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Editorial

"ENGINEER in Chief's Annual Report to the Corps" summarises the major developments over the past year and looks ahead to the future. It is a time of significant change on a number of fronts, what with realigning the Corps into its post-SDR establishments and bringing into service new equipments which will dictate engineer capabilities for the next ten or more years; all this with continuing heavy commitments in the Balkans and elsewhere. The events of 11 September and the war in Afghanistan put into sharp focus the decisions made in the SDR process to develop forces to be more adaptable for operations, in conjunction with coalition partners, such as those we are now seeing to counter the threat of terrorism.

There is a good range of articles from serving members which are both topical and thought-provoking, ranging from the higher-level conduct of engineer operations in Kosovo to practical lessons learnt in peace-support operations in Northern Ireland. These may be of more interest to serving members as they deal with current concepts and roles that are important in maintaining the professional standards to which the Corps aspires. Opening up such ideas, for discussion and debate, to members of the Corps is one of the fundamental objects of the Institution, and it is hoped that those who wish to advance their professional knowledge will take time to read them.

It is clearly important that the articles in the *Journal* must be enjoyable to read, albeit readers tastes vary considerably, but there is little doubt that some will have much wider appeal than others. "Memoirs of a Tunnelling Officer in the First World War" is surely one of these. It not only gives a brief glimpse of the social history of the early 20th Century, but also conveys the fear, the courage and stoicism of the soldiers of those times; and there are some wonderful touches of humour. The author died 37 years ago and we are thankful that his son unearthed his notes and manuscripts and offered them to the Institution.

This is the first *Journal* for some years that has included contributions from a warrant officer and commissioned ranks from captain to brigadier. Although the Publications Committee want to maintain a good standard of articles, it is their variety which will help to make the *Journal* appeal to a wider readership. There are still too few article being submitted to make this possible. We need therefore to have contributions from as wide a cross section of the membership as possible. Some criticism of the *Journal's* lack of appeal to junior members in particular has prompted a review to determine, amongst other things, whether any changes should be made to its style and presentation. These have changed little in its 126-year history.

We said farewell to Mrs Juliet Scanlan, our assistant secretary, two months ago and I know that many of you would like to join me in thanking her for the great contribution she has made to the Institution's publications over so many years.

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Engineer in Chief's Annual Report to the Corps

Introduction

THE Corps has had another successful year and continues to be held in the very highest regard by others in the Armed Forces and the Government. Our importance as a Defence asset was again clearly demonstrated by the extensive essential enabling works carried out by the Corps in the Oman for the Joint Rapid Reaction Force Exercise *Saif Sareea II*, as well as the tasks undertaken during the exercise.

The Corps continues to grow in size with the implementation of the SDR ORBAT. This process is due to continue through to 2005 with a peak in 2003. Undermanning, however, remains a problem and will continue to do so until we have reached our steady-state SDR ORBAT. I regret that some level of under-manning is likely to be with us for the next three or four years and is something that we will have to manage as effectively as possible.

However, recruiting is much healthier, retention is constantly improving and soldier promotions continue to increase and are likely to do so for some time to come. It is also good news that, in general, our tour interval has risen to more sustainable levels although some elements of the Corps remain very badly over committed.

The RSME PPP moves closer to fruition. The number of bidders has been reduced to two who are now in the process of completing their Best and Final Offers. The process is on track for the contract to go live in early 2003.

Organization

THE implementation of SDR continues apace and I am pleased to report that plans are now approved for all but one of our new units. 26 Engr Regt is just moving to its interim site at Ludgershall and looks forward to the formation of 30 Fd Sqn to complete the close support capability required for 12 Mech Bde. The TQM of 23 Engr Regt is now in place at Woodbridge, working on the barracks plans for the regiment as a precursor to the Operations Planning Team forming early next year and the Command Team being in place next September. Similarly, an implementation team is already in place at RAF Leeming in preparation for the formation of 10 Fd Sqn (Air Sp), which will now become part of 39 Engr Regt. All three of these new units will be fully formed in 2003 and ready to embark on collective training in 2004. The increase in the MWF also continues, with 518 STRE (Wks) having formed early, at the start of this year, and 522 STRE (Wks) planned to move from Hameln to Chilwell in the summer of 2002. 52 Fd Sqn (Air Sp) is to form up in 2005. We continue to pursue the Manpower Establishment Review endorsed aspiration to increase the size of 33 Engr Regt (EOD) so as to allow it to better meet its operational commitments. Regrettably under the restructuring of the Army Technical Foundation College in Sep 01 for the Army Foundation Project, 82 Trg Sqn RE has been disbanded.

As I have mentioned, the ramp up of manpower in the Corps will lag behind the SDR increase in liability. This will, to some extent, institutionalize under-manning for the remaining years of the SDR implementation period. As a result of this I have produced a Corps Soldier Manning Policy, to ensure that we manage our manpower as effectively and efficiently as we can, whilst also encouraging the ATRA to increase its throughput of RE recruits. I have every confidence that we can and will meet our post-SDR manpower liability.

Change is endemic in today's Army. As I write this report there are inevitably a plethora of ongoing studies, into a whole variety of issues, at various stages of maturity that could make further changes to the way we organize ourselves. The LANDmark study and Strategy for the Army (SFTA) are two of the more significant of these. The LANDmark study, which looked at the way LAND Command is structured, will result in major changes to that headquarters. The unique nature and utility of the Corps has led, however, to Engr Div LAND remaining largely intact but now as part of a new organization called Theatre Troops. At a higher level SFTA is building on the SDR to provide a re-validation of the Army force structures against planning assumptions and linking them to projected manning levels. The findings from this are not yet available.

Operations

LAST year I reported that the average tour interval for the Corps was 13 months, and set to increase. Even allowing for the deployment to

Macedonia, the average tour interval is now over 18 months, although certain units such as MWF and 33 Engr Regt (EOD) continue to suffer shorter intervals. TA units continue to produce a steady flow of officers and soldiers for deployment on operations (over 30 are currently deployed in the Balkans). They continue to relieve pressure on heavily committed regular units.

Kosovo. The tour plot is now firmly aligned with the Formation Readiness Cycle (FRC), with changeover dates in May and November. The ORBAT of RHQ, HQ squadron, close support squadron and field support squadron is now well proven and is supplemented by an EOD troop, HQ CRE (Wks), STRE (Wks), and Geo detachment. The regiment is now a truly pan-Balkans regiment encompassing the Bosnia close support squadron, and surging from one theatre to the other, and even Macedonia, as necessary. The focus in Kosovo remains internal security. Search has grown considerably with the Search Cell from 33 Engr Regt (EOD) controlling the operations of battle group all arms search teams. From November 2001 there have also been Royal Engineer search advisers, teams, and specialist search teams and equipment, found from within the roulement engineer regiment.

Bosnia. A close support squadron provides engineer support to both MND(SW) and the UK battle group. This is seasonally adjusted to support an armoured or mechanised battle group, and changes over in April and October. Additionally an EOD troop and an STRE (Wks) (-) supports MND(SW). Many of the tasks this year have been as a result of a rationalisation of the force structure and bases (both UK and other nations).

Macedonia. In late August, elements of 36 Engr Regt deployed to Macedonia to support 16 Air Asslt Bde in the collection of weapons handed in by the National Liberation Army. RHQ(-), 50 HQ Sqn(-) and 9 Para Sqn deployed from the UK to provide support to the brigade and 2 PARA battle group, whilst 39 Armd Engr Sqn(-) deployed from Kosovo as the Force engineer squadron.

Falkland Islands. After a review the maintenance section will increase to a level commensurate with the work required on the equipment held in theatre. This section is supplemented by an annual squadron-level construction project, and regular exercising of the Lead Air Support Squadron in FI.

Northern Ireland. Rear basing of the Roulement Engineer Squadron has continued in principle, although this is more apparent in the winter outside the marching season. Roulement dates are being realigned to mid-March and mid-September to ensure that one squadron can cover the whole marching season, thus reducing the training bill.

Sierra Leone. The RE maintenance detachment remained at 1+10 whilst it supported the Short Term Training Teams. A Freetown Maintenance Section (five tradesmen) was also deployed from mid-April to November, as well as a larger surge deployment for six weeks to construct an ammunition depot. The STRE (Wks)(-) remained throughout, as has a two-man EOD detachment. In November the various detachments were consolidated into one detachment of eight tradesmen, based in Freetown, to support the UK military assistance to the Military Re-Integration Programme. Both the EOD detachment and the STRE (Wks)(-) returned to the UK in December.

RAF Operations. RAF deployments have continued to be supported by 12 (Air Sp) Engr Bde, who undertake a wide variety of important tasks in the Middle East and Balkans.

Collective Training and Exercises. Collective training in the UK, Germany and Canada was severely restricted in the early part of the year as a result of the Foot and Mouth Disease (FMD) epidemic. Some overseas training exercises did proceed on schedule. The biennial refurbishment of the BATUS training area was also squeezed through before the Canadian authorities closed training down to UK forces. The scope of the special-to-arm construction exercises, their austere conditions and remote locations, continue to provide units with challenging and worthwhile training. As the year progressed and training restrictions were lifted, combined arms training resumed. Some combined arms training was lost but all special-to-arm exercises proceeded on schedule. Sadly, one of the casualties of FMD was 29 (Corps Sp) Engr Bde's first brigade FTX, which would have involved engineer regiments from the UK, Italy, Poland and the Netherlands training together on Salisbury Plain.

Combined arms training for many units is now directed by the FRC. Those units in their Training Year looked forward to a demanding programme of training that progressed to formation level training at BATUS and for some, in the Oman on Ex *Saif Sareea II*. For others, main effort was the enabling works for Ex *Saif Sareea*

II, which peaked in August with both 28 Engr Regt and 39 Engr Regt in theatre under the command of HQ 12 (Air Sp) Engr Bde. The exercise, a Combined Joint exercise with the Sultan of Oman's Armed Forces, was designed to prove the Joint Rapid Reaction Force concept. Sappers supported the land, air, maritime and logistic components and at one stage this involved significant elements of 21, 28, 35, 39 Engr Regts, 59 and 131(V) Cdo Sqns, 522 STRE(Wks), 516 STRE(BP), 521 STRE(WD) and Geo support. All made an outstanding contribution to the exercise but perhaps worthy of special mention is 39 Engr Regt who worked tirelessly through the heat of the summer, in temperatures reaching 50°C, to construct the infrastructure and camps for the joint forces. None of this would have been achieved without the logistics support provided by 45 Fd Sp Sqn who, having worked in the desert from late May to December without a break, can truly claim to have been ***first in last out.***

In addition to all the activity associated with Ex *Saif Sareea II*, 'normal' overseas, special-to-arm exercises continued unabated. Units deployed to North America, both Canada and the US, Belize, the Falkland Islands, Ascension Island, Gibraltar, Cyprus, Germany, Norway, Kenya, Oman and Kuwait. Despite the severe financial restrictions imposed as a result of the costs of Ex *Saif Sareea II*, the Corps only lost one overseas exercise.

I have made no distinction here between Regular and TA exercises, for good reason. Of all the countries mentioned above, the TA exercised in over half of them. This is an outstanding achievement, given the restrictions in place at the time and I look forward to the TA continuing to train and exercise around the world in the future.

Reserve Forces and the TA

THE five RE TA regiments continue to train in their operational roles in support of the ARRC or the RAF. A review of the post SDR RE TA establishments has been carried out and the outcome is eagerly awaited. There are signs that recruiting, which has slipped to 87 per cent from 93 per cent last year, is picking up again and it is noteworthy that the recent recruit course (RESTART) and the RE Troop Commanders Courses (V) were both oversubscribed, particularly RESTART which was 100 per cent oversubscribed.

The RE TA Training Plan is regarded as best practice across the whole of the TA. The Career Employment Structure for Officers and Soldiers of the Royal Engineers – Part 4 – Territorial Soldiers was issued in June. Currently the RE TA are conducting a user trial on a Training Management Information System (Project CRESTA) which will last until April 2002. Command courses at all levels at the RSME are well subscribed and a review of all RE TA officer training has been underway for several months.

Attention is now turning to Vocational Qualifications with the focus being HQ RE TA. The basis of the plan will be to offer Level 2 to all soldiers within their employment with the opportunity to pursue Level 3/4 management qualifications linked to command courses.

Over the past year, some 114 individuals (four per cent of the RE TA) have undertaken a period of mobilized service in support of operations, on Full Time Reserve Service (FTRS) and on "S" Type engagements. A small number of officers on FTRS have successfully applied for conversions for their TA commissions to Regular commissions. The RE TA deployed equipments and manpower, including specialists not available in the Regular Army, to assist MAFF in fighting the FMD epidemic. In addition, a team from the RE TA, under the command of MWF (V), deployed on Op *Tosca* to Cyprus to carry out essential health and safety work in support of HQ UNFICYP and individuals from the Civil Affairs Group have deployed on operations to Sierra Leone.

Engineer Logistics

THE Corps' logisticians, from our front line HQ and Fd Sp Sqns personnel through to those embedded in the Base area, have continued to undertake a pivotal role enabling engineer activity world wide. The continuing high operational tempo, with the enduring commitments to Sierra Leone and the recently enhanced deployment to the Balkans, has provided particular logistic challenges. Closer to home, MACA operations to support both flood relief and the Services' response to the FMD epidemic created demands for a wide range of engineer materiel to be deployed at short notice. There has also been a notable increase in collective training. 3 (UK) Division undertook a logistic exercise involving all the UK based engineer logistic units. A number of challenging OTXs took place in the Falkland Islands, Kenya, Belize and Cyprus and, as ever, timely well planned and executed logistic support proved critical to the success of them all.

Military Engineer Services

SUPPORT to operations continues to dominate the work of specialist engineers, resulting in an unacceptable tour interval for some. As I have mentioned, we have managed to bring forward some of the SDR enhancements to MWF, increase the establishment of Operational Commitments Establishment posts and also increased the scope of some contracts to reduce the requirement for military expertise in theatre.

Management of our non-operational estate has also assumed a higher profile and this has resulted in requests for more specialist engineer involvement and placed greater demands on existing staff. Chartered engineers, garrison engineers and clerks of works continue to play key roles in this essential activity, and their input could increase further, under organization and procurement initiatives currently being staffed. In the UK, the re-roling of CRE (Airfields) to provide an integrated works delivery organization on six STC airfields is well under way and could provide a model for our activities elsewhere.

MES personnel are in great demand to assist with Project SLAM (Single Living Accommodation Modifications). Work is presently ongoing in both UK and UKSC(G) to provide a better standard of accommodation for all ranks. This work is seen as a key factor in retention, and is therefore of a high priority.

Significant progress continues to be made in developing infrastructure and sustainability doctrine. Joint Warfare Publication 4.05, covering infrastructure management on operations, will be published shortly.

MES is now an integral part of HQ RE at HQ Land Command, under Commander Engr Land. This now brings all three legs of deployable engineer support under the one command. It is still intended to move the doctrine, policy making and Group B MS focus to HQ EinC (A) at some point in the future.

All areas of MES continue to be stretched by operational commitments. Support is currently being provided to three Military Works Areas: Bosnia, Kosovo, and Sierra Leone; and support to Macedonia has been recced. In addition to this, support is also provided in Northern Ireland, the Falklands, Cyprus, Gibraltar, Nepal, Belize and Brunei.

Geographic Engineer group

ON 15 Nov 00, 42 Survey Engineer Group was disbanded, some 15 years after it was formed, to became the Geographic Engineer Group (GEG); at the same time, 42 Engr Regt (Geo) was formed. The term RE (Svy) was replaced by RE (Geo); the squadrons' titles were changed from "Topographic" to "Geographic", and 14 Sqn lost its independence. In March, Lt Col J D Kedar RE became the first commanding officer of the regiment, and in May, it exercised the Freedom of Newbury.

The regiment currently remains committed to operations in Bosnia, Kosovo, Macedonia and Sierra Leone. It continues to deploy on survey and geographic work throughout the world, such as Jamaica and the Azores, and has had troop-sized deployments for two months to both Cyprus and Kenya. In addition, the regiment supported exercises in France, Germany, USA and Norway, and 14 Geo Sqn deployed to Oman for three months on Exercise *Saif Sareea II*. The GEG in general, and 42 Engr Regt in particular, have remained at the forefront of geographic support to defence, not only in the UK, but also within NATO and ABCA forums.

Following the recent re-structuring of ME Geo Tech trades, the Royal School of Military Survey (RSMS) has completed the transition to a new training syllabus, and training to new trades will begin late in 2001.

Recruiting, Manning and Career Management

THE Corps continues to attract and sponsor record numbers of officer candidates to Sandhurst. However, we need to guard against complacency and re-double our efforts to retain the interest of candidates during officer training. Notwithstanding the difficulties involved, there needs to be an increase in the number and frequency of unit visit and attachments to allow us to retain the loyalty of individuals during the Arms Selection Process. On the soldier side, I identified in my last report the extremely disappointing start to our ramp up to SDR manning. I am pleased to report that the structure established through the Corps' Recruiting Action Plan (RERAP) has had a very positive influence on recruiting figures. Although by the end of the year the Corps achieved only 87 per cent of its recruiting target, this was in stark contrast to the 65 per cent of target projected at the end of the 2nd quarter. I am acutely aware of the sacrifices units are making to support RERAP, but the

recovery in our figures from October is testament to its success. In actual number terms, by the end of the year, there was a net inflow of recruits into the Corps. However, with targets set so high because of the ramp up to full SDR manning, we were still in effect two squadrons worth of sappers short. I continue to monitor recruiting closely. RERAP, which addressed the immediate recruiting problem, was superseded in January by a recruiting strategy to take the Corps forward to full manning. At present the Corps is amongst the best recruited in the Army, but we are still not quite making our very ambitious targets and there is some way to go.

Last year I reported that RE MCM Div remained underresourced for its task in a period of significant change for the Corps. I expressed optimism that the establishment of the Regimental Career Management Officer (RCMO) in most major units would provide the focus for improved and consistent communication between the unit and the APC (at least on soldier matters). This year I can report the RCMO to be a resounding success. All are in place and effective. Units such as 1 RSME Regt, who did not have the benefit of the cover for the new post, have established an RO for the task and other units have nominated an officer to undertake the duties of RCMO. To complement this, RE MCM Div has reorganized and instituted new procedures to capitalize on the opportunity. Further, MS has enabled some of the long-needed extra staff: an additional three EOs and three AOs have started work in the last two months and have allowed the black economy NCOs to return to their units.

Soldier Issues. Soldier manning is hard hit by our overall situation. There are specific areas of shortage at SNCO level, particularly clerk of works, but the real pain is being felt in the junior ranks. Currently the Corps is only about 90 per cent manned over the ranks of Spr to Cpl and this has resulted in significant gaps within units. Some CEQs are far worse off than others (notably ME C^3S) and this is likely to remain the case until the recruiting situation improves further. The all-pervading issue of undermanning aside, there is much more good news in soldier career management:

- **Promotion.** The new establishments have created the opportunity for increased promotion numbers (as I reported last year) and the overall volume of selections for promotion this year has been slightly higher than even last year's exceptional numbers:
- **Spr to LCpl Promotions.** In addition, 547 soldiers have been promoted to LCpl in the past year compared to a steady state of about 390 in earlier years. I would wish all to note that all the promotion boards are maintaining the quality line achieved hitherto and, if quality is not available in a particular CEQ, then we take the pain of a gap. I expect the step-change in numbers felt in the last two years to be sustained up to achieving our SDR steady state in 2005. The new processes established last year to manage Spr to LCpl promotions have matured and been refined. In the past year over 30 per cent of those who gained their first tape were promoted directly by their commanding officer, the remainder being promoted by the new board in accordance with the needs of the Corps. In the coming year commanding officers are being granted a greater allocation of discretionary promotions and the "flash to bang" between selection boards and substantive promotion will be reduced to six weeks.
- **Career Reviews.** This year RE MCM Div has embarked on an ambitious new project of formalizing career reviews. In the wake of each promotion board, a Career Review Panel has been established to review and audit the career situation of every soldier in the rank (from substantive LCpl to WO2) whether he was not yet in the zone, not qualified, not selected, selected for promotion or out of the zone. The product is an Annual Career Advice Notice (ACrAN) for each soldier, issued with a covering letter to his commanding officer. For most the ACrAN will contain unremarkable and undisputed statements of fact; but for others, its content (the advice and action arising) will be fundamental and it is here that the added value of the new process arises. For the first time, once any issues arising have been discussed, the soldier, his commander and the staff of RE MCM Div will share a common view on the individual's situation and the direction of his future career.
- **Short Notice Postings.** Another shortcoming of recent manning performance has been tackled this year. The volume of short-notice postings (those with less than four months notice) has been driven down from 70 per cent last year to the rate of 31 per cent in the current year; RE MCM will continue to drive this down.
- **Retention.** Our soldier retention rates have improved steadily since the mid-1990s and the issues I have outlined above should be retention positive too. In combination, I hope that they will help to balance, at individual level, the pressures generated by undermanning in units. Indeed, further improvement in retention will be one of the keys to re-establishing full manning.

Officer Issues. This year 121 officer cadets at

Sandhurst had the Royal Engineers down as either first or second choice, of which the Corps required 50 per cent. SDR, the evidence of contemporary operations and our vision of the future, which includes a role in the higher level management of the Defence estate, all lead us towards the need to generate more chartered engineers. This is reflected in our commitment to, and uptake of, professional engineer training. We currently have 21 involved in the two year courses with a further eight starting this year. We continue to select between three and five officers a year to attend the Survey Course. Nine officers were selected for Staff College entry this year. This represents ten per cent of the course; a little more than our "share".

In contrast to soldier retention, there has been a noticeable increase in PVR of majors which reflects an Army-wide trend. At the same time there has been an increase in the number of majors posts within the Corps and a huge increase in the volume of SO2 and SO1 posts Army wide to which we must, of course, contribute. The result is, again, the requirement to manage significant gapping. Some 39 LE officers are in traditional mainstream posts where they are competing and shining at both staff and command. Even so, some 20 major's posts in the Corps remain unfilled until Beige List officers (those selected for promotion to major) can be released from training or captain's appointments. As with soldiers, so too for officers, it is a time of much change as Army-wide studies come into effect.

Pay 2000. Pay 2000 was introduced on 1 Apr 01 for all three Services. It introduced the use of just two pay bands and greatly reduced the complexity of the pay system. All combat engineer trained personnel up to and including the rank of Cpl were placed in the high band but initially only 30 per cent of the Corps' trades were evaluated and as a result, by default, those that had not been evaluated were placed in the low band. Whilst the Job Evaluation (JE) system and its process was understood it soon became clear that the methodology was far from perfect. The balance had shifted away from the requirement for qualifications, experience, complexity of work and mental challenge towards the use of resources, the variety of employment and span of command. This shift was not to the advantage of the more technical corps, including ourselves. I am hopeful that this will be addressed in the future and I will be actively involved in ensuring that a review of the JE strategy is carried forward. That said there is unlikely to be any significant change in the very near future so in the mean time we must run with the current system. To that end, the follow-up JE interviews for the evaluation of the remaining trade groupings in the Corps that took place in July, August and October are fundamental to reducing any retention-negative impact the initial Pay 2000 gradings may have had and I therefore look forward to some positive results. The AFPRB Team visits have also allowed us to air our concerns in this area.

Individual Training

THE work on the Statement of the Training Requirement (SOTR), which I reported on last year, has become even more important with the possibility of an increase in recruits set against the ever-tightening financial constraints imposed on the RSME by HQ ATRA. However we are well placed to continue to defend our case with the underpinning provided by REESR.

The Royal Engineers Training and Development Team (RETDT), ably supported by the Royal Engineers Training Aids Centre (RETRAC), has had another extremely busy 12 months. Work has been completed on a number of tasks including the external validation (EXVAL) of RE Command, Leadership and Management training, the review of the specialist qualifications and a number of training needs analysis tasks particularly on TROJAN and TITAN. Work continues on the course design of the Clerks of Works courses and a review of EOD training and an EXVAL has started on the RE Troop Commanders Course. The job analysis of the Professional Engineer Training Course will commence in January 2002.

The Defence Training Review (DTR) reviewed every major facet of individual training across defence and the DTR Report was published earlier this year. It is still early days but I judge that the review will have little impact for the Corps.

The Corps has continued to make major progress on civilian qualifications with the introduction of NVQs and a number of other types of qualification. Significant numbers of personnel continue to qualify as NVQ internal verifiers and/or assessors, with some going on to gain either the Further & Adult Education Teachers Certificate or a Level 3 or 4 NVQ in Training & Development. RE Wing of the Driving &

Maintenance School, intends to introduce an NVQ scheme in late 2001. 21 and 38 Engr Regts are piloting a limited range of NVQs delivered in units, with a view to establishing whether such arrangements can be spread throughout the Corps. It is growth industry and one that I will endeavour to retain once the RSME Private Public Partnership (PPP) process has been finalized.

RSME

WITHIN the last 12 months the RSME has trained over 14,000 students on 240 different courses. The RSME has also continued to make progress with the PPP project and the evaluation of project bids has recently been completed. Work is also progressing towards twinning the RSME with L'École Supérieure et d'Application du Génie, the French Military Engineer School at Angers.

- **RSME PPP.** Following the evaluation of bidders' responses to the Invitation to Negotiate (ITN), the RSME PPP project has now progressed to the Best and Final Offers (BAFO) stage. Carillion Defence Training and Holdfast Training Services have been invited to submit BAFO proposals, and the aim is to award a contract in Autumn 2002 with full contract implementation by April 2003. The evaluation of the short-listed bidders' ITN proposals required very considerable effort from the RSME, and I am extremely grateful for the professionalism and the dedication of all those involved in the evaluation. PPP is a great opportunity for the RSME, and I am confident that it will provide a high quality, secure future for the Corps' individual training.
- **Implementation of REESR.** Implementation of the new 2 to 1 trade courses has had to wait while the backlog of pre-REESR soldiers has been trained. Both types of course are now being run with the aim of phasing out all pre-REESR courses by the end of next year. The EXVAL process is now starting to review the first of the Phase 2 REESR courses.
- **Bridging.** The Combat Engineer School has successfully introduced the Mabey & Johnson logistic support bridge to all courses from Troop Commander to Combat Engineer Class 3. This has replaced the EWBB. BR90 courses continue.
- **Information Technology.** RSME continues to embrace information technology. The RSME website (*www.rsme.co.uk*.) has recently been upgraded to include course details and schedules are now updated monthly. Combat Engineer School has developed its own intranet site and continues to run IT night school for all permanent staff. Construction Engineer School is implementing a LAN, prior to setting up the School's Virtual Private Network. Future RSME developments include ambitious e-learning projects for many courses and the setting up of internet accounts for all students.
- **Capital Works.** Recent visitors to Chatham will have noticed significant building works, which have provided considerable improvements to the single living accommodation (SLA) within Brompton Barracks. This much-needed work will improve the quality of life for our soldiers on trade courses and for the permanent staff. Further capital works are in progress and include the building of two new SLA blocks providing 72 extra bed spaces and an additional gym/sports hall.

