force multiplier", may I refer you to a letter to President Clinton signed by 15 US generals and published in the *New York Times* on 3 April 1996. This letter called for a total international ban on anti-personnel mines stating that such a ban is "not only humane, but also militarily responsible" and went on to say "Given the wide range of weaponry available to military forces today, anti-personnel land-mines are not essential. Thus banning them would not undermine the military effectiveness or safety of our forces nor those of other nations." Amongst those generals were Schwarzkopf (not exactly a dove in these matters), John Galvin, former Supreme Allied Commander Europe, and David Jones, former Chairman Joint Chiefs of Staff. They, quite possibly, know what they are talking about.

The Essence of Business

D G MABEY

Mr Mabey is the past managing director, and now President, of Mabey and Johnson Limited, a firm which will be very familiar to many sappers involved in building bridges in Bosnia and elsewhere. His very perceptive and previously unpublished views on surviving in business have been acquired over a lifetime building up a successful engineering group after six years of war service.

Business is a jungle – the first principle is therefore to survive. Most of the nationalized industries are complete or near monopolies. The jungle is not for them. They operate more like caged animals – fed by their owners and protected by their cages when inside; let them out and they have forgotten how to survive in the jungle and would soon be eaten up. Few businesses even survive intact longer than the span of human life. Therefore, it is necessary first, to study the **strategy for survival.**

In the summer of 1940 Hitler's mighty and victorious *Wehrmacht* and *Luftwaffe* stood threatening our ill-armed country from across the Channel. Franklyn Roosevelt said that he spent many a sleepless night worrying about the future of Europe and even of the world. But when he heard that Churchill was a bricklayer and Hitler a paper hanger he had no further anxiety. Herein lies the essence of our strategy – have a good foundation and don't just cover up the cracks.

People

The first essential is to have the right people. To survive they must keep fit and be constantly trained to learn new techniques and methods. **Try to recruit** a promising young graduate/equivalent each year, even if you don't need one. Cultivate this seed corn by training him/her and in a year or two's time he/she will become most valuable and save you the cost and the risk of recruiting a more senior person from the wild. The first quality to look for when recruiting is integrity, the second is intelligence and the third is initiative. Those who have done juvenile jobs – like newspaper rounds – are most likely to succeed in later life. Those who speak of needing a challenge are unlikely to be successful. To achievers, life is one long challenge of self-inflicted targets. **When recruiting,** particularly by advertisement, the timing of each stage of recruitment should ensure that you are in a position to offer the job to the successful applicant within a maximum of three weeks. The best candidates are the first to be snapped up. Slowing the process leaves you with your second or third choice. Remember that nearly 50 per cent of the population is made up of women – more should be made of this under-utilized resource.

Products and Plant

The second essential is to have the right products at the right price: the secret of selling is good buying – which includes sound design and production. Scrap heaps and rubbish dumps are good places to study design shortcomings. Assets and machinery must be kept up to date to enhance efficiency.

D G Mabey
The essence of business p142

Strategy

The third essential is to have a sound long-term strategy. In war it is vital to win the final battle: intermediate reverses don't matter so long as you have the reserves to weather them. It is the chairman's job to look six months ahead and onwards. A managing director's job is one to six months ahead. A manager's job is the next 30 days. (The exact period varies with every industry.) Each one must backstop for those immediately beneath him. **Don't over-expand in boom times** – don't follow the herd (usually motivated by greed) during a boom. Keep expansion plans for the following recession when the herd is motivated by fear. This way you double your money instead of halving it. Remember that most business failures are preceded by unaccustomed successes. "Do not follow where the path may lead. Go instead where there is no path and leave a trail."

Risks

Business is about taking risks – calculated risks. This is, perhaps, what makes it exciting. The biggest risk in business is, possibly, to take no risk at all but if you try to remain the same size you will probably get smaller. Business is a mixture of large, medium and small contracts or deals. The small ones are no problem, a few bad ones will be compensated by one good one. But, you'll never make a fortune on small contracts – there are too many competitors and, hence, the profits are pro rata smaller still. It is the large contracts that have to be watched. Here one can be at considerable risk, but equally, with less competition, this is where money is made. Try to spread the risks in **time, place** and **manner**.

Time – You don't want two or three large contracts during the same time-scale – suppose they all go wrong – you may have impossible weather or a currency loss, then you could be in trouble. But, if you have three contracts going wrong at different times, you'll probably survive on your medium and small contracts. (This principle is difficult to follow when you have two or three juicy-looking contracts which you can't refuse!)

Place – you probably wouldn't choose to have more than one contract at a time in Gaddafi's Libya, or in certain undemocratic republics, a few of which I could name. **Identify** whether you have too many/all your eggs in one basket ie try not to concentrate on one product or one market, or have all your money in one bank, or depend too much on one individual.

Manner – you may get a contract where 80 per cent of the work is right up your street and 20 per cent outside your skill and know-how. The 20 per cent may be potentially the most profitable. Subcontract it and let someone else have the profit, thereby laying off the risk.

Caution

You are usually at greatest risk when everything appears to be going perfectly: when all the traffic lights ahead are green. You become overconfident and take too big a step – your risks not properly spread, your reconnaissance not done and – bang! – it's all gone. Ninety per cent of the whizz-kid property millionaires of the late 1980s are no longer whizzing, no longer kids and no longer millionaires. But at the time their operations seemed infallible and they were the envy of all. Hitler made the same mistake when he had conquered nearly all of western Europe in under one year with an army from a country which was bankrupt eight years previously. His over-confidence in the infallibility of his master race lead to his ambitious attack on Russia, which was his undoing. Believing he could take Moscow by *blitzkrieg* and end the war before the winter of 1941, his soldiers were not equipped for the intense cold. Surprisingly for a German operation they had not been sufficiently thorough (pessimistic) in their planning.

Napoleon committed the same error in the previous century. So, when all the traffic lights are at green – look out for the ambers and reds – for Greek scholars, the four states of man were: one Genesis, two Hybris (confidence), three Euphoria, four Nemesis.

Profits

It is usually easier to make money than to save it – easier to increase your profits by £10,000 than to save £10,000 from your costs. When the going is good, don't try to be penny wise and pound foolish. Don't worry too much about your costs. Do all the business you can, subject to the survival laws already mentioned, and accumulate as much profit as possible to reserve for the bad times which will undoubtedly follow. When business is difficult, concentrate on your costs. Watch the pennies and the pounds will look after themselves. By trimming your prices, you will pick up the most work available and be in good fettle when the next boom comes along. This is also a good time to take the plant out of the flower pot and look at the roots; it is a time to restructure and recruit new and enterprising people.

Monitoring Clearance of Anti-tank and Anti-personnel Mines in Bosnia and Herzegovina

MAJOR PAUL VAN VUUREN MMM

Paul van Vuuren is from the South African Engineer Corps, South African National Defence Force. Commissioned in 1988, he has filled a variety of appointments in the Engineer Corps of the South African Army, and is at present the Second in Command of 2 Field Engineer Regiment.

Attached to 20 Armoured Brigade in Bosnia and Herzegovina, Major van Vuuren filled the post of SO2 Mines with 39 Engineer Regiment Group, Multi National Division (South West).

Introduction

Mines and explosive devices of all kinds continue to contaminate Bosnia and Herzegovina, where many mined areas are not recorded. Few mines have been cleared and this problem hampers reconstruction of the country and the return of displaced persons, refugees and evacuees (DPRE). It may also hinder the effectiveness of stabilization force (SFOR) operations and is a serious force protection issue. There are at present an estimated .75 million anti-tank and anti-personnel mines lying around, and only 15,475 anti-personnel and 6601 anti-tank mines have been lifted to date within the Multi National Division's (South West) (MND(SW)) area of operations. A recent study has shown that on average there are 10 civilian deaths and 40 injuries a month directly caused by mine-related incidents.

Although agreements were reached whereby the Parties in Bosnia and Herzegovina were to use their military forces to remove mines, progress was slow. However, on 17 January 1997, Commander SFOR issued instructions to the Former Warring Factions (FWF) that they were to start demining operations from 10 March 1997, with SFOR monitoring the work. Initially, each FWF corps or independent division had to deploy at least one demining team. During the months of April to June, 15 more FWF demining teams were trained and equipped as part of a US Department of State programme, bringing the total number of teams in theatre to 59 by the end of July .

Multinational Effort

With every countermine team that deployed, a SFOR monitoring team deployed to observe activities. The teams consisted of four members: an engineer officer or non-commissioned officer, supported by a driver, signaller and interpreter. Recruited from all the engineer elements and other service arms deployed within MND(SW): British, Czech Republic, Malaysian, Dutch and Canadian soldiers, this was a real multinational effort.

Training

Senior monitors assess the performance of countermine teams and determine whether their operations are to be given credit for effective effort. HQRE is responsible for the training and accreditation of senior monitors to ensure that they are properly equipped to carry out this fundamentally important task. During training, the concept and mechanics of conducting countermine operations are covered in detail, with a large amount of practical, hands-on,

Maj Paul Van Vuuren
Monitoring clearance of AT and AP mines in Bosnia
p144

experience. Also attended is a one-day course focused totally on mine-awareness matters.

Joint Engineer Group

Force protection remains a high priority and safety of SFOR monitoring teams is a key concern.

To ensure precise and accurate control of operations, fortnightly joint engineer group meetings were held with the chief engineers of the FWF, who handed in plans of work for a two-week period. The plans were taken to the mines cell, translated and analysed. The minefields were plotted on a 1:50000 map to ensure that the FWF had abided by SFOR policy concerning minefield priorities, which were geographical, based, for example, on plans for the return of DPRE, and also targeted high-density mined areas with 50 or more mines in a minefield. In conjunction with EOD and using the computer mines database, a complete analysis of the proposed areas for demining and the risk levels on the routes from rendezvous to each minefield was undertaken; if the risk on the routes was assessed as too high, the plans were referred back to the relevant FWF, or an EOD team tasked to prove the route.

Monitoring Teams

The ebb and flow of combat, coupled with the proliferation of mines and their use by individuals and groups for house and farm protection as well as military advantage, has meant that mines might be anywhere; risks, therefore, are considerable.

The senior monitor's principal responsibility during countermine operations was and is the safety of all SFOR members, ensuring that they do not enter minefields or mined areas during countermine operations and that safety distances are maintained at all times. In effect, this means that force protection takes precedence over the monitoring of countermine operation activities. Second to force protection is the requirement to judge the performance of each demining team's operation during a day. A successful day's demining is measured by the number of mines lifted in a minefield taking into account variables such as weather, terrain, minefield complexity etc. As an incentive, FWF corps must achieve 20 days of "effective effort" out of every 30 days. Failure to comply causes training and movement restrictions, if not a total ban, to be imposed on the corps concerned.

Meticulous care is taken to ensure that everybody is aware of exactly what is going to take place during a day's countermine operation. All members of the monitoring team wear helmets and body armour until the work for the day is completed. FWF team vehicles lead at all times with the monitoring team following about 50 to 100 metres behind. When a senior monitor believes that he or his team are being placed at an unacceptably high level of risk, he informs HQRE so that an alternative option can be considered.

As no member of the monitoring team can enter a minefield, monitoring is carried out from the nearest track or road. This restriction applies even in the event of a minestrike by a member of the countermine team; it is the responsibility of the countermine team to recover injured personnel from the minefield.

On completion of the day's demining the senior monitor has to ensure that all lifted mines not destroyed *in situ* are destroyed in a suitable area. If mines have to be moved to a new location for destruction, this has to be monitored to ensure their destruction. The total amount of each charge should not exceed 15kg or two anti-tank mines, but for amounts in excess of 15kg a "Notice to Airmen" has to be sought which takes a minimum of 48hrs to be approved. In such an event, mines are left in a clearly marked area until authority is received.

Senior monitors send daily reports to the engineer operations cell and weekly reports to HQRE. HQRE send a weekly synopsis to HQ SFOR Engineers, and the UN Mine Action Centre in Sarajevo. The UN Mine Action Centre controls all the humanitarian demining efforts in Bosnia and Herzegovina, and it is therefore essential that it is kept up-to-date concerning minefield clearance.

Conclusion

Countermine operations have so far been very successful within the MND(SW) area of operation with both monitoring and countermine teams working together to ensure that this very important task is carried out effectively. During the first few weeks of operation 38 minefields were cleared, and 162 anti-tank and 654 anti-personnel mines destroyed.

39 Engineer Regiment Group was instrumental in laying down a solid foundation and a streamlined system for future engineer regiments to build on, and they can be proud of what was achieved in such a short period. It was a great privilege for me to be part of the group and team that initiated the countermine operations programme in MND(SW). There is no doubt that countermine operations will continue to remain one of the highest priorities in Bosnia and Herzegovina for years to come.

GPS and Gravity Survey of Lebanon

CAPTAIN R W PULLMAN MSc

Captain Rob Pullman was commissioned into the Corps in August 1989 and attended 99 YO Course. He went as a troop commander to 52 Field Squadron (Construction) at RAF Bruggen for two years, which included a four-month Falkland Island tour. He then spent a year as operations officer of 23 Amphibious Engineer Squadron, before returning to the UK to take up the appointment of Second in Command 32 Field Squadron. The tail end of this tour saw him in Bosnia for three months before starting No 80 Army Survey Course. After survey training he became Officer in Charge 512 Section, 19 Specialist Team RE based in Hermitage. He carried out survey work in Bosnia, Lebanon and the UK before taking up his present appointment as an SO3 in the Operations Branch, HQ Land Command in September 1996.

Introduction

During the period 21 July to 31 August 1996, an eight-man team from 19 STRE carried out survey work in Lebanon. The work resulted from a request by the Lebanese government, for British assistance in re-establishing a survey control network (a series of points on the ground (ie trig pillars) for which precise coordinates are known), and gravimetric data within Lebanon. During the reece, a visit was made to the Lebanese National Survey Department to determine their requirements, which were: to produce a primary survey control network of about 25 points, and a gravity base station network of a similar number of points.

Lebanon is an Arab country with French and Arabic as its official languages. The population of 3.4 million is made up from those who follow one of several religions: Christian, Muslim (Shiite and Sunni) and Druse. Religion, together with the large number of refugees (such as Palestinians) can and does cause friction.

The country is relatively small, roughly 100 miles by 50 miles at its widest. It has two mountain ranges, up to 3000m in height, running northeast to southwest within its borders *(see Figure 1)*. The coastal region and the Bekaa Valley are very fertile areas and there is a reasonable road network covering all regions of the country.

During July and August, Lebanon has a dry, warm climate with temperatures in the high 30s (°C). However, the Bekaa Valley can experience temperatures in the high 40s.

Background

Lebanon's original control network was produced from triangulation by the French Army Map Service between 1920 and 1930. This produced a first order control network of 26 points throughout Lebanon and Syria. During the 1930s the Lebanese started up their own cadastral survey department and, with the assistance of the French Army Map Service, densified the control network to produce second, third and fourth order points (control points with decreasing accuracy). In 1962 the DAG *(Direction des Affaires Geographic)* was established and continued to survey the country until civil war broke out in 1975. During the war survey work was discontinued and much of the existing control network was destroyed, hence the need to re-establish it once relative peace came to Lebanon in the early 1990s.

During initial discussions, the chief executive of DAG, Brigadier General A Nehme, outlined their requirements and asked for advice on how best to achieve their aims. They wanted to produce a primary survey control network to achieve the following:

Captain R W Pullman
GPS and gravity survey of Lebanon (p146)

- Produce a control network in order to use aerial photography for mapping. The aim being to map Lebanon at a 1:25,000 scale.
- Determine transformation parameters to convert coordinates from the Clarke 1880 datum to the WGS84 datum (this would allow them to transfer coordinates from their current mapping to their proposed new mapping).
- Leave a well-distributed and monumented control network from which to densify control and carry out further surveys.

In addition they wished to establish a network of gravity base stations in order to produce a local geoid model.

Due to other commitments, the team had six weeks to carry out the work. To finish within the time-frame it was decided to survey in approximately 25 well-distributed control points, coincident[1] with the original triangulation stations where possible, which would also be used in the gravity base station network.

GPS Surveying Theory

In order to cover the basics of GPS (global positioning system) surveying it is necessary briefly to cover basic geodesy. The earth is roughly spherical, it has high ground (mountains) and depressions (valleys, deep sea troughs). We commonly refer to the ground as the topographic surface and it is this surface upon which survey measurements are made. Although surveying is carried out on the topographic surface it is not suitable for mathematical computations. Computations are therefore carried out on the geoid or spheroid. The geoid is a shape that roughly equates to where the level of the oceans and seas would be if they could flow freely over the earth (in other words mean sea level). In order to make more precise calculations, a mathematical model of the earth is required. This is elliptical in shape and known as the spheroid *(See Figure 2)*. There are a large number of mathematical models (spheroids) in use however, GPS receivers make measurements to the World Geodetic System 1984 (WGS84) spheroid.

Most readers will now be aware of GPS receivers due to their increasing use within the field army. What may not be common knowledge is how they work. The USA have put a system of 24 satellites into earth orbit. These satellites send a pre-arranged coded message to earth which can be

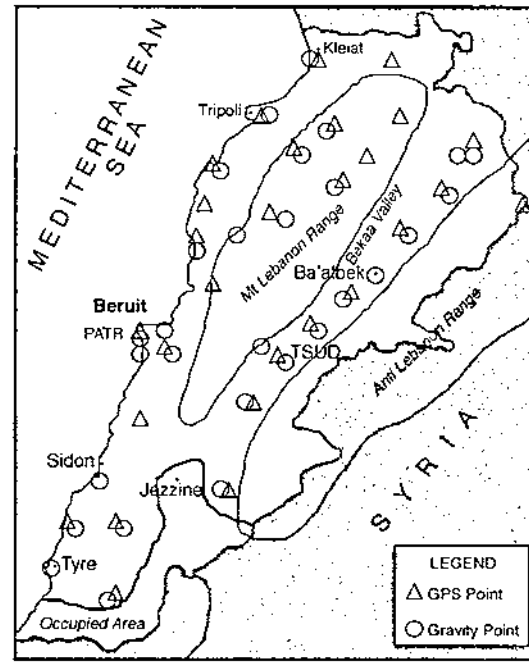


Figure 1. Map of Lebanon showing the GPS and gravity points.

decoded by the GPS receiver. The receiver can then calculate the distance between the receiver and the satellite (distance = speed (light) x time taken). If a receiver therefore has a signal from a minimum of three satellites, it can calculate its position on the earth by a process of intersection *(See Figure 3 over the page)*. There is a sphere of error associated with the intersection which is

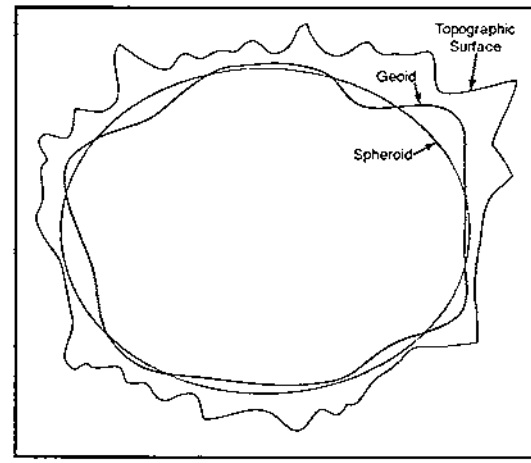


Figure 2. Relationship between spheroid, geoid and topographic surface.

[1] Coincident points would allow transformation parameters to be calculated.

GPS site selection is important, it needs to be placed where it is unlikely to be disturbed in the future. Hence the selection of this graveyard at Kefraya.

reduced as the receiver tracks more satellites. Whilst in Lebanon the satellite constellation was excellent and the receivers were normally tracking seven to eight satellites.

GPS Survey Network Design

Initially a geometrically well-balanced network of 25 control points was planned with an average distance between control points of 30kms. It became evident that some of the proposed areas were unsuitable for a variety of reasons such as the area being controlled by refugees/militant factions (like Hezbollah), to high obscuration of the horizon (the GPS receiver would lose the signal). A slightly modified network was therefore

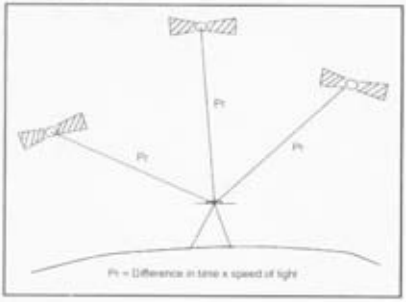


Figure 3. Pseudorange (Pr) can be calculated and hence three or more satellites will give the position of the GPS receiver.

planned which resulted in some baselines being up to 60kms long. One hour sessions would still be sufficient to provide centimetre accuracy as the stated accuracies for the Trimble equipment used was 0.5cm + 1ppm (eg 60km line = 0.5cm + 6cm = 6.5cms) when carrying out a dual frequency static survey for 60 minutes. To ensure the survey came within these accuracies, it was decided to observe three sessions, one of one and half hours and two of one hour. The spacing between these sessions would be half an hour and one hour respectively. A computer programme preplanning tool (GPSurvey 2.0) was used to ensure the timings selected would provide the maximum number of satellites with a good change in satellite geometry (changes in satellite geometry improve the precision of the measurements).

GPS Survey Execution

In order to start the survey it was necessary to determine at least one station to be fixed with precise WGS84 coordinates. Any error in the start coordinates would be propagated through the survey.