DOCTRINE

ENGINEER 2 in HQ EinC(A), now headed up by Col Force Development, has four of its five established SO2s. They ensure that appropriate engineer input is provided to the development of army, joint and multinational doctrine and that our capabilities are understood and represented at all levels. Among the important areas covered have been:

- **NATO Engineer Doctrine.** ARRC Engineer Branch is the focus for developing NATO engineer doctrine at the operational level. This ongoing work should significantly improve the visibility of engineers and our capabilities within NATO HQs.
- **Joint Engineer Doctrine**. Ex *Saif Sareea II* provided the first opportunity for the concept of a Joint Force Engineer to be exercised on a Combined Joint FTX. HQ LAND are therefore developing a preliminary Joint Force Engineer doctrine publication which will be formally circulated for comment. In addition we have been active in the development of Joint Service EOD doctrine.
- **Urban Operations.** Within the LAND component, doctrinal work on Urban Operations recognizes that whilst we are proficient at urban based Other Operations, our future ability to warfight in cities needs to be developed. The draft paper defines the need for mobility, countermobility and survivability in the future operational urban environment.
- **Non Lethal Capability**. The Non Lethal Effects Paper examines the requirement for a non-lethal capability for future operations, accepting that it should complement but not replace our existing lethal capability. The problem of anti-personnel mines was highlighted in the paper. Our view is that to focus solely on non-lethal anti-personnel mines would be too prescriptive and that a coherent anti

personnel capability should be examined instead.

- **Need for Mines.** In order to inform the debate on the requirement for anti-tank mines, Engineer 2 has prepared a draft paper on the need for obstacles and how these contribute towards capability – primarily the countermobility component of manoeuvre. Following circulation the paper will be passed to DGD&D for adoption as an all arms paper.
- **Close Support Engineer Doctrine.** This aims to provide doctrine guidance for engineer support at the brigade level. The second draft paper is on circulation.
- **Command and Control of Engineer Tasks**. A rewrite of Military Engineering Volume 1, Part 3 is currently underway. The revised document will provide an All Arms guide to the planning and control of Royal Engineers' tasks up to divisional level.
- **The Engineer Intelligence Handbook.** This is designed to identify categories of information that are of interest to Sappers on the battlefield and surrounding environment. It should enhance Sapper input to the Intelligence Preparation of the Battlefield process. The draft is now on circulation within the Corps.

EQUIPMENT

CLOSELY linked to that doctrinal work is my role as Second Customer dealing with the user aspects of new equipment. We have continued to make much progress on the engineer equipment programme over the past year:

- On the mobility front there is much good news. TITAN and TROJAN are one of the highest equipment priorities for both GOC 1 (UK) Armd Div and GOC 3 (UK) Div. A contract has now been let with Vickers Defence Systems for 33 TITAN (replacing AVLB) and 33 TROJAN (replacing CH AVRE) which is excellent news. The first prototypes will be available towards the end of next year and the ISD is 2006. TITAN and TROJAN are based upon an upgraded CR2 and will have many capabilities to which the rest of the CR2 fleet aspire. The Breaching and Dozing Capability (BaDC) programme is looking at a replacement for the in-service mineplough and dozer blade. Trials of the in-service mineplough mounted on CR2 have proved that CR2 provides a considerably greater performance compared to CH. The BaDC programme will run in parallel with TITAN and TROJAN and will have the same ISD.
- TERRIER is the air-transportable replacement for CET and has an ISD of 2007. Two proposed solutions (one from Vickers Defence Systems and one from BAE Systems) are being assessed and one will be selected before the end of the year. Currently both proposals meet our requirements and the Corps is well placed to receive a very capable vehicle.
- A contract has been let with Williams Fairey Engineering Limited for the Air Portable Ferry Bridge (APFB). It is currently undergoing user trials and has an ISD in mid 2003. It uses MGB top panels and has a basic span of 14m at MLC 35 (T) and (W). The integral reinforcement set can extend this out to 28m without reducing the MLC, and powered pontoons provide the RORO ferry capability (also at MLC 35). The complete system is carried on DROPS but the basic 14m bridge can be air dropped from a C130 and towed on special-to-role trailers behind light vehicles.
- The Logistic Support Bridge (LSB) is based upon the Mabey Johnson Compact 200 bridge though with modified ramps. We are buying an immediate stock for training and operations, and have the option to procure more at short notice when required. Training has already started and I expect the LSB to be formally accepted into service this year. A standard set provides crossings of 57.9m at MLC 80(T) and 51.8m at MLC 100(W). It also comes with a span-junction set and a distribution beam to allow 2-span builds, although it does not have an integral pier or pontoon.
- For longer close support bridging spans the Close Support Bridge (Trestle) (CSB(T)), which formally enters service this year, will provide an integral pier in a 5m deep wet or dry gap. The development of the Two Span Bridge (Pontoon) (TSB(P)) for use with general support BR90 is being carried out by Vickers Bridging and user trials are planned for the end of next year. Its ISD is in 2004 and it will allow a 62m crossing at MLC 72(T) and MLC 110(W). It is moved on three DROPS from which it is launched and constructed by a team of 12 men.
- Looking at mine detection and clearance our vehicle-based mine-detection capability will be divided into route proving (RP) and recce elements. It is intended that MINDER (RP) with an ISD of 2005 will provide an integrated capability to detect, neutralise and mark mines in support of route opening and proving operations. MINDER (Recce) with an ISD of 2010 will provide the capability for engineer recce to locate the edge of mined areas and to act as pathfinders for critical equipments. With regards to mine clearance, the Python Trailer reliability and user trial is due to take place in December 01.
- For countermobility the story is mixed. On the positive side SHIELDER Vehicle Launched Scatterable

Mine System vehicle field trial continues and is due to be complete by the end of this year. In addition, the comparative Evaluation Phase for the Area Defence Weapon is now in progress. This has an ISD of 2006. The Aimed Controlled Effect Anti-Tank Mine (ACEATM) was taken as a savings measure. That decision may be reassessed in the light of results from the Counter Mobility Balance of Investments analysis. It is worth reminding you that under present plans the only AT mines in service post-2006 will be: SHIELDER, Area Defence Weapon, MLRS-delivered AT2 and SI Barmine for local protection. The replacement of our lost AP capability is being considered but nothing substantive has emerged at this stage.

- In the plant world the C Vehicle Private Finance Initiative (PFI) continues apace. Bids were received in September 2001 from the two remaining companies, which are Fastex (Brown and Root/Caterpillar) and the Amey Ventures/Lex Consortium. The evaluation process is now starting with a contract award target date of March 2003.
- There are other C vehicle equipment programmes in the pipeline including replacements for LWT, MWT, HWT, MDT, plant trailer and the excavator fleet. These acquisitions will continue irrespective of any PFI contract award and will be included in the eventual contract.
- Finally turning to CIS, the BOWMAN project is now being realised with the selection of Computer Devices Canada – now known as General Dynamics (UK) – as the contractor. They remain committed to an ISD of 2004. Much progress has also been made on the Engineer Battlefield Information System, known as MAKEFAST, which now has an endorsed URD. The projected ISD is 2005.

Regimental Affairs

RE Museum. The strategy paper has now been approved and a summary was published in *The Sapper* magazine and the April edition of the *RE Journal*. To complement the strategy we have invited Army Management Consultancy Services to prepare a five-year business plan. The Museum Foundation has embarked upon raising the funds needed to build the extension and is preparing a bid on the National Lottery. The improvements funded by the Government's Designation Challenge Fund will be completed this winter. The 50-year lease is supported by a Customer/Supplier agreement which defines the support to be expected from the MOD and what the MOD requires from the Museum in return. Meanwhile the Museum has achieved re-registration with the Council for Museums, Archives and Libraries, a mark of its continuing professional excellence. It should be noted that the Library is included in this award. These developments coupled with support from the Foundation and Friends allow us to face the future with confidence.

RE Band. The 32 members of the Corps Band have had a very busy year undertaking a total of 189 engagements: 89 military band, 85 orchestral and 15 fanfares. The main effort this year was raising funds for the Museum, involving a very successful tour of Scotland and participating in "Music of the Night" with the RA Band at Woolwich which earned some £5,000. Recently the band has been in the recording studio cutting a CD for the 25th Anniversary of *The International Military Music Society* and a sequel to Bandstand Favourites, *Bandstand Favourites II*. Next year it is proposed that the band visit the US Army's equivalent of the Engineer in Chief's Conference in May and from September the band will be in Cyprus for three months.

RE Association. The REA continues to provide support to the retired sapper, his spouse or widow and their dependent children who are experiencing hard times. Last year the number of cases the REA assisted was almost 1,200 at a cost of £360,000. About two thirds of this comes from the serving soldier who through his generosity is helping those who are suffering "severe financial distress". The range of types of assistance given to those in need continues to grow. The purchase of electric-powered vehicles, bath lifts and stair lifts has helped to ease the suffering and discomfort of those elderly former Sappers who have served their Corps and country and are now asking for assistance to ease the difficulties experienced with old age. Apart from benevolence the REA continues to have Veteran Weekends and Family Events around the UK, which are much enjoyed by all who attend. The formation of "Functional" branches continues to broaden the REA membership base with many applications to join the new Junior Leaders Branch, Survey, Armoured Engineers and Postal & Courier branches.

Headquarter Mess. The long awaited refurbishment of the Headquarter Officers' Mess at Chatham has been completed. The public rooms were opened in time for the March Corps Guest

Night and in early September the hoardings came down around the newly refurbished junior and field officer rooms which all now have their own facilities. There has also been a transformation of the Cellar Bar.

Adventure Training. Over the past year the Corps has provided financial support to those taking part in adventurous training expeditions and challenging pursuits and overall there has been an increase to 109 trips that were mounted. These included Operation *Raleigh Projects* in Bolivia, Brunei and Ghana; climbing in Thailand, Nepal, France, Italy, Germany, Spain and Bolivia; sailing as far a field as the Arctic; skiing in Canada, France, Austria, Switzerland, Germany and Scotland; sky diving in the USA and Cyprus; and trekking in India, Australia, USA, Spain, South Africa, Guyana and Peru. Assistance has also been given to individuals and teams taking part in sport in South Africa, Canada and the USA.

Corps Sport. The Corps has had another good year on the sports fields. On the occasion of the Army FA's 100th cup final 28 Engr Regt retained the Major Units football title and we also produced the losing finalist in 3 RSME Regt. This all-sapper final ended 3-3 after extra time and was decided on penalties. By way of consolation 3 RSME Regt won the UK Inter-Service Jubilee Cup and then took the Army 6-a-side title, defeating 27 Regt RLC. 42 Engr Regt(Geo) reached the Minor Units football final losing a very close game 3-2 against Def Int Sy Centre. In addition 42 Regt continue to shine, at Major Units level in hockey. They retained the Army title and then took the Tri-Service champions cup. At rugby they reached the final of the Army Minor Units, losing to 29 Regt RLC. To complete an Army hockey one-two the Military Works Force won the Army Minor Units hockey final. On the skiing front, 35 Engr Regt are once again Army and Inter-Service Nordic Champions but were placed second in the Princess Marina with 28 Engr Regt in sixth place. The Corps rugby league team were victorious in the Lawson Cup, the Inter-Corps competition, defeating the REME in the final 42-20. Corps boxing goes from strength to strength. The Corps boxing centre has now been set up at Waterbeach under WO2 Chadwick and the team have recently boxed at prestigious venues in London and Guernsey. On the individual boxing front Cpl James, the Army cruiser-weight champion, was entered in the All England ABA Senior Championships and subsequently won Gold in the National Final. Four Sappers reached the Army Finals, Spr Robson and LCpl Bateson, both of 35 Engr Regt, became Army featherweight and light middleweight champion respectively and Cpl Pearson, MWF, and LCpl Johnston, 35 Engr Regt, were losing finalists in heavyweight and welterweight respectively. In the shooting world we now have a total of 13 officers and soldiers entitled to wear the coveted Army 100 badge – an unprecedented number. At Bisley, 3 RSME Regt won both the Army long and short range team sniper matches with Capt Camp and Cpl Wellings, both of 3 RSME Regt, winning the individual titles in long and short range. The RE Sports Parachute Club won the Armed Forces Skydiving Championship and in the sailing world REYC entered three boats in the Fastnet Race though only one completed the course. Windsurfing has been a recognized Army sport for a number of years now. This year the Corps windsurfing team has broken new ground by winning the Inter Corps Championships in a fierce contest around Portland harbour; individually SSgt Machell of 36 Engr Regt won the Army novice title and Maj Noble became the 7.5m class champion. Finally, Lt Unsworth of 35 Engr Regt represented Great Britain in the Women's European Triathlon Championships in the Czech Republic in June of this year; a 1500m swim followed by a 40km cycle time trial and a 10km run. Her time of 2hrs 26mins won her the race and the European title.

Military Secretary Appointments and Honours and Awards. Lieutenant General Sir Anthony Pigott CBE was appointed Honorary Colonel Engineer & Logistic Staff Corps in April 2001. Lieutenant General K O'Donoghue was appointed Honorary Colonel 75 Engineer Regiment (V) from 1 April 2001 and Colonel The Royal Gloucestershire, Berkshire and Wiltshire Regiment on 13 August 2001. Major General R A Oliver CB OBE became Representative Colonel Commandant on 1 January 2001. Major General J D Moore-Bick CBE was appointed Honorary Colonel 39 (Skinners) Signal Regiment (V) from 6 June 2001 and Colonel G R Marsh TD was appointed Honorary Colonel Specialist Units (V) on 1 May 2001. Col W R Barker became TA Advisor to EinC(A) and Dep Comd HQ RETA in April 2001.

Military Secretary appointments of senior offi-

cers were: Lieutenant General K O'Donoghue, United Kingdom Military Representative Headquarters NATO in May 2001; Major General J D Moore-Bick CBE, GOC United Kingdom Support Command (Germany) in March 2001; Brigadier P A Wall, Commander Joint Force Operations PJHQ in April 2001; Colonel G O Whitehead CBE, Commanding Officer Engineer and Logistic Staff Corps on 16 January 2001; Colonel G C W Dodds, Commander Royal Engineer HQ LAND in December 2001; Brigadier M F N Mans, BGS HQ LAND in December 2001; Brigadier N H Rollo, ACOS J5 PJHQ in December 2001; Brigadier D R ff Innes, EinC(A) in February 2002; Brigadier K H Cima , Senior Army Member Royal College of Defence Studies and promoted to Major General in April 2002.

During the past twelve months the number of honours and awards conferred on serving members of the Corps includes: the award of KCB to Lieutenant General Sir Anthony Pigott CBE, 4 x OBE, 11 x MBE, 6 x QCVS and 1 QCB.

Conclusion

CLEARLY this report is self congratulatory: it should be. It reflects a very great deal of hard work throughout the Corps in training, on operations and gearing ourselves in doctrine, equipment and organizational terms for the operations for the future. In addition, many have found time and the determination to undertake expeditions and sport with considerable success. It reflects a Corps of high quality young men and women focussed on getting the job done and with considerable robustness, stamina and professional expertise. It also, in part, demonstrates how the serving Corps is sustained by the wider family of the Corps.

As I finish my tour as EinC(A) I am confident that the Corps will continue to face every challenge and opportunity with the same vigour and expertise as it has done throughout its history. I finish with an enormous sense of pride, not for my own contribution but in the family of the Corps, for what it has and continues to achieve, and above all in its people: Sappers all.

Memoirs of a Tunnelling Officer During the First World War

Mr D A Cassels, the son of Captain G R Cassels MC RE, discovered recently some hand-written papers belonging to his father, who died in 1964, most of which relate to mining operations during the First World War. He transcribed the papers into a draft memoir and the following is an edited extract covering the period up until July 1915. Captain Cassels' tunnelling and mining operations continued up until September 1915 when he was posted to command an army troops company bound for the Middle East.
Born on 7 August 1893, Cassels was commissioned on 17 October 1914 and awarded the MC on 19 July 1915 in recognition of his actions in the preparation and blowing of the Hooge mine. He served in the Home Guard during the Second World War.

INTRODUCTION

I THINK a matter of first importance when writing an account in retrospect about World War One is to convey to the reader the atmosphere of life as it then was.

The rank and file of the Army was recruited from a class of man who was prepared to be paid one shilling per diem and his keep. In those days, the working classes paid respect to their bosses; judged by today's standards perhaps undue respect. The bosses themselves paid respect to the professional classes and the professions to the nobility, and so forth. Teddy boys and gangs of youths hardly existed and, if they had, their activities would have been frowned upon by their seniors. Education was of a much lower standard than today and there was unemployment always.

Dance halls, cinemas and other organised entertainments were comparatively rare. Railways were the main form of transport. Motor cars were primitive and open-topped; motor omnibuses had only just come into their own in towns. Horse-drawn vehicles still predominated in country districts.

Enlisting in the Army was an escape from the uncertainties of civil life. It offered security and adventure. It attracted a number of fine men with a desire to serve and surprisingly few of the otherwise unemployable.

The officer class consisted mainly of well-educated men with private means, and most of them had to act as 'pukka sahibs'. The young officers commissioned at the very beginning of the war were public school or grammar school boys who had had OTC training. They had led comparatively sheltered lives amongst their own class. These were followed, of course, by men with professional or commercial training and men promoted from the ranks.

In general, there was little or no real security

for anyone in civilian occupations except within the family. There was no Health Service or National Health Insurance as we know it today.

Army life in peace time was at least secure, but when war broke out it was the sense of adventure and patriotism which attracted men to it.

JOINING THE ARMY

MY own experience, although somewhat unusual, is perhaps a good example of the time then, and of the life of a tunnelling officer. I had been brought up in a doctor's family and had five years experience as a mining engineer pupil in the Yorkshire collieries; also OTC training at a public school. As soon as war broke out a colleague and I set out for Pontefract Barracks and tried to enlist but here and elsewhere, try as we would, we were told that the regular Army would soon dispose of the Germans and we were not wanted. In desperation, whilst on holiday in Eastbourne, I enlisted as a regular private in the 2nd Battalion Royal Sussex Regiment and was sent to Colchester. I was just 21 years of age.

Within six weeks I had graduated to a full-blown sergeant and then, without any choice in the matter, given a commission as 2nd lieutenant with the same platoon of the same company in the same regiment. The battalion was then reformed as the 8th Royal Sussex Pioneers, but only very few of us had had any engineering experience. Together with some fellow officers, I decided to get a transfer to the Royal Engineers.

Having heard that a Major John Norton Griffiths was looking for officers and men for the newly-formed tunnelling company, I went to see him at Queen Anne's Mansions in London but was told that he was away. I remarked that his 'brass hat' was hanging on a peg so presumed he must be in. The clerk opened an inner door and showed me another brass hat, saying "There's one in every office!".

Eventually, after much persuasion, I was ushered in to see Captain Miles Bailey, late of King Edward's Horse (in civilian clothes). He asked me personal questions and then put me through a form of viva voce exam, the final question being "What is spiling or speiling?". I said that I did not know but presumed it was sheet piling. I was then told that the interview was at an end, that coal and rock miners were not wanted, that only underground railway and sewer tunnellers, used to working in sand and clay, were required.

Whilst Miles Bailey answered the phone, I still sat there. When he had finished he asked what I was waiting for. I replied that I had come for a job and I intended to have one if there was the slightest chance. This evidently impressed him for suddenly he said, "When could you sail for France? I said "Now!" "What about your kit?" said he. "It's outside in the taxi". Then he thought a bit and said "You know a lot about telephones don't you?" I've used them" I replied. "But you're an expert", said he with a glint in his eye. "Yes", said I. "Good", said he, "but don't you let me down."

I was then sent to see General Jackson at AG7 and advised to just answer his questions but to remember that I was an expert on telephones.

General Jackson was in a hurry to get home, which perhaps was just as well. He said, "So you're an expert on telephones. When did you gain your knowledge? They don't use telephones down collieries". "Sorry sir," I replied, "telephones are connected to all parts of collieries, even underground". He told me briefly what I had to do and I got the job.

Then it was back back to Miles Bailey's flat where over gins and soda he explained the situation fully. It appeared that two scientists, one from Cambridge University and the other from the Cambridge Scientific Instrument Company had each invented a device for detecting mining operations by sound underground and I was to test and report on them. The matter was top secret. A lieutenant joined me and together we entrained for Cambridge.

The Cambridge University instrument was a flop, being too sensitive. It consisted of a tiny diaphragm at the end of one prong of a tuning fork and a needle on the other which made electrical contact and one listened in with head phones. Through it, a fly walking up the window pane sounded like a man running in clogs. It amplified every sound within hearing.

The Scientific Instrument Company's device was a box with batteries and headphones connected to an iron spike driven into the ground. It certainly picked up underground sounds but trains passing two miles away affected it, so it was obvious that it would record surface sound as well as those made by mining and neither would be distinguishable. Besides which, it did not indicate direction. I was asked to pay £99 for it saying the War Office stipulated less than three figures. I gave him £5 out of my own pocket for the cost of materials thinking it might

be developed somehow but further experiments proved that this was impossible. I put it in on charge at Chatham RE Depot Stores and, as far as I know, it may still be there as a piece of equipment, purpose unknown.

As I had little knowledge of microphones, I asked Miles Bailey for advice and he introduced me to a senior GPO official who in turn sent me to see a consulting engineer, Mr Cook, whose previous offers of gratuitous help in the war effort had been turned down. He wrote a highly technical report for me which I condensed into more or less non-technical jargon. Before that however he and a colleague, Mr Pook, accompanied me to Chatham to test the instrument.

Imagine the Colonel Commandant General Rainsford Hanney's amazement when I reported to him with Mr Cook and Mr Pook. He could not have been more surprised had I said Mr Box and Mr Cox. During my stay at Chatham, still wearing Royal Sussex buttons and badges, I was accommodated in the bedroom used by King George V and waited on by the two senior servants (or batmen) and treated most regally.

Off to France

I PROCEEDED to France with 44 tunnelling rank and file plus one RE lance corporal to join 175th Tunnelling Company carrying a prototype rescue apparatus with which to start a rescue school at Strazeele. The men had been enlisted only three weeks and, although carrying rifles and ammunition, had been on the range but once. I confiscated the ammunition for safety.

The men and I parted company at le Havre and I proceeded to Poperinghe via Rouen. The journey from Rouen to Poperinghe took all day, mostly spent stationary on the line or in sidings. I arrived after dark. All seemed confusion and chaos. We could hear gun and rifle fire and one large shell (probably a 17" Jack Johnson) landed very near the rail head. No one knew the whereabouts of 175th Company but the Surrey Yeomanry very kindly gave me a billet and I stayed with them a few days doing patrols round Ypres. During this time I was sent for by Army HQ. On arrival there I was met by Major General G H Fowke, Engineer in Chief, Major General F M Stubb, Chief Engineer 2nd Army, and other staff officers who congratulated me on my negative report, saying that they had been trying to turn down the idea of these instruments but the War Office persisted. They considered them highly dangerous as they would give false results and were glad they had been shelved.

The 175th Tunnelling Company was located at Terdeghem, a quiet and pretty little village near Cassel with a vineyard whose proprietor was most friendly and generous. Our Mess was in a comfortable house and I slept in a room of another house above a stable complete with cows and livestock which one had to pass en route to bed. We trained men in tunnelling and lectured on explosives. Practical demonstrations with detonation produced fish and chicken for the Mess.

As no orders for active service came through and very anxious to start work, I applied for leave to visit the front line and see some actual tunnelling.

I was sent to Erquingham (?) near Estaires, from whence I visited the 1st Army front between Ploegsleest and Givenchy. (Ploegsleest - Armendiers - Houplines - Neuve Chapelle - Givenchy, etc). This was a most instructive visit for I saw tunnelling in both sand and chalk which was excellent education.

Rescue Operation

ONE night, whilst I was at Mademoiselles bar in Amendiers, a signaller arrived with an urgent message for me to return to Erguingham. I was drinking gin and Italian and had had a convivial evening. Nevertheless I mounted my motorbike and returned. There I was told that the Germans had blown in one of our galleries near Amendiers and as I understood rescue apparatus I was to go and get them out.

Near the front line I met men who had attempted a rescue but were overcome by fumes from the explosion. The medical officer was one of them and he whispered to me, being practically speechless, "Carbon monoxide". On arrival at the shaft, which was a shallow one, I was shown a captured Draeger apparatus and an oxygen cylinder but no key. It was therefore useless and in any case the headpiece was far too large to wear in the small confines of the tunnel. The gallery (an old French one) was about 3ft high by 2ft wide. It had duckboards covered by mud and water leaving only from 18 inches to 2ft headroom and air space.

There was a blacksmith's bellows and tubing available. This was manned and my batman and I descended, taking turns with the air supply from the tube and held our breath in between. After crawling some considerable distance, we

came to a junction, turned right and then we saw the face of a man almost completely buried by sand and obviously dead. The second man lying near to us had also died from carbon monoxide, as he was rigid and had the tell-tale pink markings under the armpits and on soft spots.

Before attempting the hard effort of extricating them, I decided to obtain canaries from Amendiers to test for fumes. Two in a cage were purchased in Armandiers from a barber's shop. We pushed the canaries in on a board before us. One canary died and the other survived. We ourselves still shared the air tube. On reaching the first man we found it impossible to move him with one hand (the other was needed to hold the air tube) as rigor mortis had set in and his left foot was stuck fast in the duckboard. Only one of us could work as there was no room even to pass each other. For the same reason we could not reach the face man until the first was out of the way.

We reluctantly decided it was no use risking further lives so we tied the end of the air tube to some facing and left it there to clear the air till next day, when it would be safe and two hands could be used. On my way out without an air supply I took a breath of the foul atmosphere and nearly succumbed. The second canary died. I was assisted out of the shaft but bemused by gas I had a splitting headache and was nearly dead but got to the road. I mounted my motorbike to drive "home" alone as Gaucet, my batman, could not be found.

A Dangerous Assignment

My next assignment was at Hooge. Major S Hunter Cowan, OC 175th Tunnelling Company, took me through Ypres to a convent (vacated by the nuns and used as a staff office and HQ). Here we met a general who gave us a plain lunch but who regaled us with apricot brandy found in the cellars. He told us of a plan to tunnel under the German trenches at Hooge and blow up a Chateau there. As Hooge was at the apex of the Ypres salient, it was considered a most dangerous job and whoever undertook the work was to be a volunteer. The apricot brandy was extremely potent and its effect such that I would have accepted an assignment in hell and, as it turned out, I had. The most hopeless and inadequate plan I have ever seen of the trenches there was produced. The inadequacy could be explained perhaps by the fact that these trenches had not long been in our hands. The plan was about two inches square and consisted of two thick curving lines with a few intersecting ones and conveyed nothing to us, so we all three set out for Hooge to inspect the site.

At that time it was possible to walk some distance up the Menin Road and then cut across open country to Hooge. The journey to Hooge with a dozen men, untrained in soldiery, let alone warfare, was a nightmare. Our route lay from Hell Fire Corner, through the remains of Lillebeke, part of which was covered by whizz-bang and pip-squeak fire. Every time a whizz-bang arrived anywhere near us, I lost all my men, (the only training they had ever had, it seemed, was in taking cover). Just before reaching our destination in Sanctuary Wood the ground rises and then descends to the wood. At this point bullets passed just over our heads but there was no need even to duck. My men lay flat on their faces and it took an incredible time to get them to proceed, crawling on their stomachs to the jeers of old soldiers passing by.

In Sanctuary Wood we built dugouts half below and half above the ground for the men and made them as comfortable as materials, mud, rifles, bullets, enfilading machine-gun fire and flies would allow. The men were in a sheltered hollow but my own dugout had to be found easily by signallers, messengers and other units so was in a more open spot and not so safe.

Rations and supplies arrived during the night, usually around 2am. On occasions when shelling was heavy they did not arrive at all. I had to be there to check them and sign for them, also to instruct the infantry carrying parties. I always liked to visit the front line during the hours of darkness, when enemy surface activity was greatest, to give confidence to the men working in the tunnel.

During the mornings, surveys and measurements were made so I tried to sleep in the afternoon. My OC notified me beforehand of his intended visits but not so the CRE and other VIPs who turned up at all hours and always in daylight. The CRE once accused me of spending my time in bed but after an explanation he understood and became most considerate on future occasions. During the whole time we were at Hooge the men were never dry, as no fires were allowed, but they were issued with generous tots of real Naval rum brought up in stone jars, and I supplemented my own ration with whisky. In fact most of the indents for

stores contained messages urging a fresh supply.

Luckily our CO was a Scot who liked his dram or he might have imagined that we conducted mining operations in a drunken stupor (and he would not have been wrong on some occasions!)

The stables appeared to be a good spot for our main shaft. Although in an exposed position the thick walls left standing offered protection and concealment and it was nearest to the Chateau.

After commencing the shaft the Germans drove a sap towards our line, so we did likewise. The two saps actually met. We quickly sandbagged the breakthrough and put up barbed wire and manned the post. It was here that the British and Germans actually held conversations on occasions.

Our mining activities had to be kept strictly secret and even the infantry manning the trenches were not allowed within the shaft area. They knew of course that we were tunnelling but all details were withheld from them and everyone nearby bound to secrecy. This secrecy was so well kept that, although everyone for miles around knew when the mine had been exploded, full information was available only to the few and the item has been omitted altogether from some war histories That the blowing of the Hooge crater was one of the most important, I have no doubt, and it certainly was the forerunner of the supermines using large quantities of explosives.

It is interesting to record here that one night at Hooge a staff major (very correctly dressed and speaking with a perfect Oxford accent) was enquiring for me and he asked to see the mines. I was suspicious to say the least. It was night, and a peculiar time for a staff officer to visit the trenches unaccompanied. I had not been notified of his coming and my instructions were to show no one the tunnels nor discuss them with any unauthorised person. I was in an awkward situation, a 2nd Lieutenant, 21 years of age, faced by a staff major. We worked directly under corps not brigade or division although, of course, they had some jurisdiction. I therefore denied their existence. He pressed me for information which I refused. He then walked down the front-line trench and was not seen again. No one had seen where he went or from whence he came. It was a mystery. I reported the incident to my CO who, frankly, was puzzled. I have no doubt that he was a very clever German spy and it was quite possible, with careful planning, for a man of courage and initiative to enter enemy trenches at certain places.

We commenced our main gallery at Hooge when we were about 35 feet down. The actual depth was difficult to judge on account of the cellar depth and the surrounding ruins and top soil being piled up around us. The gallery started at about 7ft high and 2'6" wide and gradually reduced until we were working at 4' x 2' (these dimensions may not be quite accurate as I speak from memory of 45 years ago). The whole was fully cased and an extremely neat job. Listening posts were tunnelled off on either side as we proceeded. About a third of the way in we encountered water and had to start inclining upwards more steeply to effect drainage. The higher we went of course the nearer we got to green sand and more likelihood of water but we avoided an accumulation at the face.

At the shaft end of the gallery clay kickers were used and progress was good but, as we proceeded under No Man's Land beyond our own barbed wire, quietness akin to silence had to be observed and each small quantity of clay or sand was excavated by pear-shaped push picks.

There had to be no sound of falling material, so a heap of clay or sand was retained at the face of the gallery, covered by empty sandbags, onto which the freshly excavated spoil was allowed to drop with a fall of only a few inches, but even this often sounded like a ton of bricks in the eerie silence. Everyone wore gumboots which had to be well fitting and speech was limited to the faintest whisper. Progress often was painfully slow, the maximum being only a few feet per day.

Then there were listening periods. The listening posts off the main tunnel were built for the purpose. At intervals of time all work stopped and complete silence reigned, lasting up to an hour to detect any sounds of enemy counter mining, These were nerve-wracking periods and often the tunnellers were withdrawn for a rest above ground whilst listening by an NCO or officer was taking place. It was eerie enough to be working in the quietude of a tunnel, lit only by an occasional candle (we had no lamps then). The work place was dark and damp, often soaking wet with the acrid smell of wet clay or sand. We were far away under the enemy trenches, wondering whether one might break through to a German tunnel or, worse still, whether German miners would break through into ours behind us, cutting off retreat to the shaft. Perhaps they would use gas and it would seep down into the tunnel?

When listening was in progress, however, even the bellows were stopped and one was all alone and in the dark as this assisted concentration. With forehead pressed against the face, side or floor of the gallery one stood, knelt or lay still listening, listening, listening.

Some surface sounds would be heard, dull and muffled, as men walked in the trenches, hammered pickets in, or as shells fell and exploded, and these had to be distinguished from those of mining, but there was always that fraction of a second between hearing and interpretation when it might be enemy mining and then one's pulse rate would quicken and fright push to the fore in one's whole being.

I well remember an incident in a mine where the listening galleries had been driven downhill because it was harder to hear sounds below one than above and the greatest danger could come from below. The listener had to be with his head below the level of his body. For three days and nights I had been called at frequent intervals, mostly during the night to interpret the sounds of enemy mining heard by sappers. At first I could not detect them. Then on the third night I was all alone in the tunnel and I distinctly heard the sounds, exactly as described, the faint thud-thuds of a pick, a pause, followed by shovelling and then the dragging away of a filled sand bay. I was lying prone. Again and again I listened but could not judge the direction. I knelt and listened, forehead to the sides of the gallery and the sounds ceased. On lying prone again they recommenced and I concentrated very hard. Then revelation came in a flash. The thud-thud was my own heartbeat and the other sounds, those of blood flowing through my veins and arteries, the variations being degrees of concentration, excitement, and very likely fear. Couple these emotions underground with all those experienced by an infantryman in the tunnels and it is small wonder that so many tunnellers' nerves were shattered for, in addition, the majority of them were untrained soldiers doing the most dangerous job of all. They had no idea of other positions around or alongside them and the fear of the unknown is far greater than that of the known. Even the officers knew very little of the general scheme of things, their attention being wholly concentrated on the tunnelling. They were however being called out constantly and urgently to visit neighbouring trenches, where supposed sounds of mining had been heard by the occupants, and a tunnelling officer might get no sleep for days and nights on end.

As most of these alarms were abortive and, in any case sounds were difficult to interpret, I had made a box (similar to the one I had tested at Cambridge and Chatham) containing a battery and headphones attached to an iron spike for driving into the ground. It produced various noises at will, which I duly interpreted like a fortune teller as surface sounds or mining because the trench occupants would seldom, if ever, rely upon my superior listening ability without an instrument. We christened it the “Wind Box” and it proved a blessing in dealing with false alarms.

As I have said, we had had to run our tunnel uphill at a steeper slope than we had planned on account of drainage and we feared that we were getting too near the surface for safety. We had no idea how deep were the foundations of the redoubt nor what other excavations the Germans might have made. We could hear them hammering pickets or posts above us but the sounds were still dull so we continued.

A survey, using a miner's dial, relying on a magnetic compass, which was the only instrument provided in those days, is unreliable in the extreme under trench conditions because of the large quantities of metal lying about which would deflect the needle. We therefore were constantly worried as to the true direction the tunnel was taking and we used all sorts of expedients to check it.

One of our last checks indicated that the main tunnel was approaching the larger redoubt, but the trench gallery towards the smaller redoubt would never reach it. The angle was too acute and the slope too steep, besides which Zero Day was approaching. We had travelled about 190ft (about the length of three cricket pitches) and therefore decided to construct the T-Heads to contain the explosive charges in our present position, put in a larger quantity of ammonals to blow the larger redoubt sky high and bury the smaller one with the debris. It was a bold and somewhat risky scheme because we did not know our own depth accurately, nor the weight and thickness of concrete above us, neither were we sure of the effect of a large quantity of explosive in soft ground at our shallow depth. A small charge would not have the required effect, a medium charge might throw too much heavy debris over our own trenches, whereas a larger charge would

spread much of it in smaller particles over a wide area. I went back to Corps HQ in Ypres and explained my scheme. It was very hard to explain to the brass-hats and there was much deliberation and hesitation but eventually it was agreed.

Mine Blowing

THE mine was to be blown at 7pm exactly and troops would advance three minutes later. This would give time for the heavy debris forming the crater of the mine to settle and the men would advance under an umbrella, so to speak, of medium-sized debris whilst it was still in the air and before it had had time to fall on our own trenches. The guns would open fire with a barrage at exactly the same time: 7.30pm.

We decided to use 3,500 lbs of ammonal and an order was placed through the QM Stores. By 16 July no ammonal had arrived, The matter was now extremely urgent so messages were sent here, there and everywhere for explosive of any and every kind and we collected all we could. Then, out of the blue, 3,500 lbs of ammonal arrived already packed in square tins. In all there must have been the equivalent of over 4,500 lbs of ammonal in the mine.

19 July 1915 dawned and tamping the tunnel and shaft was finally completed. Tons of clay and sand had been loaded in sand bags which were now tightly packed into the mine. Spaces of a few feet were left at intervals between the tamping to give a cushioning effect to prevent any of the tamping being blown out backwards.

The 24 detonators had been prepared at HQ and were distributed evenly throughout the whole of the explosive. They were arranged in groups of six. Two groups on electrical leads connected to separate exploders just outside a dugout some distance away from the communications trench behind the support trenches. The other two groups were on separate instantaneous fuses ending near the shaft entrance. In case of electrical failure it would be my job to light the instantaneous fuses, which would mean almost certain live burial for me. As Zero Hour approached the electric leads were tested every few minutes with a weak torch battery and lamp to ensure they were in circuit.

Just before Zero Hour the circuit failed and I had visions of the Hun having broken into the mine lead and cut them. Another officer, a corporal, and I hurried back along the line of the leads and suddenly a shout went up from the corporal. He had found both leads broken where a German shell had burst. Hastily we replaced them, tested and found them okay, and connected them to the two exploders with only four and a half minutes to spare.

It was a beautiful evening, the sun about to set, and everything at that moment quiet and peaceful like the still before the storm. Although there was nothing but dried mud and ruins in sight, some blokes were singing and a little black cat, which earlier had been sitting on my knee, rubbed itself against my boots. I and another tunnelling officer were standing in the short trench outside the dugout and at 7pm exactly by our synchronised watches, we simultaneously pressed our exploders.

The whole ground beneath and around us sank and then rose again two or three times and then it shuddered and swayed from side to side like a ship in a rough sea. Away in front, the earth opened up with a huge woof and a roar like a miniature volcano. Actually there was more than one explosion and it appeared that we might have blown up a German magazine and ammunition store as well. Concrete, bricks, earth, sand, timber and other debris, with volumes of smoke, soared high into the sky and amidst it all we could detect whole trees and bodies and limbs of Germans ascending and then falling to the ground, but we did not wait for all of it to come down. We ran for cover as the German guns opened up with heavy barrages. Debris the size of large bricks came hurtling over us. One wondered how anyone could survive and we began to think that we had not only buried the Germans but our own troops as well, for we could see none of them. We only hoped the attackers had passed safely under all this as intended and were now overcoming the German positions. Soon afterwards an officer from the front line came in to say all was well but that we had killed some of our own men and he himself was wounded by a falling sandbag.

A few days afterwards articles appeared in the daily press stating that lights were blown out five miles away and some staff officers watching from two miles away had to run for shelter to avoid the smaller debris and that they too had imagined the whole garrison, British and German, had been overwhelmed by the mine. As it turned out it was a huge success. Our men captured the German positions, including the crater, which at first was about 45 metres across and 15

metres deep but this contracted as the soft sand and earth consolidated and sank to about 37 metres in diameter, by six metres deep from ground level or 11 metres from the tip to the bottom.

Various estimates were made of the German casualties as a result of the mine. It may quite well be that the estimated total of one thousand was near the mark. For days after the explosion, exhausted and dying Germans were crawling out of the sides of the crater and buried trenches. It may be, too, that a German attack was imminent because shortly before Zero Hour, great activity was taking place in and around the redoubts. Top-hats, brass-hats and large binoculars were to be seen, surely indicating the presence of VIPs.

As soon as it was light on the morning of the 20th, telegrams of congratulations were coming in from General Plumer (commanding 2nd Army) at Corps HQ, Major Cowan, neighbouring tunnelling companies and other units, one of which notified me of the award of the MC.

After I saw that the men were issued with clean clothes and were comfortable, I had drinks with the CO and others and then went to sleep only to be aroused by a signal that some general or other demanded my presence immediately. A motorbike and sidecar came to fetch me. I have no idea where we went. I think I slept all the way. We arrived at a dugout where a captain and lieutenant ordered me to remove my cap and my Sam Browne and to consider myself under arrest.

I was ushered into the dugout down a number of steps and there I stood before the general. He told me that six of his men had been killed by the mine and he required a full explanation. I visualised being shot at dawn but wouldn't have worried if he'd done it there and then.

Suddenly, after he had asked me a few questions, another beribboned general appeared in the doorway and told me to wait outside and get dressed. The captain and lieutenant told me it was General Allenby.

Soon Allenby came out and told me to go inside, salute the general, say thank you and then get in his car. All this was said in a stern voice without a smile. I feared the worst, if fear were possible in my condition. After doing my piece I got in the car, with General Allenby on the back seat beside me, when he congratulated me on a good show and said I was to lunch with General French. It was then back to my own HQ where a champagne dinner followed by a bottle of port and rum awaited me. I believe the CO’s batman put me to bed.

Royal Engineers and Public Order Operations

MAJOR A G JACKSON BEng CEng MICE

Major Gary Jackson was commissioned into the Corps in 1986 and after serving in Germany, Canada, Northern Ireland and Southampton completed PET (C) training and a fantastic attachment in Australia. He went on to be 2IC of 523 STRE (Wks) at Chilwell, which took him to the exotic locations of Belize and Bosnia before taking command of 33 Field Squadron in Northern Ireland in May 1999. With the tour recently completed, he is currently "scanning the essentials" on Advanced Command and Staff Course 5.

Introduction

Before arriving in Northern Ireland to begin my squadron command appointment I believed that I would spend the majority of the tour casting around for opportunities to keep the squadron busy during the terrorist ceasefire. Having just completed 28 months commanding 33 Field Squadron, I am now much wiser.

The long-standing staple diet of fortification work has all but disappeared due to the "peace process". However, the operational reality that dissident republican terrorists have significant capability and intent to kill members of the army or police means that some work is undertaken to maintain existing facilities. For better or for worse demolition has replaced construction as the field squadrons' bread and butter, and the removal of fortifications as part of the peace process was and will continue to be a vital, interesting and critically important part of "normalisation" in Northern Ireland. 25 Engineer Regiment's role will be pivotal should the "peace process" continue to make progress.

Another capability the Regiment has developed over the past few years that has been pivotal to events in the Province is the subject of this article: Public Order Operations (PO Ops).

PO Ops and its development into a coherent capability with a well understood doctrine has been a significant development in Northern Ireland. I owe much to my predecessor, Major David Strawbridge MBE RE, who commanded 33 Field Squadron through the crisis of Drumcree in 1998. His work during that summer and the subsequent development of the lessons learnt from this and events elsewhere in the Province have helped to develop the Regiment's role in PO Ops. Some of these lessons could be applied in other situations such as the May Day riots in the UK or anti-globalisation riots around the world.

Aim

The aim of this article is to explain the nature of PO Ops and how the Corps supports the Security Forces in NI PO Ops.

History

Public disorder is as old as "The People" and "The Authorities". The struggles between the chariot racing corporations of Rome and the Roman Army are an ancient example[1]. A more recent examples is the infamous reaction of the

[1] The Roman Army's public order doctrine was recorded simply as "to impose the habit of peace, to spare those who submit and to conquer the proud".

Yeomanry at St Peter's Field in 1819 to public disorder:

> "*The commanding officer then approaching Mr Hunt, and brandishing his sword, told him that he was his prisoner…..A cry now arose among the military of "Have at their flags!" and they dashed down not only those in the cart, but the others dispersed in the field; cutting to right and left to get at them. The people began running in all directions; and from this moment the yeomanry lost all command of temper: numbers were trampled under the feet of men and horses; many, both men and women, were cut down by sabres; several, and a peace officer and a female in the number, slain on the spot. The whole number of persons injured amounted to between three and four hundred."*

How different things may have been for the Yeomanry with a clearly defined doctrine, joint civil-military command, rational commander and integrated array of physical barriers designed to take the sting out of any serious disorder.

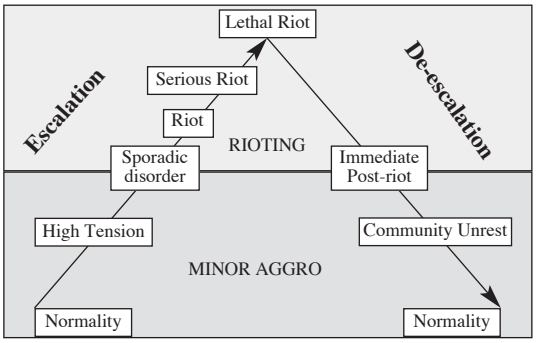
Royal Engineers have deployed to Northern Ireland in both the Infantry and Engineer role since the "Troubles" began in 1969. The very early days were characterised by mass protest and civil disorder as well as, later, by terrorism. The Corps had a strong role to play in those early days and much experience was gained in the use of obstacles in public order situations. This rapidly gave way to the more pressing demands of force protection as the terrorist campaign gained momentum.

Nature of Public Order Operations

PUBLIC disorder is fundamentally a civil and hence a police matter. However, the particular circumstances present in Northern Ireland, and perhaps in places elsewhere, make it necessary for the police response to public disorder to be supported occasionally by the military. The fundamental nature of PO Ops is that:

> "*[they] will be conducted across a spectrum of violence, ranging in intensity and intent on the part of the protestors…..[PO Ops] could vary between urban and rural or take place at a volatile sectarian divide. [They] will be conducted alongside an ever-present threat of terror*ist *attack; indeed public disorder may be engineered by terrorists to launch such an attack….. in an age when Human Rights is an increasingly sensitive and topical issue, PO Ops will often be subject to national and international scrutiny in the Media and by observers".*[2]

The police describe various stages of public disorder and these are shown in the diagram below. It is important to recognise that each of the stages shown in the diagram can take a few minutes or extend for many days. This places intense pressures on decision making and command and control systems in all cases and ultimately, in the case of more protracted disorder, on the endurance and sustainability of troops and police.



Stages of Public Disorder

The ground influences the nature of PO Ops. The confined nature of urban operations leads to the following factors being considered:

- Shorter fields of view
- Restricted and easily blocked foot and vehicle access.
- Rapid escalation of both violence and numbers involved more likely
- Fluid nature of operations
- Threat of terrorist attack at close range and masked by crowd.
- At interfaces there will be threat of disorder and terrorist attacks from both directions.
- At interfaces there will be a need to balance controlled access with need for separation.
- At interfaces access to or from the area of operations may have to be denied.

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[2] A Publication "Northern Ireland Public Order Operations Part 1" December 2000

The greater space in rural areas for operations to take place gives rise to the following factors:

- Larger TAORs possible and greater dispersal of troops
- Veh access may be difficult or impassable
- Risk of units being outflanked or isolated
- Scope for longer range engagement by terrorists and for surveillance by security forces
- Greater scope to use obstacles to shape the response of a crowd

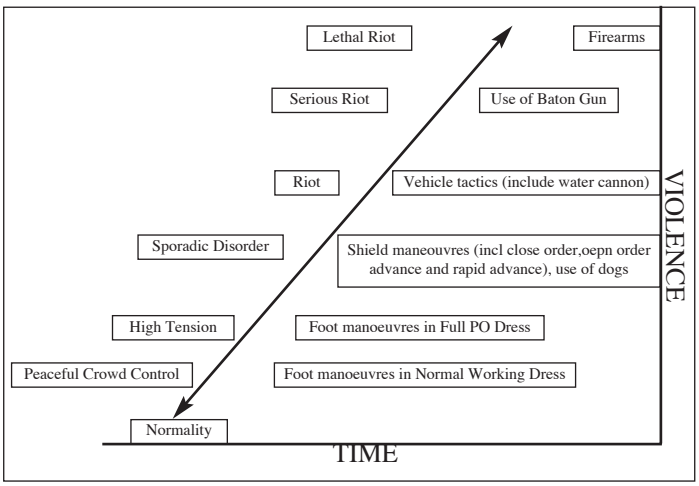
PO Doctrine

NI Police PO doctrine, with which, because of its supporting role, the military complies, follows that of other UK police forces and relies on a graduated response to disorder. It also relies on speed and pre-emption of disorder in order to prevent escalation. The doctrinal police responses are shown against the level of disorder in the diagram at Figure 2. What is not illustrated, nor accounted for, is the changed situation regarding the use of plastic baton rounds (PBRs) in NI. There is increasing reluctance by many policemen to use PBR, especially as the NI Police Ombudsman must now investigate every firing. There have also been some recent high-profile rejections of this weapon system by mainland GB police forces and a corresponding problem in justifying their continued use in NI. The result has been to place a greater emphasis on pre-empting violence and keeping opposing sides apart thereby reducing the need for PBR. It has also resulted in the need to put distance between policemen and their would-be assailants in order to prevent injury. Both of these desired effects have been satisfied by an increased use of obstacles.

The military experience of PO Ops in NI is very different from elsewhere. The police have primacy at all times, yet there is constant training by the military to fit into police plans with the ultimate political sanction of taking over from the police in extremis. Military support is available at a much earlier stage in NI and there is a greater readiness to call upon it. This undoubtedly arises from the greater mutual understanding in NI in contrast to the general lack of knowledge of military capability amongst GB police forces. There is also a higher threshold for the use of lethal force in the UK as a whole than in some other, equally sophisticated, countries such as Sweden, China and the USA.

The greater familiarity of the military with large scale operations and a doctrinal understanding of the need for manoeuvre, combat support and logistics give the police many additional capabilities to call upon, especially those of the Royal Engineers. The military describes four levels of support for the Police in PO Ops as follows:

- Level 1 – No military support, although there will be joint planning for escalation.
- Level 2 – Limited support. This will include peripheral and depth operations, surveillance, Engineer, Aviation and logistic support. The intent being to provide a secure, sanitised and supportive environment in which the Police can operate.
- Level 3 – Integrated support, which as it suggests sees troops deployed alongside police or held immediately in reserve.
- Level 4 – Military Take-over from Police. This may occur when Police need to reconstitute after protracted operations or in extremis. Worse still is when there is a complete breakdown of normal policing.



The Police's Graduated Response

Note that engineer support for the police occurs at Level 2, before troops deploy alongside police with shields and batons.

Grouping and Capability

WHAT does the Corps offer the police? Like all other Sapper

units, 25 Engineer Regiment specialises in organising a variety of equipment, combat engineer and artisan skills into force packages tailored to the task at hand. However, like all units there are basic building blocks. In PO Ops these are the Light and Heavy Plant Teams:

- A Light Plant Team (LPT) is a field section to which has been added a Volvo FL12 SLDT, a plant trailer and a LWT. The field section moves in a SNATCH variant Land Rover without ECM. The role of the LPT is to provide counter mobility and survivability support by constructing a number of different standard obstacles and improvising the rest from basic stores such as scaffolding and steel sheet, all of which are the subjects of more detailed illustration later.
- The Heavy Plant Team (HPT) comprises a plant section commander and three POMs: one operates the CASE MWT (Armd)[3] and the others drive a Volvo FL12 SLDT and a Seddon Plant Transporter. The MWT (Armd) operates closely with the police or military and provides a rapid and highly protected means of clearing obstacles. The equipment and operator are protected against fire, blast and small arms. The MWT (Armd) can push up to 20 tonnes and, in a deliberate clearance within a secure cordon, can pull 40 tonnes. Whilst the latest version of SCOOBY DOO[3] is considerably better than the original of 30 years ago, the protected MWT has been around throughout the troubles and is not covered further in this article.

Light and heavy plant teams need command and control and SHQ provides this at brigade level. Deploying with a brigade HQ, its role is to advise the brigade and to command assets assigned to it by RHQ. Whilst the advisory role is principally to the brigade commander, the squadron commander is also responsible for advising the police "Gold" and "Silver"[4] Commanders. BGEs of junior officer or SNCO rank deploy to each Bn HQ to provide advice, coordinate movement, security and administration of engineer assets and to command assets when deployed in their Bn's TAOR. 3 Inf Bde deployed nine battalions for Op CLAUDIUS II at Drumcree in 1999 and, given the limited numbers of experienced captains in 25 Engr Regt, this is the reason that junior officers and SNCOs are used as BGEs. This overall C^2 arrangement allows LPTs, HPTs and other assets to follow the GOC's Main Effort by re-grouping to another SHQ when required. This is the same practice used elsewhere in the Corps, even if the levels of command are a little different.

Obstacle Effects and Integration

Having set out the general framework of PO operations and introduced the idea that engineers have an early and increasingly important role in dealing with public disorder, it is now time to illustrate what is required. Just as in general war, commanders wish obstacles to have a particular effect on the opposition. The usual effects of turn, disrupt, block and fix are not all relevant, and in PO operations block, turn, separate and deter apply:

- **Block.** The desired effect is to prevent any further progress of, or bypassing by, a crowd. The best examples of this have been at Drumcree Bridge in the rural setting and on the Ormeau Bridge in the urban setting where the respective parades were met by linked 15 tonne crowd control obstacles (CCOs) in combination with a number of other measures.
- **Turn.** To re-route a crowd's progress. Implied in this effect is to prevent the build-up of a crowd and to encourage it to move in the desired direction. Such an obstacle may need to be as large as that for a block but typically it should be sufficient to make it more desirable to follow the officially designated march route in the case of a demonstration or parade.
- **Separate.** Typically at a sectarian interface, the effect is to keep the sides apart and preferably beyond missile-throwing range of each other. Whilst all obstacles will allow some distance to be placed between the crowd and the police, this effect may specifically be required away from interfaces simply to

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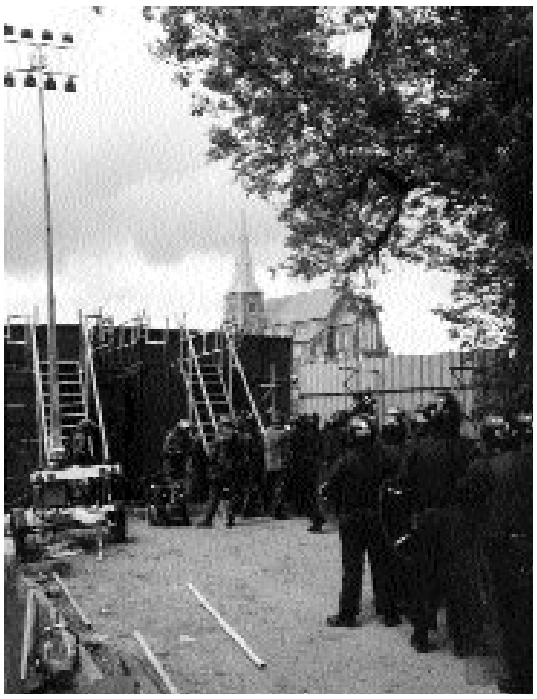
[3] The CASE and its predecessor the Terex are known by the RUC as "SCOOBY DOO" when talking on its radio nets. Perhaps someone could tell me why?

[4] GOLD commanders set strategy and policy, SILVER commanders plan the operation and are responsible for tactical control of the operation to meet the strategy, BRONZE commanders carry out the plan with the resources allocated by SILVER. During the major events of the Marching Season GOLD is the Regional Comd (Asst Ch Const), SILVER is the District commander (Ch Supt) and BRONZE are Insp or Ch Insp who typically command up to 7 x Mobile Support Units (MSUs) of 30 men each.



The scene behind the Drumcree CCOs.

keep police and soldiers out of missile-throwing range.