Normally control would have been brought into Lebanon from known control points in surrounding countries, but in this case Israel and Syria would not grant access for the necessary survey work, and it was therefore decided to carry out absolute position fixing for two points from which to start the survey network. Determining absolute positioning requires GPS observations for a minimum of three, five-hour periods. The increased observation time will give more accurate coordinates. Meteorological conditions are recorded every hour (helps to model for atmospheric errors). Two of the original first order triangulation points, College Patriachal (PATR) in Beirut and Terme Sud (TSUD) in the Beqaa Valley *(See Figure 1)* were selected as the absolute points. This is because they were roughly in the centre of the country, with one point in the east and one in the west. In addition both points are existing first-order control points from the original triangulation and TSUD was one of the original start points for the triangulation.

Six consecutive 12-hour observation sessions took place at PATR and TSUD (this is much more than the minimum stated above but gives flexability in that the survey scheme could be connected to an international network of survey control points if required). Trimble 4000 SSE geodetic receivers with L1/L2 microstrip antennas were

GPS and gravity survey of Lebanon (p148)

used for the observations. An hourly record of temperature, pressure and humidity was taken at each station.

Using these control points, four teams were then deployed. Two teams observed on the known control points and two observed on two new stations. This allowed the new stations to be "fixed", and these could then be used as control stations to fix further new stations and so on. This procedure is known as a dual frequency static survey. Monumentation and detailed station descriptions were completed to ensure the stations could be easily reoccupied.

A total of 28 stations, two absolute and 26 relative, were successfully coordinated *(see Figure 1)* over a 20-day time period. Absolute stations have an accuracy of 0.25m at a 66 per cent confidence level in each ordinate whilst relative stations are better than 0.06m at a 95 per cent confidence level in each ordinate.

Gravity Survey

As previously mentioned GPS measurements relate to the spheroid *(See Figure 4)*. Mapping heights are relative to mean sea level which is related to the geoid. Figure 4 shows that if the separation (N) is known, height above the geoid (h) can be calculated by using h = H-N. There are geoid models in existence (which would give you N to calculate h) however, in the area of Lebanon they are only accurate to 5-10m. To produce an accurate geoid model gravity measurements need to be taken.

For the gravity survey it was decided to build up a network of gravity reference base stations from which gravity observations could be taken. This would facilitate further gravity survey work in Lebanon at a later date. To produce a reasonable network throughout Lebanon, within the limited time-frame, it was intended to observe about 13 base stations and 16 anomaly stations. A base station is an accurate point on the ground with known gravity values from which gravity work can start and finish. An anomaly station is data to calculate the changes in the shape of the geoid.

Whilst carrying out the GPS task, it was possible to visit proposed gravity locations to assess the suitability of the areas selected. This resulted in a final observation plan of 31 gravity stations.

Observation Procedure

For gravity observations four LaCoste and Romberg Model G gravimeters were used with at least two observers giving a total of eight loops per day (four machines x two different observers gives eight independent loops) and hence plenty of redundancy. All gravity base station observations were completed using a full ladder-loop sequence of observations. A ladder-loop requires all stations to be visited on the outward and return journey with a drift station observed prior to making the return trip (i.e. observe stations A, B, C then a drift station X, reobserve stations C, B and A). A description was completed for each base station to ensure it could be reoccupied at a later date.

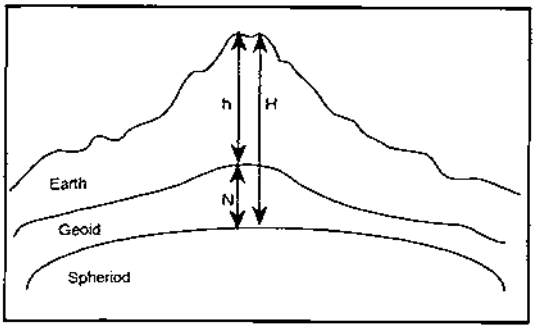


Figure 4. Separation (N) = H-h.

During the observation phase in the Bekaa Valley, temperatures were reaching the high 40s and although gravimeters have an internal heating element that keeps them at a constant operating temperature of about 50°C, when outside temperatures near the 50s mark, readings can become somewhat erratic. The problem was overcome by observing early in the morning and ensuring gravimeters were not in direct sunlight.

To start the survey it was first necessary to determine the standardization (scale factor) for each gravimeter in the IGSN71[2] reference system appropriate to the survey region. Basically gravimeters should measure threequarters of the expected range of readings for the survey. In this case it needed to be approximately 300 milligals (mgal)[3]. This is done by visiting two absolute gravity stations (ie Stn 1 = 650 mgal, Stn 2 = 960 mgal therefore range = 310 mgal. For completeness this should be carried out twice (in order to determine any errors) at the beginning and at the

[2] This is a common worldwide network connecting gravity data.

[3] Mgal is a measurement of gravity. One mgal equates approximately to a change of 3m in height.

Existing third order point at Sir Ad Dinniyah

end of the work. Suitable absolute gravity stations were considered to be: Cairo International Airport, Egypt, and Rome International Airport (Leonardo De Vinci), Italy. A Beirut-Rome-Cairo Drift Station Cairo-Rome-Beirut loop would be used for the standardization which had the added advantage of transferring IGSN71 gravity values into Beirut. Descriptions had been obtained for the proposed gravity stations; the only concern being their lack of currency as they were dated July 1973. Out of date descriptions make it difficult to reobserve a station accurately. The surroundings could have changed drastically (several new buildings in the area) making it difficult to locate or, indeed, the point may have been destroyed.

A request to observe gravity at the chosen airports was made through the British Embassies in Rome and Cairo, but during the time we were in Lebanon permission was not forthcoming from Egypt, so it was decided, as an interim measure, to determine local scale factors. This was achieved by visiting base stations that gravimetrically span the project area (ie the highest and lowest gravity values that would be experienced in Lebanon).

At this stage, back in the UK, the following alternatives for the gravimeter standardization were considered:

- A trip from London to Johannesburg, Pretoria (more than threequarters of the required range).
- Use the Trinidad to Casper portion of the US Mid Continent Calibration Line (USMCLL).
- Wait for political clearance from Egypt and use the Rome-Cairo stations.

It was decided to use USMCLL as financially this option was cheaper, political clearance would be easily obtainable and the gravity stations on the USMCLL have currency. The standardization was carried out between 20 and 27 October 1996. Scale factor for each gravimeter was then computed.

The last outstanding issue was to transfer IGSN71 values to Beirut (this would have been achieved originally by combining with the Rome Cairo standardization). The transfer started on 27 November 1996 with four gravimeters and two men visiting four stations in the UK and five stations in Beirut.

A total of 14 gravity base stations were established giving a reasonable spread across the country, and all accurate to within 0.031 mgal (requirement is 0.05 mgal). In addition 17 anomaly stations were established with an accuracy within 0.102 mgal. In practical terms 1 mgal is approximately 3m in height so the worst base station has a 10cm error and the anomaly a 30cm error prior to any additional processing.

Conclusion

The Lebanese people are extremely hospitable and this was evident as the teams moved around the country. Whenever teams stopped to work, land owners would insist they eat and drink with them; this became such a problem that extra travel time was added to account for this. The accompanying Mukafeha (internal security soldiers) would ensure teams stopped at places of interest such as the Roman ruins at Balbeck, the Cedar forest and the vineyard at Ksara. Beirut itself was very European in its outlook and the section enjoyed sampling the *mezes* in the wide choice of restaurants (although sitting on the Mediterranean coastline watching the sun go down can make the lambs brains look like cauliflower!)

An extremely worthwhile survey was carried out to the benefit of the DAG and 19 STRE. The DAG now has a first order GPS control network and a gravity base station network, and they are keen for the section to return to do more work. The team had the opportunity to operate in a difficult climate, work with foreign soldiers, pass on their knowledge, and practise their language skills.

GPS and gravity survey of Lebanon (p150)

The Engineer and Logistic Staff Corps RE(V)

COLONEL J P TABERNER OBE MA CEng FICE FIHT

The following gives a very brief overview of the author's service and employment:

National Service, Royal Engineers, 1950 to 1951 (136 Construction Regiment (Army Emergency Reserve) 1951 to 1957),
Cambridge University 1951 to 1954,
Sir William Halcrow and Partners 1954 to 1958,
John Mowlem & Company (Contractors) 1958 to 1963,
Costain Civil Engineering 1963 to 1986 (Chief Engineer 1976 to 1986),
Eurotunnel, Director of External Relations 1986 to 1994,
Union Railways, Consultant, 1994 to date,
Member of the now Engineer and Logistic Staff Corps since 1976.

Introduction

At a time when the army is experiencing frequent reviews of its role and cost effectiveness, similar to those undertaken in private businesses and industry, the existence of a unit which is manned by unpaid volunteers who pay a subscription for the privilege of membership is not only an attractive proposal but warrants explanation.

The Engineer and Logistic Staff Corps is a typically British institution; it is a corps of officers but no men; it is a corps of experienced professionals who become amateur soldiers to be available to give advice to the Services on engineering and transportation matters. Members of the Staff Corps retain their civil occupation, perform no military duties, receive no pay or outfit grant and, except on very rare occasions, do not dress in military uniform or carry military identification cards. The only cost to the Army is the annual capitation grant. The members pay an enrolment fee and a modest annual subscription.

The precise description of the unit's function and more particularly its title have changed to stay in tune with military and political changes since its formation in 1865. However, the function of the Staff Corps, to provide a body of skilled engineers and logistics experts to advise the Ministry of Defence on such related matters as may be put before it, is very similar to the original concept; not surprisingly the scope of the services and the range of expertise required has widened with the changes.

Formation and Early Activities

The Staff Corps was founded in 1865, as the Engineer and Railway Volunteer Staff Corps, by a senior volunteer officer, Lieutenant Colonel Charles Manby, then Secretary to the Institution of Civil Engineers, to co-ordinate the activities of the many competing private railway companies that existed at that time to ensure the prompt and rapid movement of troops across the country in cases of emergency.

This Staff Corps was formed of three classes of member: lieutenant colonels, majors and captains, recruited from senior managers and civil engineers from the railway companies. The management and administration of the Staff Corps was undertaken by a Council of the Colonels under the chairmanship of the OC. The Secretary and *de facto* executive officer was the acting adjutant, initially Lieutenant Colonel Charles Manby. He was called acting adjutant because the usual rank of adjutant in the Army was a captain, whereas in the Staff Corps he was to be a lieutenant colonel or colonel.

The first briefs of the Staff Corps were to draw up a series of detailed plans for the movement of troops and stores from all parts of the country to specific points selected by the War Office to meet theoretical threats.

Col J P Taberner OBE MA
The Engineer & Logistic Staff Corps p151

There can be little doubt that the smoothness and efficiency with which mobilisation was carried out and the Expeditionary Force dispatched across the Channel in 1914 was the direct outcome of the basic work undertaken by officers of the Staff Corps during the first 30 years of its existence.

Although the First World War lasted over four years the War Office called on the services of the Staff Corps only twice; however it would appear that many members of the Staff Corps were either serving or were consulted individually from time to time during the war.

There was little call on the services of the Staff Corps between the wars, and this inaction seriously threatened its existence as it found itself in 1942 with no brief as to how it could be useful. Only the determination of a handful of engineers, the Corps Secretary and a more involved officer commanding saved it from possible disbanding.

Discussions with the EinC and the Director of Transportation led to a review of the objectives and resources of the Corps, both in peacetime and in war, with consequent revisions to the rules and changes in constitution. It was recognised that without the Staff Corps the various officers concerned could be approached only through their managements and, in their civilian capacity could only speak and advise in accordance with the requirements of their concerns, but as military officers of the Staff Corps they could be asked for their personal opinions and advice without in any way committing the firm or concern to which they belonged. The establishment was confirmed at 10 colonels, 20 lieutenant colonels and 30 majors and recruitment was widened to include all civil engineers, officers of railways, docks, inland waterways and other transportation undertakings and contractors.

The first fruits of this reorganisation were seen when the Staff Corps was called on in 1945, immediately after cessation of hostilities, to assist with postwar reconstruction.

During the next few years the Staff Corps was asked to give advice on such issues as the rapid construction of roads in wartime, pile driving equipment, strengthening of civilian road bridges, storage and distribution of cement in the field, and to vet RE manuals on civil engineering topics.

Widened Scope

In order to make greater use of the services of the Staff Corps, the rules were again changed in 1970 to enable new members to be recruited from engineering institutions other than that of civil engineers and give greater flexibility in the choice of potential officers. In April 1972 the EinC suggested to the OC that it would be beneficial to the work of his department of the Ministry of Defence (name changed from War Office in 1964) if the fields of experience could be expanded to cover four additional areas: petrol and oil engineering, electrical and mechanical engineering, airfield design and construction, and geology and site investigation; a short time later engineer services was added. As a result of these requests the Staff Corps was reorganised to have expertise available in ten disciplines with a number of members experienced in each of these.

During the next ten years or so members of the Staff Corps were called on to give advice on a wide range of subjects; these included: protective walls to army posts constructed and taken down by unskilled labour ("Lego" blocks), rapid repairs to scabs and craters after air attack on airfields, checking design principles for a concrete chimney, selection of material as a filter to a rubble bank, type of pile for a jetty across a coral reef, commenting on powerhouse design and bulk fuel storage, types of wood suitable for use on structures in Saudi Arabia, plant needed for constructing field defences and tank ditches and the rapid assessment of strength of damaged bridges.

Members were also asked to provide critics for the "end of course" papers by students at the RSME, assist in finding civilian firms for training in the design office or on site and assist in training officers in advanced aspects of plant management.

Under the Macleod reorganisation (in 1964) responsibility for railway operation passed from the RE to the newly formed RCT (Royal Corps of Transport.) There was therefore a need to consider some changes. One early suggestion was for the RCT to have their own Staff Corps, but this was refused by the Ministry of Defence. They did however agree to approach the Staff Corps about providing advice and assistance to the RCT in addition to the Corps of RE. Following a series of meetings and discussions this was agreed and not only led to the addition of transportation to the list of disciplines covered but in due course a requirement for further changes to the name and rules of the Staff Corps.

In 1984 to acknowledge the change of emphasis away from railways to a much wider range of advice and assistance, not least in transportation generally, which was to include land, sea and air

modes, the name of the Staff Corps was changed to become the Engineer and Transport Staff Corps RE(V). This decision was hastened following a visit to the Falkland Islands by the then OC and acting adjutant to see some of the results of their advice during and immediately after the campaign there. The troops were very sceptical and sarcastic about the need for a railway unit to visit the islands!

Currently the Staff Corps appoints and retains officers in the following general disciplines: roads and bridges, ports and harbours, airports, water and sewerage, structural engineering, railway engineering, railway operations, geotechnical engineering, petrol and oil engineering, electrical and mechanical services, electricity generation and distribution, transportation and logistics. The Staff Corps through its members and organisations covers other fields such as management, architecture, quantity surveying, construction plant, training and health and safety.

Pro-active developments

In 1982 the incoming OC was an energetic and enthusiastic civil engineer, deputy chairman of British Rail and a president of the Institution of Civil Engineers. If he was to be associated with anything it needed to justify its existence; the Corps was to be no exception.

Although the Staff Corps had been giving advice and assistance to the RE it was not very frequent and reactive only. In fact when the incoming acting adjutant was appointed in 1983, having asked how much time it would take up, as he was still active in his profession as were the other members of the Staff Corps, he was advised that providing he had a good secretary there was not a great call on his time! The new OC had other ideas; the Staff Corps was to be pro-active.

First, a pamphlet had to be produced to tell those in the Ministry of Defence, the Corps of RE and the RCT about the Staff Corps and what it could do. Second, two liaison groups were to be set up, one with the RE, the other with the RCT. Third, he proposed an additional meeting or seminar for all members of the Staff Corps in April.

The liaison groups were to comprise about four or five members of the Staff Corps expert in engineering or transportation issues respectively, under the chairmanship of a colonel but to include majors, who had up until then been comparatively passive members of the Staff Corps. The main terms of reference were:

- to consider how the combined expertise within the Staff Corps could best be applied to assist the RE/RCT with identified problems,
- to discuss with the RE/RCT the development or extension of new techniques which might have application to the operations of the respective Corps.

To do this the liaison groups were to meet the RE/RCT at least twice a year.

The work of the liaison groups started with meetings which took the form of explaining the expertise available within the Staff Corps and understanding the concerns or problems of the RE/RTC; however, the liaison groups soon began to justify their intention.

Contact with the RE had been a routine matter and generally problems were addressed as they arose. However the increasing demand on the RE for more conventional engineering advice and assistance, in both support and reconstruction roles, saw them calling for advice on civil design and on-site construction practice; this included a call for group visits to consultants' and contractors' offices in addition to individual attachments. Particular fields of interest on which advice was sought included the rapid assessment of strength of structures, geotechnical matters, plant suitability and procurement, applications of information technology, environmental issues especially pollution survey, water treatment and processing, energy conservation and health and safety at work. The EinC also requested the formation of a panel of visitors to review the organisation and operation of the Military Works Force and, later, advise on the organisation of Defence Works Services following the reorganisation and privatisation of the Property Services Agency.

It seems that the concept of liaison groups could not have been timed better, as the onset of their activity also coincided with significant changes in the organisation and scope of activities of the RCT and later the Royal Logistic Corps (RLC). These corps have derived their benefit through an ongoing series of seminars on topics they have selected. These seminars have included subjects such as contractorisation, fuel supply in the field, information technology for financial and budgetary control, the training of transport and distribution managers, performance indicators, use of rail transport, freight distribution, port operating, the hub system of distribution, warehousing, asset tracking, supply chain management, petroleum distribution, shipping and partnering with industry. These have

included or been based on visits to the military port at Marchwood, a major retail distribution depot, an express parcel and distribution depot, an oil refinery, the Channel Tunnel terminal at Folkestone and Dover harbour. Advice has also been sought on the impact of rail, bus and air transport deregulation and privatisation.

The liaison groups have prompted some very complimentary remarks: a former QMG who attended an early seminar given by members of the transport liaison group to senior members of the RCT, wrote "...we are indeed truly lucky that we have the support and ready advice that is on offer from the Engineer and Transport Staff Corps, the members of which are men eminent in their respective professions. May I, therefore, take this opportunity, as the Army Board Member within whose review lie the activities which are most relevant to the service your Corps gives, to express our profound thanks for all that you do for us, which is so freely given too. Long may this association flourish!" Again a couple of years later the next QMG wrote "Thank you for inviting me to your seminar. I thoroughly enjoyed the day. I must say I thought the whole exercise very well worthwhile and that a number of very useful points came out – especially during the discussions on contracting in or out. In fact I thought a lot of what was said was relevant to all our contracting operations and not just in the question of administrative transport. I must say the Staff Corps is a most extraordinary organisation and one which it seems to me we are very lucky to have. I am so glad you have found such a good way for the Army to benefit from them."

Apart from the special activities mentioned in the next section, the more routine role of the Staff Corps has continued and advice has been sought and given on such varied subjects as the specification and procurement of temporary accommodation units for use worldwide, the reuse of portakabins in exposed locations, repair of earthquake damaged structures, architectural advice on the new RE Museum, an RE dinghy park and slipway at Plymouth, cleaning of fuel tankers, refurbishing an old steam engine for the Imperial War Museum, field connectors for electric cables, terrain analysis, compaction plant, data processing of geotechnical information, repairs to bomb damaged structures and airfield design and layout. A long-term study of military power requirements was also commissioned on a consultancy basis.

The Falklands, the Gulf and Bosnia

No sooner had all the new initiatives mentioned above been put in train, through the acting adjutant who was by now helping with the pamphlet and was a member of both liaison groups as secretary, than the Falklands War broke out and the Ministry of Defence was in regular contact for technical advice. The phone never seemed to stop ringing! It was perhaps fortunate that the Staff Corps had been invigorated to adopt a more active role. However, apart from advice on the load classification of the existing Stanley airfield, the bulk of the requests was to deal with immediate postwar reconstruction.

This assistance covered advice on quarrying operations, design of berthing dolphins for mooring accommodation barges, wind and tidal forces on the barges, electrical problems on new diesel and switchgear installations, the electrical protection of power plants, the use of surface water runoffs for potable water supply, navigational aid equipment to be installed there and geotechnical work in connection with the new airfield.

One of the more significant tasks was the preparation of a report for the EinC on the construction of the new airfield in the Falklands. The work of the RE during the war and in the reconstruction after, had been so impressive that it was proposed that they undertake the construction of the new airfield, associated buildings and facilities. That this was beyond the resources of the whole of the Corps of RE was not recognised! The EinC needed a comprehensive report from an independent authoritative organisation to demonstrate this and indicate the way in which the task should be undertaken. This was exactly the sort of task for which the Staff Corps was eminently suited. The report, prepared by a team of experts of unrivalled experience and standing, was gratefully accepted by the EinC who was able to use it to retrieve the situation and the more usual public tendering and contracting process followed.

About six months after the war was over the EinC arranged for the OC and acting adjutant to visit the Falklands to see the results of the advice that they had been giving. This was one of the rare occasions on which members of the Staff Corps wore uniform.

In 1991 the Staff Corps was called on both collectively and individually to give advice during Operation *Granby*, the war in the Gulf. At least twelve members of the Corps, who had themselves or through their firms practical experience

in the area, provided information on a wide variety of topics including the design and construction of the infrastructure there, ground conditions, water supply, oil pipelines and fighting petroleum fires including dealing with fires in oil-filled trench defences.

After the campaign the EinC wrote to the OC to say that "this assistance was not only of direct benefit to the UK forces but helped them and particularly the Corps of RE to establish in the eyes of the allies a high degree of credibility for good intelligence, which greatly improved cooperation and relations."

More recently the Staff Corps has been called on to provide assistance to the RE serving with NATO in Bosnia. On the spot advice has been provided on the reopening of war-damaged quarries and the repair of a damaged geothermal well at the HQ site near Sarajevo.

The OC Staff Corps also visited Bosnia to see what assistance could be given. This, to a large extent, sprang from a major initiative of the EinC during 1996 in proposing a policy for Building the Peace in the aftermath of war in regions such as Kuwait and Bosnia. The Staff Corps provided assistance in developing this policy, in order to improve the advice available to military commanders in such areas during periods of hostilities and to provide opportunities for UK industry to participate in post-conflict reconstruction of infrastructure.

Increasingly concerned at the way the US construction industry obtained work through the involvement of their Corps of Engineers, the Staff Corps itself was interested to discover ways in which "UK plc" could obtain some or greater benefit from the areas in which the RE had been active, as hostilities died down and the need for reconstruction gave opportunities for more conventional construction activity. This has linked in with the EinC's initiatives for Building the Peace.

Membership and Modus Operandi

The current rules state that the Staff Corps shall consist of officers who are professionally qualified or who have particular skill and experience in aspects of engineering, management or logistics. They have to be senior members of their organisations, who not only have the relevant skill or experience, but can provide access to the skill and experience within their organisation, on which the Ministry of Defence, through the Staff Corps, may wish to call.

Nomination for membership is made by members of the Staff Corps to maintain the range of expertise requested from time to time by the Ministry of Defence, the Corps of RE and the RLC. Appointments to the Staff Corps are normally in the rank of major with promotion based on seniority and degree of active participation in the affairs of the Corps.

Members appointed to the Staff Corps are expected to respond to requests for advice and assistance received from or through the Corps of RE and the RLC. This advice is generally freely given unless it is commercially confidential, in which case it is at the discretion of the member. If the request is of a more substantial nature involving surveys, studies or reports, then, with the prior agreement of the OC and the Ministry of Defence, a charge may be made.

Communication with the Staff Corps is usually through the acting adjutant. Officers seeking advice, outside the range of their normal sources, address requests through their units to the liaison officers in the Directorates of Engineer Support and Logistic Support at HQ QMG, who review the issue and pass the query on to the acting adjutant. Depending on the nature of the question he then raises it at the next meeting of the Council of Colonels or passes it to the appropriate expert(s) within the Staff Corps who can reply through him or directly to the officer raising the question. Once such contact has been established further direct contact is permitted providing both the Acting Adjutant and the appropriate liaison officer at HQ are kept informed.

There is a potentially interesting twist in the role of the Staff Corps that follows from the privatisation of the railways. Will the Staff Corps again be required to coordinate the activities of the competing train operating companies, as it had been when founded in 1865?

A very recent development was the decision to recognise the increasing importance of logistics in military activity as reflected in the creation of the RLC in 1993 incorporating the RCT and other support corps. In November 1996 the name of the Staff Corps was changed to the Engineer and Logistic Staff Corps RE(V).

As a way of developing the active links between the Staff Corps and the RE and RLC, the Council of Colonels decided to institute an annual Staff Corps prize to a serving member of either of the two regular corps who makes an outstanding contribution or performs meritorious tasks which

would otherwise not have been rewarded or acknowledged. The first of these was awarded to Major A J Wakeman RE for his outstanding contribution to bridge reconstruction in Bosnia.

One of the most pleasurable activities is the annual dinner of the Staff Corps which has been held, with some comparatively short breaks, nearly every year since the unit was founded. This has enabled the Corps to entertain regular and territorial officers with whom they have contact and to extend each other's range of contacts inside and outside the Services. More recently, in fact since 1984, a ladies' guest night has been held every three years.

The Future

The Staff Corps is a valuable asset to the Ministry of Defence, particularly to the Corps of RE and the RLC with whom it has its main contacts. The expertise available within the Staff Corps is becoming more widely recognised, extending its advice from single local issues to detailed advice from industry affecting strategic policy issues. Where does the Staff Corps go from here?

It is to be expected that the armed services will be involved in engineering and logistic activities nearly every year somewhere in the world. History has shown that there is no pattern to the nature of the involvement and the unexpected will always happen. The reorganisation of the forces following *Options For Change* has increased the call on fewer and fewer resources and it is likely that the particular expertise available from within the Engineer and Logistic Staff Corps will be needed increasingly in the years to come.

Progress in the future is likely to be at a faster rate than hitherto. The introduction of new technology, eg the Internet with its web sites, is likely to provide further opportunities for the Staff Corps to support HM Forces through the various channels of communication being established; with increasing contact and knowledge of the role of the Staff Corps, more immediate and direct communication with members will become practicable.

The formation of the Civil Affairs Group within Land Command and the recognition of the need to address potential post-conflict infrastructure requirements at an earlier stage, could lead to a greater involvement of the Staff Corps in the future, even before deployment of HM Forces to a theatre of operations.

Support to formation commanders on the ground to achieve military objectives could well be widened to include identification of future commercial opportunities for "UK plc", by arranging appropriate representation from the Staff Corps network. The increasing importance of logistic support requirements and the speed of modern management change both in the field and support services are also likely to increase the call on the expertise of the Staff Corps.

Through its network of members the Staff Corps currently provides access for HM Forces to approximately 25,000 professionals in the fields of engineering and logistics. This expertise is nearly always provided free and always willingly. The future of this historic and august body depends to a large extent on the use made of it by the Ministry of Defence and the two sponsoring corps.

Transferable Talents

PETER DELL

Peter Dell retired from the Corps as a lieutenant colonel in 1973. From then until 1996, he held a series of senior management and consultancy appointments in various international business organizations, including Courtaulds and Ernst & Young. Throughout this period he was a Visiting Fellow at Manchester Business School. Presently, he holds appointments as a Director or Consultant and is a Visiting Professor at Durham University Business School.

THE progressive collapse of the authoritarian communist governments throughout Europe, has caused many organizations and individuals to examine their talents and then determine which may be transferable to new organizations, or different careers.

The forces of economic change, through reductions in defence budgets from the perceived peace dividend, have been seen throughout NATO, both within the armed forces and the defence industry sector. The talents that this process unlocks for a country are considerable and if correctly recognized and transferred should be of considerable benefit to both the community and the individual concerned.

The increased professionalism of the UK's armed forces since the 1960s has tended to accentuate a division between successful civilian and military careers. There has been a simultaneous increase in the precision of the respective relevant vocabularies. This combination sometimes accentuates a lack of true dialogue on common subjects, such as management. As an example my own career is accurately described as including senior management appointments in specialized military engineering units, civil engineering, textiles, forestry, service industries and consultancy, supplemented by management educational appointments at Camberley, Manchester and Durham. The use of the respective military and civilian titles for these appointments, such as officer commanding or managing director in the first group, or directing staff and visiting professor in the second can be misleading, or even, to some, daunting.

Equally the title of the "army staff college" at Camberley, or the "business school" at either Manchester or Durham University tends to imply a more specialist institution than in reality exists. Certainly the talents that these appointments require are not self evident, nor is the ability to achieve an effective transfer of the relevant talents to a new role. However some thoughtful imagination can expose some original juxtapositions.

Perhaps the principal talent that many service officers will have acquired is a combination of multi-disciplinary skills, which provide a sound base to handle a situation totally different from that to which their recent experience and training has been directed.

These skills are likely to include:

- analysis, both quantitive and qualitative;
- team development, including an ability at appropriate times to lead and play, whilst retaining overall authority;
- management of change, with a strong emphasis on achieving attitudinal change;
- risk assessment;
- anticipating the unexpected;

Peter Dell
Transferable talents p157

- eliminating the unknown, or the factor over which no control can be exercised, by assumption if necessary;
- managing stress;
- leadership in a style, from consensus through to autocratic, appropriate to the need;
- clear ethical standards;
- technical knowledge, for instance logistics, engineering and telecommunications.

This is not an exhaustive list of skills, but those selected are of great value in both military and civilian organizations. Individuals will identify their own depth of knowledge and enthusiasm against each skill, with those ranked highest being the ones that define that person's true talents. In that honing process a mentor can help both extend the range and test the objectivity and veracity of the identified talents.

There are other skills and characteristics which are more common in the civilian commercial environment which, if not recognized at an early stage by someone with a military background, can lead to conflict. Many of these are qualitative, but have a powerful psychological impact both individually and collectively, some examples of which are:

- an emphasis on potential future achievement, with brief, largely unretained, acknowledgement of past success;
- the pursuance of personal ambitions and agendas within corporate aims, with normal priority to the former;
- a dominant emphasis on financial, or other quantitative, measures of progress, rather than qualitative.

In the military environment, the concept of achieving advancement by way of promotion exam or selection hurdles to a professional level does not operate to anything like the same degree in the commercial world; indeed with reducing UK military forces, this concept is already changing in the military.

Similarly the common themes of service training which foster natural support of the overall aim, rather than the personal, tends to be replaced by, usually constructive, more individual originality, almost anarchy, in many successful commercial organizations. Many service officers initially fail to recognize, or even consciously ignore, this very different approach and thus disadvantage themselves, whilst also presenting an impression of naivety. Quantitative and financial analytical skills need to be understood and learnt, being essential additions to the appreciation and planning techniques of any commercial or military operation.

Once this skill assessment has been undertaken and expanded as widely as each individual determines, then honed into a set of identified talents, the examination of the possible ways to transfer them into a civilian career can be commenced. Clearly recognition and transfer are not discrete processes, there is a continuum throughout both the working and retired phases of a life. The acknowledgement that distinct ages make up a whole life is becoming increasingly invalid, which also sharpens the realization that each significant transition, for instance from military to civilian career, requires very long term planning to identify options, rather than an absolute route. The continuation of the enormous improvement in communications alone will ensure that each individual career in the future will contain a larger number of more varied stages than those of the past. The vast majority of professions and craft skills are unable to provide the career stability that the considerable investment in sole-role education previously afforded. Large international companies like Shell, Unilever, IBM or Toyota are unable to offer the career continuity upon which part of their earlier strengths were built. Indeed their emphasis now is on identifying the transferable talents necessary to sustain future success, which will come from both within and without the present organization. Thus individuals who analyse their own talents, then both how and where these can be transferred, will strengthen both the security of their own career and the potential corporate strength of their current organization.

A transfer into a civilian career from the military provides an almost unique opportunity for choice, which ideally should be motivated by an assessment of how much fun is to be enjoyed in the new career. The potential benefits to be considered should envelop all members of the family, who, depending upon their individual knowledge, can and should make a contribution to the decision. Just as enthusiasm contributed to a chosen military career, then that equivalent enthusiasm must motivate the next stage. An early stage of the transfer analysis should list organizations which attract an individual; the list should be eclectic and cover commercial business, government agencies, sporting organizations and charities. Subsequent research and analysis will reduce the list and identify an appropriate method of approach to employment in each organization. There are a number of

books, educational establishments and professional consultancies which can assist. However honesty with oneself is an essential strand throughout the process. This is exemplified by such detail as a curriculum vitae that presents an individual who can immediately be recognized both by the subject and the recipient, whilst the motivation for applying for a particular appointment should at least be recognized by the applicant as for career development, fun, benefit to the employer, financial necessity or some combination of these and many other factors.

These suggestions on how to recognize individual talents, then to use them as a basis for transfer from a military to a civilian management career perhaps indicate that the opportunities can be greater than imagined. Successful transfer benefits both the military and civilian employer: the former because its quality of recruitment is improved by evidence that a military element is a beneficial component in a whole career; the latter through the addition of independent, yet disciplined, leaders who expect and welcome change. Perhaps over a period of time, as the change in the foreign policy and the military extension of that policy continues to increase in both scope and speed, these transfers between military and civilian management will become more common in each direction and occur on more than one occasion for an individual. Certainly the benefit of a successful career change and subsequent development to the individual is self evident, as it provides greater confidence and personal security, thus improved competence. A fundamental aim for any new career should be that it is forward-looking, fundamentally different and fun.

Journal Awards

The Budget, Investments, Membership, Scholarship, Memorial and Publications Committee announces the following awards for articles of special merit published in the April 1997 *Journal*.

REPAIR OF SLAVONSKI BROD FIXED BRIDGE
by Lieutenant Colonel A P Burnside – **£75**

ENGINEERS AT GALLIPOLI – 1915
by GLC – **£75**

QUARRYING OPERATIONS IN BOSNIA HERZEGOVINA
by Warrant Officer Class 1 P Jackson – **£75**

GEOGRAPHIC FIELD SUPPORT TO IFOR
by Major J D Kedar – **£50**

ROYAL ENGINEERS OR ARMOURED CORPS ENGINEERS?
by Captain M D Owen – **£50**

BOSNIA BRIDGE GALLOP
by Warrant Officer Class 2 A D Pearson BEM – **£50**

The History of The Future (As We Knew It)

WARRANT OFFICER CLASS ONE C J MORTLOCK MIMGT

Warrant Officer Mortlock took up the post of Senior Military Instructor at the Centre for Defence Analysis (Land) at Fort Halstead, Kent in February 1997. On joining he worked for the Divisional War Game (DWG), but found that this was to be disbanded to rise Phoenix-like under another name at sometime in the future. He awaits the result of the reincarnation with confident expectation.

"On the battlefield of the future, enemy forces will be located, tracked and targeted almost instantaneously through the use of data-links, computer-assisted intelligence evaluation and automated fire control. With first-round kill probabilities approaching certainty, the need for large forces to fix the opposition physically will be less important. I see battlefields that are under 24-hour real or near real-time surveillance of all types. We will be able to destroy anything we locate through instant communications and almost instantaneous application of highly lethal firepower."

– General William C. Westmoreland, US Army Chief of Staff, 14 October 1969.

The History of Fort Halstead, Sevenoaks, Kent...

The Fort's history can be traced back to the 1890s when it formed part of the plan for the defence of London, described in: "Handbook for the Defence of London" issued by the War Office in 1903.

As a direct result of a paper written in 1886 by Major H Elsdale RE, entitled: "The defence of London and England", the idea came about to have a committee for the defence of London. The chairman of the committee was Major General Sir Andrew Clarke, GCMG CB CIE (late RE) who was, at that time, the appointed Inspector of Fortifications. The committee recommended a defence line along the North Downs from Guildford to Fort Halstead, then up to Dartford and north of the Thames to the North Weald. It was proposed to build a series of storehouses which would form *points d'appui* for a series of forts to be constructed if the need arose. In 1889 the acquisition of the sites was approved and in 1890 another committee was appointed to produce maps and plans for the forts and the manning of them by regular and volunteer forces.

By 1903 the whole subject of the London defence positions was under review. With the Royal Navy in command of the seas at that time, an invasion of the country seemed unlikely, and a change of government in 1905 saw the whole scheme swept away.

The construction of Fort Halstead, however, had been completed in 1897, and it remained War Office property until purchased by a retired army officer in 1922 to be used as his residence. The War Office repurchased the Fort in November 1937, when its role in research started, being used mainly by the experimental branches from Royal Arsenal, Woolwich. The history of the Fort as an experimental station has continued ever since.

The postwar years brought many changes to the work carried out at the Fort. It was here that development of Britain's first atomic bomb was carried

WO1 C J Mortlock
The history of the future p160

out and due to the success of this project the Atomic Research Establishment was set up at Aldermaston as a separate entity.

Today the Fort remains the focus for tri-service weapon systems research as well as being the home for a number of other DERA (Defence Evaluation and Research Agency) organizations, one of which is the CDA(Land) (Centre for Defence Analysis (Land)).

... And the Facility Known as the Divisional War Game

CDA(Land) had within it a facility known as the Divisional War Game (DWG).

The actual history of war gaming within Fort Halstead can be traced back to 1956. A model (on a scale of one inch to 100 yards) was built to study the effects of antitank weapons. It was based on an area of ground to the west of Fort Halstead. The use of real ground as the basis for the model allowed weapons to be sighted using the real ground and then placed on the model for study. It was during this period that battles were fought using hand-placed units, very much like the battle group trainers that are around today.

The first computer was introduced into the Fort in the 1950s. It was called AMOS, and was only allowed to work 50 hours before it required 15 hours maintenance. By this time the war games was housed in a purpose-built room with separate areas for opposing commanders. A further two models had been built featuring an area of divisional size of over 24 square miles (a far cry from the less dense battlefield of today's plans).

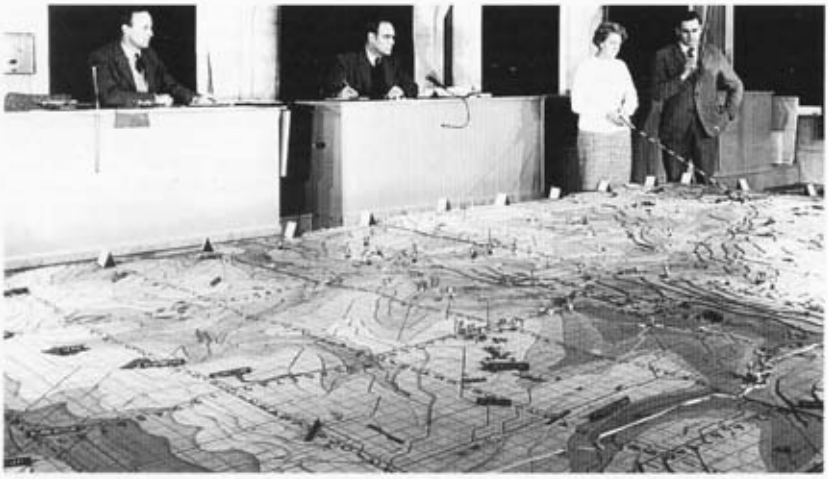
The rules for playing the game by hand had been written, and inroads had been made into employing AMOS as a facility to speed up the deployment process. The programme for the computer was based on the rules for a game of chess and draughts, and consisted of three parts: the board, pieces and the programme. The board was to be based on 128 squares per side as any more would be "inconvenient". The game was expected to move at 15 to 20 moves per minute and was fashioned so that "draught-like play would lead to total destruction of a unit, while chess-like play would allow the chance of escape for a unit".

No strategical concepts were taken into account, the "best" or "right" moves were entirely dependent on the assessment of a specialist advisor. Time was not taken into account during the early stages of the programme because "Strategically important objectives may be tactically unattainable because the (computer) operation would be too slow to succeed against the best defence".

By 1958 the game was being modelled on the Army Operational Research Group model, but aimed at a lower level such as battalion actions. The following year the computer was programmed to take into account the intervisibility between two points on a digital map. The war game had developed to a point of being useful in the assessment of antitank guided weapons which were being developed at that time. Up to this time, all the models had been based on land within the shores of Great Britain, but now ground models of British Army operational areas in Germany were developed. The threat of a war in central Europe was used as a planning tool and with that the war game was used for planning the deployment and use of low-yield nuclear weapons on the battlefield. The use of these weapons was soon voted out, however, because of the difficulties of command and control of units using them on the battlefield. One of the problems which had to be overcome was to prevent the game from becoming too complex and therefore inhibiting military realism.

In July of 1965, the MOD placed a contract with a firm called Arthur Anderson & Co from London, to carry out an in-depth study of the ways in which the game could be speeded up using more up-to-date computers. The report was extremely detailed and came up with costings for various configurations, prices ranging from £260,000 to £530,000 for the main frame and software, with an extra £50,000 to £100,000 for the display equipment. The report also covered the manpower requirement to set up and run the game on computer. It allowed eight to ten man-years to develop the software and install, set up and run the computer, with wages ranging from £2000 per man per annum for staff from RARDE (Royal Armament Research and Development Establishment) or £5/7500 per annum for a consultant team and a final bill of £20/30,000 for a system analyst and programmer for two years. The report must have been convincing, for in March 1966 a letter was written accepting the proposals and giving the go-ahead for the work.

The War Office placed significant importance on the role of the war games in future planning, so much so that a special team of military players was attached full time, with other officers being attached to act as opposing commanders. The original senior officer of the games was an artillery officer, but after a request from the senior scientific officer of the establishment at that time, for an officer who



Early war gaming, with controllers and staff manually moving the division.

was good at logistics, defence, tactics and overall planning, a Sapper officer was appointed. That officer was Brigadier P J M Pellereau, and he took over as the senior military officer in the spring of 1970.

On appointment, Brigadier Pellereau noticed that the attached officers were somewhat "bloody minded" to the task in hand because they had to travel to the Fort daily as no accommodation was available. He instigated the "mouse holing" of two military quarters into one, and the officers mess was born and christened "Armstrong House". The officers now had somewhere to stay, other than the local pub, to discuss the finer points of war gaming!

In the background, work continued to develop a computer with software capable of running war games for all arms. In 1971/2 the first experimental game was played by two Gurkha Sapper officers, Lieutenant Colonel John Edwards and Lieutenant Colonel Gil Roach. The game was designed to research the barrier and mine problems encountered in the European theatre of operations. The use of remotely delivered mines (RDM) by gun, aircraft or layer was explored, and Lieutenant Colonel Gerald Napier was posted to the Fort in 1971 to assist in this.