- **Deter.** The effect is to dissuade the passive, the faint-hearted and the leaderless (in increasing order) from becoming merged with people intent on escalating disorder. The need to deter has increased in importance because of a greater awareness of human rights and because the police have a duty to facilitate peaceful protest. However, the police also require to identify clearly those with violent intent. Layered deterrent obstacles can assist in identifying lawbreakers and justifying a response by the police to anyone crossing a defined point or line. The best example of this has been the multiple obstacle zones across the fields in front of the church at Drumcree. These zones range between one designed to make it uncomfortable to walk to a zone of dense razor wire to deal with those harbouring the most violent and purposeful intent.

Integrating the obstacles into the commander's plan is usually straightforward. However, there are special factors which need to be considered:

- With the focus of operations at the commander's main effort, is there a requirement for stronger obstacles on the flanks than might initially appear to be needed?
- An obstacle must be manned, or at least observed, once constructed and therefore how much force is the commander prepared to expend in picketing obstacles?
- The longer that obstacles are in place the worse the media image that is presented. How late and how light can obstacles be constructed?
- Does the higher commander's intent indicate the redeployment of troops, hence weakening our own position?. Will this lead to greater strength and durability of obstacles when initially placed or require contingencies for strengthening or adding new obstacles as redeployment draws near?

Obstacle Types

25 Engineer Regiment has been the focus for the development of standard solutions to countermobility and survivability problems in PO Ops and in utilising tried and tested obstacles to suit modern PO problems. Most obstacles are based on simple construction materials such as concrete blocks, wriggly tin, scaffolding and clamps. As new and more dangerous weapons are used by crowds in public disorder, these basic materials have been used to create new obstackes but the principal requirement of each is that they are quick to construct, are non-destructive and are non-lethal (and non-injurious unless challenged). The standard forms of obstacle are :

- **Universal Concrete Block (UCB) based obstacles.** The UCB is in fact so universal that one purloined by the verger of Drumcree church last year is used annually to support the Christmas tree at a nearby old people's home. The UCB weighs one tonne and provides an excellent support for structures whilst also providing a useful obstacle in its own right. UCB-based obstacles are principally used in urban operations and the standard ones are as follows:

- **Rapid Cover from View (RCFV) also known as Powerclad**[5]. This is wire-reinforced opaque plastic sheet, plasticuffed directly on to scaffold tubes up to 6m high, which are themselves supported on UCBs. A LPT using the standard load in the skip of its SLDT (self-loading dump truck) can produce 15m of RCFV in one hour. The advantage is its speed of construction and disadvantage its lack of durability, including its comparative sus-

[5] An industry trade name.

ceptibility to fire and lack of ballistic protection.

- **Button on Fence (BOF).** This is another form of cover from view screen with the cover provided by steel profile sheet screwed into steel sheeting rails and supported by lattice-braced scaffolding tubes in UCBs at 3m spaces. 15m of it can be loaded into the skip of a SLDT and will take a LPT 2-2.5 hours to construct. It is half as quick to construct as RCFV but its durability is much greater, including much greater protection from hand-thrown missiles, stones from catapults, golf balls, acid and petrol bombs, and a measure of protection against pipe bombs.
- **Vehicle and Personnel Denial.** Where there is a need to prevent access rather than observation, this type of obstacle provides a rapid means of blocking a road or path. UCBs are spaced to prevent vehicular access and scaffolding tubes supported between each UCB are laced with barbed or razor wire to prevent personnel access. A LPT carries 30m of this form of construction which will take 1.5 – 2 hours to construct.
- **Access Control.** There are circumstances when it is necessary to close a route during disorder but to allow controlled access at other times. For these occasions the Engineer workshop developed robust gates, both vehicle and pedestrian, that are supported by UCBs. The pedestrian gate also provides pram and wheelchair access and eliminates the need for pedestrians to leave the safety of the footpath to get around an obstacle.[6]
- **Anti-Lob Screens.** These screens have been essential in Londonderry, especially around the city walls. Plastic mesh sheets laced together and draped between scaffolding towers prevent missiles from arriving at the intended target.

DROPS has provided a new avenue of development for PO, not only in logistics but in rapid and accurate placing of obstacles. The CCO is a standard 20-foot long sea container that has been modified with fold-out steel wings and ballasted with over 15 tonnes of concrete and steel. Each CCO is mounted on a DROPS flatrack and CCOs can be chained together to make them act as one. This obstacle type was deployed first at Drumcree in 1998 and proved its worth by withstanding fire, blast, grappling hooks and many drug-crazed rioters throwing themselves against it night after night for two weeks. Since 1998, CCOs have been developed to be wider, stronger and adapted to make them easier to scale by the police and less so by rioters. In 2001, a sprinkler system was added to douse fires set in front of the CCOs and it had the secondary effect of dampening the spirits of the protestors.

Anti-Lob Screen erection in Belfast.

Although CCOs form an impressive and daunting obstacle to protestors when fully deployed, the wing doors are wide enough to allow 44-tonne lorries to pass between two adjacent CCOs. This enables controlled movement to take place and thus preempts criticisms from commercial organizations trying to make deliveries. They each take approximately 15 minutes to deploy into pre-recced positions and so can remain tucked out of sight and off key routes until the last minute. Their only slight disadvantage is that they are of fixed dimensions and do not fit every gap but by using BOF they can be adapted to suit most situations.

Along with the more recent innovations, there is still a firm place for "traditional" obstacles, especially wire. Catwire constructions have proved to be the most robust types and the deterrent value of Type 2 Catwire in razor-wire coils is particularly good. Also, low wire entanglement adapted with 50 per cent 1.8 metre pickets is an effective method of delaying large crowds and dissuading the less determined rioter. The widespread deployment of wire obstacles over

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[6] If not addressed these seemingly insignificant matters can be exploited by media aware groups.

CCOs at Garvaghy Road, Portadown. Doors open for vehicle and pedestrian access.

the last few years has highlighted some problems with other arms. For example, some infantry units were not always prepared to accept that wiring is an all arms responsibility and QMs do not always understand that wiring stores are not an engineer stores supply item. To construct wire obstacles quickly and to a high standard requires both practise and supervision, the latter ably provided by sapper JNCOs.

Factors in Planning

ACTUALLY deciding on the appropriate obstacle to achieve the desired effect needs an appreciation of the factors involved. Some of the more important ones that must be considered are:

- **Duration.** The longer the obstacle is in place the more durable the form of construction must be. It would be better to use BOF rather than RCFV, for instance, in prolonged operations.
- **Available Time.** Durability can be traded off against speed of construction.
- **Threat against obstacle.** What is anticipated to challenge the obstacle? Petrol bombs would militate against RCFV; grinder saws would militate against BOF.
- **Significant buildings/grounds nearby**. Religious buildings, for example, create problems of access for construction.
- **Space available.** Space can be traded against the scale and durability of an obstacle. For instance, at a sectarian interface with dwellings immediately adjacent, a heavy obstacle such as CCOs may be appropriate. However, open ground may only require the creation of a buffer zone between two lines of catwire.
- **Controlled access.** Consideration needs to be given to chicanes, or UCB-mounted vehicle or pedestrian gates. The location of gates needs to be far enough away from junctions to prevent unnecessary traffic problems without creating areas for protestors to gather off the main route.
- **Own forces movement through or around the obstacle.** Gaps, gates and concealed access points should be considered.
- **Provision for weapons.** It is essential that obstacles be sited to allow the legal application of fire. For instance, obstacles must be sited in the knowledge that an unimpeded sight-line is required to fire PBR and that the lethal distance of the weapon is 15 metres with the optimum range between 20 and 40 metres. This is made doubly important by the need to maintain an audit trail of decisions, which may be needed to justify later in court firings of PBR.
- **Man Down Contingency.** Where there is the possibility of security forces deploying forward of an obstacle, there must be a plan and facility for recovering a man who is injured or isolated.
- **Visual impact.** The appearance of the obstacle must be considered in order to reduce the possibility of adverse media coverage.
- **Foreseeable damage.** Unavoidable damage should be declared to avoid adverse PR.

The Future

As stated at the beginning of this article, the wide scale and serious disorder that has affected Northern Ireland over the last few years may not be repeated. However, on the grounds that Northern Ireland always has the capacity to surprise, it would be wise to keep developing and innovating for the future. One line of development stems from the increasing use of pipe bombs. To counter this threat, mobile, lightweight shelters are being evaluated, which would give good ballistic cover. The DROPS system has also given mobility to the good old sangar. These clearly have wider applications in force protection elsewhere.

The environment has changed significantly in NI over the years and never more so than in the years since the "peace process" seriously got under way. There is greater similarity now between Northern Ireland and mainland UK in the types of protestors, their levels of preparedness and their potential for violence. The hard-won experience gleaned from Northern Ireland operations will provide important lessons for those engaged in controlling public disorder in mainland UK and even further afield.

In Search of Lost Cities

WARRANT OFFICER CLASS 2 D C HALFORD BSc

Warrant Officer Class 2 Halford served in 21 Engineer Regiment, from 1987 to 1990, before attending an A2 design draughtsman course at the RSME. Following a tour with 39 Engineer Regiment he returned to RSME for a clerk of works course from 1992 to 1994. He went on to serve with DCRE (NI), Property Management Office, Gutersloh and Gibraltar Estates Organisation. He attained a BSc (Hons) in Environmental Engineering in 2000.

Introduction

I WAS browsing through Part One Orders when an attached notice caught my attention. It asked for volunteers for a Scientific Exploration Society (SES) expedition called "Kota Mama III" to Bolivia. Having got agreement from the boss, I found myself having an interview with Colonel John Blashford Snell (JBS) and Captain Jim Masters at the Expedition Base in Dorset a week later. Within a few weeks I received the news I had been waiting for: selected to head up the engineer section for phase one of the expedition. The expedition was split into five phases. I was going for the preparatory phase and phase one, which was jungle based, whereas phases two to four were to be river based. Phase one involved seeking previously undiscovered archeological sites in the jungle-covered Andean foothills. To this end we were going to investigate the supposed site of a legendary pre-Inca city called "Paititi", located in a very remote region in the mountains east of Lake Titicaca. In the mid-fifties an ex-Nazi called Hans Erthel claimed to have found Paititi and despite writing a book on the subject, few people took him seriously. Indeed the book was written in such a manner as to mislead and confuse anyone who hoped to follow his footsteps. Erthel refused to talk about his "discovery" and died in 1999 taking his secret to the grave.

After much fund raising and preparation I found myself back in Dorset for a meet-and-greet weekend. This was the first time most of the fifty strong expedition would get together, though some of us would not see each other again as we were on different phases of the expedition. It was also the first time that I would meet the other Sappers who I would be spending two months with in the jungle: Corporals Baz Barrow, John Dolman and Barry Igoe and Lance Corporals Dale Birch, LV Leavold and Matt Pickup. After several briefs on what to do and what not to do we started getting a clearer picture of what was expected of the engineer section. In good old Sapper tradition, we would be out in front of the main expedition group carrying out route-enablement tasks. One problem was that the area we were going to had never actually been mapped!

Preparatory Phase

A month later I flew from Gibraltar to Heathrow and onward to Miami where I met up with seven key members of the expedition, who were part of the preparatory phase. JBS was already in Bolivia with Yolima, a Columbian lady who acted as our liaison officer. We eventually flew into La Paz on 4 May. The approach to the runway was one of the most beautiful sights I have ever witnessed: the sun was rising casting an orange glow over the Andes, with La Paz rising

proudly above the clouds. I could see the high-level plains (Altiplano) stretching out as far as the eye could see. Once we had landed the lack of oxygen at 4500m left a few of us feeling slightly light-headed. The cold wind made me wish I was wearing a fleece.

In the following days we met the Prefectura (Governor) of La Paz, witnessed coca farmers protesting, riot police firing tear gas, and continued with our logistical preparations for phase one. Having bought some hand tools, I decided to wait until we were up country before buying any more engineer stores. Up country was Guanay, a small gold mining town on the junction of the Rio Mapiri and Rio Tiupani. The gold has pretty much run out and the town has fallen on hard times. To compound the town's problems, it suffered a devastating flood at the beginning of the year.

We set off in a convoy of three pickups and one eight-ton truck from La Paz, through the Altiplano and then down into the Yungas. The Yungas region is between the Amazonian Basin and the Altiplano, consisting mostly of jungle-covered mountains with heights ranging from about 2000m to 4000m. It is an area infamous for the production of the coca leaf. We drove along the so-called Highway of Death for eight hours until we reached Guanay. The highway has a sheer 300m drop on one side and is barely wide enough for two vehicles to pass by each other.

The main reason for my inclusion in the preparatory phase was my background in construction and civil engineering; the other was being able to speak Spanish (the pigeon variety). I was tasked with helping Lieutenant Colonel (Retd) Ernie Drury with setting up the expedition base and providing the Alcalde (Mayor) of Guanay with advice on several local engineering problems including flood prevention, a medical centre extension and approach roads to a half-built bridge. Meanwhile, Mike Howe (ex-RE), Lieutenant Drew Craig and Prince Leopold d'Arenberg (a Vatican prince) set off on a week's recce of the route to Paititi.

Once JBS and the others had departed, Ernie and I were the only gringos in town. We got on well and soon identified some key local people, one of whom was an elderly gentleman by the name of Don Luco. The compound that we were using was his, as was one or two of the hotels, as was….he seemed to have a finger in every pie! He was extremely helpful and a lovely chap to boot. We realised that it was possible to live like a king in this part of the world. We hired five people in the first few days: a cleaner, a handyman, a cook, a mechanic and a driver. The total daily wage bill for all five was about £3.50.

My Spanish was improving with every passing day (out of necessity more than choice!) and I soon realised that people had stopped staring and it seemed that we had been accepted as locals already; indeed, I was greeted with "Buenos Tardes El Ingeniero" (Good day Engineer) wherever I went. A week or so later the recce team returned looking absolutely shattered. The terrain and insects were worse than had been anticipated. The team had followed a route gleaned from talking to local quinine hunters but had not found any lost cities.

Hearing that the Prince Leopold was back in town a few of the local school governors invited him, Lieutenant Colonel Ernie Durie and I to dinner. At 2000hrs sharp the councillors and several fifth-form students arrived and escorted us to what looked like a huge Hawaiian style structure in which a top table was laid. We had a lovely meal and chatted away, in Spanish of course. I soon realised that there was some kind of negotiation going on between Prince Leopold and the school governors. It turned out that they had asked him to become a patron of the school. He agreed and made a $1000 donation, which is a small fortune in Guanay. Suddenly, everything changed. There was a lot of clapping, the doors burst open and about 400 students and their families entered in an orderly queue to shake our hands and give us a kiss on the cheeks. We were then showered with confetti and invited to dance with the ladies! We were soon aware that as each song was played three white handkerchiefs were being passed around. It was just like a game of pass the parcel. When the music stopped the "lucky" recipient got to dance with one of the explorers! After the twelfth dance I was sweating profusely in the humidity. Following a short respite, the DJ changed the music to reflect the preferred choice of the local teenagers. To our horror we saw the handkerchiefs doing the rounds again! We were back dancing but to a much higher tempo. We finally made our excuses and were escorted back to the compound by a group of female students. It was a great evening.

During the course of the previous evening, I had been invited to examine an earth bank

behind the school and expected to have to design a retaining wall. However, I was greeted by the head teacher and his staff, including the English teacher who spoke only very basic English. I was escorted to a classroom with sixty students crammed into it awaiting their English lesson. I was the guest tutor! We chatted in Spanish for a bit and I explained that I was from Wales and showed them where it was on a globe. When I explained that the country was a Celtic nation the teacher mentioned that they had seen a film about Wales with William Wallace in it! My brow furrowed and then it dawned on me that he was probably talking about "Braveheart". I mentioned the name Mel Gibson and they started nodding, then when I crossed my face with chalk like the Scottish flag they cheered and laughed. We chatted for an hour and I was then ushered on to a balcony and watched as the children performed military-style drill in the playground before congregating to listen to the speech that I was expected to make!

Phase One

We finally left Guanay, with fireworks being set off and to cheering from half the population, and headed off in convoy for the remote village of Quillapituni, the last point of civilisation before we entered the jungle. We arrived in the dark and were surprised to see a large crowd and a school brass band waiting expectantly for our arrival in the middle of a field. They proceeded to play music and again we danced with the eager locals.

The mules that we had arranged to pick up arrived the next morning and by lunchtime the seven members of the engineer team were en route with nine mules and their handlers. We walked all day up mountains, down mountains, up spurs and along ridges. Our objective was Huarriconca, a large pampas grass plain on the ridge adjacent to Mount Paititi. After an overnight stay at San Jose Saddle, we arrived by lunchtime and on the second day set up camp. The engineer stores were off loaded and the mules and their handlers headed back to Quillapituni. We were on our own.

The next day, carrying over 120lbs each, we struggled down the valley to the Rio Chinijo where we were going to construct an aerial ropeway, clear a path up the spur for mules and build a permanent camp. By this time we had all sustained so many bites from sweat bees that we became almost immune to them and barely noticed our little companions any more.

For the next five days we continued with our work at the Chinijo but I soon had to radio back to JBS to say that no amount of engineering effort was going to get mules up the spur, and that all the equipment was going to have to be manpacked for the three-day journey to the Rio Tulani and the area that supposedly held the Paititi secret. After completing the other tasks at the Chinijo site it was time to move up the mountain and join a small recce group which had left a few days earlier. We left behind what equipment we could but were still struggling to lift our packs on to our backs.

Led by a local Shaman called Juan Blanco, I chatted with him as we scrabbled up the spur but eventually gave up for lack of breath. I looked back at the others and was pleased to see that they were all feeling the worse for wear. Juan Blanco was what I would call a real bushman and knew his way around. I slipped the GPS back into my pack and concentrated on following him. We dropped down from the ridge into the Peccary Wallow. The Wallow is a long wet valley favoured by the local wild pigs (peccary). Juan loaded his rifle, explaining that there were two types of pecarry, one timid the other ferocious! They roamed in groups of 50 or 60 and the first action on meeting them was to dump your pack and get as far up a tree as possible. Thankfully, our passage was uninterrupted. After a very long day we

WO2 Halford after his English lesson with the school children of Guanay.

camped at Fort Eliza, a defensive position built on the ridge. Again the sweat bees kept us company.

We struck camp early the next morning and set off to find water. We found plenty of it as we climbed in and out of seven wet ravines. Surely there had to be an easier route? However, the worst was behind us and soon we could hear the rumble of the Tulani in the distance. After a few more hours we were met with a beautiful vista, the waterfall that signalled our arrival at Paititi. We spent the next few days assisting with site clearance and camp preparation, taking care to avoid the many snakes in the area.

Bridging the Rio Chinijo

We were definitely at Hans Erthel's site: the beams of his timber house could still be seen standing in the middle of the jungle. We also found the ruins of a much earlier house, large stone steps, terraced walls, a tunnel, two man-made pools and aqueducts. The archaeologists studied the finds but were perplexed at the lack of artefacts, without which a the site could not be dated. For the next few weeks groups studied, surveyed and excavated the site whilst the engineer section took it in turns to conduct further recces.

JBS then tasked the engineer section with returning to the Rio Chinijo to build a bridge at a site called Inca Pampa. This would save up to a day's march for the expedition members who were by now feeling the worse for wear. So off we went and after two days reached the proposed bridge site to be faced with a 16m wide torrent flowing through a gorge with wet, sheer vertical rock walls on each side. Luckily there were two small beaches that allowed us to bridge the gap. After a few early attempts failed to float a tree into position, we finally came up with a workable plan.

We built two 3m high rubble piers and by doing so closed the clear span to about 12m. We cut down a 15m tree further up the valley, par buckled and dragged it down to the bridge crossing, and manhandled it with some difficulty on to a hardwood bankseat beam. We launched it as far as we could with a rope attached to the far end. Unfortunately, we could not afford to send a bank party across the river as it was hard enough to move the tree as it was. On cue, Lieutenant Drew Craig and others arrived on the far bank. Perfect timing! They lifted the far end of the beam on to the other pier. We fixed footplates to the log and built a handrail. Before leaving we had another little drama. One of the surveyors, Karl Reid, broke a cardinal rule. He stopped mid-span and looked down at the water. Next he tumbled in, pack and all. I was on the far bank, downstream, with a long pole just for this eventuality but never actually expected to have to rescue anybody. I waded in but Karl was passing me at a rapid rate of knots. I dived in further and with some help from John Gorski, another surveyor, we got Karl to the relative safety of the eddy currents. However, the water was too deep to stand up in and we could feel our boots acting like lead weights. After a bit of frantic swimming against the current we made it back to the beach to be greeted with a round of applause.

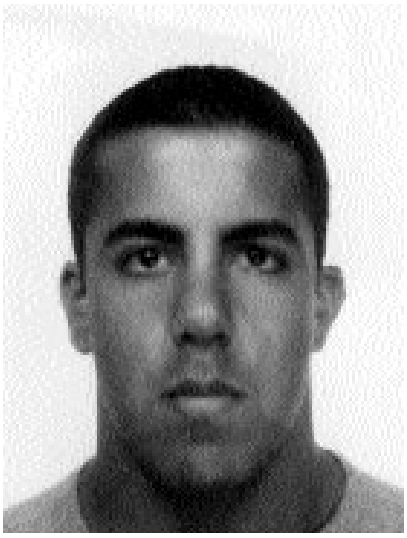
Conclusion

EVENTUALLY we made it back to Huarriconca. I had an awful two-season tent in tow and decided to give it to the head porter as he had been sleeping beneath tarpaulins. I forgot all about it but as we entered Quillapituni a few days later he was waiting for me and invited my group to his house to share what little he had with us as a thankyou for the tent. To decline would have been out of the question. The indigenous people of Bolivia are all the same – they have very little but will give you what they have. We all felt quite humbled.

We had all experienced a gruelling phase of the expedition and the fact that most of us lost quite a bit of weight was testament to that. The terrain was unforgiving but the people were fantastic. I had been given the chance of a lifetime, one that I would seize again given the opportunity.

Gap Year Commission

SECOND LIEUTENANT V Y AHUJA



Vijay Ahouja recently completed a Gap Year Commission with the Royal Engineers. He is now at Cambridge University reading for a degree in Medical Sciences.

I TURN over but immediately feel a hard object pressing against my chest. It's a water bottle. I adjust it and settle back in my sleeping bag. Still can't sleep. I check my watch. 0054hrs. Oh well, reveille is at 0100hrs anyway. I fill our pan with water and put it on the stove. I light the stove.

"Orite mate", I hear from behind me.

I turn to face my tent buddy. "Oh, morning Dave. I've just put the water on. Probably be ten minutes."

"Sound" came the reply.

I lie back down in my dos bag. Several minutes later the water boils. We both prepare our mugs with drinking powder and pour in the water.

"Dave, this tastes like crap, man."

"Just get it down ya. You'll need it."

My lack of appetite came as no surprise. We were at 5500m, our final high camp before the ascent of the summit of Mount Sajama at 6549m, the highest peak in Bolivia. I struggled through another hot chocolate and some instant oats before beginning to organze my kit.

"Shit, Dave! One of my water bottles has frozen."

"You should have left it in your dos bag."

"I did . . . the other two are ok. I'll just have to make do with them."

"Two litres will be enough."

I finished packing my daysac and then put on my final layers of clothing. It was cold, but I was dressed for the occasion. I wore three pairs of socks, mindful that a member of our party had already gone down with frostbite on the previous mountain. Shortly before 0300hrs, I made my way out of the comfort of the tent. It wasn't as bad as I thought it would be. There was a full moon and indeed the scene was quite picturesque. I called to my rope partners.

"Bri, Scouse, your orite fellas?"

"Morning Vij", Brian replied. "Just sorting the rope out. Here, the centre's marked. You tie on here."

"Cheers, Bri. It's not looking too bad, is it?"

"No, but take your warm kit. The wind could pick up."

We began our ascent just after three o'clock. We were eight in total, on three ropes. Our ninth member, suffering from altitude sickness, was not going to attempt the summit.

Initially, the going was not that hard. We went at a fairly easy pace, trying not to burn ourselves out. The terrain was awkward in places, and we spent some time crossing a narrow ridge. But at this stage I was still quite enjoying myself. Having completed the ridge, we now reached the final approach to the summit. It was a fairly benign looking slope, no more than thirty degrees from the horizontal. I sighed in relief. It was now 0550hrs. We would surely summit by 0700hrs.

We began zigzagging our way up the slope. It

was really quite monotonous and was becoming increasingly tiring. The air was getting thinner, my energy stores were getting depleted, and despite my repeated sips of water, I felt I was becoming dehydrated. Every so often I looked up the mountain. To no avail. We struggled and struggled, but we seemed to be making minimal progress. By 0700hrs, we appeared no closer to the summit than we had an hour before. Morale was dwindling. We continued in silence. No one had the energy to speak. No one had anything to say. We just kept our heads down.

Time seemed paralysed. Every second was an eternity, every step a marathon. But at around 0830hrs, our torture ended. I looked up and saw blue sky. Day had broken. Further along the mountain I could see the top of a flag – the summit! We were now just a number of yards away. I was tearful. A few moments later, we were there. We all reflected for a moment, and then embraced. It was a proud moment for us all . . . But is was no time to become complacent. We all posed for a couple of photographs and had a little food and water before hastily beginning our descent. Later that evening we arrived back in base camp, exhausted, hungry, thirsty – but extremely satisfied.

Exercise Bolivian Heights was the culmination of my gap year in the Army. It was a month long mountaineering expedition run by the Corps of Royal Engineers. But my whole military adventure had begun more than three years previously. I was fifteen years old, casually walking round by my school's annual Careers' Fair. By chance I stumbled upon the Army's pitch. Soon enough I was chatting to an army liaison officer, who felt the Gap Year Commission (GYC) would be ideally suited to my needs, I agreed. We stayed in touch and in my upper sixth year, I began to pursue my ambition.

First of all, I did a couple of familiarization visits. These were typically 2-3 days long and introduced me to life in a corps/regiment. I then went on to officer selection. The first hurdle was the Regular Commissions Board (RCB) Briefing, a 36-hour assessment consisting of physical, psychometric and social tests. On completion of the Briefing, an individual receives one of four grades. I achieved a category 1 pass, which, realistically, is a must for a GYC applicant.

Following this, I progressed to the main hurdle, the three and a half day long RCB. This is an expanded version of the RCB Briefing that also includes interviews, essays and presentations. Both boards are sat by all potential officers, such that I, as an eighteen year old GYC applicant, was alongside a twenty-eight year old regular applicant. However, I found all the applicants and staff extremely friendly and helpful; the reality was far less daunting than I imagined it would be.

I was informed the day after completing the RCB that I had passed with a special recommendation for a GYC. All that remained was for me to select and be accepted by a corps/regiment and for me to pass my Army medical. I considered the Parachute Regiment and the Corps of Royal Engineers but finally chose the latter. I passed my medical and then, in November 2000, began my gap year with my month long commissioning course at the Royal Military Academy, Sandhurst.

It was initially something of a shock to the system. There were early starts, very late nights, room inspections, stacks of ironing and hours of drill. It was certainly nothing like school had ever been. But everyone fell into their stride and learnt to just get on with it. By the end of the month, all but one of the fifty three who started the course were parading off the square as newly commissioned officers. It felt good.

At this point we were all separated as we were posted to different regiments throughout the UK and Europe. I was posted to 39 Engineer Regiment based in Waterbeach, Cambridge. I had a brief introduction to Mess life and was quickly away to France on a week's adventurous training. I had skied before but was more than grateful for the the opportunity to do it again. It was awesome. It was also my first real contact with soldiers, with whom I spent the entire week. They will be the first to admit that they are a different breed, but I really took to them and we all had a great time.