Use of RDMs was bounced around as early as 1951, but it was twenty years later that the first RDM system was developed at the Fort, and was demonstrated in 1972 during a visit by the Queen. The concerns regarding accuracy and recording of RDMs were as important then as they are now. One idea put forward was to colour the mines: green for the spring, summer and autumn, white for winter, with a red coloured mine to be laid in conjunction with one of the other two colours as a sign to indicate that a RDM field was in the area.

The work to install a computer in DWG was completed in 1976 and the first fully computerized war game then took place. Unfortunately, the computer used was still also the computer used by every other department in the Fort. During a game series, all other work had to cease to allow the computer to deal with game commands. It wasn't until 1980 that the war game department had its own computer and work in the rest of the Fort could carry on as normal (much to the delight of the people who did and didn't work in the department.)

It is interesting to note that the Americans have not always been leaders in the use of computer technology for battlefield simulation. They did not have a research game equivalent to ours, and in 1980 a copy of the series was sold to them.

The Present

The DWG was a well established but old computer-assisted facility, used to support mainly land-based studies and the synergy of new and developing military hardware systems. The game

The history of the future p162

was played by permanent military staff as well as all ranks from the Regular Army Assistance Tasking (RAAT). It has been invaluable as an operational analysis tool to explore the concepts, tactical doctrine and use of present and future equipments.

DWG worked towards the future, usually looking about 10 to 15 years ahead. The last computerized game was able to be based on many different areas of operation including in the desert or on mainland Europe. During a full series of games (five), it was hoped to achieve about 20 to 25 hours of simulated battle, fought by military staff with scientific advice where necessary. The conflicts were conducted under closed and free-play conditions. This allowed commanders to manoeuvre the relevant forces having to rely on information obtained from the "models" of the appropriate equipment programmed into the computer. The players made the tactical decisions and controlled and commanded the units through a menu-driven interface system. The computer executed orders and assessed the effects. The permanent military staff acted as game controllers providing continuity to both sides, umpires on "unfair play" decisions as well as advisors on the operational capabilities of the equipment and unit organizations. The role of visiting players was to act as the staff at divisional level, commanders at brigade and battle group level as well as commanders of individual units with special-to-arm roles.

At the time of writing, the last serving engineer officer attached to DWG for the last series of games was Captain Jon Roose of 32 Engineer Regiment. He acted as the CRE, CO of one general support, and three close support regiments of the View 1 Division. Should do his promotion prospects no end of good!

The DWG provided a flexible and useful post-game analysis service. Each series was presented in a fully documented report containing a wealth of information on lessons learnt and topics addressed. Additionally the permanent military staff gave presentations to Deputy Directorate of Operational Requirements, Assistant Chief of the Defence Staff Operational Requirements (Land Systems) and other dignitaries. Out of the reports came various papers written by the scientific staff of DERA to support studies or procurement bids. Examples of post game analysis are:

- Support to the Fibre Optic Missile programme.
- Studies concerning the new recce vehicle – Tracer.
- Employment and control of Aimed controlled effect antitank mine and Area Defence Weapons.

Engineer Systems

With CDA(Land), a team of scientists and engineers is responsible for operational analysis relating to the Corps. Formally set up as a unit in 1986, it is responsible for analysing every aspect of battlefield engineering. The staff try to maintain close ties with the Corps and have in the past deployed with units on training exercises as well as operationally. They have full access to all departments and agencies dealing with the functioning of the Corps. The mission statement for engineer systems (ES), includes carrying out studies on mobility, countermobility and survivability on the battlefield, of all Sapper equipment as well as the deployments and tactics used for the employment of these equipments. An excellent example of work that the team carry out was seen during the Gulf War. It was during the build-up to and during the conflict that the ES used manual war gaming to work on obstacle crossing and breaching procedures and techniques for the Allied forces.

In the past the ES team has carried out studies on the following:

- Military bridging.
- Future mine systems.
- Breaching of obstacles.
- Identifying the requirements for future armoured engineer vehicles such as the Future Engineer Tank and the replacement for the combat engineering tractor – Terrier.
- The requirement for mine countermeasures.
- Sustainability.

It is also responsible for international liaison in these areas; and with studies on the effectiveness of future equipment, carrying out combined operational effectiveness and investment appraisals for the procurement executive.

The Future

As can be seen, the Corps has had a long historical connection with the Fort. The work carried out here by civilians and members of the Corps for the Corps is varied and enjoyable. DWG as it was known, has come to the end of its working life. More modern and dynamic processes to achieve the same result are to become available for the development of future doctrine, tactics and equipments. In the past DWG with the aid of ES, has produced some outstanding contributions to the effectiveness of the Corps as a combat support arm, and with the introduction of new technology, CDA(Land) will continue its excellent work.

For Once I Got It Right

MAJOR D A GOOD

THE article entitled "Actions Speak Louder Than Words" published in the August 1989 edition of the *RE Journal* (Volume 103 Number 2) described an incident in the life of a sapper subaltern during the advance of the XIV Army into central Burma at the end of 1944.

The story opened by illustrating the advance of the divisional armoured column from the river Chindwin and recorded the fact that the column moved along the bed of the river because the majority of the bridges on the road or track were not of the required load classification. I quote from the article " ... However they (the bridges) would not take the weight of the medium tanks and therefore a diversion had to be made around each one before the advance could continue. Very quickly it was appreciated that the armoured column could motor along the river bed and under the bridges instead of over them. The monsoon was long past and the chaung was dry with a firm sandy bottom".

It may be of interest to record an incident which helped to determine the decision to move the tracked vehicles from the road to the river bed.

A day or two after the breakout from the Chindwin I was acting as RE recce officer for the column and was leading it in my armoured car. My main task was to check for mines on the road and to assess any other road blocks or hazards.

In due course we reached a bridge spanning the river. This was of similar construction to the majority of bridges on that stretch of road and consisted of piled timber trestle piers with timber road bearers and decking. I halted the column, measured the road bearers, consulted my RE Pocket Book, and tried to remember what I had been taught at the Officer Cadet Training Unit some months previously. My calculations indicated that the bridge met the required load class and so with fingers crossed, I lead the column over it without mishap.

Shortly we arrived at a second bridge of similar span and again we crossed without any problems.

In the early afternoon we reached a third bridge with road bearers of the same diameter but much longer unsupported spans. In this case it was clear that the bridge would not support the weight of the tanks and so I reported to the column commander that it would be necessary to construct a diversion. I signalled for my working party to move to the head of the column but this was a slow business. The tanks on halting had remained in the centre of the road, and my Sappers with a bulldozer had difficulty in passing them.

The brigade commander appeared to have no such difficulty, and arrived at the bridge site in very short time to ascertain the cause of the delay. I explained the situation to him but he could not see the problem. He was aware that we had already negotiated two bridges successfully and failed to see why we could not cross the next one. I waffled on about bending moments and unsupported spans but these terms meant even less to him than they did to me.

The brigadier's instructions were clear – namely to press on with all speed to catch the enemy off balance (a popular phrase in those days and no doubt still is). Further, he visualized that any unnecessary delay could jeopardize the award of his DSO. He made a quick appreciation (he was staff trained) and ordered the advance to continue over the bridge.

I was in a slight quandary. I had no desire for the advance to be delayed. To date it had been proceeding rather like a fox chase. On the other hand I did not want my engineering "expertise" to be held up to ridicule as this would have reflected not only on me but on the divisional Sappers as a whole. I need not have worried.

The leading tank commander, a young NCO in the Carabiniers, like the brigadier was also keen to press on. I doubt if he was thinking of a bravery award but he did realize that "brew-up" time was approaching and he wished to reach the leaguer before dusk. Consequently he instructed the driver to "step on it".

The bridge abutment was a few inches higher than the decking, probably because the trestle bents had sunk over the years. The tank took off from the abutment, landed on the decking and went straight through into the river bed below. The brigadier turned away and I seem to remember him muttering something to the effect that you win some you lose some. I continued to mark out the diversion.

It was as a result of this incident that the CRE advised that the advance should continue along the river bed.

I was left with one final impression. The Carabiniers like all good regiments, believed that there was no merit in being uncomfortable when with a little effort they could improve their condition. Therefore the tank crews had fairly luxurious bedding rolls, complete with camp beds made in the regimental workshop or more likely liberated from the transit or convalescent camps in Imphal. These were strapped to the outside of the tanks during moves. In the case of the leading tank the bedding rolls were ripped clear as it fell through the shattered decking and were deposited in the river below. Although in the main the river was dry, at the site of the bridge which was on a sharp bend in the river, erosion had created a hollow which was still full of water. Into this water the bedding cascaded. The infantry which had been detailed to act as close bridge garrison during this episode had crept forward to see the fun and raised a happy cheer. Their bedding consisted at best of a monsoon cape or ground sheet.

50th Anniversary Articles

The Editor of the *Journal* would be pleased to receive articles from anyone who took part in projects during the aftermath of WW2, or have something interesting to relate of happenings during the years 1947/48, with a view to their publication on or near to the 50th anniversary of the event. Accounts of later events are also welcome as they can be kept for publication in the appropriate issue.

Who Knows Wins

KETAN PATEL

Ketan Patel, a partner in the international advisory firm KPMG Management Consulting, specializes in advising the leaders of major businesses on how to transform their organizations.

Graduating from the London School of Economics in 1983, Ketan worked and trained with Hewlett-Packard for three years, and studied for a Master of Business Administration degree before joining KPMG Management Consulting as a consultant.

Ketan has been a speaker on the subject of corporate performance improvement. He has also long been fascinated with the mind of the strategist and the principles that lead to success. In order to make these ideas accessible to a wider audience, in his book "Who Knows Wins", Ketan combines the lessons of modern-day business strategists with those of great ancient military strategists.

[A copy of the author's book "Who Knows Wins" is held in the Corps library.]

WHEN one considers that a central role of any Chief Executive Officer (CEO) is to secure victory for an organization, and that a general's responsibility to his troops is the same, it is not so strange that successful businessmen of today are often compared to accomplished military leaders and strategists of the past. As markets become more global, the lines between the art of warfare and the art of business are becoming increasingly blurred. And for the individuals with ambition and drive, managing a large-scale business in a competitive environment is the modern-day alternative of a high level career in the military. To succeed in this increasingly competitive arena, business leaders, like accomplished military men of the past, are rising to the strategic business challenges that face them. And, for those whose companies are struggling, the battle is becoming more intense.

Research conducted into the success of great military strategists shows that their success owed much to meeting, superbly, six challenges. An extensive media examination of companies shows that these are also the six crucial issues or challenges that face every CEO:

- Understanding the role of power and influence in victory;
- deciding how to benefit from and become the architect of macro-change;
- developing insight into the capabilities and flaws of an organization, its rivals and its competitive battlegrounds;
- ensuring fights are chosen that can be won and winning the fights that are chosen;
- learning how to dictate the movements of rival organizations as well as developing strategies to guide your own company; and
- drawing up an agenda to lead an organization to victory now, and to get to the future first.

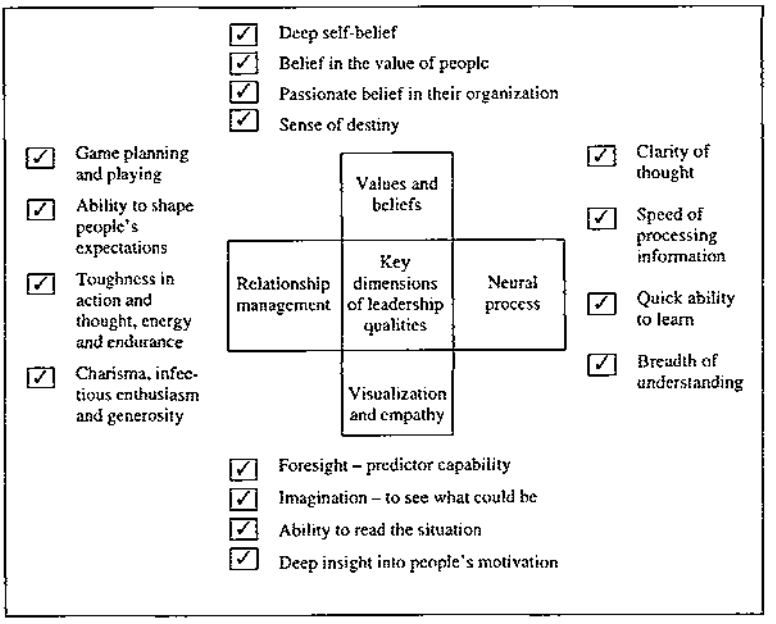
As in most military campaigns, the basic factor that dictates success or failure in these areas, is the leader and his or her leadership qualities. No matter how knowledgeable, a CEO needs to have a strongly-developed mix of four critical character dimensions if effective action and profitable results are to be realized by the organization (see key opposite).

In order to turn these qualities into achievements, the possession, utilization and control of information is fundamental. However, being in command of strategic knowledge is not a new concept. Military leaders throughout history have been faced with similar challenges in order to meet their goals of obtaining leadership and power, and the techniques and strategies they have used to achieve these objectives can provide business leaders of today with useful lessons and insights.

Challenge 1: Understand the role of power and influence in winning. For any CEO, it is crucial to recognize the role of power and influence in

Ketan Patel
Who Knows Wins p166

winning, brilliantly demonstrated by Alexander the Great (356-323BC) during his military campaigns. Alexander was one of the most triumphant and strategic of military leaders. His campaigns demonstrate that he was totally aggressive in attack, a master practitioner of the first strike, a clever user of surprise and innovative methods. Alexander's success owed much to his understanding of the use of power and influence. Alexander's pursuit of King Darius and conquest of the Persian empire shows an excellent example of the use of power to conquer and the use of influence to win, that is, win the loyalty and commitment of the conquered.



Key leadership qualities.

Early in 334BC, Alexander took his army into Asia Minor. He led a relentless campaign against King Darius in which he destroyed three Persian armies, broke up the Persian fleet, occupied the Persian capital and pursued King Darius to a death at the hands of his own men. Having conquered Persia, Alexander set about winning over the Persian people. This was achieved by honouring their Royal family, making an ally of King Darius's brother to quash Darius's assassins, taking Persian princes into his inner circle of companions, reappointing Persian rulers who surrendered in return for loyalty, ruling justly and adopting visible and distinctive elements of their culture, such as the Persian dress style. Alexander had the vision to perceive that, if he could break down prejudice, two great civilizations could cross fertilise to create a greater future. He knew that the way to achieve this end was through influence not force.

Alexander's use of power and influence in his treatment of Persia is akin to the takeover of a business and its post-acquisition integration and assimilation. Whilst the former may require the use of aggression the latter requires tact and diplomacy. Abuse or misuse of power would result in resistance, non-cooperation, loss of key resources and assets, diversion of leadership time in containment and perhaps final disposal at a loss.

Like a military leader, the first area of information that is vital to CEOs is to understand the role of power, influence and knowledge operating *in* an organization, both at an internal and external level. Allies, rivals and stake holders must be identified quickly, and their ability to aid or inhibit the company's activities needs to be assessed and dealt with before strategic moves are made. The organization needs to appreciate the vital importance of intelligence in feeding this understanding. Finally, strategy, as well as planning frameworks, should be created to utilize this information.

If this responsibility is not successfully discharged, leading an organization becomes difficult and others with less imagination and capability but greater power, will come to dominate. Knowledge becomes the crucial factor in placing the CEO in a position to exert the desired influence, and as Machiavelli said, " ... whether it is better to be loved than feared, or the reverse. The answer is that one would like to be both the one and the other; but because it is difficult to combine them, it is far better to be feared than loved if you cannot be both," *The Prince*.

Challenge 2: Benefiting from and becoming the architect of macro-change. "We are not fit to lead an army on the march unless we are familiar with the face of the country – its mountains and

forests, its pitfalls and precipices, its marshes and swamps" wrote Sun Tzu, Chinese warlord and military strategist of the fifth century BC, in "The Art of War". Although knowledge about your rivals is vital, it is equally important for a CEO to understand how the macro-environment, or external forces, affect an organization. Gathering information about these factors places the CEO in a position to channel the macro-environment's influence in a productive manner, rather than being controlled by them. Napoleon Bonaparte (1769-1821) in his military career succinctly illustrates how to turn external forces to advantage.

When Napoleon took over the leadership of France, the country was suffering from a lack of social unity and many of its populous were heavily influenced by the external religious authority of the Roman Catholic church. Rather than accepting this situation, in 1802, Napoleon attempted to channel the Catholic authority into his strategic vision of France by using the Concordant agreement with Pope Pius VII. Despite having little time for the intrinsic tenets of Catholicism, Napoleon recognized that it was useful as a social bedrock and could be used as a political tool. In effect, the Concordant turned bishops and priests into salaried administrative servants of the state and kept them comfortably under Napoleon's authority.

The Concordant also greatly helped to reconcile the mass of the French people with the consular regime and later fortified the sanctioning of an hereditary empire. It further aided Napoleon in his pacification of continued sporadic insurgences in Vendee, and by officially permitting other religions to be legally practised, Napoleon was able to negotiate agreements with the Jewish communities, thereby, extending his control of the powerful religious organizations in France and Europe.

So how can Napoleon's military tactics be applied to the business world? Many companies believe that all too often, the results of their planning and strategic moves are out of their control. However, monitoring external forces allows an organization to decide whether it can shape the forces themselves, anticipate the impact they will have and seize new business opportunities, or merely minimize risk. Capturing this information is central to the process of turning a business from being the passive victim of a game that is beyond their control, into a modifier or controller of macro-level forces.

A current example of an external development that is affecting many organizations, is European and Economic Monetary Union (EMU). A recent survey, conducted by KPMG Management Consulting, revealed that four out of five of Europe's top companies have not estimated the costs of adapting to EMU, and only eight per cent have allocated a budget to deal with the changes. It appears there are likely to be many casualties from EMU and therefore opportunities for other companies who plan how to tackle the necessary changes. Disruption will give prepared organizations the opportunity to change the nature of the game whilst rivals merely struggle to bring their systems in order.

Challenge 3: Detecting the strengths and weaknesses in your own and your competitors' organizations. Using knowledge about yourself, your rivals and your relative competitive positions in the wider market, is a central concern for all CEOs. Lack of information about competitors, for example, is one of the reasons why many companies are failing to improve their market share.

Sun Tzu also echoed the necessity of organizational assessment in his book. "If you know your enemy and know yourself," he wrote, "you need not fear the result of a hundred battles. If you know yourself and not the enemy, for every victory gained you will also suffer a defeat. If you know neither the enemy nor yourself, you will succumb in every battle."

One of the areas Sun Tzu recommended as of vital importance to the state, was the use of spies to procure information about a rival's movements. Sun Tzu divided spies into five categories in order to gain foreknowledge about enemy activity, intentions and capabilities. Using this method, Sun Tzu advised on how to be in a position to prevent surprise attacks and also pre-empt an enemy's moves.

In the business world of today, the use of "monitors" (the contemporary corporate version of Sun Tzu's spies) continues to play an essential role in keeping an organization informed of its competitor's activities. By drawing on mediums of communication, a CEO becomes equipped with a strong weapon of both attack and defence. These include:

- local agents, who are used to make contacts and assess the market place in unknown environments. These agents can quite legitimately gather published and physical evidence of a competitor's movements as they are not employed by the rival organization;

- consultants, who from their interaction in the market place are able to provide up-to-the-minute information on what is happening; and
- the media, which can be used to pass both information and misinformation.

A clear and timely understanding of the capabilities and flaws of an organization and its position relative to rivals, will enable the CEO to decide which products, customer segments, geographic locations and businesses to attack, and which to avoid. The creation and use of comprehensive information networks enable such opportunities to be seized, as well as information to be passed onto rivals to shape, or misshape, their expectations. More importantly understanding this factor enables CEOs to defend what they have effectively, and gather information to plan for future actions.

Challenge 4: Choose fights that you can win, and win the fights you choose. Businesses are faced everyday with an enormous array of opportunities to attack, defend and retaliate. If leaders attack smaller rivals who are ultimately no real threat, they will waste valuable resources and may even inadvertently provide publicity to rivals who have no public profile. Companies must attack attractive targets convincingly, defend themselves from serious threats and retaliate ruthlessly to teach challengers a lesson. Genghis Khan (c1162-1227) was a master strategist in this area and his defeat of the Naimans is a perfect example of how to win the fights you pick.

Before commencing attack on the powerful and "sophisticated" Naimans, Genghis Khan carefully measured his enemy's resources, terrain, approach and situation against his own army's capabilities. Although the Naimans and their allies were better equipped and significantly outnumbered Genghis's forces, the Naiman army did not have the same iron discipline, nor its leader the same control or confidence as was seen on the Mongol side.

Due to pressure from his lieutenants, the *Tayang* (Naiman king), was shamed into a premature and disastrous confrontation with Genghis's forces. The Mongols responded to this surprise hostile move with a swift, aggressive attack; having assessed the Naiman's weak position, Genghis Khan was able to decide how his troops should move in order to win. While defending the flanks that the Naimans assaulted in the foothills, the Mongol army went on to attack the centre of the enemy forces. Spreading wide in a broad fan, Genghis Khan's troops encircled and intimidated the Naiman troops, and once enclosed, slaughtered them without mercy. Victories such as this ensured that Genghis Khan's reputation always went before him and inspired fear in the hearts of potential rivals. His attacks were uncompromising and his retaliation ruthless. He planned meticulously, ran a highly disciplined team and used a wide array of spies and informants to enable him to win the fights he chose.

The business lesson that can be learned from the example of Genghis Khan's military actions is simple: the CEO needs to make clear and often tough decisions to ensure the company selects fights that it can win and wins the fights that it picks.

One of the critical factors that affects the outcome of planned strategic moves such as these, is timing. Once appropriate action has been decided, it should be implemented quickly and effectively, so opportunities can be seized along the way. Depending on the situation, the challenge for a CEO is to assess a rival organization's weaknesses in comparison to his or her own, such that combat is not required to secure victory. If combat is unavoidable, the CEO must pick fights that can be won by leading bold attacks, creating unassailable defences and delivering crippling retaliations. Without this determined approach and careful assessment, maintaining your position as a serious player in the market and a leader with direction, is almost impossible.

Challenge 5: Dictate the movements of rival organizations and develop strategies to guide your own company. "When the enemy attacks, remain undisturbed but feign weakness," wrote Miyamoto Musashi (1584-1645) in his work *A Book of five Rings*. "As the enemy reaches you, suddenly move away indicating that you intend to jump aside, then dash in attacking strongly as soon as you see the enemy relax. This is one way to forestall him."

If an organization can only respond to obvious competitor moves and market developments, then it still leaves itself open to attack from rivals who use unconventional and unpredictable tactics. For CEOs, it is critical to ensure that the organization is lead beyond the battle at hand, and that creative, flexible responses are employed towards new threats or opportunities.

Miyamoto Musashi was the most famous sword master in Japanese history and one of his

major strengths was his fast response tactical manoeuvres. After beating Yoshioka Seijiro, Musashi was challenged to a duel by Seijiro's son, Hanshichiro, who was not yet in his teens. Suspecting foul play, Musashi arrived at the meeting place before the appointed time and waited in hiding for young Hanshichiro to come. The boy arrived with a party of well-armed retainers, determined to kill Musashi whatever the result. However, the sword master remained concealed until the party was ready to leave (believing Musashi to have reneged on his challenge), then leapt from the foliage, cut the boy down and hacked his way through the other soldiers to escape.

Apart from displaying the importance of quick thinking, the example of Musashi's tactics demonstrates how anticipating the moves of your rival in changing circumstances are vital, as victory in one market will not ensure a similar result elsewhere. Competition is not static and diverse tactics and approaches will need to be adopted. Collusion and alliance where available can be used to multiply an organization's resources, and CEOs will need to develop their analytical skills and insight to interpret information effectively about a rival's psychology and the nature of the environment where that business is competing.

Challenge 6: Creating a winning agenda. The final challenge that faces all CEOs is to draw together the previous five challenges, and establish an agenda that will lead an organization to victory.

There are five items on the winning agenda:

- Establishing a case for change; regarding the business environment, the organization, its rivals and relative position.
- Developing the vision and goals for the organization; its purpose, strategy and tactics.
- Establishing a clear programme of change for delivering the vision and goals; this requires an action plan for realizing the blueprint of the future.
- Monitoring, steering and fuelling change so that an organization continues to realize its ambitions and aspire to new glories.
- Developing one's self; the CEO must strive to understand, develop and renew himself if he is to do the same for the organization.

In order to create and sustain strategic advantage in today's market place and create the markets of the future, all six challenges discussed need to be successfully met by the CEO.

The leadership qualities and attributes a CEO possesses are profoundly important, and regularly dictate not only personal success, but organizational prosperity. Empowerment, teamwork and corporate culture are only made productive and successful through visionary and purposeful leadership.

It is clear that businessmen can learn many lessons from the examples and ideas of military leaders, and those who would once have been interested in battlefields now operate their strategies from the boardroom. Despite changing circumstances and the advent of new weapons and technologies, the battle of business is still based on ancient principles.

Memoirs

MAJOR GENERAL D R CARROLL OBE

Born 2 January 1919, died 9 November 1996, aged 77.

Soon after Derek Carroll retired from the Army in 1973, his friends and former colleagues were surprised to see newspaper headlines proclaiming "General drives buses", accompanied by photographs of him in his driver's cab and a quote from his local bishop applauding his choice of post-service career. His passionate love of all forms of transport, which had influenced his military career and personal life, thus became public knowledge.

At the age of 12 he had driven an Austin 12 from London to Brighton; railways, model and real, were his lifelong hobby; offshore sailing in 100-square metre yachts was his enjoyment; gaining his private pilot's licence added aircraft to his repertoire. As soon as he retired, he satisfied his long-held ambition to drive a double-decker bus.

Carroll was a fiercely independent man with a far from orthodox military background. His sense of humour and light-hearted approach masked his perfectionism and his total dedication to soldiering. He enjoyed life to the full, but expected his officers to deliver, and refused to tolerate incompetence.

Leaving Cardinal Vaughan School in London at the age of 14, he became a dispatch clerk in the East London Rubber Company in 1933, before training as an architect at the North London Polytechnic. He joined a firm of architects in 1937, and two years later, as war seemed imminent, he enlisted in the Territorial Army as a trooper in the Middlesex Yeomanry. At the outbreak of war, the regiment was converted into the divisional signals of the 1st Cavalry Division in Palestine.

Transferred as a lance corporal driver/operator to Egypt in 1941, he drove armoured command vehicles in the 7th Armoured Division and the 22nd Armoured Brigade throughout the desert war, surviving the great tank battles of 1941 and 1942. Thanks to his architectural background, he was given an emergency commission in the Royal Engineers in Tunisia during March 1943; he fought throughout the Italian campaign with 42nd Field Company RE in support of 201st Guards Brigade.

When the war ended, he was granted a regular commission, and after attending the Staff College held a series of major's regimental and staff appointments for the next 17 years, including a tour with the Sudan Defence Force. He was the last sapper officer to leave Khartoum on Sudanese independence in 1954.

Promoted brevet lieutenant colonel in 1958 he was appointed Military Assistant to Sir Neville Brownjohn, the Quartermaster General, in the War Office. He then became GSO1 of 44th Home Counties Division (TA), 1960 to 1962, and Commander Royal Engineers of 4th Division in BAOR, 1962 to 1964. His meticulous attention to detail, born of his architectural background and love of all modes of transport, made him both an effective engineer and general staff officer.

In 1965, he went out to Malaya as Deputy Commander 17th Gurkha Division as a colonel, and returned home two years later to command 12th Engineer Brigade in Southern Command.

Selected for the Imperial Defence College, he is reputed to have demonstrated his love of railways by arriving for the 1968 course having driven a British Rail electric train from Weybridge to

Major General D R Carroll OBE (p171)

Waterloo, and hitched a lift on a GPO van to Belgrave Square because he was late. After spending 1969 to 1970 in the Ministry of Defence as Brigadier Q, he was promoted to major general and appointed Chief Engineer BAOR, in 1970, as his final job.

Retiring from the Army in 1973, he displayed his dogged independence by joining the East Kent Bus Company as a driver.

He was, however, far too unconventional to hold the job for long. He and the bus company had an amicable parting after about a year. Importantly, from his point of view, he had gained his Heavy Goods Vehicle and Public Service Vehicle licences.

After a year as an immigration officer at Ramsgate Hoverport, he established his own coach business in 1976 and drove for the Kent Ambulance Service until 1986.

He married Bettina Mary Gould of the ATS in 1946. He is survived by her and by one son, who has recently commanded 1st Royal Tank Regiment, and by two daughters.

LIEUTENANT COLONEL J A CAMERON

Born 27 August 1903, died 26 August 1996, aged 92.

LIEUTENANT Colonel Cameron, a former Madras Sapper, commanded 12 Field Company at Alamein and was CRE of 4th Indian Division later in the North African campaign. Commissioned August 1924, retired July 1952. HCT, who served under him in 14 Field Company QVO Madras Sappers and Miners, has sent in this personal memory: "I owe him much for he taught me the ins and outs of the Indian Army and in particular how to defeat the babu machinery. He was eccentric but kind even though when roused his temper was explosive. In those days he was a bachelor, teetotal and a regular church-goer but he was certainly not dry in other respects. I enjoyed being under his command and I know that the Tamil and Telegu VCOs and ORs worshipped him. His command of Indian languages was superb, so much so that when he was CRE of 4th Indian Division he was called upon to interpret for the King Emperor, George VI, at the Victory Parade in North Africa in 1943."

HCT

MAJOR MIKE REYNOLDS

Born 20 June 1934, died 19 May 1997, aged 62.

BORN in Somerset, Michael Ruscombe Caines Reynolds was educated at Kings School Bruton, and commissioned into the Corps from RMA Sandhurst in Swinburn's (13 YO) Batch on 6 August 1954. From 1955 to 1958 he read Engineering at St Catherine's College, Cambridge. Posted to Malaya from his junior officers' course, Mike spent much of his service there; he developed an early and abiding affection for Malaysia and was probably the Sapper officer who served the longest time of any with the Malaysian Engineers.

Between 1959 and 1968, he served successive tours with 1 Engineer Squadron, in the Ministry of Defence, with 10 Engineer Training Squadron and with 15 Park Squadron.

Mike returned to the UK in 1968 to command a squadron in 32nd Training Regiment RE. After leaving the Army in 1971, Mike worked for Tractors Malaysia Bhd and others in Malaysia, Singapore and the Middle East. He is survived by his wife Fatimah and their children Farah, Soraya, David and Peter to whom we offer our heartfelt sympathy.

RFNA BRR BAOW ELV

MAJOR GENERAL C W WOODS CB MBE MC

Born 21 March 1917, died 28 December 1996, aged 79.

In Major General Charles William (Bill) Woods' distinguished war service he participated in breaching the minefields at El Alamein, four major assault landings including Normandy on D-Day, and the Korean War. He was educated at Uppingham and Trinity College, Cambridge (Mechanical Sciences Tripos) and commissioned into the Corps in 1938 as a university entrant.

In 1940 he transferred temporarily to the 5th Battalion the Scots Guards, a unit made up mostly of experienced skiers who had volunteered to fight against the Russian army which had invaded Finland. The Russians defeated the gallant Finns before this British contribution could be dispatched however, so March 1941 saw Woods on his way to Egypt to join 552 Field Company. He took command when his OC was killed, and was responsible for the demolitions in Derna during the first British withdrawal after which he was mentioned in despatches. In November 1941 he was appointed commander of 572 Field Company, being responsible for the demolition of the Benghazi harbour installations during the second withdrawal.

Badly wounded on the first night of the Alamein battle in October 1942, he spent some months recovering before joining a British training team attached to the First United States Army in Tunisia, taking part in the final stages of the North African campaign. Then appointed to command 295 Field Company, he lead them in two landings in Sicily in July and August 1943, and a third the following month at Pizzo on the Calabrian coast of Italy.

In November that year the company went back to the UK to train for the Normandy landings in which they participated on D-Day with 50th Northumbrian Division. Woods was awarded the MC for his "... initiative and personal courage ..." in quickly organizing the breaching of the minefields and beach exits at a time when the assault craft were coming in some distance away from the prearranged beaches, displaying "... under fire an efficient coolness, with marked effect on all arms." He remained in command of this field company for the rest of the war and then, after Staff College and a tour as Brigade Major of 20 Engineer Group (TA) at Paisley, he was back in North Africa, as Second-in-Command of 22 Engineer Regiment in Tripoli.

22 Engineer Regiment, in May 1951, became the nucleus for the build-up of 28 Engineer Regiment in Korea. Bill Woods went with them and was appointed MBE for his services.

On returning from Korea in 1952 he went to the War Office as GSO 2 in G (SD) Branch. He spent two years in Germany, 1955 and 1956, as DCRE in Kiel before returning to the War Office again, this time as a lieutenant colonel in MT7 branch. Appointed to command 35 Engineer Regiment in 1959 in Osnabrück, after two years he returned to take up the appointment of Colonel GS, HQ Engineer-in-Chief. In 1964 he attended the Imperial Defence College before assuming the appointment of Deputy Military Secretary on promotion to brigadier in December 1965.

He was promoted major general in 1968 and spent three years as Director of Manning (Army) before retiring from the service in July 1970.

During retirement he continued his close connection with the Corps, being Colonel Commandant from 1973 to 1978, Chairman of the RE Association from 1971 to 1977 and President of the New Forest Branch for many years. On the wider scene, his major commitment was as

Major General C W Woods CB MBE (p173)

Chairman of the Douglas Haig Memorial Homes from 1975 to 1987, in which role he masterminded the renaissance of the charity.

General Bill Woods was a renowned Corps sportsman. His interest in skiing continued late into life and he became Chairman of the Holiday Schemes Sub-Committee of the Army Ski Association. His main passion however, shared with his wife Angela, was for sailing. He skippered yachts of the Royal Engineer Yacht Club in offshore races of the Royal Ocean Racing Club (RORC), joined as far back as 1954. He went through the higher offices of the Royal Engineer Yacht Club, and was Commodore for the last three years before retirement. He and his wife sailed their first boat, *Ingela*, out to Kiel to take up his DCRE appointment where he was familiarly known to the sailing fraternity of the Corps as "our man in Kiel." They took part successfully in many RORC races for over 20 years in their own boats, *Tuno, Tula* and *Tula II*. Bill Woods was also much involved with the RORC's own yachts *Griffin III* and *Griffin IV*, and was Chairman of the Griffin Committee from 1973 to 1976. He was also Manager of the winning British Admiral's Cup Team in 1971 (when Edward Heath was Team Captain) and again in 1973.

He was Commodore of the Royal Lymington Yacht Club from 1981 to 1983 and last year the club accorded him the accolade of honorary life membership.

The many tributes that were received after his death bear witness to Bill Woods' humanity, the respect he earned from his "propensity to put others before himself," his calmness in adversity and his ability to put people at ease. At the same time, his sharpness of brain and resourcefulness were attributes which marked his valuable and successful career both in action in war and later as a senior staff officer.

His wife, Angela, whom he married in 1940, died last year. They had a son who was tragically killed in a traffic accident while a cadet at Sandhurst, and a daughter who survives them with their three grandchildren.

O McC R

MAJOR J J M WALKER MC

Born 29 December 1923, died 3 March 1997, aged 73.

MAJOR John Walker was awarded an MC in Italy in 1945 for constructing a Bailey bridge over the river Gaiana under conditions of great difficulty and danger.

As the site was in enemy hands before the infantry attack at 10pm, daylight reconnaissance had not been possible. However, by following the leading infantry, Walker was able to make a detailed reconnaissance in the dark, and had ordered up the necessary bridging equipment by 11.30pm.

The enemy were bombarding the area with mortar and shellfire, the intensity of which increased during the night.

Walker did not allow this to deter him, but pressed on with the work so that the 60ft bridge, which was vital to the operation, was open for British tanks by 6.15am.

The construction of the bridge, in six hours and under such hazardous conditions, would not have been possible without Walker's coolness and organization. He and his platoon sergeant set a magnificent example to the men. Although Walker was several times blown off his feet by shell bursts, he survived, miraculously, unwounded.

John James Montague Walker was born in Shanghai, where his father was working for Shell Petroleum. Educated at West Buckland School, Devon, he was head boy and captain of rugby.

Commissioned into the Corps in 1942, at the age of 18, he fought in North Africa and throughout the Italian campaign and, after the war, in Greece, Egypt, Iraq, Cyprus and Kurdistan, as well as holding various staff and training appointments in Britain.

In 1967 he resigned his commission and took a post with the Construction Industry Training Board, remaining with them for 20 years.

An avid ornithologist and naturalist, Walker spent most of his spare time, both abroad and at home, observing birds and keeping detailed records of their behaviour. In Cyprus he noted the nesting habits of vultures.

Twice married, John is survived by three sons from his first marriage, to Sylvia Berry, who died in 1982, and by his second wife, Belinda, together with their three sons and a stepdaughter.

MAJOR GENERAL J K SHEPHEARD CB DSO* OBE

Born 15 November 1908, died 11 May 1997, aged 88.

"It was a breath of fresh air when Ken Shepheard took over command of 6 Assault Engineer Regiment in Normandy in June 1944. It was a difficult command with independent squadrons working with different divisions in a variety of roles. However, from the outset with a firm grip and a loose rein he took control and proved to be a wonderfully inspiring commander, always at the right place at the right time, consistently giving sound advice and providing instant back up for each and every task. In the words of General Horrocks, he had the capacity of 'making you feel you had just had a glass of champagne.'" (AJIP)

Educated at Monmouth School and the RMA Woolwich, Joseph Kenneth Shepheard was commissioned into the Royal Engineers in August 1928. During his YO Course he went to Christ's College, Cambridge, and took the Mechanical Science Tripos.

After a posting to 59 Field Company at Canterbury, he served from 1933 to 1938 with the Bengal Sappers and Miners in Roorkee and Rawalpindi, and in operations on the NW Frontier of India and in Military Works appointments in Murree and Kohat. A keen shot, on one occasion, as the newly arrived subaltern, he was detailed to organize a shikah for some senior officers. Duly dispatching them snug on their elephants he, feet firmly on the ground, spotted a tigress and bagged it. This was typical of the luck which seemed to follow him throughout his career, but also demonstrated his own ability fearlessly to grasp an opportunity.

In 1938, at the end of his tour in India, he and Archie Jack (whose memoir also appears in this issue) were sent to Gyantse in Tibet to inspect some buildings. They then received permission for a ten-day visit to Lhasa where they called on the Regent and other celebrities and had tea in several of the colleges in the Sera monastery.

Returning to England in 1938 he became adjutant of the 4th Divisional Engineers at Colchester which went to France with the Expeditionary Force in September the following year. In May 1940 he returned home to attend the Staff College at Camberley, and on graduating became Brigade Major 161 (Essex) Infantry Brigade, going with them to Sierra Leone and later to the Western Desert. In 1941 he became Brigade Major 18 Indian Infantry Brigade which formed part of the 8th Indian Division then in Iraq, but he returned to the Western Desert early in 1942 as GSO 1 of a training team. Shortly after the Battle of El Alamein he became GSO 1 of the 4th Indian Division and remained in that appointment throughout the advance to Tunis and up through Italy as far as Cassino. His work during the battles of the Mareth Line and Wadi Akarit, where he undertook a lone reconnaissance under heavy machine-gun mortar and shell fire, was recognized by the award of his first DSO. The citation, written personally by General Montgomery, describes how he showed " ... his great ability as a staff planner, operating from a battle headquarters close behind the forward troops, and under heavy shell, machine-gun and mortar fire coordinating the whole intricate action in mountain country."

At that time there was an aversion to giving Sapper officers command of a brigade on the grounds that their experience did not include the command of an armoured regiment or infantry battalion and it was decided that Sapper officers,

Major General J K Shepheard CB DSO OBE (p175)

recommended for command of a brigade, should be given the opportunity to obtain that experience. Shepheard came home from Italy in May 1944 as the guinea pig for this scheme and was attached to an infantry battalion in Scotland whilst the implementation of the proposal was being worked out. However this was just as the invasion of Normandy was starting and he quickly found himself ordered to the beachhead to take command of 6 Assault Regiment RE. During the operations in September 1944 to clear Boulogne after it had been bypassed by the main Allied advance, Shepheard's squadrons supported the initial infantry advance into the perimeter and he then led one of the three armoured columns which eventually broke through to the centre of the town. His tank was knocked out and he was wounded in the heavy fighting. The citation for his second DSO records him in this battle " ... personally leading one of the breaching columns in his tank, his tank was knocked out, he was wounded in the head, but refused to leave and continued leading his column until complete success was achieved five hours later. Only then did he allow himself to be evacuated to hospital." He was back with 6 Assault Regiment for Operation *Veritable* and the Rhine crossing and remained in command throughout the campaign in northwest Europe to the Baltic.

After a spell as a staff officer in the War Office he was selected in 1947 to attend the second course at the Joint Services' Staff College, Latimer. His next appointment was as GSO I (Ops) FARELF and while there he visited Borneo to take part in discussions with the chiefs of police of the three territories on their mutual security problems. Shortly after the outbreak of the Emergency in Malaya, General Briggs was called out of retirement to be the first Director of Operations. On his way through Singapore he discussed his staffing plans with the CinC FARELF and took Shepheard on with him to Kuala Lumpur to be his military representative in the rank of full colonel on the small joint military, police and civilian administration staff that produced the Briggs Plan. For his work in the Malayan Emergency, Shepheard was appointed OBE.

Early in 1951 he returned to England, stepping down in rank, to command the newly-raised 27 Field Engineer Regiment, formed as the divisional engineers of 6 Armoured Division which then moved in 1952 to Minden as part of the reinforcement of BAOR brought about by the Korean War crisis. After little more than a year in Germany he returned to England, was promoted to brigadier and for three years was the General Staff Representative on the Defence Research Policy Staff, which was concerned at the time with the development of the atomic and hydrogen bombs and their testing in Australia and the Pacific.

A sabbatical year at the Imperial Defence College followed and from 1958 to 1960 he was CCRE I (British) Corps; from 1960 to 1962 he was Chief of Staff Northern Command and was appointed CB in 1962. Returning to Germany that year to become Chief Engineer BAOR and Northern Army Group, he retired in January 1965 to take up the post of Secretary-General of the Officers' Association in London.

As a young officer he played for the United Services' Rugger Club at Chatham and represented his college at Cambridge. He also played tennis, sailed, rowed and went out with the RE Drag. He had been an early member of the Ski Club of India in the 1930s. During his several tours of duty in Germany he was closely connected with Corps sports and games, particularly skiing and sailing, and as Chief Engineer BAOR was Commodore of the British Kiel Yacht Club in which capacity he successfully took the helm of *Avalanche* in an interservice race with the CinC 2nd Tactical Air Force and a German admiral as his rivals and with the Chief Engineer BAOR designate breathing good advice down his neck.