At the end of January I returned to Cambridge for a couple of weeks, but in mid-February was off again. The majority of 34 Field Squadron (Air Support) were deploying to Canada on Exercise Warpaint, and I joined them. The squadron were there to do reparative works on the British Army Training Unit at Suffield in Alberta, Canada, but my role was that of adventurous training officer. The job involved co-ordinating the numerous skiing and mountaineering courses we were running as well as organizing weekly activities for the soldiers. The job was challenging and I was on a steep learning curve.

But I greatly enjoyed what I was doing. It was very satisfying when soldiers told me they appreciated my efforts and that they were benefiting from them. There was great interest in snowboarding, several visits to ice hockey fixtures and a visit to a local rodeo. Morale was high. I also managed to squeeze in a week's mountaineering and left Canada extremely pleased with what I had achieved in my nine weeks there.

I returned home at the end of April and went on leave, before returning to the 39 Engineer Regiment in Cambridge for a couple of weeks. But then I was away again, this time for 10 days walking/climbing in the Isle of Skye with the Royal Engineers Mountaineering and Exploration Club. This was a lot of fun as well as very valuable training. It acted as the precursor to the expedition to Bolivia.

Summit, Mount Sajama

On my immediate return from Skye I was enlisted for a two-week parachuting course. This was the realization of a life-long ambition. Jumping out of a perfectly good plane may not seem like an entirely rational action, but it's great fun! I made 15 descents over the two weeks and intend to continue parachuting in the future.

Three weeks later I was preparing to go to Bolivia. Ex Bolivian Heights was a mountaineering expedition, with sights set on the highest peaks in Bolivia. The group (including myself) succeeded in summitting two of these: Huayna Potosi (6088m) and Sajama (6549m). It truly was the experience of a lifetime. The mountaineering was fantastic and I certainly hope to pursue the sport, but simply being in South America was an experience in itself. I will treasure many of my memories for the rest of my life, not just from Bolivia, but from my entire year in the Army.

In October 2001, I began a degree in Medical Sciences at the University of Cambridge, a far cry from my last year. Despite this, I feel the experiences I have gained will stand me in good stead for the future. I am a great deal more mature and independent than I was a year ago, having travelled and having had to survive away from the comfort and security of my own home environment. I have come across such a diverse range of people that I could only have imagined a year ago and made many friends amongst them. My leadership, organization and punctuality skills have all improved vastly with the job. I have managed to participate in sports and adventurous training that most civilians only dream of. Indeed my Gap Year Commission has been a dream. I would categorically recommend it to all fit, confident and open-minded students with a sense of adventure.

The Army Estate Strategy – Single Living Accomodation

LIEUTENANT COLONEL J F PELTON MBE

As an AG officer working hand in glove with the emerging Army Estate Organisation Lt Col Pelton found himself in the ideal position to write the Army Estate Strategy for CinC. The Paper was taken and endorsed by ECAB in May 2001 and is now providing the basis for the review of a variety of estates and personnel policy issues. The Strategy was presented to the EinC's Conference in November. The following article is loosely based on that presentation.

THE Strategy for the Army work initiated by ECAB[1] in September 2000 included a requirement for an Army Estate Strategy (AES) focussing specifically on single living accommodation (SLA). The AES was duly endorsed by ECAB in May this year[2] and has provided the strategic guidance for the new Army Estate Organisation (AEO) in tackling SLA issues. However, the Strategy is not an end state in itself: the process is dynamic and strategy and policy must continue to evolve. Therefore, this article aims to provide a summary of current SLA thinking as set out in the AES.

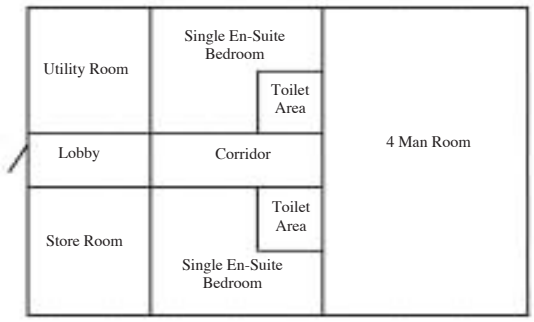


Figure 1 – Type Y Single Living Accommodation.

WHY CHANGE?

IT was good enough for me …… However, the Army is now finding it increasingly hard to sustain adequate manning levels. The attractions of better paid and less turbulent lifestyles in the civilian world are proving a challenge to retention. The resultant undermanning spiral is, unfortunately, familiar to many. The Continuous Attitude Survey (CAS) and Leavers' Surveys both point to accommodation and lifestyle as significant reasons for curtailing a military career[3]. These results reflect a paradigm shift in the expectations of the young people which the Army recruits. Past assumptions that have characterised military thinking on accommodation and barrack regimes are, therefore, being reviewed. Even the radical thinking that led to the step change from the barrack room to the Type Y accommodation layout (Figure 1) is now outdated and the pace of change continues to accelerate.

BED SPACES

THE traditional "meter" for accommodation is the bed space: a simple term belying generations of tradition and military exigency. In the context of the barrack room it represents a small island of privacy in a wholly communal environment – the ultimate measure of the sacrifice of individual to the Service? However, at the start of the 21st Century, individuals are demanding privacy, that is somewhere to "chill out" in the contemporary vernacular! The RAF has long since provided single rooms for its airmen, the same basic standard which has been adopted by uni-

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[1] ECAB – Executive Committee of the Army Board.
[2] ECAB/P(01)/13 dated 24 May 01.
[3] In a recent Leavers' Survey 76 per cent of those questioned cited mess/barrack accommodation amongst their reasons for leaving, of which 11 per cent cited accommodation amongst their top three reasons. The CAS indicates that 58 per cent of ORs and 56 per cent of officers consider that the standard of accommodation is influencing their intention to stay in the Army.

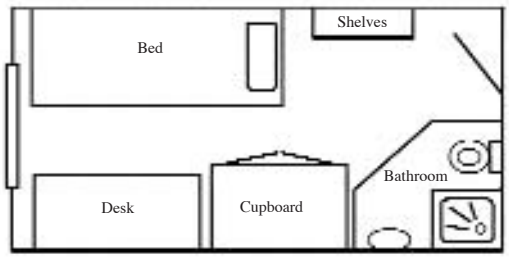

Figure 2 – Type Z Single Living Accommodation

versities, police and nursing accommodation. ECAB, therefore, brought the Army up to the same standard last September by endorsing the Type Z standard (Figure 2) of accommodation. This provides a significant step forward in the quality and configuration of accommodation available to all ranks. From now onwards new builds and refurbishments will aim to provide not just single rooms, but en suite single rooms. The bed space has now been transformed into the bed room.

LIVING ENVIRONMENT

ADOPTING Type Z accommodation was a major step, but was it far enough? The Future Standards Paper had provided a building block. However, there are many examples of how these might be put together in a way that may not be acceptable. Motels across the world illustrate the hazard – the battery chicken effect. Rows of identical soulless rooms with no encouragement and little opportunity for social interaction. Compare returning to such accommodation at the end of the working day or after an exercise with the married soldier[4] who can kick off his boots at the door st a cold beer from the fridge and sit watch telly with his family or friends. Later he can shower, order a takeaway and sit down with neighbours to watch a video or football match and all within the walls of his own living space. The single soldier also needs such a living environment: a place that he can call home and where he can to relax in the company of his mates and enjoy an equivalent style of life to that of his civilian counterparts. Director AEO has summarised these requirements as being the need for: privacy; security; choice; quality; and comradeship[5]. This thinking led to the idea of the "communal space" which was a key theme of the Army Estate Strategy endorsed by ECAB in May 2001. The aim being to provide single soldiers with a living environment which would allow them to "live their lives"[6]. The result is shown conceptually at Figure 3[7].

SMALL TEAMS

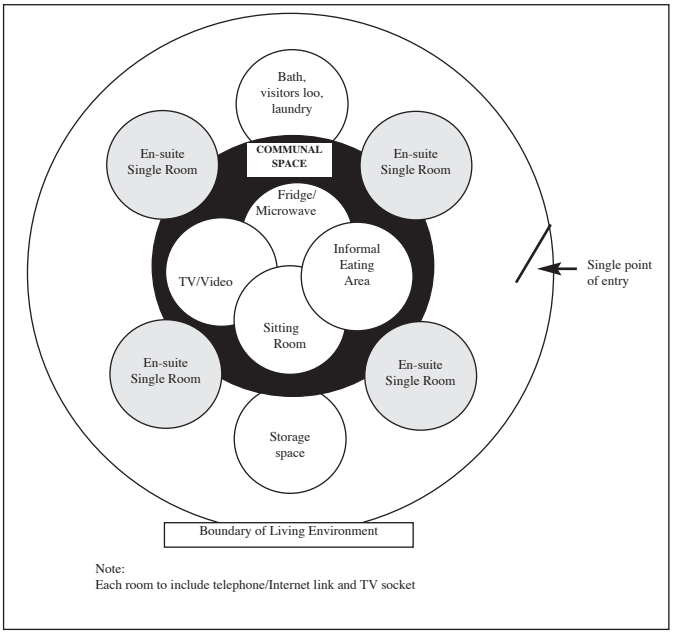

Figure 3 – Conceptual Single Living Environment (Note only four rooms shown – the model has now been developed to include up to six rooms)

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4 The masculine form is used for simplicity but should be taken to mean male or female in the context of SLA.
5 AEO P/0027/4 dated 15 June 2001.
6 The policy has since received further endorsement in the form of the feedback from a series of Customer Focus Groups held at eight Army units as part of research by the Project SLAM (SLA Modernisation) Team.
7 Note that for officers' messes the communal space is provided for in the form of bars, dining rooms and ante rooms. Therefore, the AES concept is currently aimed principally at ORs.

ply because these options do not reflect the British Army's culture which is strongly rooted in small teams. Analysis of the requirement for accommodation to reinforce this team ethos indicates that the living environment should complement the junior NCO and senior Sapper's span of responsibility. The Army Estate Strategy suggests that four would be a good number. However, the size of teams within some Arms are larger, for example RA gun crews, whilst the slightly larger grouping allows for some occupants to be away without emptying the accommodation. There is also a need for flexibility in catering for the Army's propensity for moving units around periodically and for restructuring them on a routine basis. Therefore, a grouping of up to six rooms clustered around the communal facilities has been adopted as a pragmatic way forward[8]

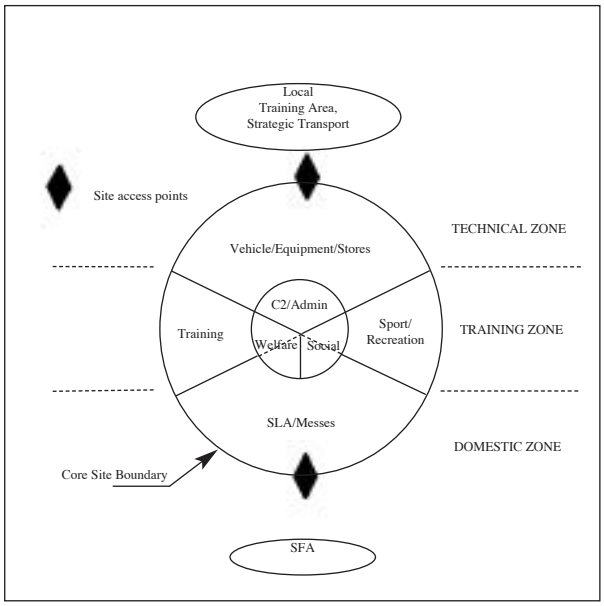

Figure 4 – Conceptual Core Site Layout

BARRACK REGIME

THERE are some implicit, and explicit, changes to the barrack regime which required to complement the SLA upgrade. These include:

- The collective 'ownership' and responsibility for the accommodation by the small teams and the responsible or empowered junior ranks.
- Relaxation of the policy towards alcohol within the accommodation.
- Changes to the assumed privileges of rank. Should full corporals now be entitled to a suite of two rooms?
- The ability to invite civilian friends, including the potential for overnight stays.
- The ability to choose higher grade facilities, perhaps an additional or larger room, in return for higher charges.
- The communications net within barracks, given that every bedroom is networked, could allow interactive training from 'home'.

These changes will take a long time to implement. However, they are a necessary complement to the culture change implied by the style and configuration of future accommodation if the full potential of new SLA layouts is to be realized.

THE BARRACK ENVIRONMENT

ALTHOUGH beyond the scope of this short article, there is also a need to consider the surrounding barrack environment and provide the necessary guidance for planners and commanders. The conceptual layout shown in Figure 4 was put forward in the Army Estate Strategy as being the basis for structuring future barracks and indeed garrisons. Again there is an emphasis on allowing soldiers to be able to live their lives and to allow easier integration with the wider community. At the same time the concept allows ideas such as "pairing and sharing" common facilities such as messes, AFV sheds and workshops. Depending on the location there is the scope to provide a significant improvement in community facilities, shops, restaurants (PAYD and NAAFI '3 into 1'), sports facilities and other social amenities.

HOW?

AT somewhere between £25K and £30K per person, this new approach will not be cheap. It is estimated that simply upgrading the Condition Grade 3 and 4 SLA, 38 per cent of the total, will cost in the order of £0.5 billion[9]. However, the Future Standards Paper put this additional cost in perspective by taking a more holistic view than previ-

[8] This compares with the US Army's approach in developing the "One plus One" concept, that is two single rooms sharing communal facilities, which complements their junior ranks "buddy" system for personnel management.

ously and including the cost of training a soldier in the equation. During STP 01 significant additional funds were released to fund the upgrade/rebuild, of Grade 3 and 4 for condition SLA to the new Type Z standard with communal areas as per the AES "nut cluster". Project SLAM[10] has been initiated to use SMART procurement methods to ensure that best value for money is achieved in spending both this "new money" and the existing STP SLA funding. Resources will, therefore, be tight but are being made available and should be used more efficiently as SMART procurement techniques are applied.

WHEN?

UPGRADING SLA to the new standard and configuration is a major challenge. There are in the order of 80,000 bed spaces within the Army of which around 30,000 are Grade 3 or 4. The first signs of change will emerge during the current STP period, that is between 2003 and 2006. The medium and long term plan reach out to 2012 and beyond. However, it will take time before much of the accommodation is upgraded.

CONCLUSION

THE challenge of providing SLA for the Army so as to meet soldiers expectations now and into the future will continue to demand creative thinking and pragmatic solutions. The estate is at last beginning to receive the resources, policy attention and staff horsepower which it needs to recover from the dire state which it is currently in. There is now a major effort being put into improving the living conditions of soldiers: it is a significant challenge and a long term task, but one which is long overdue and which has the potential to reap great rewards in terms of the quality of life available to Army personnel in the future.

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[9] Condition Grade 1: Element is new and can be expected to perform adequately to its full normal life; Grade 2: Element is sound, operationally safe and exhibits only minor deterioration; Grade 3: Element is operational but major repair or replacement will be needed soon; Grade 4: Element runs a serious risk of imminent breakdown.

[10] Project SLAM – SLA Modernisation Prime Contract.

A Disaster of 60 Years Ago

BRIGADIER JOHN CONSTANT MA EURING CEng MIEE

Commissioned into the Corps in 1936, John Constant served with Seventh Armoured Division Engineers in Egypt and Libya. He has compiled a booklet from 4th Field Squadron's earliest War Diaries, a copy of which is in the Corps Library. The article below is an edited extract.

Introduction

MANY readers will remember that the Second World War victory was preceded by a series of disasters, each of which has etched itself on the minds of those who survived it.

The 4th Field Squadron was one of the first new Sapper units raised in that war, and it went on to great success later, but only after a dreadful start. Having been raised in the UK and transported by troop-ship round Africa to Suez, the Squadron was still undergoing desert training near Mersa Matruh in the Western Desert of Egypt, when the initial British success against the Italians had led to the whole of Cyrenaica (the Eastern half of Libya) being cleared of the enemy. General Wavell, the brilliant Commander in Chief of the Middle East Forces was ordered by Churchill to denude the newly won territory, in order for the troops to fight in the Balkans. 2nd Armoured Division, a Territorial "formation" with few troops, some without any desert experience and little real training, was sent forward from Egypt to "hold" Cyrenaica, in case of enemy counter-attack.

This brief account entwines some of the events both of the Squadron, which had two officers in each Field Troop, and of the Field Park Troop which had three; with the CRE, Lieutenant Colonel Alan Mitchell, to whom I was the adjutant, they were the initial constituents of Seventh Armoured Divisional Engineers.

Operations

INSTEAD of being given any rational plan of action under our CRE, orders were received to send sub-units forward to what turned out to be an uncertain chain of command. On 23 February 1941 the Squadron's First Troop was moved to Barche, and then on 2 March the Field Park followed. The latter was sent progressively forward, until at Bilal it came under command of 3rd Armoured Brigade for operations in the area Bir el Sweyra - el Hasseyat-Gitafiya[1]. Passing through Ajedabiya on 9th March, the Field Park came under attack by German aircraft, losing two killed, two wounded and some vehicles destroyed.

By 10 March, the Squadron's First Troop, commanded by Brian Grant, had gone forward under command of 2nd Support Group into the salt marshes of Sebket Serrira, for the supply (and preparation for denial) of drinking water; they also prepared the main road near Mersa Brega for cratering, and laid anti-tank mines nearby. Then the Squadron's Third Troop under Captain "Ark" Weston went to join an Australian armoured cavalry regiment to clear the Italian Garrison at the Jarabub oasis, and his assistant John Bond's gallantry there was rewarded with the Military Cross.

A fortnight later, the CRE's HQ moved into Cyrenaica, and like the other units were continually being "strafed" by German aircraft. At Barche, the HQ of Cyrenaica District, we met the hierarchy, including the newly arrived commander, Lieutenant General Neame, a Sapper VC. We went on to stay that night in Bengazih, pounded all night by enemy air raids, and continued in the morning through the desolation of Beda Fomm. There the Italian Army fleeing south had been blocked by an outflanking sweep across the desert conducted by a column of our Division, the earliest elements of which had heroically cut the main road and had caught the Italian Army, including its commander, as they panicked.

The CRE and I continued southwards on 24 March, frequently strafed by German aircraft, and reported to Major General Gambier-Parry, Commander 2nd Armoured Division, some 30 miles beyond Ajedabiya. He had relieved the

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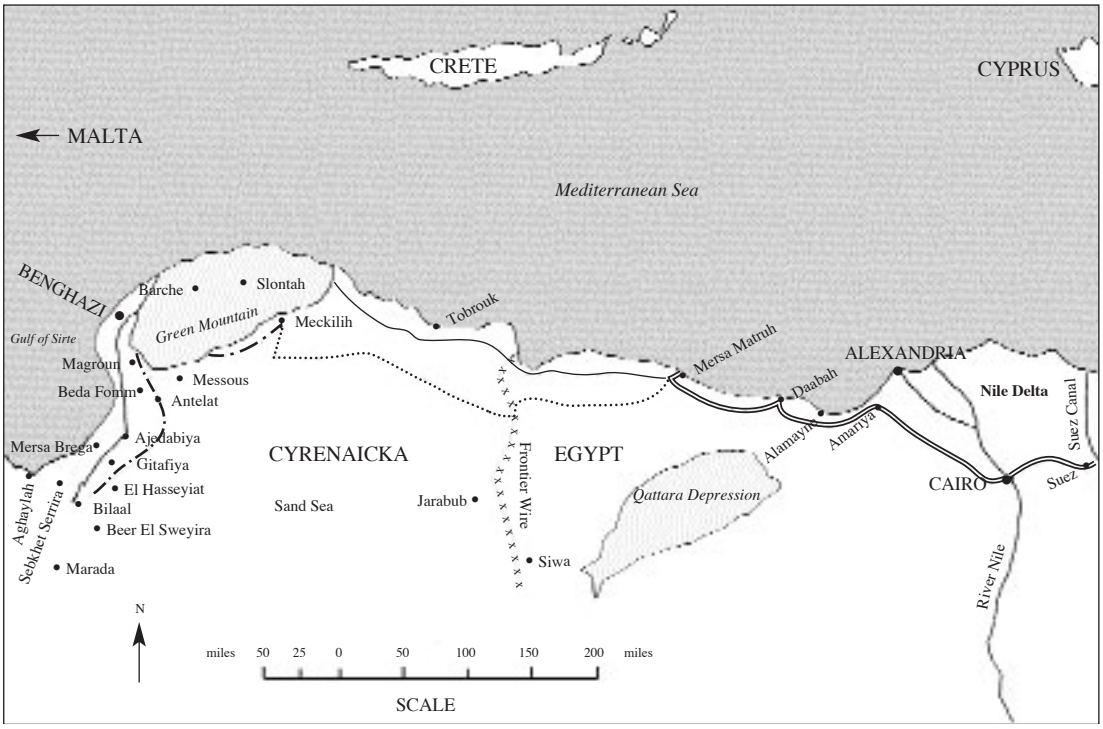
[1] The spelling of many place-names in Libya and Egypt has undergone the influence of Arabic, Italian, British and American speakers during the last Century. I have attempted to portray them phonetically, in the way our soldiers did.



The Western Desert Campaigns 1940-42.

Australian Brigade and, sadly, had very few troops at his disposal.

The Squadron, less its two detached troops, had been following us, but more slowly, and I went to meet them on 28 March at Magroun, where they had been viciously dive-bombed and machine gunned by several German fighter-bombers, Messerschmidt 110s. Three men were wounded and one new Ford 30-cwt GS lorry was partially damaged. This was an experience designed by the Germans to be terrifying, as indeed it always was, but the actual damage was light because we had, by then, developed the technique of carrying an air sentry in every vehicle, to give sufficiently early warning to be sure of dispersing everyone out of the vehicle, in time to be clear by the moment the bomb or bullets actually hit.

The Squadron, less two troops, leaguered about 6 km west of Antelat. This was a busy time of recce and excitement, during which it soon became apparent to us that the defeated Italian enemy had been replaced by the first German soldiers to land in Africa; however, it took some days to convince GHQ in Cairo that, indeed, they were Germans, and well trained. As the enemy activities stepped up and conflicting orders appeared to be given by GHQ and by General Neame at Barche, we realised that 2nd Armoured Division was a division in name only.

Not only was its HQ completely untrained, there were grave deficiencies in the signal equipment, resulting in interminable delays and insufficient battery-charging capacity; even worse, the armour was not battleworthy. The only infantry we had to cover an area the size of Wales was one newly arrived battalion of the Rifle Brigade, the Territorial "Tower Hamlets"; they had not even been acclimatised to the desert conditions, but the deficiencies in their training were fully compensated by their enthusiasm.

The German air raids increased in strength day by day, and the low-flying strafing attacks were alternated with screaming dive-bombers. We therefore extended our dispersion from 100 to 200 yards between vehicles and, indeed, the whole day appeared to be spent walking from one vehicle to the next. As the enemy forces built up, their pressure on Aghaylah increased and the Kings Dragoon Guards had to yield the place to them by 25 March, but then there was a pause for a while. With hindsight, it is probable that the extensive saltpans restricting manoeuvre

in that area were still sticky at the time, and the enemy were waiting for them to harden sufficiently. When the German armoured thrust was launched, it was on that lightly defended flank of the Support Group's position, with a view to the quick recapture of the port of Bengazih.

In order to indicate some aggressive intentions, Advanced Division HQ had earlier been moved forward to the area west of Bilal Airstrip, which our Sappers then refurbished in case any of our own aircraft ever came our way. On 31 March some enemy tanks, with supporting infantry, attacked the position held by the Tower Hamlets and obtained little success, when a cruiser squadron of Fifth Tanks appeared on their flank. Afterwards, the Support Group retired slowly, while the Sappers damaged the wells in the area, including those at Mersa Brega in the face of the enemy. Four pairs of craters were blown on the main road between Mersa Brega and Ajedabiya, with rays of mines laid from each crater.

A new position four kilometres north of Ajedabiya was prepared. All identified engineer stores were destroyed by the Workshop, which then rejoined the Field Park near Antelat. Some Australian Engineers were demolishing the dumps of Italian ammunition at Beda Fomm and elsewhere on the main road, while the First Troop did their best to deny the airstrip and other installations at Ajedabiya.

The wind pumps of the deep wells at Beda Fomm were destroyed by the Squadron, and the remains of the supply dump there were tipped into the wells. 2nd Division continued to withdraw on 3 April, and the Field Park opened a water point at Shelideemah. The Squadron passed them on their way to Rejima, as enemy patrols were by now entering Antelat, so the water point was closed after the armoured brigade had withdrawn. Cyrenaica Command HQ had blundered by sending the Third Troop to Antelat, which was by then already in enemy hands! Attacked from the air as they approached their destination, they attempted to follow the usual practice of "baling out", but were then attacked from the ground and lost six killed, six wounded, including the troop leader, Captain "Ark" Weston, and seven 15-cwt trucks destroyed.

Both Advanced Division and Rear Division moved south and east by difficult tracks in pleasant open-wooded country towards Gott Dervah, being dive bombed and machine gunned several times. The Field Park moved from Marawah to Slontah, on their way towards Mekilih, and began a sweep of water supplies in the whole area south of the main road and north of the grid line through Mesous, demolishing all they found and keeping contact with the Australians to the north of them.

Divisional HQ continued to rumble on in the direction of Mekilih with its remaining collection of unsuitable vehicles on those very rough tracks, riven at intervals by wadies. Wireless contact with the air and with the Support Group had been lost, due to continuous operation for so many days without sufficient time for battery charging. As Advanced Division approached Mekilih, the awful lack of cohesion of our desert forces was demonstrated by the fact that troops of 3rd Indian Motor Brigade, commanded by Brigadier Vaughan, fired on us, and it took some seven hours to reassure them, as all wireless contact had been lost.

Disaster

To avoid hanging about, Rear Division took up a position in the hills ten miles west of Mekilih, and Advanced Division was joined in the high ground between them and the Indian Motor Brigade by elements of various other units, including some of the Squadron. On 7 April, we could see enemy columns out in the desert to the south of us, and twelve German (Ju 52) supply aircraft were visible landing on the dry saltpans about seven miles in that direction; later they took off again. The Squadron organised patrols to scour west of us, in order to recover any worthwhile vehicles and stores abandoned in the withdrawal. They saw 8-wheeled German armoured cars, but did not have any weapons for engaging them, while enemy patrols in the hills north and east of us took up positions and began to fire at us with machine guns and artillery. When we finally heard that our armour was not after all retiring towards us, Lieutenant Edwards took half his troop as a fighting patrol, to extricate 2nd Lieutenant Parker's party which, as they discovered, had already destroyed the well and had then withdrawn in the face of the enemy, taking nine German prisoners on their way to reach Tobrouk safely. Lieutenant Edwards' patrol also engaged the enemy successfully in a brief firefight; three of the enemy were killed and the remainder escaped, with two wounded. If every section of his troop had been armed with a light machine gun, they could have inflicted heavier casualties; afterwards, Edwards

was awarded the Military Cross in recognition of his initiative and the gallant leadership he had exhibited throughout that engagement.

The Indian Motor Brigade was holding an extended defensive position centred on the old Mekilih Fort, where a water point had been set up by their Sappers, who turned out to be from 35 Field Squadron of the Bengal Sappers and Miners, commanded by Major Hayes; they now came under our CRE's command. The whole of Divisional HQ had now been joined by 901st Company RASC, 3rd Light Ambulance and some light anti-aircraft gunners, on high ground north west of Mekilih. We had no field guns and only one tank, but the general decided to break through to El Adem, near Tobrouk, at dawn the next day. During the night, the Squadron occupied a defensive position as a "keep" and all the other vehicles closed up ready for the dawn move, while the enemy's field guns were being registered intermittently on various targets, including the fort.

As first light dawned on 8th April, there was no sign of the Indian Motor Brigade, when our "charge" eastward began, trying to use the 40 mm light anti aircraft guns as field artillery to break a way out of our position, but it all failed under withering enemy machine-gun and sporadic field-artillery fire. Our General decided to withdraw three miles west, but the enemy immediately occupied the hills to the north, overlooking us and firing down with machine guns. Enemy tanks located hull down in the dead ground to the south closed that direction as a possible line of dispersal. The commander decided that the enemy remaining in our way must now have thinned, owing to the numbers moving to the north and south of us. Once more, he ordered a "charge" eastwards, but it soon came to an end, in face of the accurate machine-gun fire.

Prisoners of War

YEARS of professional training as a regular army officer had not prepared me for the sight of a general waving his handkerchief out of the the roof hatch of his vehicle, to betoken the white flag of surrender.

I felt a burst of fury, as I went to my "office truck" nearby to burn all the remaining operation orders, etc, and discovered that the wire in-and-out trays had a useful incineration role. I felt almost sick with anger as I saw the well-mannered German aide de camp, perfectly uniformed, coming to lead the General away, poor chap: dead tired, given an impossible task, and hopelessly ill-equipped, one could only feel sorry for him. I felt great sympathy for all our more senior officers, who had fought in the First World War a generation earlier, many of them decorated for bravery, and each should now have been at the peak of his career. I had hardly got to know the General in those few busy days we had been attached to HQ 2nd Armoured Division, a high-sounding name for an untrained shambles.

Ever more resentful, I watched the other senior officers, including our CRE, being escorted away as PoWs, while I removed my badges of rank and packed a small pack with spare underclothes and washing gear; I hesitated to join the bedraggled lines of dispirited men being ushered away to sit on the desert about a mile from our vehicles, but there appeared at that stage to be no option. Dead tired myself, I was thinking how unrealistic it seemed actually to have taken part in a surrender, and I was cogitating on whether the General had had any viable alternatives, as it was clear that the German artillery and machine-gun firepower, including their tanks, were so decisive. About a mile or so away, I could see the bulk of the Divisional HQ vehicles, and those of the attached, all packed together neatly by our captors, but not in use; meanwhile we were idle prisoners, but unconfined. Fortunately, I realised, the majority of the Squadron and the Field Park were still on detachment and had not been caught in the net, although both the OCs of those units were with me as prisoners. Still furious with the hopeless situation, I fell asleep there on the ground, and must have slept for well over an hour. When I woke, I found the sight of the enemy soldiers bossing our men around was a further irritant, but I began to feel the calls of nature.

Escapes

A LITTLE breeze had got up, and the well churned desert was being fanned into a mild dust "storm"; I decided to have a pee and, as I walked a decent distance away from the other prisoners for that purpose, I guessed that this might be my lucky opportunity, so I kept walking. The soldiers guarding us were spaced about 25 yards apart, and I was in full view of them, but I had left my little kitbag where I had been lying and may already have been undoing my flies. Nevertheless, I still had "un mauvais

quart d'heure" wondering whether one of those gutteral German voices would suddenly yell out at me! Surely they would not shoot an escaping PoW without at least a warning? However, nothing happened.

Unlike the excitement typically experienced in the heat of battle, the very quietness of that moment just engendered a spine-chilling fear. Just occasionally a blast of dust was swept by the wind, as I walked on. Then, was it perhaps some sort of telepathy? I became aware that John Bond was also walking, and on a convergent course. He was soon beside me, as we continued - on and on until we were near a group of the abandoned vehicles. Trying not to look conspicuous, we were about to mount a suitable looking truck, when suddenly we saw some German mechanics close to us. For a moment we froze, but fortunately their technical interests took priority and they stopped to examine the next vehicle to us, as they must have thought that we were some of their own fellows. Nothing happened and, in great trepidation, we got into a likely looking truck and I gingerly tried the starter; what a relief that it worked! With John in the passenger seat, I drove slowly westward, as if I was a mechanic unused to the vehicle, and still nothing happened. The expected rifle shot did not ring out, and I kept going for about five miles, then bearing southwest, for a few more miles, until we saw a squadron of the big German 3-engined J52 transport aircraft landing on a salt pan. Still in our battledress, it was becoming hot, as noon had come, so we lay in the shade under our truck, with it looking as if it had been abandoned.

After about a couple of hours, they had unloaded the aircraft and all was clear, so I took the wheel again to drive south. Gradually, in the distance, a motorcycle and sidecar appeared with a German soldier riding it, and I altered course towards him, accelerating as much as I could on the rocky surface of the desert. Unsuspecting, he turned in our direction and was all trusting until the last minute, when he suddenly realised that I had evil intentions – indeed, my pent-up anger now had an outlet, indeed a blood-lust! Panicking, as he tried to turn his front wheel, he fell off, and I did not stop until my front wheel was actually touching his shoulder; John leapt out and menaced the poor wretch, as I went round behind and grabbed the rifle from his sidecar. He was obviously terrified, but we were then faced by awful doubts: Did international law permit one to tie up a prisoner of war ? Did we have any rope? No. Taking the wheel in turns, how could we guard our prisoner? 60 years later, I am still seeking the answer to such questions! What we did was to take his boots and all his clothing, except for his uniform shorts; we took the rifle, watch and water bottle, and kept them all in the driver's cab. Although there was a big packing case in the covered back of the truck, there was plenty of room there for our prisoner, as well as for the novel German Army 20-litre watercan. We bashed his motorcycle with a pick-axe to render its recovery more difficult.

Keeping about 20 miles south of Mekilih, we then drove generally eastward, taking the best of the "going" as far as we could judge. After a couple of hours or so, taking our hourly turns at the steering wheel, the pangs of hunger proved powerful so, when we changed over at 1600hrs, we looked for sustenance and found a tin of pineapple chunks in the truck. Sitting down on the ground with our prisoner, we each dipped our fingers into the can to grab the pieces, in order to assuage both hunger and thirst. My ability with the German language was fairly fluent, so I did my best to quiz the man, who gave his name as "Schulz", of Three Company, First Brandenburg Regiment; he tried to be careful with his statements, but admitted that he had not enjoyed his six weeks in Libya. While we sat there, we saw a Fieseler Storch light aircraft flying eastwards about ten miles north of us, so we judged there must, therefore, be more enemy troops ahead; we also wondered whether it was carrying their commander, whom we later heard was called Rommel. About two hours later, when dusk had fallen, we crossed a series of tank tracks; we recognised they were from Mk 2 and Mk 3 German tanks, moving in a northeast direction, and up to a hundred in number, accompanied by a similar number of heavy lorries. We concluded that they must be concentrating in a position to cut the road between Gazalah and Tobrouk.

Noting there was spare petrol in the back of the truck and the tank was fairly full, we resolved to keep well south of Tobrouk and to aim for the Egyptian frontier, which the Italians had delineated by a huge wire fence with occasional passages through it. The moon was clear and we could keep direction without difficulty, but there were many small escarpments to be crossed;

they were mostly descents of less than a metre, over each of which we fell with a considerable bump and the risk of breaking a spring. Every hour on the hour we changed over driving, and also checked the back of the truck but, at 0100hrs, now 9 April, we were shocked to find that our prisoner was no longer there. Also absent was the big crate; it must have bumped out, when we "jumped" down one of the scarps. We were worried about our German guest, so lightly clothed and perhaps wounded by a fall, lying in the desert until the Senoussi picked him up; his future, then, would have varied according to whether it was our Long Range Desert Group to whom he would be handed by the Beduin, or whether similar patrols were already being mounted by the Germans. Mussolini's cruelty towards the Senoussi had led them to retaliate by slaughtering lonely Italians, unless the price was good; but what did they feel about Germans, we wondered?

We reached the frontier wire about 0730hrs and soon found a gap to cross into Egypt. Then driving north we were relieved to discover a petrol dump, guarded by a single Egyptian soldier. If Schulz had still been with us, his presence might have caused a problem; however, sadly being now without him, even our few words of Arabic were sufficient to charm the guard into giving us a fill of petrol for our fuel tank. Following the well worn Trigh-el-Abd, "the slave route", we made for Matrouh, and reported to the local Garrison HQ, where Brigadier Lomax gave us a hot meal. After interrogating us while we ate, he emphasized the need to avoid any delay; without further ado, he then called a driver and dispatched him, with John Bond as his passenger, up the road to Tobrouk to give the garrison there the benefit of our observations. Meanwhile, his own driver had checked over our truck, and prepared it to drive me, almost nonstop, all the way to Cairo with the gear from the prisoner, including the "Jerrican", the first one ever seen by our staff there.

I was later able to piece together the whole "jig-saw" of information. It transpired that several parties totalling some 200 all ranks from the Squadron and the Field Park, including Lieutenant Weir and 2nd Lieutenants Parker and Harris, had gradually escaped the German net near Mekilih, and had reached Tobrouk, where they gathered together briefly with Major Hayes, the Indian Sappers & Miners commander. Also, Lieutenant Terrell had reached Tobrouk with 90 of our men, mostly from the Field Park. When he had been some distance away to the west of Mekilih, he had been able to see in the clear dawn light that a debacle was about to occur, as Divisional HQ was trying to charge the German arms and armour, so he had decided to lead the dozen vehicles with him into a wadi, where they had hidden for a while, before joining up with an anti-tank battery under Major Mitford. On the way across the desert to Tobrouk, this combined force managed to capture about a 100 prisoners .

The survivors of the Squadron were evacuated from Tobrouk on 21 April, but their vehicles had to be left there, with some of their equipment, and the Australian Fortress commander refused to let the Field Park go. However, only two days later, I received orders for One Field Troop to be ready for operations in the desert by 1st May, if necessary using reinforcements from the RE Base Depot at Moascar. Vehicles and equipment were to be found by our Division, and the remainder of the Squadron was to be made up to strength later. Still equipped with one vehicle only, the truck we had seized at Mekilih, but now properly maintained and clean, I moved to a camp at the Depot in time for the Squadron's arrival the next day, 24th April, as their voyage by ship from Tobrouk was followed by the rail journey from Alexandria.

Only two days later Captain Terrell, arriving from Tobrouk reported to HQ 7th Armoured Division, and to the Engineer in Chief. Later that day, he and the rest of the Field Park joined us at the Depot, so we celebrated, albeit briefly, that the whole of what was left of the Seventh Armoured Divisional Engineers was together again, and indeed on exactly the first anniversary of our original "birth". We remembered all the vicissitudes we had endured, and the sad loss of so many splendid men of all ranks, especially Lieutenant Colonel Alan Mitchell, the CRE, who would, I am sure, have risen during the war to great heights, as he was so convincingly professional, both as a commander and as a staff officer. Mourning our casualties, both killed and wounded, we enjoyed only two days together.

Afterwards

In spite of those casualties and the many disappointments in the desert, all ranks shared a feeling that our one year of existence had not been in vain. Both the Squadron and the Field Park had carried out their duties, in training and in operations, with a degree of honour, and all

ranks had emerged resilient and more experienced. It was interesting to see the majority of our men growing in self-assurance, learning the most effective way of getting things done, moving and living independently when necessary, confident of their ability to outwit the Germans; without suffering from undue pride, they seldom boasted, and they cherished a sense of humour, often regional in character.

The resourceful leadership of the commissioned, warrant and non-commissioned officers, had been matched by the skill and determination of our Sappers. Although grossly underequipped compared to our German enemies, we felt that each of our detachments had beaten them face to face in every individual engagement, and we were sure that we would do so again, however long the war might last. We were delighted to hear that two more had escaped from the Germans: Captains Peter Moore and Bill Loring, second in command of the Squadron and OC of the Field Park respectively. Sadly, Loring was killed later that summer, but Moore survived and later commanded 3rd Field Squadron, himself inventing the Eighth Army minefield gapping drill, which succeeded at Alamein and became accepted worldwide. After the war, and the one in Korea, he became the most highly decorated officer in the Corps, with two MCs and three DSOs

For the rest of 1941, the Squadron went from strength to strength; Gerry Duke was popular and efficient, operating the Squadron all over the Western Desert of Egypt, both in support of the armour and of the "Jock Columns", as well as some deep penetration tasks, preparing emergency landing strips for the RAF miles behind the enemy. In August 1941, the Commonwealth forces in the Western Desert of Egypt were restructured as "The Eighth Army" with many reinforcements and new equipment, including the first of the splendid American-built tanks, familiarly known as "honeys". The Field Park was enlarged to a squadron and I was promoted to major again, to command it, in good time for Operation "Crusader". Tobrouk was relieved and the remnants of Rommel's "Afrika Korps" were pushed out of Cyrenaica.

Joint Engineers in Kosovo – A NATO Perspective from HQ(5) KFOR Main

LIEUTENANT COLONEL R C SWANSON MBE

The author was commissioned into the Corps in 1974 and spent the early part of his career oscillating between Germany, GB and NI. His latter regimental appointments included Operations Major 33 Engineer Regiment (EOD), OC 62 (Cyprus) Support Squadron, and 2IC of 28 Engineer Regiment. Since then he has attended the NATO Defence College(NDC) in Rome and stayed on to be MA to the Commandant NDC. Currently he is Chief J5 Operational Planning Branch in JHQ NORTHEAST but recently deployed as part of the core of KFOR (HQ) 5 as Deputy Chief JEngr/Chief JEngr Ops/Plans from March to September 2001.

INTRODUCTION

BOTH JHQ NORTH (Norway) and JHQ NORTH-EAST (Denmark) provided the core of HQ (5) KFOR, some 300 personnel. This core was able to provide the NATO perspective and experience to a very large staff of over 900 officers and NCOs, the majority of which came as national augmentees. The core had received a good pre-deployment training package, including a very effective Mission Rehearsal Exercise, where even the JEngrs were well employed and rehearsed in typical KFOR business. Thus when KFOR 5 arrived, it came well bonded, tuned and hit the ground running.

JEngr is part of ACOS Support Division, and while much debate could be devoted to discussing whether it should be part of the Operations Division, it is not intended to do so in this article. The most important factor is that it is a separate J Branch and not part of J4, which is reflected elsewhere in the majority of the NATO organisation (the ARRC excepted). The chief engineer is a German national OF5 although three separate personalities filled the post during KFOR 5. Thus the three core JEngr personnel within the branch of 22 provided the essential continuity.

OPERATIONAL REVIEW

IN March 2001 the Ground Safety Zone[1] (GSZ) Sectors were already in the process of being relaxed and returned to the VJ Forces with the most difficult one, Sector Bravo, incorporating the Presevo Valley, still to come. On arrival of KFOR 5 JEngrs, there was a perception that the emphasis of the previous JEngr staff had been to concentrate mainly on short term planning and reacting to the fast moving events within Kosovo and those pertaining to VJ re-entry. There was little long-term vision or contingency perspective on engineer projects, very little or no J5 or J3 involvement in the process and, above all, there was no mechanism for reviewing, prioritizing, endorsing or developing short or medium-term operational requirements[2] (OR).

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[1] The Ground Safety Zone (GSZ) was a designated area around the Kosovo border 5 km inside the Former Republic of Yugoslavia (FRY) which under the Military Technical Agreement signed in 1999 prevented VJ Forces and Special Police Units (MUP) entering the zone. KFOR's Joint Implementation Commission monitored it and only local Serbian police were allowed to operate within the zone.

[2] A Resources Board of some kind had existed in KFOR 3 (and maybe before that) but it did not operate during the latter part of KFOR 4.

Thus one of JEngr's first staff actions was to develop an OR review process to develop these modalities and allow branches to submit ORs, and compete for and receive NATO common funding. This was solved by the creation of the KFOR Operational Requirements Review Board (KORRB) which would review, prioritize and endorse all ORs, not just JEngr requirements. Chaired by ACOS Support and with all JHeads as members, including most importantly J3 and J5, it would regularly meet and once KORRB had endorsed an OR, it would either be developed with approved funds, or be forwarded through the NATO review process as a COMKFOR approved OR. The creation of this review and planning process was considered to be so important to JEngr that the author became its Secretariat.

KFOR's and SFOR's ORs are routed through the Regional Command's Crisis Response Coordination Board (CRCB) at AFSOUTH, then to the Crisis Management Review Board (CMRB) at SHAPE and finally to the Infrastructure Committee (IC) at NATO HQ. Once endorsed at the IC, funding is approved by the 19 nations. Thus KORRB is the body which initiates and launches the KFOR requirements into the complete NATO review process. SFOR is now about to create a similar board which may, or may not, become known as SORRB!

Long Term Planning

CLEARLY there is an evolutionary process within a peace support operation (PSO) where the environment becomes more stable and flexible planning can be developed into more concrete long-term engineer planning. This transition point cannot be fixed in time before an operation starts. It requires the establishment of a safe and secure environment. That point had been reached in Kosovo during KFOR 5's tour.

The painstaking process described above can often take in excess of four months to materialise and this reinforced the need for long-term planning. That said, the process is too slow to be responsive to the urgent demands of the theatre, which will remain a challenge for our successors and the chain of command.

The first actions of KORRB were to instigate the long-term plans and investment strategies. J5 were to look beyond the horizon to establish how changes in mission practices would create new and different ORs. J4 produced a LOC (line of communication)and APOD (airport of disembarkation) strategy. JEngr developed a project planning and investment strategy which looked ahead two years identifying the short and long-term funding deficiencies where appropriate. The strategy analysed all APODs, SPODs (seaport of disembarkation), RHODs (railhead of diembarkation), the KFOR route network (KRN) and HQ infrastructure to integrate the requirements of Kosovo and the Balkan theatre within one document. All plans were eventually nested together and included a number of hallmark projects.

Hallmark Projects

THE FYROM border had been closed for political reasons in both September 00 and March 01, sometimes for several days due to increasing National Liberation Army[3] (NLA) activity in the north of the country. Later, during August and September 01, the main entry point into Kosovo at Blace was closed for 19 days. As KFOR's main APOD and the primary LOC to Thesoloniki SPOD are in FYROM, plans were in place for a number of projects to cater for the possibility of the border being closed for significant periods. One of the hallmark projects was the repair of the Gate 1 rail tunnel, the last physical barrier to opening railway traffic to the north.

Analysis of the APOD requirements identified the need for greater flexibility within Kosovo itself. Pristina APOD is shared with UNMIK (United Nations Mission in Kosovo) on a 70/30 per cent basis for UNMIK and NATO respectively which creates its own difficulties in times of crisis when both have increased demands. There are now designs in place for a KFOR passenger reception centre and cargo handling facility at Pristina, which should be complete by December 2001. Also, with some small access road projects, greater use of the existing taxiways will be made to create increased ramp parking space. Other options for use of APODs within Kosovo were also considered and are currently being staffed by AFSOUTH and SHAPE.

Clearly freedom of movement within Kosovo is a key task for JEngr and will remain a funda-

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[3] The National Liberation Army was an extremist Albanian Group operating inside FYROM seeking to improve the rights of Albanians living inside FYROM.

mental component of the long term plan. The KRN is repaired to minimum military requirement and, taking advantage of the good summer weather during KFOR 5, much work was done to repair and improve the roads and bridges. In addition, funding was obtained relatively quickly to create and improve bypasses around the principal towns of Prizren, Pec and Gnjilane and around the six vulnerable bridge/tunnel targets in the Kacanik defile using the US Asphalt Platoon, in theatre for three months. Moreover, JEngr instigated and completed an operational reserve bridge study identifying the military Mabey Johnson bridging required to support KFOR in a crisis. Upon completion of the study, a KFOR Bridge Park was established at Suva Reka in Multi National Brigade (South) (MNB(S)) to store the bridges.

KORRB was a catalyst to initiate a Film City (so-called because the HQ is on the site of an old film-making company) development plan, possibly the first time this had been done during the two years of the KFOR deployment. It was decided that JEngr would provide a medium-term plan to look ahead two years and that a long-term plan would be developed using a civilian consultant under the terms of the Engineering Logistic and Maintenance Services contract in August/September 2001. The medium-term plan was produced very quickly and was used to justify some key projects such as a relocation of the Joint Operations Centre and an increase in accommodation requirements to support the ever growing population within Film City. To give an example of the painfully slow NATO review process, both of these submissions took four months to reach the NATO IC which effectively meant that the KFOR staff that planned them did not receive funding in time to implement them.

Future Key Requirements

THE KORRB initiated J5 long-term OR focus identified key changes for the future. It concluded that there was a continuing trend to multi-nationalise KFOR operations across brigade boundaries and that the nature of NATO peace support operations was changing as a result. More than ever before, the Alliance now needs to address whether the use of common NATO funds is more efficient than each nation funding it separately, as was the case during the Cold War days when there was no multi-nationality below divisional level. For example, this article started by mentioning the relaxation of the Ground Safety Zones as the key focus of the HQ at the start of KFOR 5. In early June 2001, once Sector Bravo had been handed over, the focus switched to the FYROM border in the south to interdict the NLA lines of communication in and out of Kosovo. The interdiction required greater cooperation between MNBs to operate inside each other's boundaries as well as to share intelligence, communications and search expertise. As this cooperation improved, ORs which demanded the use of common NATO funding increased, particularly in the J2 field, thus involving KORRB in more urgent business.

Two future JEngr requirements, which were identified shortfalls during our time in KFOR 5, are now placed within the programme of work for NATO's Command, Control and Communication Agency at SHAPE. The first was an integrated mines and UXO database with geographic information service support to replace the existing civilian database. With this tool, it should be possible to report and categorise all known and reported minefields and areas that have been targeted in order to establish an overview of minefields and dangerous areas. The second was to develop and implement a KFOR theatre of operations road and bridge web-based, user-friendly information database as existing data is in many different mediums at present. KFOR requires a road and bridge database that links reconnaissance information to a map at the touch of a fingertip. The feasibility studies for both of these projects will not be completed until 2002 and development will take much longer, but the planning is now in place to develop a system which NATO can implement in the KFOR theatre of operations and on future peace-support operations.

Conclusion

TO conclude, JEngr was successful in formalising the whole OR review process within KFOR, which now ensures full J5 and J3 visibility. The process put in place by KFOR 5 and the contribution of KORRB now provide a good foundation for planning and implementing operational requirements in the future.

What's in a Name?
An Examination of our Headquarters Squadrons

MAJOR R K TOMLINSON MBE MSc BSc

Major Rob Tomlinson is currently serving at HQRE LAND as SO2 Engineer Logistics Operations. Before this he did the Defence Logistics Management Masters degree at RMCS and commanded 65 Field Park Squadron for the best part of three years (or was that just the best three years). Though clearly now a logistician at heart he is keen to stress that previous posts include G1 at Rhine Garrison, G2 at HQ ARRC, G3 (Training Major) with the TA and a fair amount of G5 on his travels. He wrote the following article in the form of a discussion paper for HQ RE LAND and hopes that this wider exposure will prompt further discussion and feedback.

Introduction

"While long recognized as having an unbalanced establishment, we have had foisted upon us by Manpower and Equipment Review (MER), with no consultation at unit level, an unworkable organization that struggles to cope with the functions it is required to carry out. Further, we continue to do ourselves no credit by calling at least nine Sqns in the Corps' orbat HQ Sqns when they are patently not – they are Regt Sp Sqns"[1]

During the past three years there has been much talk, though little analysis, of the perceived shortcomings of the Corps' HQ Sqns. The frustration voiced in the opening quote is typical of many current and recently departed HQ Sqn commanders who have had to juggle inappropriate resources to meet often unspecified and ambiguous tasks. In part, this frustration is caused by nothing more than nomenclature: there is also a perceived discrimination between HQ & Sp Sqns and HQ Sqns which leaves the HQ Sqn commander feeling undervalued. But the real problems, perceptual or otherwise, run deeper than this.

The Corps currently has 11 regular HQ and HQ & Sp Sqns and five in the TA. Of the regular squadrons, six support close support (CS) regiments, two support general support (GS), and three "specials" support Air Sp, EOD and NI regiments respectively. One other "special", supporting the Air Assault Regiment, forms up next year. The roles and establishments of each type of squadron do differ slightly but in essence they all provide 1st line support to their respective regiments[2]. The way that each CO uses his headquarters assets in peace and on operations, and in particular the responsibilities that he assigns to his squadron commander, differ considerably.

Aim

The aim of this article is to examine the roles of HQ and HQ & Sp Sqns and some of the perceived weaknesses in their establishments and

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[1] OC 6 HQ Sqn writing to Col Engr Log LAND 27 Jul 00.

[2] 60 HQ & Sp Sqn role is significantly more complex than the others in that it aims to provide 1st, 2nd and 3rd line support. In war it could be expected to provide this to four deployed air support squadrons across three continents as well as the essential rear based (push forward) support; a tough task for a single squadron.

structures in order to recommend some changes. It is hoped that it will provoke further discussion of the issues and, in time, should help establish the basis for future doctrinal work.

Background

THE Option Whiskey (W) review transformed the way that the Corps supported the army in the field. Prior to the review a division had been supported by a single (large) engineer regiment, each with three field squadrons and a support squadron. Option W resulted in smaller (CS) regiments supporting each brigade and a separate divisional (GS) engineer regiment. The regiments lost their integral 1st line support squadrons, which become semi-independent 2nd and 3rd line field support and field park squadrons.

Option W evolved into the "Options for Change" study, which resulted in deeper cuts. However, it was decided to establish a squadron-sized headquarters organization within each major field unit. This add back was required for two compelling reasons: the need to group echelon and regimental support assets (one of the lessons from the Gulf War) into a more coherent package; and the need to maintain squadron numbers and thus the viability of many regimental commands in the Corps.

Commendable though the formation of HQ Sqns was it had to be done at minimum cost, the inevitable result being that the new HQ and HQ & Sp Sqns became little more than rough amalgamations of the many disparate headquarters and support assets that formed them. Since then several attempts have been made to rationalize the HQ Sqn structures. Notable successes include adding a second in command, the formation of the construction supervision cells and the addition of DROPS vehicles and trailers[3]. To date, however, the organizations still appear ad hoc and inadequate for their role.

The Corps also has five Fd Sp Sqns. Under SDR they been aligned and they are now almost identical in terms of structure and capability. As such they can be employed in both the 2nd and 3rd line engineer support role within the division or JFLogC (Joint Force Logistics Component). When working within the JFLogC, or when given a dual role, its important to note that they also have a remit to provide support across all components of the deployed force – not just the Land elements. Their excessive cadreisation (over 50 per cent) means that they become rapidly over stretched when deployed at Best Effort Unit Establishment (UE).

Current doctrine dictates that CS and GS regiments provide their own integral 1st Line support using their HQ Sqns and then call on a Fd Sp Sqn for 2nd / 3rd line support. However, the HQ Sqns recently deployed to Kosovo have been hard pushed to provide even adequate 1st line support to their single taskable field squadrons. As a result the Fd Sp Sqns have had to play increasingly a 1st line role. This has been fine for relatively benign and static operations but sets a dangerous precedent: Fd Sp Sqns simply do not have the capacity to bail out HQ Sqns in war.

Role and Functions of the Headquarters Squadron

THE role of a HQ Sqn is to provide 1st line support to its regiment on operations. In barracks and on exercise the squadron organization should reflect that role. It does not. The organization in camp bears little resemblance to the one that supports the regiment on operations and exercise. Units should train and be organized in peace, as they will be in war. To do otherwise risks confusion and a blurring of responsibilities and roles. There needs to be clear doctrinal direction on the war roles and organization of HQ Sqns.