On 5 September 1939 Ken Shepheard married Maureen Bowen-Colthurst, who died shortly after him, on 7 June 1997. Their three daughters survive them. AJIP, who served under him during the war recalls "... those who were lucky enough to serve under his command after the war, and were able to get to know his family more closely, found it was an invigorating, rewarding and enjoyable experience. Although on the one hand the highly respected and admired commander, on the other he was a wonderfully kind and thoughtful friend and a great family man, who in his quiet calm way took immense trouble with people. One will always remember him dealing with some problem, chewing on his pipe quietly deliberating, and whether it was something trivial or complicated, coming out with just the right answer. As the Irish say 'a lovely man.'"

AJIP JHGP

LIEUTENANT COLONEL J DEAN

Born 5 June 1913, died 20 October 1996, aged 83.

As a beach landing officer in Movement Control, Jack Dean was witness to, and played a key role in, many of the dramatic landings during the Second World War. He was selected for the Transportation & Movements Branch of the Corps because of his experience as a trainee cadet with London Midland & Scottish Railways.

Jack Dean was the son of a Derbyshire coach-builder, (the last of a long line), who attended the Boys' Grammar School across the county border in Ashby-de-la-Zouche, Leicestershire.

His military career began in the TA, and he spent the first phase of the war defending armament and aircraft factories, in the Peterborough/Hatfield area, with 116 Light Anti Aircraft Regiment. However, in June 1940 he was compulsorily transferred to the transportation branch of the Royal Engineers, serving in the ranks until 1941. A desire to be at the "sharp end" led him to apply for the infantry but this was turned down so he remained in transportation throughout the war until his retirement from the Army in 1968.

Attending 143 OCTU RE located at Hamilton, Scotland, he was commissioned into the Corps in September 1941, spending a short time with a movements unit in Northern Ireland, before being posted to First Army in 1942, taking part in the initial landings at Algiers and Bougie. Serving with movements in the ports of Bizerta, Sousse, Sfax and Tripoli, he landed in Salerno as a beach reinforcement officer on D+One (10 September 1943), was afterwards stationed in the port of Naples, and then assisted in the January 1944 landings at Anzio. Returning to the UK that same month for the landings in Normandy, Dean was posted to 2nd Battalion Oxford & Buckinghamshire Light Infantry, training with their beach group at Strathpeffer before landing with them on D–Day at Queen Beach, Sword Sector, and operated from there, dealing with discharge over the beaches.

Early in 1945 came a posting to Military Landing Group – a combined operations unit in India, where Dean was involved with the amphibious training of units in 23, 25, 26 Indian Division, and the Gurkha Brigade on Mardi Island. During this period he was posted to the HQ Staff as the military landing officer of a battalion group based with a Hyderabad battalion which was tasked for Operation *Roger*, the capture of Phuket (Siam). This was cancelled and he was then involved in Operation *Zipper*, the intended invasion of Malaya.

Although *Zipper* was pre-empted by the dropping of the atomic bombs on Hiroshima and Nagasaki, thus ending the war against Japan, the war had not ended for Jack Dean, who then became Military Landing Officer for the Indian brigade which landed at Bilawan – in Sumatra. He spent some months running the port as Garrison Commander which included the return of Japanese prisoners-of-war by sea. Jack Dean was three times mentioned in despatches.

After a spell of leave in the UK in 1946, Dean was posted back to HQ FARELF, eventually being responsible for military operations in the port of Singapore, where he was joined by his wife and family.

Returning to the UK in 1948 to attend No 4 Long Transportation Course, he afterwards became responsible for the administration and military training of Transportation Supplementary Reserve (SR) units. In 1953 Dean was posted as 2IC 8 Training Regiment at Elgin, which he finally disbanded before taking up an appointment

Lt Col J Dean (p177)

as DAD Transportation at HQ MELF, Fayid, in August 1954.

A short posting to HQ Cyprus District, preceded promotion to lieutenant colonel and, in 1956, command of the military port of Cairn Ryan, where amongst other things, he disposed of the majority of the German nerve gas stock in ships scuttled off Rockall.

Returning to Longmoor in 1958, he commanded the Transportation & Movements Army Emergency Reserve units, before, in 1961, he was posted to HQ Advanced Base in Antwerp as SO1 Movements BAOR, with local responsibilities for command as well as for movements. His last posting, from 1963 to 1968, was on the staff of HQ Western Command.

The family then moved to Hampshire and Jack took up a retired officer appointment at Minley Manor, finally retiring in 1978. He is survived by his wife Kay, two daughters and five grandchildren.

DS

LIEUTENANT COLONEL Æ J M PERKINS MA

Born 29 October 1918, died 5 September 1996, aged 77.

ÆNEAS Perkins was one of the generation of regular Sappers who were commissioned in 1938 and went straight to war after their training. The descendant of a distinguished line of Sappers, he was educated at Wellington College and the Shop, where he became an under-officer. He went on to Magdalen College Cambridge and YO training at the SME as a member of 40 YO Batch. Second Lieutenant Perkins joined 216 Army Field Company, a mobilized London TA company, in July 1940 after it returned from Dunkirk. His father, Colonel Frank Perkins, who was also serving in the Corps at the time of Æneas' commissioning, was sadly killed in Belgium, in May 1940, during an air attack on the BEF lines of communication.

216 Company was engaged in constructing defence works against the threat of German invasion and making safe, by demolition, dangerous structures damaged by air raids on towns in the Midlands. In August 1941, it was reorganized and redesignated 14 Field Squadron; part of the Guards Armoured Division. Æneas was promoted acting captain in February 1942. 1943 saw him volunteering for Airborne Forces and after parachute training he was appointed second-in-command of 3rd Parachute Squadron in 6th Airborne Division. Later in 1943, he was promoted acting major and posted to the Airborne and Air Transport Development Centre at Amesbury Abbey.

In the late Spring of 1944, Perkins was appointed OC of 4 Parachute Squadron in 1st Airborne Division. The squadron had been serving in the Middle East and North Africa and had now returned to the UK where it was training for the forthcoming invasion but the previous OC had fallen sick; this and other changes gave their new OC a tough task taking over at such a critical juncture but he settled in quickly and his enthusiasm and drive were infectious, and his confident manner rubbed off on his team. When D-Day came it was a disappointment to all that they were not included but they continued to train for contingency after contingency until finally being dispatched to Arnhem in Operation *Market Garden*. Perkins was injured in the drop and later badly wounded so that he fell into German hands when the temporary hospital in which he was fighting for his life was overrun.

After the war Perkins was first employed in the Land/Air Warfare Directorate in the War Office. Later he had a tour with the British Military Mission to Turkey, held appointments in the RE Works Organization and in 1959 commanded the Singapore Engineer Regiment. However, by this time he was contemplating a second career and retired from the Army in 1961.

Joining the Public Works Contractor, George Wimpey Ltd, in the Public Relations and Marketing Organization that same year, he covered civil and industrial engineering together with domestic housing, seeking work with government agencies, county councils, local authorities and private developers. He was most successful in this field and colleagues speak of his great ability as a communicator, his great courtesy and willingness to see others' points of view. They also commented on his fair-mindedness and concern for others. He retired from Wimpey on 31 May 1988 and subsequently did short spells with Tarmac, Ballast Needham and R M Brooks.

When he left the Service, Perkins became involved in local politics and in 1968 was elected to the Sevenoaks Urban District Council. After local government reorganization, he served on Sevenoaks Town Council from 1974 to 1987. He was regarded as a good representative with the ability to bring to notice important matters related to the local area. He was also Chairman of the Wilderness Branch of the Conservative Party for many years and was later elected Vice President. He remained active in party affairs until the day of his death. One who knew him well, said of him " ... in politics, he had many friends and admirers, and of course opponents, but no enemies ... " .

Throughout his lifetime Æneas Perkins was a most able and competitive sportsman. At Wellington, he was in the XI and the XV. At the Shop he was chosen to represent the academy at rugger and cricket. He also played hockey and squash. He joined Harlequins before the war (his father's old club) and played again for the "A" XV immediately after the war. In a busy life he still found time for commitments to the Royal British Legion, to the Maidstone Branch of the Parachute Regiment Association and kept in touch with the Royal Engineers through the Blythe Sappers of which he had a most successful year as Chairman in 1988. He maintained close interest in Wellington College as a long serving member of the General Committee.

His wife, Ursula, whom he married in October 1943, survives him.

GSH REW

LIEUTENANT COLONEL JOHN HUGH FYSON MBE MC

Born 19 July 1915, died 27 February 1997, aged 81.

LIEUTENANT Colonel Fyson served in the Corps from 1935 to 1956 before retiring and moving to New Zealand with his wife and family, to begin a new career with the Ministry of Works there.

Born in Lowick, Lancashire, he was educated at Sherborne, the RMA, Woolwich, and Cambridge, before being commissioned into the Corps. He represented the Army in athletics. Embarking with the BEF in 1939, he was appointed MBE in 1940, before being shipped to North Africa, where he was wounded and won a Military Cross for his efforts while dismantling a bridge to delay advancing Germans. Recovering in time to join the crossing of the Rhine, he was then sent to Burma to help defeat the Japanese.

In New Zealand, John became the Ministry of Work's chief construction engineer until 1976, spent four years in Saudi Arabia and Iraq with the UN's International Civil Aviation Organization, and also compiled a master plan for future development of the airport for Wellington City, before retiring in 1985.

John Fyson married, in 1942, Monica Cleeves, and is survived by her and their children, Hugh, George, John and Janet.

Ackowledgement is made to Peter Kitchen, *Wellington Evening Post*

LIEUTENANT COLONEL C E OTWAY OBE MC

Born 6 March 1916, died 2 November 1996 aged 80.

LIEUTENANT Colonel C E Otway, who died in South Africa, was appointed CRE Episkopi in 1953 and in East Africa in 1958. Commissioned January 1936, retired May 1960. EMW, formerly his Adjutant, writes: "He was responsible for the building of the enormous cantonment at Episkopi, and the building works started just as General Grivas and EOKA started their terrorist campaign. Not only did the CRE have to cope with all the problems of construction of such a huge complex, but had the interference – dare I say, excitement – of EOKA bombings and burnings, and the danger to British families living amongst the Greeks in Limassol to contend with. All these problems were coped with by Colonel Caesar magnificently; during this time, our power station was blown up, the Governor's half-built house was burned down and other buildings were damaged. In the midst of all this, Colonel Caesar, despite his terrible experiences as a POW in Japan, insisted on accompanying the rest of the unit on its annual ten-mile bash physical efficiency tests – and completing them. He was a truly wonderful boss."

EMW

MAJOR A F M JACK MC

Born 21 July 1913, died 13 January 1997, aged 83.

ARCHIBALD Frederic Maclean Jack – "Archie" to nearly all his friends, but "Maclean" to his immediate family – was a worthy successor to the long line of remarkable and enterprising characters who have so enriched the Corps over the years. He was also a perfectionist, who could not tolerate anything but the highest standards either in himself or in what he perceived in others. His story is a further example of the built-in hazards of Special Operations in that the gallantry of those in the field was too often wasted by the ill-informed intrigues of politicians.

He was the only son of Brigadier General Archibald Jack CB CMG CBE a distinguished railway engineer and pioneer in South Africa, India, Argentina and Cuba who, during and after the Russian revolution, ran railways for the White Russians under Kolchek, arriving a week or so after the Czar's abdication. His mother was much given to solo treks in Asia, armed only with a Bank of England cheque book. It is hardly surprising that the son of such parents was so adventurous a person.

Archie was born in Buenos Aires in 1913. In 1916 on their return to England the family were torpedoed off Milford Haven in the *Drina*. Archie went to Gresham's School, Holt, where he met Donald Maclean and James Klugman (of whom more later). He went to Rugby in 1926. Sir Francis Younghusband had sponsored three Tibetan boys to Rugby during the First World War and it was this connection which later opened the door to Lhasa.

Entering the RMA Woolwich in 1931, his strong character resulted in his being made Senior Under Officer in his final term, and being awarded the Sword of Honour. He organized the famous fake fire on the roof of Staff House on the eve of April Fools Day. Though temporarily demoted, he was quickly restored, having taken the precaution of warning the Commandant, who watched with amusement from his house. The Adjutant, Captain Brian Kimmins, had to pacify 25 fire brigades from all over London, and was not so amused.

Commissioned into the Royal Engineers in 1933, he did the usual courses at Chatham and Cambridge, where he rowed for Pembroke and represented the University against Oxford in épée fencing. He gained a degree in the Mechanical Sciences Tripos.

In 1933 he went to Berlin as the youngest member of the British Modern Pentathlon team. Disgusted by the Nazi hysteria, he and others managed to release prematurely a mass of white doves which flapped around a furious Führer's head.

He crewed in a number of ocean races in old *Ilex*, and in the Hunt family's *Spica*. He joined the Royal Ocean Racing Club in 1935.

In 1936 he was posted to India to join the Bengal Sappers and Miners, with whom he saw service in Waziristan and, typically, sought more action with the Tochi Scouts.

The Bengal Sappers had the right of inspection of the Indian Army garrisons at Yatung and Gyantse in Tibet, and in 1938 he and Captain (later Major General) Ken Shepheard (whose memoir also appears in this *Journal*) were detailed for this task. Archie then used his Rugby contacts (now in Lhasa) to get permission for them to visit. They journeyed on foot, and were warmly welcomed by Tibetan officials, both monk and lay, and came back with a wonderful collection of photographs.

With the outbreak of war, there followed a period of frustration, with Archie at the depot in Roorkee itching to get into action, even threatening to resign his commission at one point. Meanwhile, in

Major A F Jack MC (p180)

Bombay, he had married Pamela Foster-King, the daughter of a distinguished architect.

At last he got away to the Middle East, as an instructor at the Mountain Warfare School at Tripoli in the Lebanon, and there came in contact with SOE (Special Operations Executive) and undertook parachute and special training with them. He was dropped into Yugoslavia as sabotage adviser to the loyalist General Mihailovich whose chetniks (royalists) he trained in demolitions. His main target was the railway, which besides supporting the Axis forces was the means of shipping chrome back to Germany. He and his men blocked a number of tunnels, and destroyed railway bridges, including the 450-foot single span bridge over the river Drina. For these exploits he was awarded the Military Cross.

Unfortunately there was, in HQ SOE Middle East, a by then well-known communist James Klugman, who appears to have ensured that reports of operations carried out by Mihailovich's men were credited in reports to London to Tito's partisans. The result was that the Allies abandoned Mihailovich, who was later executed by the Communists. Archie had great respect for and loyalty to Mihailovich and always felt very bitter about his betrayal. He devoted much time and effort after the war to trying to get the record put right.

On return to the UK he was given command of 1 Parachute Squadron RE and sent to Norway to supervise prisoners of war in clearing mines. For this work he was awarded the King Haakon VII medal. Following a Staff College course he was on the staff of General Sir John Harding in Trieste but after a brief tour in Palestine decided that peacetime soldiering was not for him. He and Pamela did a year's attachment to a farm in Cornwall, and then bought an historic Elizabethan house, Collacombe Manor in Devon, the former seat of the Tremayne family, together with its mixed farming land of 450 acres.

Archie set to with his usual energy to restore the house to its former state, including visits to London and country house auctions to buy period furniture. Though both very stretched on animal husbandry, they always had time for their many friends who came to stay. Eventually, with farm labour getting hard to find, and having no children, they decided to sell, and moved to Walreddon Manor not far away, a Queen Anne mansion owned by a scrap dealer, and much in need of repair. Here again they made a perfect job of restoration including its fine garden.

During his time in Devon, Archie was very active in county affairs. He was president of the West Devon Parish Council Association, an Income Tax Commissioner, and a prison visitor to Dartmoor for 20 years. He was also for a time secretary of the Devon branch of the Country Landowners' Association, into which he infused fresh life.

Later he and Pamela moved to France and were engaged in restoring a mediaeval farmhouse in the Drôme, when they were hit by the stock market crash of 1974. They had to sell up, and took up positions as butler and cook to various splendid British Ambassadors in Geneva. This experience had its humourous side, but more importantly enabled them to repair their fortunes, so that they were able to acquire a farmhouse in the Haute Savoie, near Thorens Glières, birthplace of St Francis de Sales. Naturally Archie did his usual perfect job of restoration and they made a lovely garden including many plants which had accompanied them all the way from Devonshire.

From here they made annual camping trips to Italy and Yugoslavia, and sailed with Henry Denham during the course of his compiling material for his books for worldwide yachtsmen for that region.

They eventually returned to England in 1991 with much sadness at leaving their good French friends, so as to be nearer relations in their old age, and settled in a charming cottage in the middle of Kington where they lost no time in making a fine garden. Archie maintained his interest in Tibet, contributing to a photographic exhibition on that country in Paris in 1993, and attending a meeting with the Dalai Lama in 1994.

In November 1996 he slipped on ice in his garden, badly fracturing a femur. The operation was not a success. He suffered a heart attack on the stairs of his home and died in Pamela's arms.

In London he was a Freeman of the Clothworkers Company, a member of Boodles, the Special Forces Club, and the Royal Ocean Racing Club.

Archie was a unique character. A man of immense energy and enthusiasm and a fine leader who would accept nothing but the highest standards. He had a ready sense of humour, and it was a pleasure to be the object of his friendly banter. It was a tragedy for the Corps that his disillusionment at the treatment of Mihailovich was a contributing factor to his leaving the Army, in which he was fully capable of reaching high rank.

ECWM WGAL JHSB

Memoir in Brief

A brief memoir is published below on a distinguished man whose death was notified recently in the national press and who served in the Royal Engineers during World War Two.

William Tatton Brown, who died recently, was influential both as an early proponent of Modernism and as a leading figure in the welfare state architecture of the 1950s and 1960s. Tatton Brown was commissioned into the Corps in 1941 and served in India and Burma, attaining the rank of major before demobilisation, when he was sponsored by the army to join a town planning course at the Architectural Association. From 1948 to 1959 he was Deputy County Architect for Hertfordshire county council, and from 1959 to 1971 was first Chief Architect to the Ministry of Health (later Department of Health and Social Security), in charge of the design of all large-scale hospitals.
He married, in 1936, Aileen Sparrow; they had two sons and two daughters.

Correspondence

THE LAST OF THE KOI HOIS

From: Mrs S H M Battye

Sir, – How nice to read of the "temporary gentleman" posted to the Indian Army in the last war. They certainly livened things up in the stations and have since become invaluable as "young" seventy-year-olds in bringing new interest and enthusiasm for those times to the dwindling ranks of the regulars at our annual reunions.

"Koi-hai" (spelt as it is pronounced with an "a") does, as Lieutenant Geoff Webb correctly says, mean "Anyone there?" and thus became the soubriquet for the old-timers. The origin of the call was quite simply that the bungalows – such as my husband and I had both in Quetta at the Staff College and in the Bengal Sappers and Miners in Roorkee – had no front door and therefore no bell. These old bungalows were surrounded by shady verandas leading through long French windows into the various rooms. The main entrance was usually into the living room. Thus the visitor, or resident, would walk in and make his presence known by calling out to the bearer who lived with the other servants and their families in the compound behind the house where the separate kitchen was also situated. No door was ever locked by day, and at night a chokidar slept on the veranda with an ear open for any badmash who dared to try and enter.

Fifty years after Independence, I am happy to say there are still many of us "koi-hais" around to tell our tales of the Raj! Yours sincerely – Désirée Battye.

GEOLOGICAL TRAINING FOR BRITISH ARMY OFFICERS: A LONG-LOST CAUSE?

From: Lieutenant Colonel M S Rosenbaum TD, BSc, PhD, CEng, CGeol, DIC, EurIng, FGS, MIMM, ARSM

Sir, – I was very interested to read, in the April *Journal*, the article by Colonel Ted Rose concerning the rise and fall of geology as an educational subject in the British army. However, this might have led some readers to come to the conclusion that the application of geology to military matters has also declined, but this is far from the case.

There are no geologists appointed as such within the regular army, but geological expertise is available to all three services through the Territorial Army at CVHQ RE, within Military Works Force (Volunteers), and through the Engineer and Logistic Staff Corps.

Awareness of the ways in which geology significantly influences military operations and engineer tasks is brought out through a number of military courses which are held on a regular basis. These include presentations and modules taught by military geologists, for example on the Terrain Analysis User's Course at the Royal School of Military Survey and the Construction Materials Technicians' Course run by the Plant, Roads and Airfields Wing at the RSME. The Professional Engineer Training (Civils) Course at RSME, currently in the process of being

accredited as an MSc degree of Cranfield University, includes a three-day module on geology; in recent years this has been under the direction of Dr Brian Hawkins at Bristol University, but currently the syllabus is under review with the aim of incorporating recent developments in ground engineering such as groundwater protection and environmental site assessment, in line with the Environment Act 95 and the Corps Safety Management System.

However, such input to military training can do no more than introduce the subject of geology, which for the individual to reach professional standards requires full time study at undergraduate level for three years (for most BSc degrees) or four years (for some BSc degrees and the MSc degrees) followed by five years of postgraduate training incorporating both work in industry and further university courses (frequently leading to an MSc degree by teaching or a PhD by research). The assessment of professional competence is then judged through application for Chartered Geologist status, akin to the requirements to become a Chartered Engineer. – M S Rosenbaum

ENGINEERS AT GALLIPOLI – 1915

From: Colonel M J W Wright DSocSc MIMgt

Sir, – I was very interested in the article by GLC in the April issue of the *Journal*.

In particular, the story of Frank Sutton, and how he lost an arm and won an immediate MC reminded me of an acquaintance of 35 years ago.

In 1962, whilst serving in Hong Kong with the QGE, our next door neighbour in the married quarters area at Barbecue Gardens was an elderly RAEC major named Patrick Lumley. His wife was a most interesting lady and was the daughter of Frank Sutton.

She had a fund of stories about her father and her life in the Far East in prewar days. One of her earliest memories was as a very young child going to a "family lunch" in Brompton Mess when her father was undergoing training before going to Gallipoli in 1915.

She lent me a biography of her father and although it is 35 years since I read it, Sutton struck me as such a remarkable character that I can recall quite a lot of his life as described in the book.

After leaving the army, Sutton went to the Far East, where he spent the rest of his life.

1919 saw him in Vladivostok, involved in various commercial ventures – not too successful. When the Red Army arrived at Vladivostok, he moved to China, which at that time was run by a number of competing "war lords". He entered the service of one of them and soon became his CinC with the rank of general.

In 1927 he was in Shanghai, again in commerce. The book describes how Sutton and Viscount Gort (then GSO1 of the Shanghai Defence Force) used to drink together sometimes in Shanghai Club; Gort used to pull his leg about having been a general!

By the late 1930s he was in Manchuria and his daughter recalls staying with him in Mukden, just before the war.

In 1941 he was in Hong Kong again in commerce and he was there in December 1941 when the colony surrendered. He was interned in Stanley Goal and died there in 1943.

Frank Sutton was a most remarkable man and one of the small group of Sappers, including Kitchener, Gordon, and Glubb, who were generals in a foreign army. Yours sincerely – Michael Wright.

ROYAL ENGINEERS OR ARMOURED CORPS ENGINEERS?

From: Major A P Dennis

Sir, – I was interested to read Captain Marc Owen's article in the April edition of the *Journal* on the knotty problem of Sapper groupings and command and control at battle group level. I am currently serving as the British Exchange Officer with the 3rd (US) Infantry Division (Mechanised) at Fort Stewart, Georgia. I am employed as the Assistant Divisional Engineer (SO2 Engr (G3 Plans) in our system if we had the luxury of such a post in our divisional HQsRE). Captain Owen states in the final paragraph of his article that the US Army amalgamated their armoured engineers into tank regiments, but this is not now the case, and in fact they operate in a very similar fashion to the Royal Engineers.

The division is supported by an engineer brigade of three mechanized battalions which provide "close support" to the three group manoeuvre brigades of the division. Each engineer battalion consists of a HQ company and three line companies which support the three task forces (battle groups) of the manoeuvre brigade. A US engineer company consists of two

line platoons of sappers and an assault and obstacle (A&O) platoon. The A&O platoon includes four AVLBs and until recently four AVRE equivalents (combat engineer vehicles – CEVs); these equipments are engineer manned and maintained and are an integral part of the engineer company and battalion. The neat fit of engineer companies to task forces in a brigade does however reduce some of the debate over engineer command and control issues although task force and brigade commanders are very reluctant to release engineers to support engineer main effort, eg preparation of a defence.

These affiliations between engineer battalions and companies and brigades and task forces are referred to as "habitual" and nearly all training is conducted in this configuration. The division engineer brigade therefore has no reserve of engineers for what we would term "general support", to artillery, logistic units, divisional supply areas and routes. This capability is provided by corps engineers pushed forward into the division area, often under operational control of the division, often with a command and control HQ known as an engineer group (another brigade sized HQ). This engineer group can contain any number of units depending on task, terrain and the corps engineer main effort. On recent CPXs that I have been involved in these groups have contained additional mechanized engineer battalions to enable the division to reinforce its own engineer main effort, a wheeled engineer battalion for general engineer support in the divisional support area, a heavy construction battalion and two heavy equipment (plant) companies for infrastructure work and main supply route construction/maintenance. All these assets, as many as seven engineer battalions, are under the technical control of the division engineer (a colonel), who is also double hatted as the division engineer brigade commander!

Captain Owen bemoans the problems of running an "Antiques Roadshow"; we are not alone. US Army tank battalions are currently equipped with the M1 A1 Abrams main battle tank (MBT); some units will soon be upgrading to the M1 A2. The US Army's armoured engineer vehicles are based on the much older M60 MBT chassis and they consequently suffer in the same way that we do; a comparatively small vehicle fleet when compared to M1, lack of mechanical expertise except within the engineer battalions, spare part resupply, reliability and so on. Again, like us, they are awaiting the final development and deployment of a new line in armoured engineer equipment. This will include a new "breacher" the "Grizzily" and a new AVLB the "Wolverine" both based on the M1 chassis and due to come into service early in the next century. Yours faithfully – Allan Dennis.

Reviews

GIBRALTAR

MAURICE HARVEY

Published by Spellmount Ltd, The Old Rectory, Staplehurst, Kent, TN12 0AZ – Price £24.95
ISBN 1 873376 57X

THE Rock of Gibraltar stands at one of the world's most important crossroads. In classical times, it was known as the northern of the two Pillars of Hercules, marking the western limits of the known civilized world of the Mediterranean. Beyond lay all the imagined terrors of the Atlantic. Throughout history the Rock has been fought over continuously, and layer upon layer of fortification has marked the eras in its 1200 years of recorded history like the rings of an old oak tree. The Rock has not only dominated the east-west flow of maritime trade through the Strait of Gibraltar, but also the north-south flow of peoples and trade between Europe and Africa. It has suffered 14 military sieges in the past, and the long 16-year political and economic blockade in our day.

There have been two relatively recent books on the Rock's history: George Hills's "Rock of Contention", which has a marked Spanish bias; and my own "Rock of the Gibraltarians", written through the eyes of a former governor. Air Commodore Maurice Harvey covers the same ground without political bias of any kind: he has never served in Gibraltar and can be said to present a neutral historian's view of the Rock's highly controversial history.

At first sight, his "Gibraltar" appears to be a glossy coffee-table book with its magnificent colour reproduction of the oil painting of the Rock on the dust-cover by the Gibraltarian artist, Gustavo Bacarisas (not G Bacaris as his publishers claim), which was presented to the Queen during her post-coronation visit in 1954. This impression is further enhanced by the hundred well chosen photographs and an appendix setting out a guided tour of Gibraltar. But a book should never be judged by its cover: Harvey's book is an intellectual tour de force, lucid and accurate, it gives an excellently comprehensive account of the Rock's political and military history from prehistoric times to the present day.

With his air background, however, he tends to view the many sea and land battles from high altitude; nor does he provide any tactical sketches to help the reader understand the fighting on and around the Rock. His strength lies in handling the complex political issues, which make the story even more fascinating than its sieges.

Harvey first recalls what is known about the Rock in pre-history; then classical times when Greek, Phoenician and Roman seafarers traded east and west through the strait; and later the march of the nomad tribes from Central Asia through Spain and across the strait from north to south into North Africa. The real story of the Rock, however, starts with the reversal of that flow in 1711 when the conquering armies of Islam invaded Spain and were to hold Iberia for 800 years until they were gradually driven back across the strait by the Christian armies; pursuing their *Reconquister* with varying degrees of success throughout the 13th and 14th centuries.

The fortress of Gibraltar came into being as one of the Moorish "base ports" through which their armies in Spain were supplied. It suffered its first eight sieges during the Moorish period, which ended soon after the Rock's final capture by Queen Isabella the Great of Castile in 1462. Surprisingly, Harvey does not mention her last will and testament in which she adjured her heirs and successors never to alienate the fortress, the key to the strait. Much of the Spanish emotion about the Rock stems from Isabella's will.

Spain held the Rock and neglected it for just two and a half centuries before it was wrenched from her grasp by Admiral Sir George Rooke, the commander of the Anglo-Dutch confederate fleet, on behalf of the Spanish Hapsburghs in 1704, and was ceded to Britain "in perpetuity" in the Treaty of Utrecht of 1713.

During the 18th Century the two Bourbon monarchies, Spain and France, tried to recover the Rock by force and diplomacy. Harvey outlines the three sieges during the British period – the 12th of 1713, 13th of 1727, and 14th or Great Siege of 1779 to 1783 – but he is at his best analysing the seven attempts of British ministers to get rid of the Rock and the popular and parliamentary reactions that thwarted their efforts.

Gibraltar earned its reputation "as safe as the rock" during the Great Siege by resisting the combined might of France and Spain. It went from strength to strength during the 19th Century acting as a base for Nelson in the Nile and Trafalgar campaigns, and as the first stop on our imperial communications through Suez and round the Cape of India and Australasia. Its dockyard was built to meet the Kaiser's naval challenge, but it played little part in the First World War.

In the Second World War, the story was very different. Threatened with attack by the Axis powers, it

survived to provide a base for Admiral Somerville's Force H, which gained supremacy in the western Mediterranean basin, and as the launching pad for Eisenhower's Operation *Torch* – the invasion of French North Africa in 1942. But the women and children of the Rock had to be evacuated to London, Madeira and Jamaica because they were an embarrassment in the fortress.

Harvey reaches his political best in describing the complexities of the postwar struggle to defeat the virulent Spanish claim to the Rock's sovereignty. Franco misjudged Britain's postwar decolonization period as offering the ideal opportunity to twist the lion's tail. He and his successor Spanish governments refuse to accept that the Rock does not belong to anyone but the Gibraltarians, who are immensely proud of their British citizenship and have no wish to be recolonized by Spain. WGFJ

THE OPERATORS
Inside 14 Intelligence Company – The Army's Top Secret Elite
James Rennie

Published by Century, 20 Vauxhall Bridge Road, London, SW1V 2SA – Price £8.99
ISBN 0 7126 7730 5

The most surprising thing about this book is that it has ever been published at all and, what is more, it apparantly has the imprimatur of the Ministry of Defence in that the manuscript was submitted before publication and a number of changes were made at its request. Bearing in mind that the work of 14 Intelligence Company has been so secret for over 20 years, one can only speculate on the reasons for the Ministry's change of heart, or is it just that, after the plethora of SAS books, they couldn't stop it? Whatever the reason, the end result is a riveting story told by one of the operators himself.

James Rennie, if that is his real name, volunteered for "special duties of a hazardous nature in Northern Ireland." He knew it would involve surveillance of some sort and that six months training would be required – how different from the early days when surveillance was carried out by men like the relatively older colour sergeants in the battalions going off in private cars after work to drive round known republican areas in the rather vague hope of spotting bombs being moved around. Intelligence was virtually non-existent. Much has changed in the intervening years and our intelligence gathering methods now are probably unsurpassed anywhere in the world. The training he was to undergo would involve the most sophisticated surveillance techniques, honed to perfection in the harshest of environments where one mistake could prove fatal. Though the failure rate for applicants is high, that operational casualties have been so few is a tribute to the training methods used. Few of us would care to go through what James Rennie endured.

The author takes us through this training, phase by phase, with its constant monitoring and tests. As each stage is passed, so the veil of secrecy is lifted a little more until the operator is judged safe to join one of the detachments in the Province. The operations he describes are hair-raising, demanding not only training of the highest standard but also the most cold-blooded courage. James Rennie describes what it is like to be operating in a hard-line area, be it Republican or, so called, Loyalist, sometimes on one's own or accompanied by one other operator, male or female. It requires a very special sort of courage, and the stakes are high.

Though one may be surprised that this book has been allowed to be published, it is time that this remarkable unit was given the recognition it rightly deserves. The young men and women who serve in it can but fill one with pride and admiration that such people exist in our armed services today. GLC

OFF THE RECORD
The Life and Letters of a Black Watch Officer
David Rose

Published by Spellmount Limited, The Old Rectory, Staplehurst, Kent, TN12 0AZ – Price £14.99
ISBN 1-873376-76-6

The cover of this book shows Terence Cuneo's painting, hanging in the Headquarters Mess in Chatham, of sappers working at the Hook in Korea. The commanding officer of the battalion holding the Hook at that time was Lieutenant Colonel David Rose and a photo of him is superimposed. The preface is by another distinguished member of the Rose Clan, General Sir Michael Rose.

David Rose had three brothers, two of whom commanded other Scottish regiments during World War Two, while the third was a legionnaire who covered himself in glory in the French Foreign Legion. What a formidable family. David himself won his first DSO in Somaliland as a subaltern, fought at Tobruk and commanded a Chindit column in Burma. So it is hardly surprising that he has an exciting story to tell.

Joining the Black Watch in 1932, the regiment became involved in the troubles in Palestine some five

years later. When Italy entered the war in 1940 they were rushed to British Somaliland where David Rose's learning curve was steep, but the campaign was short-lived and he resolved to "do better next time." Next time was the siege of Tobruk and the following year sees him commanding a Chindit column in Burma where he was badly wounded (not for the first time) and evacuated to India and eventually home.

Marriage and a few quiet years were interrupted by the war in Korea. His subsequent reminiscences are based largely on letters to his wife and his brother, Rhoddy, and they make fascinating reading.

David Rose is immensely proud of his regiment and also extremely protective. He doesn't suffer fools gladly and his forthright views did not always endear him to others, be they senior or junior. He did not think much of other units and is often harsh in his judgements. Writing frequent letters, the narrative comes out in almost diary form and describes the everyday life of a battalion in the line in great detail. Nothing much missed his eagle eye; his battalion was extremely well trained and morale was high. Two big battles on the Hook were fought with distinction, the detailed orders throughout the first being printed as an annex at the end of the book.

Sadly, David Rose's career failed to prosper, despite being such an outstanding battalion commander in Korea. The regiment moved to Kenya but fighting the Mau Mau was something of an anticlimax and he failed to hit it off with his general. He retired some time later, a disappointed man, but can look back with pride on his time in command where he was an inspiring leader. His book stands as an example to all aspiring commanders and is a joy to read. GLC

KITCHENER'S SWORD ARM

ARCHIE HUNTER

Published by Spellmount Ltd, The Old Rectory, Staplehurst, Kent TN12 0AZ – Price £20
ISBN: 1-873 376-54-5

KITCHENER'S name is well-known but relatively few have heard of Archibald Hunter, the man associated with many of his military successes. Hunter was gazetted a sub-lieutenant in the King's Own Regiment of Foot in 1875 and his early years in the army were unexceptional. But in 1884, at the age of 27, he joined the new army in Egypt, where he spent the next 15 years, rising in 12 years from captain to major-general and becoming in the process a Victorian hero. Thereafter he was sent to South Africa where he fought in the Boer War and again distinguished himself. He returned home a full general but his star was not shining quite so brightly because of a tendency to speak his mind without weighing the consequences. This also led to him being forced to resign as Governor of Gibraltar, and was probably the reason he was neither given a field command in the First World War nor rose to the rank of field marshal.

This is an account of a brilliant field soldier; tough and demanding in training and preparation for battle, audacious and inspiring in battle itself, and always showing a genuine concern for the well-being of his soldiers. The author draws on much material previously unpublished, particularly personal letters, and gives a real feel for the difficulties of campaigning in southern Egypt and the Sudan, and provides enough political background to put them into context. The text is well supported with maps. This part of the book provides an excellent insight into Kitchener's Egyptian campaign (leading up to the Battle of Omdurman) and into the nature of battles in this inhospitable terrain.

The story then moves to South Africa and the Boer War. Here Hunter served as both field commander and staff officer, again with distinction but without making the same personal impact he had made in the Sudan. Again the author gives the political background to events and the story is very readable. Thereafter the book deals more briefly with the less successful episodes in Hunter's life: a short term as Governor of Gibraltar, a frustrating training appointment at Aldershot during the First World War, and finally a brief spell in Parliament. It was a relatively low key end to the career of a man many thought was "the most outstanding front-line soldier of his day."

This is a fascinating insight into the life of a brilliant soldier. DAG

CAIRNRYAN MILITARY PORT 1940-1996
FROM U-BOATS TO THE ARK ROYAL

RICHARD HOHNE

Published by G C Book Publishers Ltd
ISBN 1 872350 22 4
Obtainable from the Royal Engineers Museum, price £6.95 plus £1.05 post and package.

CAIRNRYAN Military Port was built by Sappers during the Second World War. The site, on the west coast of Scotland, was chosen to minimize threats from the German *Luftwaffe* and U-boats.

After the war the port was used for disposing of surrendered German U-boats, dumping unwanted ammunition and ship-breaking: Soviet submarines,

made surplus by the ending of the Cold War, as well as the Royal Navy ships such as *Eagle*, *Ark Royal* and *Bulwark*.

The book was intended to be a history of the ship-breaking industry at the port from 1969 to 1991 but the author became so interested in the earlier history of the port that he expanded his work to cover the earlier period, although the emphasis remains on the ship-breaking period.

Published in A4-size on glazed paper with card covers, it is very readable with helpful sketch maps and a plentiful selection of photographs. There are detailed lists of U-boats and ammunition ships disposed of as well as ships broken up. A very useful bibliography is included.

The book is recommended to anyone interested in the port construction and operation activities of the Corps.

JEN

LA BOISSELLE
(OVILLERS/CONTALMAISON): SOMME
MICHAEL STEDMAN

Published by Pen & Sword Books (Leo Cooper), 47 Church Street, Barnsley, South Yorkshire S70 2AS – Price £9.95
ISBN: 0 85052 540 3

THIS further book in the "Battleground Europe" series follows "Serre", reviewed in the April *Journal*. These battlefield guides are very well produced in handy A5 format with laminated covers. "La Boisselle" deals with the opening days on one of the most notorious sectors of the Somme front where casualties were severe even by the standards of the Somme. A particular sapper interest lies in the work of 179 Tunnelling Company that prepared the mines resulting in two devastating craters, one of which, Lochnagar, was never filled and can be visited today. However, the work of the field companies is not mentioned and this would be necessary homework for any sapper visiting the area.

The book, like its predecessors is limited in scope but very detailed, both in the background information and the human stories it tells. It contains advice on maps to enhance the already clear sketches of its own, the accounts of the battle, a section on personalities, details of the memorials and cemeteries and suggestions for a general tour of the area and six possible walks. Although intended for the visitor to the site the book is so well researched and presented that it will also be a pleasure to the armchair investigator of the Somme.

GWAN

A MOST DIPLOMATIC GENERAL
THE LIFE OF GENERAL LORD ROBERTSON OF OAKRIDGE
DAVID G WILLIAMSON

Brassey's (UK) Ltd, 33 John Street, London WC1N 2AT – Price £25
ISBN 1 85753 180 9

GENERAL Lord Robertson kept no diaries or papers for posterity, so the author of this book had to carry out a vast amount of research to reveal the magnitude of Lord Robertson's achievements. He shows with clarity just how unusual a soldier he was, possessing as he did such a first rate mind, allied to great skill as a staff officer. It has to be said that painstaking examination of the archives dominates the book, giving it an academic atmosphere rather than a personal account by Lord Robertson's contemporaries and subordinates.

His father was Field Marshal "Wully" Robertson who was CIGS from the death of Kitchener until dismissed by Lloyd George in early 1918.

After passing out from The Shop in November 1914, Brian Robertson was appointed to a number of ADC and staff posts on the Western Front and latterly in northern Italy until the Armistice. He was awarded a DSO and MC during this period, and after the war returned to Chatham for young officer training. At the end of 1920 he was posted to India to join the Bengal Sappers and Miners, spending five years as a regimental officer, including one year constructing roads in Waziristan. This represented his only period of service with Sapper units.

After passing through Camberley Staff College, the War Office claimed him for another five years, during the course of which his staff expertise burgeoned. He gained his first experience of the interplay between military and political factors in preparation for and attendance at the League of Nations Disarmament Conference in Geneva.

In 1934, disillusioned by poor career prospects, he retired to join Dunlop in a new factory project in South Africa; a step he had long contemplated. Based in Durban, by 1939 he had gained much business experience and had developed his distinctive management style of setting up a clear chain of command and of establishing in the minds of his employees exactly what their responsibilities were.

After the outbreak of the Second World War, he applied to rejoin the British Army, but at 43 years of age was told he was too old and could only expect at best a job such as Railway Transport Officer in Durban. He therefore applied to the South African

Defence Forces and was commissioned as a lieutenant colonel for staff duties. In June 1940 he arrived in Nairobi with the Advanced HQ of the South African Defence Forces and was appointed AQMG under General Cunningham. He remained a South African officer until formally rejoining the British Army as a lieutenant general in 1945.

The remarkable campaign in East Africa, to defeat the Italian forces in Somaliland, Ethiopia and Eritrea, was essentially an administrative triumph. Brian Robertson's skill and drive in providing the sinews of war in the form of ammunition, petrol and supplies of all kinds to keep pace with the rapid speed of advance of two African and one South African divisions was the key element in this success. On reaching Cairo, General Cunningham, Commander Eighth Army, invited him to fill the same job within his staff, which he did despite taking a reduction in rank. In May 1942 he was re-promoted Brigadier AQ as the Eighth Army reformed on the Alamein line. Montgomery confirmed him in this job on assuming the command.