The functions carried out by the headquarters organization are listed here:

Core Functions:

- ***Provide RHQ and C3***
- ***Provide A2 Echelon and C3***
- ***Provide B Echelon and C3***
- ***Provide Engr Ops Cell***
- ***Provide Engr Int Cell***
- Provide focus for the supply of C Sups
- Provide ES and spares support
- Provide construction supervision
- Provide Engr resources support
- Provide 1st line medical support.

Special to Role Functions:

- Provide GS bridging (CS and GS Regt)
- Provide VLSMS (CS and GS Regt)
- Provide additional plant (All)
- Provide additional transport (All)

[3] DROPS and trailers are established though few have actually appeared in units yet.

- Provide recce assets (CS and GS Regt)
- Provide Engr workshops (Air Sp and NI Regt)
- Provide Engr sp to NARO[4] (EOD)
- Provide air assault engr support (23 Regt when formed)
- Provide the ERG[5] (CS Regt)
- Provide advice and support to the Brigade Support Group (BSG) (CS Regt)
- Provide advice and support to Divisional Support Group (DSG) / JFLogC (GS Regt).

The five functions listed in bold italics are headquarter functions. They provide command, control, communications, liaison, personnel administration and staff support. The remainder are pure support functions. The HQ Sqns in CS and GS regiments are larger and provide more support functions than their HQ & Sp Sqn counterparts in the three "specials". Why then, does the Corps differentiate between HQ and HQ & Sp?

Squadron Title and Perceptions

THE infantry has a different approach. Infantry battalions generally comprise three rifle companies, a manoeuvre support (MS) company, usually commanded by a mainstream officer, and a HQ Coy, often commanded by a late entry officer. There is a clear split between the HQ, echelon and CSS functions (grouped within the small HQ Coy) and the combat support functions (anti-tank, recce, machinegun and mortar) which are held in the MS Coy. In war the HQ Coy commander, often referred to as the battalion DCOS, co-ordinates G1 and supply functions for the battalion. The MS company commander assumes a fire and manoeuvre support co-ordination role within Bn HQ.

Arguably, the headquarters and support functions undertaken by an engineer HQ Sqn are considerably more diverse than those undertaken by these two infantry companies. However, there is neither the scope (in terms of resources) nor any real aspiration to form separate headquarters and support organizations in the Corps. That said, to compare our HQ Sqns directly with an infantry HQ Coy, which is inevitable given that they have the same name, does no credit to our sub-unit commanders or their soldiers. The straight 'Headquarters' title fails to reflect the importance and diversity of our squadrons' roles. They should be re-titled 'Headquarters and Support Squadrons' or more simply 'Regimental Support Squadrons'.

Role of the Squadron Commander

WITHOUT clear direction on his unit's role it is difficult to define the role of the squadron commander or his subordinate officers. Indeed it is not at all clear which officers are subordinate to OC HQ Sqn and which act as freelance advisors to the CO. This lack of clarity causes friction in the chain of command as there is no single focus within the squadron. Even accounting for extensive diplomacy the task is difficult.

OC HQ Sqn's job in barracks is relatively straight forward: he exercises direct command over those elements under his functional control and provides administrative support to the remainder. Most importantly, he is responsible for the welfare and training of his support assets, namely recce, bridging, VLSMS, signals, plant, construction supervision cell, MT, resources, workshops, and his echelon.

The squadron is transformed in the field and splits into fairly autonomous command, echelon and rear party components. The Cbt Sp (or Sp) Tp usually becomes a critical regimental asset, often controlled directly by RHQ. The role of the squadron commander becomes far more complicated, and less well defined. He runs the A echelon (both Main and Forward), provides support to other sub-unit A1 and A2 echelons and any Engr RVs and conducts logistic estimates at RHQ Main. Some believe that he should be the CO's principal logistics advisor although most COs defer to their QM Techs for this advice. He also represents the regiment at HQ BSG, and must continue to command those elements of his squadron that have not been detached elsewhere. It has been suggested that, as the principal G1/G4 officer in his regiment, the squadron commander is effectively the regimental DCOS. Such a title might bring a useful and deserved kudos to the post but we should be cautious in apportioning staff officers labels to our commanders.

Responsibilites and Relationships with other Key Staff

IF the HQ Sqn provides all 1st line support to the regiment on operations, it follows that the OC should exercise command over all the functional

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[4] Nuclear Accident Response Organisation.
[5] Engr Resources Group

areas within his organization. He does not. Consider these points:

- Is OC Wksps (usually a captain) a sub-unit commander in his own right or should he work for OC HQ Sqn? Most REME officers see themselves both as commanders and as the CO's neutral equipment support (ES) quality control advisor. Few, if any, regard themselves as subordinate to OC HQ Sqn.
- Is the QM Tech responsible for the regimental supply chain or does he have a wider supply, support and general advisory role? Does he work for OC HQ Sqn or direct to RHQ? Does he provide internal G4 support to the HQ Sqn (there is no Sqn QM) or purely external? Does he have a responsibility for the supply of engineer resources or just C Sups? I suggest that he should act as the focus for all 1st line supply issues (within and forward of the BSG for CS Regts) and that he works directly to OC HQ Sqn.
- What is the role and position of the QM on operations? OC B Echelon or OC Rear Party? Who does he work for? This issue will touch a raw nerve with some. As the most experienced soldier in the regiment, the QM should deploy on major exercises and operations. He should command the B echelon and co-ordinate 2nd line supply (C Sups)[6] and personnel support issues. He should come under command OC HQ Sqn but all will recognize, by dint of his experience and role in B echelon, his unassailable right of direct access to the CO. Interestingly, both QM and QM Tech deployed with RHQ 36 Engr Regt to Macedonia on Operation BESSAMER in August.
- What are the roles and relationships to OC HQ Sqn, of the RCMO, RMTWO, MPF and SQMS? The roles and relationships of these people tend to vary from unit to unit. A standard should be agreed on and applied across the board.
- Should Recce Troop even be in the HQ Sqn? It has no operational links whatsoever. Recce Troop should be OPCOM RHQ in peace and war and then TACOM battlegroups as required. Feedback on this issue has been varied. One respondent suggested that command of Recce Troop was the only thing that gives OC HQ Sqn any credibility! One agreed that the troop should work to the Ops Officer in peace and war but another noted with caution that Ops is a staff post not command and that he is too busy to be burdened with additional leadership responsibilities. Perhaps we should simply accept that the current compromise is as good as it gets and just let things be.

[6] The QM does not have any direct responsibilities to provide Engr resources but could, if required, liaise with the 2nd line Fd Sp Sqn on behalf of his QM Tech.

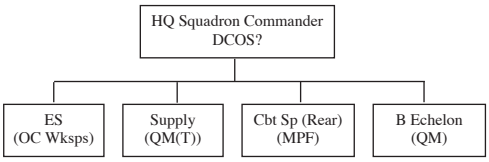
Streamlining the Headquarters Squadron Organization

Regardless of regimental role, HQ Sqn functions fall into four categories:

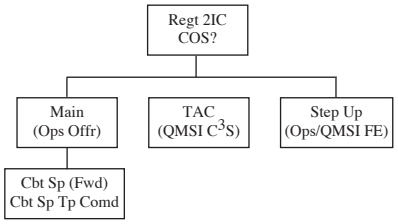
- **RHQ Support.** Manpower and equipment dedicated to the running of RHQ in the field. Clerks, signallers, drivers, key staff, etc. For convenience these assets are grouped under command OC HQ Sqn in peace but he has no links to them on operations. One respondent suggested (perhaps mischievously) that we should reform RHQ Troop! Is this such a bad idea?
- **Supply.** The provision, movement and management of all C Sups, spares and engineer materiel.
- **Equipment Support.** The maintenance, repair and modification of all the regiment's equipment (regardless of the existing split in REME and RE responsibilities).
- **Combat (or Task) Support.** The provision of manned combat or task support assets including recce, VLSMS, GSB, plant etc. Recce and VLSMS would normally be detached forward and would rarely if ever report to A2 Echelon. The GSB section and plant assets may be used to provide engineer support within the BSG / DSG or on the MSRs. As such their rightful place is in the A2 Echelon.

The outline organization of all HQ and HQ & Sp Sqns in peace and war should reflect this simple functional split as follows:

The remaining headquarters assets should



therefore be grouped under the 2IC, thus:



Other Structural Weaknesses

The problems of unsuitable recce vehicles, under-manning in the ABLE sections and even the inflexible fusing of scatterable mines are well known and need no further exposure here. However, the list below highlights additional perceived weaknesses in HQ Sqns structures that need to be explored:

- **Inadequate Plant Assets.** An Armd Sqn has twice as many plant operators as the CS Regt HQ Sqn! We need to review plant holdings and distribution in CS Regts.
- **Lack of Doctrine on New Equipment.** There is a lack of doctrine to support new equipment. For example the introduction of long span/two span GSB increments sets and pontoons has been dogged by uncertainty over the precise utility of the kit, the repair and storage responsibilities, lift requirements and the additional manning and training bill. This further compounds the uncertainty within HQ Sqns. The Corps does not have a good record of applying Integrated Logistics Support principles when procuring new equipment. Too often the training, manning and logistic support requirements associated with new equipment buys are dealt with as after thoughts to procurement; this hurts the user units and affects operational capability.
- **Inadequate First Line Lift**. Despite the recent addition of DROPS and trailers to establishments the headquarters squadrons still lack the ability to move unit equipment and first line stocks in a single lift. Exactly what equipment and stocks should the squadron carry on wheels? Doctrinal review is needed to define first line stocks. Once complete this will dictate lift requirements and drive a review of vehicle holdings.
- **Lack of MHE.** HQ and HQ & Sp Sqns rely heavily on plant with forks to move engineer stores. This wastes valuable plant assets, which in war will be heavily committed to other tasks and ties up plant operators within the resources organization. Similarly, because of a lack of ISO capable forklifts we use cranes to shift ISOs, which is not only slow but a ludicrous waste of this critical asset. Additional rough terrain MHE, operated by drivers or resources specialists not POMs and crane operators, are required in all HQ and HQ & Sp Sqns.
- **Inadequate Communications**. HQ Sqns lack adequate communications equipment, particularly secure speech and data systems.
- **Resources Section.** The CS and GS regiment resources sections have recently increased to one SNCO + four JNCO resources specialists. This should be sufficient to meet their exercise, project and OOTW (operations other than war) commitments and, with decent training and the addition of WFE (war fighting establishment) drivers, gives them an adequate capability in war. However, units too often mis-employ their resources specialists in peace and on OOTW and thus completely fail to train them. This leads to an over reliance on Fd Sp Sqns during OOTW and threatens to lead to a breakdown in the supply of engineer materiel in war. Fd Sp Sqns would be too busy with their own 2nd and 3rd line roles to be able to augment front line units in higher intensity operations. Units must employ their resources specialists in trade and train them for their war role.
- **Construction Supervision Cells.** There is clear utility in having construction supervision cells in GS regiments and in the "specials". However, their usefulness in CS regiments is highly questionable. For example:
  - What technical design or construction supervision is required during high intensity close support engineer operations?
  - How does a CS regiment train it's CSC in peace?
  - On OOTW an STRE invariably deploys in support of the engineer regiment(s) and it makes sense to pool all design and site supervision capability into one central team (as happens on Operation Agricola). Why have CSCs at all?
  - With the current shortage and over-commitment of clerks of works can the Corps really afford to have 18 of them sitting relatively idle in CS regiments?

Conclusion

It is hoped that in being slightly controversial this article and the staff paper that prompted it will catalyse debate and action within the Corps. Indeed at the time of writing this article most of the formally requested feedback has been received[7], and the wide variety of opinions therein further demonstrates the need for some structural change and doctrinal guidance. Most of the challenges facing HQ Sqn commanders are resource linked and are unlikely to be resolved overnight. That said, some affordable and very tangible progress is possible and simply renaming our HQ Sqns to reflect their diverse and complex roles would be a good start.

There is a danger that in highlighting so many problems those within HQ Sqns will feel

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[7] HQREs, Engr Bde HQs and Theatre Engr Troops have provided some excellent feedback on the original discussion paper and this is currently being taken forward by HQRE Land and EinC (A).

unfairly maligned. That has been furthest from my mind and it is worth stressing that the officers and soldiers in these sub-units are as good as any in the Corps. They have an immensely important but difficult job to do and one that is made more difficult yet by poor structures, an inadequate establishment and a lack of clear doctrinal direction. SDR has been pretty good for the Corps but has done little to rectify any of the fundamental structural problems that face our vital 1st line engineer support assets.

The author welcomes any feedback on the issues raised in this article. Comment, written or verbal, should be passed to him at HQRE LAND, Erskine Barracks, Wilton, SP2 OAG.

e-mail: engineerdiv@hqland.army.mod.uk

Journal Awards

The Budget, Investments, Membership, Scholarship, Memorial and Publications Committee announces the following awards for articles of special merit published in the August 2001 issue:

BELIZE – THE OPPORTUNITY OF A LIFETIME
Major T R Urch MBE – £100

ROYAL ENGINEERS AND THEIR ROLE IN THE FOUNDING OF THE AUSTRALIAN NATION AND THE CORPS OF ROYAL AUSTRALIAN ENGINEERS
Maj D Wren RAE – £75

WHERE NEXT – A YEAR IN THE LIFE OF A SPEACIALIST TEAM
Maj R J Abbott – £75

IT MAY HAVE SEEMED A GOOD IDEA AT THE TIME
Maj G C Jones TD – £75

IN PROUD MEMORY
Lt Col M C McCabe, Brig A A Wilson OBE – £50

THE ROYAL SCHOOL OF MILITARY ENGINEERING PUBLIC PRIVATE PARTNERSHIP PROJECT
Lt Col J M Gunns MBE – £50

An Examination of the Ending of the Gulf War after 100 hours of Ground Warfare

MAJOR S P F HARRIS MA

Major Séan Harris joined the Corps in 1989 following completion of the Standard Graduate Course 893 at the Royal Military Academy, Sandhurst. His first posting was as troop commander in 32 Armoured Engineer Regiment which allowed him to see service with 1 (UK) Armoured Division on Op Granby. *Subsequent postings have included de-mining duties on behalf of the Foreign and Commonwealth Office in Angola. The Queen's Gurkha Engineers in Hong Kong, ERLO in RHQ RE and SO2 J1 (Army) in Headquarters British Forces Cyprus. Following the completion of the Advanced Command and Staff Course at Watchfield in July of this year, Major Harris arrived in Maidstone to assume command of 69 Gurkha field Squadron (QGE).*

"THE decision to end the Gulf War after 100 hours of ground warfare was the rational result of Coalition politics. Nevertheless, as the past decade has shown it was the wrong decision."

THIS essay will explain and assess the assertion that halting the war after only 100 hours of the ground offensive was wrong and that the decision to end the war so quickly was a rational result of Coalition warfare. It will examine what alternatives were available to the Coalition force and any other influences that may have contributed to the premature ending of the ground campaign. It will also look at the US difficulty in effecting conflict termination and the US national unwillingness to become involved in a protracted and distant conflict.

Woodrow Wilson in his address to Congress on 2nd April 1917 said that "…the world must be made safe for democracy…America is privileged to spend her blood and her might for the principles that gave her birth and happiness and peace which she has treasured." In the same internationalist spirit the US under President George Bush felt obliged to do the same when Iraq invaded Kuwait in late 1990. Bush felt, with some justification, that the defeat of Iraqi forces would not simply reverse their military aggression but would be a redefining event in the life of the planet.[1]

The reason for such lofty aspirations was the fact that the US had assembled a thirty-one member Coalition. The Coalition was drawn from every continent, from NATO, the now defunct Warsaw Pact and the Non-Aligned Movement. Nations with a long history of antagonism between them (such as Greece and Turkey) were arranged behind the US, all united in their condemnation of Iraq and more specifically the Iraqi president Saddam Hussein. That the ground war took only 100 hours in order to achieve (in George Bush's triumphant words) "total victory", should be a ringing endorsement of Operation Desert Storm. However, some ten years further on, the continuing problems of maintaining peace in the Gulf region seem to suggest that a more comprehensive dismemberment and thereafter the neutering of Iraq may have proved more effective.

Strobe Talbot surmises in his essay *Status Quo Ante*, Operation Desert Storm was successful because the objective had been to bring the

[1] Strobe Talbot. *After the Storm – Status Quo Ante:* The United States and its Allies. Nye, Smith. p.4.

Coalition together in order to preserve the *old* order and to:

"restore the *status quo ante bellum*, in more respects than just the return of Sheik Jabir-al-Ahmad al-Sabah as the Emir of Kuwait."[2]

A political-military assessment of the Gulf War and the wisdom of halting the Coalition advance after only 100 hours must be considered in a grand strategic setting. Liddell Hart in his work titled Strategy observed:

"While the horizon of strategy is bounded by the war, grand strategy looks beyond war to the subsequent peace".

In this respect the prosecution of the Gulf War by the Coalition[3] clearly looked beyond the conflict to the aftermath. It was never intended that Iraq be destroyed in situ nor that there be a requirement to provide an occupying force. Also Iraq could not be left so weak that Iran subsequently assumed military primacy in the Gulf.

Given that the UN and US resolutions were successfully enforced, it seems somewhat parsimonious in terms of credit to suggest that the US ground war concluded too soon[4]. It was never the intention of the UN, the US or more importantly the Coalition (which included a number of Arab nations) to seize Iraq or to directly topple Hussein. It is also worth remembering that the Coalition did not operate in splendid isolation. Saddam Hussein sought to counter unfolding US strategy by attacking the perceived weak point – the fragility of the Coalition, especially the Arab members. Iraq embarked upon an information/propaganda effort, seeking to justify Iraq's seizure of Kuwait whilst at the same time portraying allied nations as nothing more than US puppets. To galvanise such pressure US actions were depicted as anti-Islamic and pro-Zionist and supportive of gross maldistribution of economic resources within the region.[5]

Attempts by Iraq to undermine the Coalition through anti-Zionist rhetoric requires further consideration. That Israel was constrained by the US as regards retaliatory action against Iraq is beyond dispute. The US clearly feared that reprisals by Israel against Iraq would lead to the break up of the Coalition in that anti-Israeli feeling would outweigh anti-Iraqi feeling. In this respect US military action was conditioned by its involvement in Coalition warfare. Israel could have made a very real military contribution to Operation Desert Storm, far greater in fact than the combined contribution of most Arab states. Israel's exclusion was in order to preserve the wider Coalition. The long-term durability of the Coalition remained in question throughout the conflict. This did not however directly contribute to the eventual cessation of hostilities.

Coalition nations such as Saudi Arabia and Kuwait showed concern about the Shi'ites of southern Iraq and feared that a rebellion in this area might lead to the region becoming a political satellite of Iran. Once Iraq had been reduced in terms of a credible threat to the region, the Gulf States once again began to fear Iranian hegemony (which had led them to back Iraq against Iran during the 1980s). The continuation of the ground war and subsequent dissolution of Iraq would have caused concern for other Arab and non-Arab members of the Coalition[6]. There were several members of the Coalition who at

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[2] Ibid. p.5.

[3] The term Coalition accords the assembled force the correct nomenclature. However the war was prosecuted by a US led force, that in turn provided the vast majority of troops and materiel and executed a US plan in accordance with US policies.

[4] Resolution 660 demanded an Iraqi withdrawal. Superimposed upon the UN Security Council resolutions were the US political objectives: (1) immediate, complete and unconditional withdrawal of Iraqi forces from Kuwait; (2) restoration of Kuwait's legitimate government; (3) security and stability of Saudi Arabia and the Persian Gulf; and (4) safety and protection of the lives of the US citizens abroad. Due to the US specific nature of objectives 3 and 4, it was objectives 1 and 2 that became the bedrock of subsequent US and coalition military/political action.

[5] Iraq emphasised the connection between the US and the IMF. In the mid-1980s the IMF and World Bank had renegotiated outstanding debts within the region. Iraq felt that much of the economic hardship they were experiencing by 1990-91 was as a direct result of this inequity.

[6] Turkey, Syria and Iran all harboured fears of a successful Kurdish separatist movement in Northern Iraq fuelling similar aspirations within their own borders. Turkey, Syria and Iran all harboured fears of a successful Kurdish separatist movement in Northern Iraq fuelling similar aspirations within their own borders.

the time were concerned with restive minorities within their own nations. Secessionism was an issue in Czechoslovakia where Slovaks were moving away from the Czech system and in Canada where the Quebecois were threatening to leave the federation. The Soviet Union would almost certainly have used its veto within the UN Security Council on any proposal that would have led to a strengthening of minority power within Iraq, as this may have encouraged internal discord within their own borders. Not surprisingly therefore, the consensus opinion, which included the US, was not to precipitate the break up of Iraq. Aside from the immediate military destruction of Iraq's offensive capability, it was recognised that in the aftermath of the war the region would need Iraq as a counterbalance to both Iran and Syria.

In this respect the cessation of hostilities after only 100 hours of the ground offensive was the result not so much of Coalition demands as *realpolitik*. The US was prudent in its objectives. As a result of harsh lessons learned from past experience, the US wished to preserve the status quo in the region. The Bush administration had never supported the Kurds campaign for autonomy, which in turn was seen as a euphemism for independence. The protection of the Kurdish and Shi'ite minorities was not a result of Coalition demands but a result of international public outrage at the suffering of these minorities as reported by the media.

It could be argued that the early cessation of the ground war by the Coalition was more a result of conservative US policies, the desire by all to preserve a post-war status quo in the Gulf, and the moral underpinning of the conflict by the international media. Certainly media coverage of the Basra Highway *(The Highway of Death)* "turkey-shoots" contributed to domestic US pressure on the Bush administration to show grace in victory. General H Norman Schwarzkopf noted that "Shooting a fleeing enemy in the back was not the American way of conducting warfare" (although he acknowledged that the British 1st Armoured Division had positively encouraged such a course of action).

It is rare that military pressure alone will achieve ones goals and it is necessary to translate political goals into military objectives:

> "Wars are fought for political goals. Policy sets the ends and provides the means; military strategy is the plan to achieve the desired ends with the available means."[7]

In this respect the 100 hours of the ground war achieved those UN and US political objectives that *could* be achieved by purely military action. (Continued military action not in support of political objectives would have hung uneasily with those that viewed the war as a necessary evil; there can be no excuse for destruction purely for military gratification). "The immediate and unconditional withdrawal of all Iraqi forces from Kuwait" was achieved through the air campaign and 100 hours of the ground offensive. The other objectives were longer-term objectives and ones that the military could only in part contribute to.

Liddell Hart noted that "..the perfection of strategy would be to produce a decision without any serious fighting." In this respect the allied strategy was to prove the "acme of military skill"[8]. Due to the tactical supremacy of the Coalition force, and the strategic naivety of Iraq (as well as the use by the US of shattering force at the point of decision), the Coalition achieved the political objectives of the UN and the US Congress through military action. That this was achieved after *only* 100 hours of a ground offensive (following the most intense aerial bombardment since WW II) should not detract from its success. However, with the benefit of hindsight would the current political/military situation in the Gulf have benefited from a more protracted ground offensive?

Iraq's continued belligerence towards both immediate neighbours and Israel remains a cause for concern. Moreover the scope and nature of Iraq's NBC programme was grossly underestimated. As a result, one of the key military objectives, *the destruction of Iraq's known NBC potential,* has not been fully achieved. It is generally accepted that given the Coalition force's rout of the Iraqi Army, a further 48 hours of ground operations would have broken the cohesion of the Republican Guard. The decision to allow several divisions of guards to escape was perhaps misguided especially given their subsequently savage repression of the Kurds in

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[7] B E O'Neill and I Kass. *The Persian Gulf War: A Political Military Assessment* – Taylor & Francis (1992). p.223.

[8] Sun Tsu. The Art of War.

the north and the Shi'ites in the south. Added to this tactical oversight was the surprising decision to allow Iraq to use helicopters within Iraq, thereby greatly adding to their mobility and effectively dooming any hope of an uprising, which ironically had been the US intention. The apparent contradictions in US policy were a result of conflicting domestic politics as well as those at Coalition level.

The lesson that the US learnt was that "..the decision as to when and how to end a war is at least as difficult, and as momentous, as the initial decision to go to war"[9]. Unless the goal of the war is the total annihilation of an enemy and the subjugation of his country, it is difficult to know when to stop. As Desert Storm illustrates, it is easier to compel an opponent to sue for peace than it is to modify his behaviour in the aftermath. Thus the *fog of war* thickens at the war's termination, making it increasingly more difficult to translate battlefield victory into political stability. The study and application of conflict termination, rather than a continuation of the ground war beyond the 100-hour time-limit, may have provided a successful conclusion to Operation Desert Storm. Conflict termination is an art that military professionals have devoted insufficient attention to. In General H Norman Schwarzkopf's book *It doesn't take a Hero* he recounts how:

> " Powell told me that the President would ask for a meeting of generals from both sides within forty-eight hours to work out the military particulars of the cessation of hostilities. That caught me by surprise – it has never crossed my mind that I'd have to sit down opposite Iraqi generals…."

General Schwarzkopf had fought the battle but had given scant regard as to how the war was to be concluded at the political level. In more general terms the military/political tendency is to concentrate on the "causes of war as opposed to the outbreak of peace."[10] The way in which a war is brought to an end has the greatest long-term impact. Achieving the correct blend in conflict termination can often present greater problems in terms of managing the peace than either a formal surrender or, the military decimation of an enemy. It is necessary to recognize that termination is a mixture of blending political aims, coercion and time.[11] As retrospective criticism of the ending of Operation Desert Storm so clearly illustrates, there was a balance between the "swift victory" and terminating the conflict on truly favourable terms whilst the Coalition held the requisite leverage. Unfortunately, the balance since has shifted in favour of Iraq, as the will to enforce such leverage by the Coalition has slowly waned.

The postwar situation in the Gulf is one that will require long term attention. There is a case for re-engagement, a case for limited co-existence (following renegotiated terms of Iraqi compliance) and ideally a case for full co-existence and conflict resolution. Such pacific moves will require a number of resolutions critical to success: the termination of the Israeli-Iraq Conflict; the culling of Iraq's Weapons of Mass Destruction (WMD) programme and the removal of an Iraqi threat against Kuwait and Kurdish autonomy. Such a series of resolutions would require huge compromises to be undertaken by Iraq – such compromises would in turn require Coalition efforts. The Coalition would need to agree to limited verification of WMD programmes; the immediate termination of economic sanctions; an end to the military embargo; a reduction in allied military presence; the termination of allied aid to exiled opposition groups; and financial assistance in the re-building of Iraq. There is, however, little in current US policy that would suggest an increased inclination to embark on the route of political/social discourse with Iraq and no signs of lifting the decade-long siege.

To conclude, this essay has examined the assertion that ending Operation Desert Storm after only 100 hours of the ground war was a mistake and that its premature termination was a result of Coalition politics. It has been shown that the cessation of hostilities was a political decision that suited both the US and the majority of Coalition states. The limited ground offensive should not be seen as having been flawed. The US and UN objectives had largely been met, Iraq had withdrawn to within its own borders and Iraq's capability to launch offensive military action had been culled. At the same time the *status ante bel-*

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9 Lt Col M R Rampy. Conflict Termination and Post-Conflict Activities - US Army (1992). p.49.
10 Geoffrey Blainey. The Causes of War. Third Edition (The Macmillan Press 1998). p.ix.
11 Lt Col M R Rampy. Conflict Termination and Post-Conflict Activities - US Army (1992). p.46.

lum had been achieved. The balance of power within the region had been roughly restored. Political developments following the cease-fire and the international community's failure to resolve them should not be linked to the rapid conclusion of the ground war. Continued problems are a result of clever Iraqi politicking, a lack of resolve by Coalition states to re-engage in major warfare and the recognized failure of the UN embargo and siege operations of the US. To suggest that today's impasse is a result of military failings is wrong. To further suggest that these failings are a result of Coalition pressure on the US is to fail to appreciate the supremacy of the US within the Coalition. Whilst the US made extensive efforts to accommodate the social and political pride of those nations involved, all parties and most especially those bordering Kuwait/Iraq were hugely dependent upon US involvement and were willing to pursue virtually any US plan. That the current problems in the region are a result of poor US conflict termination is a separate issue. What is clear is that in the longer term, it will be at this same political level that the conflict will eventually be resolved.