Brian Robertson's record as an administrative staff officer in North Africa, Sicily and Italy is legendary. Military readers will find this section of the book strong on documentary evidence but weak on personal evidence of the brilliant way in which he handled successively larger staffs, yet more complex issues and an array of British and American commanders. He finished the war as Chief Administrative Officer in Italy as a lieutenant general. In Italy, handling the surrendered Italian State in parallel with sustaining Allied military operations gave him much experience for his next appointment, in August 1945, as Deputy Military Governor to the British Zone of Germany. Two years later he became Commander in Chief and Military Governor in his own right as a full general. For his last year he was appointed High Commissioner. As the author points out, these years were indeed his "finest hour". The panoply of events, political, economic and military, that he had to deal with are well documented. They offer an important analysis of events from the angle of the British High Commission covering not least the Berlin airlift, difficult relationships with the Russians, and the emergence of the Federal Republic of Western Germany. His part in this vital event was recognized by Adenauer who remained his friend for life. The clarity and power of his mind throughout these turbulent years are excellently brought out.

In the summer of 1950 he took over in the Canal Zone of Egypt as Commander in Chief Middle East Command. Fear of a possible Russian attack in the event of yet another war led to frenzied efforts to shore up the "Outer Ring" of defence comprising Iran, Iraq and Jordan. The Abrogation crisis with Egypt broke out in October 1951. Later Mau Mau threatened in Kenya and finally he led negotiations with Nasser to set up civilian contractors in the Suez Canal Base to follow a British military withdrawal.

I served as staff officer to the Major General Administration and can bear personal witness to the masterly signals that he drafted himself to the War Office on policy for many of these matters. I can also vouch for his remarkable ability to speak to and inspire his large staff.

Churchill offered him the job of Chairman of the British Transport Commission in the summer of 1953. Instead of becoming Adjutant General he accepted, retired from the Army, and took on yet another arduous task. The story of his battles against unions and politicians, saddled as he was with a faulty organization, does not make happy reading. Again this is well researched by the author.

This book is a much needed account of the achievements of a great soldier and gentleman. Though the approach is scholarly and lacks military appreciation, I do hope many will read it. DJW

SUMMON UP THE BLOOD
War Diary of Corporal J A Womack RE
CELIA WOLFE

Published by Pen and Sword Books Ltd, 47 Church Street, Barnsley, South Yorkshire S70 2AS – Price £16.95
ISBN 0 850525373

This book is about the actions of First British Corps, during the invasion of Normandy in 1944, and its subsequent advance through France, Belgium and Holland, as seen through the eyes of a member of HQ RE I Corps. Corporal Womack kept a diary which has been edited for publication by his daughter, whose research provides additional background.

The diary is much more than an account of personal activity, indeed the writer gives very few details of his duties apart from reference to a wireless lorry. He held a high security grading and had been helping with the plans for the invasion before landing in Normandy on D-Day. It is obvious that he continued to be involved in operational planning and saw situation reports. His diary includes perspicacious comment on events as well as observations on the local population. The text is supported by carefully studied editorial notes from unit war diaries and other sources.

The narrative reflects well the feelings of soldiers in a war zone: discomfort of existence, food, smells,

flies, rumours, concern for home, elation at success reducing as the war seems to bog down, and even the sense of superiority of the D-Day arrivals to the latecomers. Inevitably, much of the business of the HQ RE was with its Sappers. The assault engineers receive frequent mention, so does 240 Field Company.

The last chapter seems rather anti-climatic when 1 (BR) Corps, on the left flank of 2 Army in Holland was less deeply engaged with the enemy. The diary records events on a broader front but without quite the same authority as that based on the reports of units under command. Regrettably, the story runs out on Monday 12 February 1945 when the diary ends, although its writer went on to serve in Germany and was demobilized in 1946. Sadly, he died in 1976 and so the mystery of the missing record remains unsolved.

The book is illustrated with photographs and maps which might have been better larger and incorporated in appropriate places. However, it makes good reading, giving an authentic illustration of the flavour of the campaign and would, perhaps, be of particular interest to those with connections with 1 Corps, and assault engineers. ITCW

THE BIOGRAPHICAL DICTIONARY OF WORLD WAR II

MARK M BOATNER III

Published by Presidio Press, 505B San Marin Drive, Suite 300, Novato, CA 94945-1340
– Price £40
ISBN 0 89141 548 -3

THE Introduction states, "In your hands you have about 1,000 biographical sketches of the 3,000 people whose names you are most likely to encounter in reading about the Second World War." Selection, it says, has been by the "pragmatic approach." This seems to mean that, while all the most obvious people are included, the rest are the ones that the author finds interesting, or at least believes that the intelligent reader would find interesting. There is a sensible balance between the military, politicians, officials, scientists, artists and writers (Noel Coward, cartoonist Low but not Chester Wilmot) and the rest of the cast and, of course they include all nationalities. Of the non-mainstream, spies figure strongly and, on the military side, the unconventional such as Wingate, Stirling and Bader. Few Sappers appear. Jacob gets a mention and, oddly, Neame, whose entry suggests he might have gone on to greater things but for his unfortunate mishap in the desert although " ... he had combat service during the first world war as a brevet major in the Tank Corps. ... " is inaccurate and hardly does him justice.

The book is unusually readable for such publications. It is written in American, of course, but the unstuffy style is refreshing, eg, "Then began Hitler's crap shoot in the Ardennes ... ", and the subjects come across as personalities, "A 'ranker' whose promotion to field marshal did not keep the tough, lantern-jawed, unsmiling but very witty general from looking like a sardonic old sergeant, Bill Slim found full scope for his genius as 14th Army commander in Burma." Moreover the author seems to have mastered the intricacies of the British honours system getting his titles right (or mostly, "Scots Guard" appears somewhere but it may be a rare printing error). He is also, perhaps surprisingly, fair in his assessments of British leaders. Monty is blamed but not savaged for his offensive gaffe after the Ardennes battle and is duly admired for his achievements, particularly in the desert; his brittle relationship with Eisenhower is not overdone. Mountbatten is treated fairly too; even Dieppe is credited with having " ... long-range benefits for the Normandy invasion."

The book is immaculately cross-referenced and supported with glossary and bibliography. Its price might put off the casual reader but for anyone who is a regular student of military history it will be hard to resist both for its neat summaries of facts and the pleasure of its style. GWAN

THE DANGER OF UXBS

LT COL ERIC WAKELING

Published by B D Publishing, 6 Wendover Road, Bourne End, Buckinghamshire, SL8 5NT
– Price £15.99
ISBN 0 9525799 2 8

THIS is the third of Eric Wakeling's privately-published books on wartime bomb disposal. He has given us an inkling of the trials and tribulations of private publication in his article in the December 1995 *Journal*. The sub-title of this work is "Collected Stories of Bomb Disposal Heroism in World War II", and this is an accurate description of the contents. It is a compilation of the jottings of a number of individuals, loosely grouped into a chronological sequence. Interspersed are the citations for the 13 George Crosses and many of the 105 George Medals which were awarded to Sappers for bomb disposal activities in World War Two.

Because of his chosen format, the book is inevitably rather selective and disjointed, but there is

ample evidence of the cold-blooded courage of those who worked month-after-month at this calling, not knowing what the next night would bring. The risks they took so unflinchingly were enormous, especially when dealing with ticking fuzes, or when confronted by unknown or unidentifiable fuzes. But some of the accounts of incidents are very sketchy and one is left with the feeling that a fuller account of fewer operations would have been more illuminating.

Without denigrating the recipients in any way, it is apparent that the distribution of gallantry awards was somewhat haphazard. Indeed, a number of instances are recorded where members of other Arms dealt with UXBs which fell in their vicinity, in blind ignorance of the risks they were taking, and received awards for their one-off exploits, whereas countless Sappers who dealt with hundreds of UXBs in full knowledge of the dangers received no such recognition. But then Sappers have always been backward in submitting citations, preferring to get on with the task in hand.

Although slightly marred by a number of minor editorial errors, nevertheless, the book will appeal to all those who have had the privilege of serving in bomb disposal. ERC

THE BRENNAN TORPEDO

ALEC BEANSE

Published by The Palmerston Fort Society
ISBN 0 9523634 4 5
Available from the Royal Engineers Museum, price £5 plus £1 postage and packing

THE Brennan Torpedo was the world's first operational guided missile, which was in service with the Royal Engineers from 1890 until 1905. Its inventor, Louis Brennan, received a government award of £110,000 in return for exclusive rights over the system; a tidy sum in 1890!

Brennan stations were built at several places on the south coast of England, in the Thames and Medway estuaries and abroad in Malta and Hong Kong. A whole generation of the Submarine Mining Service of the Corps served the Brennan, recently described as the Exocet missile of its day.

However, an element of mystery is attached to the weapon, even today. All who worked with it were sworn to secrecy. Key elements of the mechanism were built into factory-sealed units and no written descriptions have ever been found. The Royal Engineers Museum has the sole surviving example of the torpedo. So far museum staff have resisted suggestions that these factory-sealed units should be dismantled to reveal their secrets but they are experimenting with x-ray investigations.

Alec Beanse is an acknowledged expert on the system. He has carried out much research and has distilled all references into a well-produced book which traces the system's development, describes its working in some detail, and hazards educated guesses at the sealed units. Each station is described in turn. The book is very well illustrated with many photographs and clear line drawings. Sensibly he ends with an appeal to readers who have additional sources of information, to make contact.

Readers who enjoyed Michael Kitson's series of articles in the Corps *Journal* from 1993 will certainly find this book of interest, a fitting account of brilliant Victorian ingenuity. JEN

EARLY DAYS IN SOMALILAND AND OTHER TALES

A PIONEER'S NOTEBOOK

H G C SWAYNE

Published by the Pentland Press Ltd, 1 Hutton Close, South Church, Bishop Auckland, Durham – Price £16.50
ISBN 1 85821 257X

COLONEL Harald Swayne was born in 1860, commissioned into the Corps in 1880 and retired shortly before the First World War. In the intervening 34 years of service, he had a most adventurous life. He joined the Madras Sappers and Miners in 1883, and the following year was sent, in command of a company of Madras Sappers, to Aden which was then the responsibility of the Indian Government. Some 200 miles south of Aden lay British Somaliland of which little was known. Officers serving in Aden had been across and brought back stories of the wild game there including elephants.

Swayne was very keen to follow in their footsteps and made his first trip to Somaliland in January 1885. This was the start of a number of such trips, some in the course of construction work for the British Assistant Resident, using his Madras Sappers, and others to explore the hinterland to search for big game. Thanks to his thorough training in engineering and surveying, Swayne kept records and surveys of every route taken. From these, he was able to produce the first detailed map of British Somaliland of which he became the acknowledged expert.

This absorbing book consists of a number of extracts from four large volumes of manuscript which he left when he died in 1940. It is through the efforts of his

grandson and granddaughter that this book has now been produced.

As the title suggests, it is not only concerned with Somaliland but also with his visits to Portuguese East Africa, Zanzibar and Mombasa. Also recorded are details of a campaign in Burma in 1889/90 in which he took part and later of the great Durbar in Delhi in 1911/12 to celebrate the coronation of King George V and Queen Mary. Those who served in Aden in the 1960s would also recognize many of the places he visited while serving there.

But his abiding interest was as a big game hunter. Modern conservationists would be somewhat alarmed to read of some of his trips on shikari. One such trip, exploring the hitherto unknown Issutugan River in Somaliland, resulted in a bag of five elephants, four oryx, two lesser kudu, seven Waller's gazelles, two wart hogs, five gazelles and two dik-dik. But as well as an explorer, surveyor and big game hunter, Swayne was also an accomplished artist. From his trips, he brought back sketches of many of the animals he had seen; some of these adorn pages of the book. To him was attributed the discovery of two hitherto unknown species of deer which now bear his name – the Somali Hartebeest (Bubalis Swayne) and one of the little dik-dik antelopes (Madoqua Swayne).

Readers of this book would well understand why Colonel Swayne liked to be referred to as the last of the early explorers in succession to such great names as Burton, Livingstone and Stanley. It is a collection of fascinating stories of the life of a Sapper officer one hundred years ago. PCS

A HISTORY OF THE BRITISH CAVALRY 1816-1919
VOLUME 8: THE WESTERN FRONT 1915-1918, EPILOGUE 1919-1939
THE MARQUESS OF ANGLESEY

Published by Leo Cooper/Pen & Sword Books Ltd, 47 Church Street, Barnsley, S70 2AS – Price £40.00
ISBN 0 85052 467 9

THIS is the final volume of Lord Anglesey's comprehensive history of the British Army's mounted cavalry from the years immediately after Waterloo until the end of the First World War. The project series has been 30 years coming to fruition under the auspices of the publisher, Leo Cooper, and has been widely acclaimed not only as great history (the series has been awarded the RUSI Chesney Gold Medal) but also as an affectionate and readable chronicle of the British Army's most colourful arm. This volume includes the battle of Cambrai, the first major battle designed to exploit the special characteristics of the tank. For Sappers there will be a particular interest in this volume because of the involvement of the pioneers such as Swinton, Martel and Capper as well as Elles who led the Tank Corps at Cambrai. The impotence of mounted cavalry to exploit the advantage gained by tanks in this battle is realistically related and the sense of the dawn of the new era comes across sympathetically.

Although the series ends officially with 1919 this volume carries an epilogue which tells how mechanization was successfully embraced by cavalry regiments in time for the Second World War.

GWAN

SOLDIERS OF THE NILE
A BIOGRAPHICAL HISTORY OF THE BRITISH OFFICERS OF THE EGYPTIAN ARMY 1882-1925
HENRY KEOWN-BOYD

Published by Thornbury Publications, The Old Rectory, Thornbury, Bromyard, HR7 4NJ – Price £20.00
ISBN 0 9528047 0 0

THIS very useful book of reference has been produced by an established expert on the subject of nineteenth century Egypt and its army. Essentially it is an alphabetically arranged list of mini-biographies of the eleven hundred or so British officers who served, from the effective assumption of power by the British after the defeat of Arabi at Tel-el-Kebir, to the formation of the Sudan Defence Force in 1925. A useful historical introduction also gives an outline of political and strategic background to the period. Apart from the obvious personalities such as Herbert Kitchener and Reginald Wingate it is surprising how many distinguished names of those who cut some military teeth in Egypt and the Sudan turn up from a quick browse through, such as Haig and Smith-Dorrien, together with a number of other Sappers. GWAN

Explanation of Abbreviations and Foreign Words Used in This Journal

2IC ..... second in command
& ..... and
(A) ..... Army
AAC ..... Army Air Corps
ABLE ..... automotive bridge launch equipment
(AE) ..... (Army Element)
AG ..... Adjutant General
AI ..... assistant instructor
Airmob ..... airmobile
Amph ..... Amphibious
APC ..... Army Personnel Centre
App ..... Apprentice
ATR ..... Apprentice Training Regiment
AVLB ..... armoured vehicle-launched bridge
AVRE ..... armoured vehicle RE
AQMG ..... assistant quartermaster general
Armd ..... Armoured
ARRC ..... Allied Command Europe Rapid Reaction Corps
BAOR ..... British Army of the Rhine
Bde ..... brigade
BEF ..... British Expeditionary Force
Bn ..... battalion
BP ..... Bulk Petroleum
CATC ..... Combined Arms Training Centre
Cbt ..... combat
Cdo ..... commando
CET ..... combat engineer tractor
CETC ..... Combat Engineer Training Centre
cf ..... compare
CI ..... chief instructor
CinC ..... commander in chief
CIGS ..... Chief of the Imperial General Staff
CO ..... commanding officer
Co ..... Company
Comd ..... Command
comms ..... communications
Const ..... construction
COS ..... chief of staff
CPX ..... command post exercise
cm ..... centimetre
CRE ..... commander RE
CS ..... close support
CSM ..... company sergeant major
CsRE ..... commanders RE
CSSG ..... Combat Service Support Group
CVHQ ..... Central Volunteer HQ
DAD ..... deputy assistant director
DCRE ..... deputy commander RE
DDOR ..... Deputy Directorate of *Operational* Requirements
Def ..... Defence
DEODS ..... Defence Explosive Ordnance Disposal School
DEO(W) ..... Defence Estates Organization (Works)
Div ..... Division
DSO ..... Distinguished Service Order
E&LSC ..... Engineer and Logistic Staff Corps
EESG ..... Engineer Equipment Support Group
ES(42) ..... Equipment Support
EinC ..... Engineer in Chief
Engr ..... Engineer
EOD ..... explosive ordnance disposal
eg ..... *exempli gracia* for example
EOKA ..... Ethnike Organosis Kupriakou Agonos (loosely translated as National Organization of Cypriot Struggle)
etc ..... et cetera
FARELF ..... Far Eastern Land Forces
Fd ..... field
FI ..... Falkland Islands
ft ..... feet/foot
FTX ..... field training exercise
G3 ..... operations
GHQ ..... General HQ
Gp ..... group
GPS ..... Global Positioning System
GS ..... General Staff
GSB ..... General Staff Branch
GSO ..... General Staff Officer
HQ ..... headquarters
HM ..... His/Her Majesty
hr ..... hour
IC ..... in charge [of]
ie ..... *id est* = that is
IFOR ..... Implementation Force
Incl ..... including
Indep ..... Independent
JARIC ..... Joint Air Reconnaissance Intelligence Centre
JNCO ..... junior non-commissioned officer
kN ..... kilo Newton
kph ..... kilometres per hour
km/s ..... kilometre/s
LAND ..... Land Command
lb ..... *libra* (a pound or pounds weight)
Lt Col ..... lieutenant colonel
m/M ..... metre/million
MCM ..... managing and career management
mech ..... mechanical
medico ..... *medical* officer
MELF ..... Middle East Land Forces
MES ..... Military Engineering Services
mm ..... millimetre
MLC ..... military load class
MND(SW) ..... Multi National Division (South West)
MOD ..... Ministry of Defence
MT ..... mechanical transport
MWF ..... Military Works Force
NATO ..... North Atlantic Treaty Organisation
NBC ..... nuclear, biological, chemical warfare
NCO ..... non-commissioned officer
No ..... number
Northag ..... Northern Army Group
OC ..... officer commanding
OCTU ..... Officer Cadet Training Unit
OPCON ..... operational control
OR ..... other ranks
Orbat ..... order of battle
Para ..... Parachute
Pk ..... Park
Plt ..... plant
plc ..... public limited company
PoW ..... prisoner/s of war
ppm ..... parts per million
PSP ..... Pierced Steel Plank
QGE ..... Queen's Gurkha Engineers
QM ..... quartermaster
QMG ..... quartermaster general
QMS ..... quartermaster sergeant
QMSI ..... quartermaster sergeant instructor
QVO ..... Queen Victoria's Own
RA ..... Royal Artillery
RAC ..... Royal Armoured Corps
RAEC ..... Royal Army Education Corps
RAF ..... Royal Air Force
RCT ..... Royal Corps of Transport
RE ..... Royal Engineers
RRF ..... Rapid Reaction Force
RHQ ..... Regimental HQ
Rly ..... Railway
RMA ..... Royal Military Academy
RN ..... Royal Navy
RSME Royal School of Military Engineers
SAS ..... Special Air Service
SD ..... Staff Duties
Sgt ..... sergeant
SI ..... staff instructor
SME ..... School of Military Engineering
SNCO ..... senior non-commissioned officer
SO ..... staff officer
Sqn ..... squadron
SSgt ..... staff sergeant
SSM ..... squadron sergeant major
STC ..... Strike Command
STRE ..... Specialist Team RE
t ..... tonne
TA ..... Territorial Army
TAVR ..... Territorial and Army Volunteer Reserve
TICRE ..... Technical Information Centre RE
Tp ..... Troop
Trg ..... training
UK ..... United Kingdom
UN ..... United Nations
UNHCR ..... UN High Commissioner for Refugees
US ..... United States
USA ..... *United States of America*
USSR ..... Union of Soviet Socialist Republics
(V) ..... volunteer
VCO ..... Viceroy's Commissioned Officers
Wks ..... works
WOI/II ..... warrant officer class 1/2
yds ..... yards
YO ..... young officer

BLESMA

BRITISH LIMBLESS EX-SERVICE MEN'S ASSOCIATION

ARE YOU ELIGIBLE FOR HELP?

BLESMA is a National Charity specifically for limbless Ex-Service men and women. The Association also accepts responsibility for the dependants of its members and, in particular, their widows.

BLESMA wants to help 5,000 more eligible men and women. The Association promotes the welfare of men or women who have lost a limb or limbs or one or both eyes as a result of service in any branch of Her Majesty's Forces or Auxiliary Forces and to assist needy dependants of such Service limbless.

BLESMA CAN HELP:

Provide permanent residential and convalescent holiday accommodation through its two nursing and residential Homes at Blackpool and Crieff in Perthshire.

Provide financial assistance to Members and Widows in the form of Grants.

Assist in finding suitable employment for Amputees.

Furnish advice on Pensions, Allowances, makes representation to Government Departments on individual entitlements and, where necessary, represent Members and their dependants at Pensions Appeal Tribunals.

A LEGACY MEANS A LOT TO THE LIMBLESS

Help the disabled by helping BLESMA with a donation now and a legacy in the future. We promise you that not one penny will be wasted.

For further information contact:

HQ BLESMA, Dept. REJ,
Frankland Moore House,
185-187 High Road,
Chadwell Heath, Romford,
Essex RM6 6NA

Telephone: 0181 590 1124 Fax: 0181 599 2932

Registered as a Charity under the Charities Act. 1960. No. 207621

OUR REF 500840