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The Need For Continuation Technical Training

MAJOR B G ANDREWS DIPSM MIIRSM

THE acquisition of a skill is one thing; its retention is another. The professional boxer keeps "in training"; the top class racehorse is given his daily exercise; and eminent musicians, we read, do not consider it beneath themselves to practice daily.

So it must be with tradesmen. This principle is generally accepted as far as a Sapper's basic field engineering techniques are concerned, but what of his technical skill?

The Corps has certain well defined spheres of responsibility; but it exists as a separate entity, not because it is able to execute a number of techniques, many of which have now become All Arms responsibilities, better and more quickly than anyone else, but because it is composed of a balanced body of technically trained men who can, or should be able to, tackle any military engineering task which they may be called upon to perform. In the present world situation such tasks are just as likely to arise in a "cold war" context as in any other type of "hot water", and they will be of a constructional nature. This is the reason for the present policy that each Sapper will be taught two trades, a technical trade in addition to his basic field engineering skill.

At the recent Engineer Planning Course held at the *R*SME, Chatham, which, among other things, set out to assess the engineer commitments in a limited war setting, it was concluded that 50 per cent of the engineer effort would be on constructional work in the rear areas and 50 per cent in the forward zone. Units in the forward zone included the field park (*support*) squadron whose personnel would be largely employed at their trade.

Continuation technical training should therefore be given just as much attention as training in field engineering skills, if not more. What proportion of the training year is at present devoted to technical training? Here are a few facts:

- Most trade training courses at the *R*SME, Chatham, are under-subscribed.
- During a recent visit to the training workshops by Commandant *R*SME, out of approximately fifty men questioned not one admitted to having touched the tools of his trade since last completing a course at the *R*SME.
- A bricklayer arrived for trade testing to BI standard. After two days, it was clear that he would have difficulty in retaining his BII grading. On interview, it transpired that he had had no additional instruction, nor any experience at his trade, since passing his BII course two years previously. On the other hand, the last training carried out in his unit had been on the standard drill for laying minefields by hand, and the same drill had been practised three months earlier.

At present, trade upgrading courses are necessarily long since they recognize two needs which result from this almost complete lack of continuation technical training in units:-

- A period is needed to familiarize students with their tools.
- A period is needed after all course syllabus has been covered to enable them to gain productive experience not obtained when they leave.

There could well be a reduction of course length if all students arriving had clearly made some consolidation of the basic skill previously learned. This would in turn benefit units since their best men would be lost for a shorter period. This particularly applies to NCOs arriving for BI courses.

The need for continuation training is greater now because of two other factors:

- In order to keep within existing manpower ceilings, all specialist units have ceased to exist (except AER) so that any field squadron may be called upon to execute a comparatively technical constructional task.
- In order to get units up to full strength as quickly as possible a start is being made in cutting down the period of initial basic trade training. In future, some basic-trained students will have had little or no time on any practical work.

Units will inevitably have difficulties in implementing a proper annual trade training programme; in many specialist trades, and for some small isolated units, it may be that the only solution will be to send tradesmen back to the *R*SME for a period of refresher training. (This last may well be possible since the reduction of basic course length should free instructors for other duties). But for many common trades little else

is needed other than the basic materials of the trade easily obtainable from RAOC, *RLC* or Engineer Stores; for example, C&J could start by making themselves their own work-benches.

Another unit approach to the problem should be to acquire suitable trade instructors, and here much more thought should be given to the selection of students for BI courses. The BI tradesman is the foreman tradesman, the potential instructor. In practically every case his duties include the supervision of others. It follows therefore that every BI student should either be an NCO already or else be a potential NCO; yet too many course vacancies are at present filled by ordinary Sappers, or NCOs who have come to get "promotion qualifications" without any intention of subsequently making use of the knowledge gained. If this principle were accepted by units, future BI courses could be more specifically orientated to produce unit trades instructors.

There are of course exceptions, again mainly the specialist tradesman who may well be the only one in his unit, e.g. a wood-machinist. It is accepted that such men need training to BI standard regardless of their NCO potential.

Whatever the problems, it is hoped that this article will encourage thought on the best ways of solving them.

So, is this a new problem that we are facing? Hardly. The above article is a copy taken directly from the Royal Engineers Training Memorandum dated March 1962. The only amendments made are those shown in the text in italics.

A New Vision For Engineering

DR ROBERT HAWLEY, CHAIRMAN OF THE ENGINEERING COUNCIL

A MAJOR Conference, held at the Institution of Electrical Engineers on 14 February, to determine the need for a new body to represent the UK engineering community was in many ways a watershed. It saw the emergence of a new vision for British engineering.

Equally important, it was a vision which won the public support and endorsement of everyone present. The audience included all the engineering institutions and other engineering bodies, academic and a broad cross section of industry, from the large to the small high tech companies in many diverse fields.

The outcome was a decision to establish a new, very different sort of organisation, the Engineering and Technology Board (ETB). The ETB will have a span of activity greater than that of the many existing organizations. Indeed, by providing linkages and a focal point for all of them, it should be able to help the process of gradually and voluntarily bringing them together with a common aim to the benefit of UK wealth creation.

The project is ambitious and challenging in every respect, and most immediately in its timetable. Our aim is to have established the ETB by October of this year, thus allowing it a few months to settle down, and be fully operational by the start of 2002.

Why the haste? One answer is that many people would say that we have delayed too long before launching radical reform and we must now make up for lost time. A second, more important reason, is that as the engineering and technology dependent sectors of the economy increase rapidly in importance, the need for new structures to support and assist individuals and companies in those sectors also becomes increasingly urgent.

The ETB will effectively take over, and significantly expand the promotional role of today's Engineering Council. But in doing so it will have a very different approach and focus. Its focus will be what has rapidly become known as "the wider engineering and technology community".

To understand this wider community we need to grasp the significance of some of the work done for, and by, the "Hawley Group", which completed its task on 14 February.

The Hawley Group asked Sir Robert Malpas to conduct a review of all the areas of economic activity which might fairly be described as "engineering". The resulting report was highly illuminating.

It showed that there are at least two million people engaged in relatively high level engineering and technology jobs in the UK. These include many of the most innovative, knowledge-based industries on which future wealth creation will undoubtedly depend – aerospace, nanotechnology, materials and biotechnology. These are the areas from which the next technological revolution will spring, just as the IT revolution, which took us all by surprise because of its speed and impact, sprung from the older disciplines of electrical engineering and electronics.

The distinctive feature of the highly skilled people who make up this "wider community, however, is that they do not think of themselves as "engineers" (though many of them have engineering degrees), and they have few, if any, links with the existing engineering institutions. They are most likely, the research shows, to see themselves as "technologists", or at least as working in the technology sectors of the economy.

Of the two million people estimated by Malpas to be working in relatively highly skilled, science and engineering based jobs in the UK economy, only some 200,000 are UK resident registered engineers (CEng, IEng, Eng Tech). A further 400,000 people are members of the institutions, and can therefore be said to be part of "the profession", but are not on the Engineering Council register.

That presents us with a "market" of almost one and a half million people who are clearly part of the "wider engineering and technology community", but not (yet) part of the engineering profession. The ETB's aim is to establish links with this community: to provide them with the focal point that they need, with a more coherent voice, and to facilitate the process of bringing the existing profession, and the wider community, closer together.

The research carried out for the Hawley Group showed that there is a strong demand for this approach. Individuals and businesses in the technology and knowledge-based economy face all too familiar problems – worries about skills short-

ages, about the relevance of qualifications, about keeping up to date with fast-changing knowledge, and about maintaining competitive edge.

The vision is for the ETB to make an impact on these problems, for this vital, growing sector, and thus add value on a very significant scale.

Another considerable benefit coming from this fresh analysis is that there is now far greater clarity about the role of the various different organizations. The ETB will focus on the "wider community". The Institutions focus on the needs of their members, who make up today's engineering profession. The Royal Academy of Engineering concentrates on engineering and engineering excellence. The Engineering Council is primarily concerned with the qualifications, standards, and auditing of registered engineers.

Clarity about different roles will be necessary in avoiding one of the problems of the past – duplication of effort. It also brings out one vital point, which has sometimes been missed by those commenting on the current process, which is the continuing need for a body to regulate the profession. There can be no dilution of the standards required for CEng, IEng, and Eng Tech, or of the rigour with which these are enforced. The process is essential for international reasons, and indeed in order to provide the reassurance increasingly needed on safety, public health and environmental issues.

Thus there will still need to be a Regulatory Body – a successor to today's Engineering Council. The current work on establishing the ETB is also looking at this aspect of the new arrangements. Two key considerations are already clear: First, the ETB and the Regulatory Body will need to be tightly linked, so that they can benefit from each other, and in particular so that the profession can be linked more effectively to the "wider community" and the growth economy.

Second, regulation needs to be more tightly linked to the work and development of the institutions themselves, so that they feel a greater sense of "ownership" of the regulatory process than in the past.

Tackling these issues, together with defining the priorities for the ETB in each of the key areas of activity – meeting business needs; communications; education and training; continuing professional development; and membership marketing – is complex and demanding within the timetable. One of the reasons we are confident of success is the extent of support for the process. Using a web-based working group structure, which is highly appropriate to the task, we are able to involve over 200 people from all sectors of the profession and the wider community in the work. This is giving the operation breadth and depth which would otherwise be almost impossible to achieve in the space of a few months.

Last October saw the birth of the ETB, and with it a real prospect of the re-invigoration, on a far broader scale, of British engineering.

Memoirs

MAJOR D C BROWNING
Born 4 December 1921, died 1 April 2001, aged 79.

DENNIS Browning, son of Colonel H C Browning DSO MC, was educated at Cheltenham College and was due to go to RMA Woolwich in 1940, having passed the entrance examination in 1939. With the Shop closing on the outbreak of war he joined the Army through the ranks and from OCTU was commissioned into the Corps in 1942. Volunteering for service with Indian Engineers, he was seconded to the Royal Bombay Sappers and Miners (RBS&M). After further training at Kirkee he was posted to Egypt and then to Italy, joining 97 (RB) Indian Field Company as the Mahratta platoon commander in May 1944.

97 Company was initially supporting the 4th Indian Division, on the Sangro River, mainly in forward area road maintenance and tunnel clearance, in close contact with the enemy. In June1944, the company was transferred to the newly-formed 466 Corps Troops Engineers, operating on the western and later the northern and central L of C routes. The problems encountered and the methods used to maintain and bridge the L of C roads are well described in an article Dennis wrote for the RE *Journal* and published in March 1950.

Returning to India with 97 Company in December 1945, he was posted back to HQ RBS&M at Kirkee where he was responsible for pre-release courses for Indian Bombay Sappers. He contributed much to Depot life as captain of rowing of the Royal Connaught Club in Poona and as a church warden of the East Kirkee Garrison Church. On repatriation to the UK, with a regular commission in the Corps gazetted from 1944, he became an instructor with 3 TRRE at Cove, and helped to form the Royal Bombay Sappers and Miners Officers Association which is still active. In October 1948 he joined 15 Regular RE Officers Supplementary Course at Chatham, followed by the London BSc(Eng) course at RMCS Shrivenham, graduating with an Honours degree in July 1951.

From 1951 to 1954 Browning served in Gibraltar, first as adjutant of the Fortess Engineer Regiment and then as OC 32 Fortess Squadron. Moving back to the UK he completed a Long Engineering Course from which followed a Garrison Engineer (North Wilts) appointment and later a staff job in the War Office until 1959 when he retired from the Army.

In civilian employment he joined Shell-Mex & BP as their Chief Superintendent Pipeline Operations until the company split in 1976, when he became Manager Pipeline Planning BP Oil. In 1980 he left the company to be Secretary and Technical Officer of the Pipeline Industries Guild until retirement in 1987.

Major Browning was always a keen oarsman and small-boat sailor and was a commodore of the Lensbury (Shell) Sailing club. In retirement to Milford-on-Sea he was a member of the Keyhaven Sailing Club and from 1996 until his death the Honorary Secretary of the Milford ProBus Club. During the last five years of his life he made a major contribution to the production of the 1939 - 1947 History of the Royal Bombay Sappers & Miners. He wrote much of the chapter dealing with Italy, and the whole of that concerning the Assam/Burma pipelines, which was entirely a RBS&M operation. He acquired much of the information from former colleagues who had served in the Pipeline Companies. He was a staunch supporter of the RBS&M Officers Association's functions throughout.

In 1948 he married Rosemary Ridout, by whom he is survived with their two children, Richard and Susan.

JPWB, DLJ, DA B-W

MAJOR D P ASTON

Born 14 November 1924, died 29 August 2000, aged 75.

DESMOND Peter Aston served in the Corps for over 50 years, initially as a Boy Soldier then as a Clerk of Works before being commissioned as a Garrison Engineer and finally as an Retired Officer. He was a loyal and dedicated Sapper of the old school whose hallmarks were complete integrity and intolerance of anything second rate.

He was born in the Louise Margaret Hospital in Aldershot the son of Albert Aston MBE of the Grenadier Guards who was RQMS at the Guards Depot, Pirbright. He was educated at Victoria College whilst his father was serving in Egypt as Quartermaster of the Second Battalion.

Peter started his Army career on 2 March 1939 when he arrived at the Army Technical School in Chatham as 1876722 "Darland" Boy. In November 1940 he moved to Chepstow as an Apprentice Corporal from where he passed out as a Carpenter & Joiner BIII in 1942 to join 7 Training Battalion RE.

In 1951 he enrolled on Clerk of Works (Construction) Course 106 and qualified on Christmas Eve. His first appointment was in Hong Kong where he stayed for three years. There followed a tour in BAOR before arriving in 36 Engineer Regiment as a WO2 from where he was soon off to Christmas Island. 1966 saw him in Cyprus as a WO1 and on 3rd November he was commissioned, having already served for 27 years and 274 days. He made his own Sword and Scabbard to mark the occasion.

His first tour as an officer was with 53 Field Squadron of Beef Island fame followed by tours in Dubai and the Gulf States. Other tours were in Sennelager as OC 211 Mobile Civilian Engineer Group, where he made a notable contribution to the preparations for the 1977 Jubilee Parade, and as the Project Officer for the rebuild of Bovington Camp. He retired from the active list on 14 November 1981.

Peter was then appointed RO3 G4 in HQ 11 Engineer Group at Minley Manor. There his experience in Works proved invaluable when it came to maintaining the Manor. He was bachelor and his old-style direct approach earned him the reputation amongst subalterns as the original "crustie". One of his favourite remarks when offered unsolicited advice was "Listen young man, when I joined the Army 'Centurion' was a rank not a tank". That said he would never let anyone down if he could help it. On many occasions he would lecture some disorganised subaltern on the need for proper planning, then call in all sorts of favours from his many contacts to ensure what was asked for was provided at no notice.

Even after finally retiring he could not get the Army out of his blood but continued to serve the Army Museum in Aldershot as a voluntary guide. His services in this capacity were in great demand as his depth of knowledge and limitless anecdotes were renowned. His great legacy for the Corps is his booklet *A Short History, The Royal Engineers*, a marvellously accurate and straightforward summary of Corps history, still issued to every new recruit joining the Corps and written by a man with immense pride and pleasure in the Royal Engineers' family to which he gave so much of his life and which in his passing has lost a loyal friend.

RHJN, GWAN

THOMAS PRICE MC KSG

Born 4 March 1920, died 5 May 2001, aged 81.

THOMAS Price was awarded a Military Cross in 1943 and a Bar to it the following year while serving in Italy with the Royal Engineers. In November 1943, Price, serving with 256 Field Squadron RE, was supporting a battalion of the Argyll and Sutherland Highlanders who were held up on the outskirts of Torino di Sangro, in the Abruzzo region on the east coast of Italy.

While he was carrying out a reconnaissance of the main road into the town to see if it was a possible route for supporting arms to be brought up, Price was fired on by an enemy machine-gun post. Finding an Argyll patrol nearby, Price took an NCO with a Bren gun and crew forward in his scout car towards the machine-gun post, which was promptly evacuated by the enemy.

Price then reconnoitred forward into Torino di Sangro and, finding it clear of enemy, left the Bren to guard the approach to the town before continuing to the bridge over the Osento. Here he again came under enemy machine-gun fire.

Returning to Torino di Sangro, Price obtained further valuable information from the locals and reported back to the commanding officer of the Argylls, who then quickly took control of the town.

Praising Price's "great courage and initiative", the citation for his Military Cross commented that he had advanced the division's operations by 10 hours.

The following July, Price was supporting a reconnaissance regiment which was advancing along a route north of Castiglione del Lago, Umbria.

The enemy had prepared a number of bridges for demolition. Accompanied only by his driver, Price travelled far ahead of the advance elements of the regiment, drove an enemy firing party off one of the bridges and, covered by his driver, removed the charges.

He then repeated this process with two other bridges, only withdrawing when opposed by a German unit that attacked them with machine-gun fire.

In the words of the citation: "Lieutenant Price's outstanding bravery on that occasion was directly instrumental in enabling the Recce Regiment to carry out their speedy advance to and beyond Cortona". For his conduct, Price was awarded a Bar to his MC.

Thomas Gerard Price was born in London on 4 March 1920 and educated at Terenure College, Dublin, and the Welsh School of Architecture.

He had passed his intermediate exams in architecture by the outbreak of war, when he was commissioned into the Royal Engineers. Joining 256 Field Squadron RE, part of the 78th Division, he served with it throughout the Italian campaign.

After the crossing of the Sangro, his scout car ran over a mine and he sustained injuries which were to cause him problems in later life, though he remained on active service.

After being demobilized in 1946, Price returned to his architecture studies and in 1948 joined F R Bates and Sons of Newport and Cardiff, becoming a partner in 1950. He retired in 1988, by then sole partner.

A devout Roman Catholic, much of Price's work was for the Archdiocese of Wales. This included reconstruction and war damage repairs to St David's Cathedral in Cardiff, a chapel at Llantarnam Abbey for the Sisters of St Joseph, as well as many new Catholic churches.

When the Pope visited Cardiff in 1983, Price designed the papal dais and the altar at which the Pope said Mass. For this Price was appointed a Knight of St Gregory in 1984.

He was a magistrate in Newport for many years, and a keen supporter of the Royal British Legion, serving as president of the Usk branch until last year.

He married in 1943, Valerie Wilde. She survives him together with their two sons and a daughter.

JAMES MAITLAND
Born 15 January 1915, died in 2001, aged 86.

JAMES Maitland was awarded the George Medal for his courage in carrying out bomb disposal work over several months in the latter half of 1940.

From July 1940, the Luftwaffe began attacks on English ports and industrial cities. Initially, a large proportion of high explosive bombs were used, of which more than 90 per cent exploded on impact, causing civilian casualties and extensive damage. The remainder did not explode, either because they were faulty or because they were fitted with delayed action fuzes.

In either event, the continued threat meant that every one in the immediate vicinity had to be evacuated. Factories came to a standstill and important roads, railways and other communications ceased to function until the Bomb Disposal (BD) teams had dealt with the danger.

On 26 September 1940, the Vickers Supermarine Factory at Woolston, Southampton, was hit by a 250kg bomb.

A few hours later, Lieutenant Maitland and his men arrived and started to dig. They eventually found the bomb four feet down. Unfortunately, the fuze pockets had been damaged by the concrete through which the bomb had passed, making it impossible to identify the fuzes.

On removing the base plate, the bomb was found to be filled with cast TNT. This left the squad no alternative but to load the bomb on to a lorry and take it to the demolition ground for destruction. Maitland drove the vehicle himself.

On the following afternoon, Maitland went to the gas works in Southampton to deal with another bomb. The whole plant had been shut down and production in local factories vital to the war effort had been halted. On his arrival, he found two 250kg bombs. Fortunately both were fitted with a Type 15 impact fuze which he was able to neutralise before removing the bomb to a place where the TNT could be burnt out or exploded.

The next day, Maitland was called out to an electricity power station to deal with a 250kg bomb which had fallen a few hours earlier. He was unable to identify the type of fuze and had to resort to a hammer and chisel in an attempt to remove it, a highly dangerous operation.

There were several times when Maitland was lucky to survive. On one occasion, he and his section had started working on a bomb at nine o'clock in the morning. Shortly after midday, they broke off for a meal. Fifteen minutes later, the bomb exploded, leaving a huge crater in the road.

Another time, he and his squad were digging for a bomb which had gone right through a house without exploding. After they had found and partly exposed it, Maitland climbed down into the shaft with a microphone to listen to it, while his corporal shored up the earth above him. There came a shout from Maitland "Its ticking! Get out!"

Maitland was the last to reach the door and, as he did so, the bomb exploded. He emerged into the street, covered from head to foot in a white dust, terrifying his driver who believed for a moment she was looking at a ghost.

He was invested with the George Medal by King George VI at Buckingham Palace. The citation declared that it had been awarded for "conspicuous gallantry in carrying out hazardous work in a very brave manner".

Reginald James Maitland was born in Acton, north London , on 15 January 1915. He was educated at King's School, Worcester, where he captained the rugby team, and at Brasenose College, Oxford, where he read Law.

His first job was working for an oil company in California but, as soon as war was declared, he enlisted.

He was commissioned into the Royal Engineers and served with 23 BD Company. After his bomb disposal work on the South Coast, Maitland was posted to Whitehall, where he took part in combined operations planning. On D-Day + 1, he returned to bomb clearance duties on the beaches of Normandy. He completed his war service in Egypt and was demobilised with the rank of major.

After the war, Maitland went back to California for six months, where his job had been kept open for him. He then met the chairman of Kern Oil, who offered him the post of general manager of the company's interests in Trinidad. He spent 10 years there before returning to London, where he worked for Rio Tinto, the new owners of Kern, and then for British Petroleum for the last years of his business career.

Taking early retirement, Maitland moved to Dartmouth, where he could indulge his passion for sailing. He sailed his boat until he was over 80 and kept up his interest in rugby. For a number of years he was the custodian of Dartmouth Castle.

Jim Maitland married, in 1941, Vivien Ward. They had one daughter.

LEONARD PEARSON MM

Born 8 August 1921, died in 2001, aged 79.

LEONARD Pearson, who has died aged 79, was awarded a Military Medal for his work as a demolition expert in Burma, where he operated behind enemy lines as a Staff Sergeant Sapper with the Special Operations Executive's Force 136.

In January 1945 Pearson was sent to Burma with Force 136, initially to train Karens and Burmans in the handling and use of small arms and explosives. His skills were such, however, that he soon became an operative, completing a parachute course in such haste that his final training jump was made operationally.

Pearson's group was charged with recruiting Karens whilst also disrupting enemy supply lines and communications as a prelude to General Slim's final assault on the Japanese.

They had been operating for nine months when a decision was made at headquarters to take the town of Tonguo before the monsoon, in order to prevent the Japanese from reinforcing it and blocking the way to Rangoon. The intention was to inflict maximum damage on the enemy, destroying their morale by ambushing convoys and rendering roads and bridges unusable by blowing them up.

Pearson's job was to lay explosives in potholes on a five mile stretch of road, remaining close by and waiting for the leading vehicle to drive directly over the charge before setting it off by hand. The convoy would then be forced to halt and Pearson's Karen soldiers would shoot the Japanese troops as they piled out of their vehicles in search of their ambushers.

Meanwhile Pearson had to remain in position until he was certain that his Karen soldiers had got away – a risky business which resulted in some close shaves. On one occasion, under mortar attack, he made this escape to where he

thought his comrades were waiting and called out the password, only to discover that he was in the thick of a group of Japanese soldiers who proceeded to open fire on him. Thoroughly shaken but uninjured, he managed to escape, resolving never to allow himself to be taken alive.

Pearson accounted for more than 100 Japanese vehicles, demonstrating extreme bravery on numerous occasions and behaving with great coolness and determination in exceptionally difficult conditions. He was also seen to be operating well beyond his rank and was offered an immediate commission. But Pearson, an unfailingly modest man, declined, judging himself to be from the wrong social background.

Leonard Pearson was born in Yorkshire on Aug 8 1921. After joining the Army he enlisted as an apprentice at Chepstow, and was quickly promoted, becoming a Boy Sergeant Major before being posted for service in Persia. It was feared that the Germans might try to link up with the Afrika Korps from the Caucasus and Pearson was employed mining possible lines of approach.

In 1944, whilst helping to transport Kenya-bound Polish PoWs released by Stalin, Pearson contracted typhus and almost died. He was sent to recover at Poona, where he was recruited by Force 136.

Pearson's prolonged experience behind the lines in Burma took its toll and he was evacuated to England. He was posted to a bomb disposal unit in Cornwall where thousands of mines around the coast had to be disarmed. Again he showed immense courage and presence of mind under pressure. Unfortunately, he contracted tuberculosis and, though still a young man, was medically discharged. After his recovery he pursued a highly successful career with Imperial Tobacco until a stroke paralysed his left side. Despite his disability, he took a job in health service management, where he was a well-liked and impressive employee. He remained there for 15 years before taking early retirement.

The loss of his home to a fire, and his wife's death shortly after, prompted Pearson's decision to move to the Royal Hospital Chelsea. There he refused to be idle and worked in the surveyor of works department.

At the time of his death he had contended with the effects of his stroke for more than 30 years but he was determined to remain independent, always showing great courtesy but gently reprimanding anyone who, as he saw it, inconvenienced themselves to help him. He never complained nor ever lost his sense of humour.

Pearson was proud to wear the uniform of the Royal Hospital Chelsea and was one of nine holders of the Military Medal living there.

He married Eileen Roberts in 1947. They had three children.

Photograph courtesy of Tina Hadley

COLONEL G W WALLIS OBE TD DL

Born 22 January 1916, died 1 May 2001, aged 85

GEORGE Wallis was educated at the University College of Nottingham and became a member of the University OTC before joining the Royal Engineers in March 1942, enlisting as a sapper at the TA Drill Hall in Baythorpe Road, Chesterfield. He was commissioned later that year.

During his wartime service he was awarded a Certificate of Gallantry for rescue work in a minefield in 1943. He was demobilized in September 1946 having attained the rank of major.

Wallis joined Robinson & Sons Ltd of Chesterfield after the war, becoming a director and remaining with the firm until his retirement. At the same time he renewed his acquaintance with the TA Centre in Chesterfield in 1947, joining 575 (Sherwood Foresters) Light Anti-Aircraft Regiment Royal Artillery in the rank of captain. He was promoted to lieutenant colonel and appointed CO of the regiment in 1959, and remained in command when the regiment reroled as 140 Corps Engineer Regiment in 1961.

Appointed OBE in 1962, Lieutenant Colonel Wallis was promoted to colonel and appointed Deputy Commander 22 Engineer Group TA. From 1963 to 1968 he was Chief Engineer Yorkshire District and also appointed ADC (TA) to Her Majesty the Queen.

On formation of 73 Engineer Regiment (Volunteers) in 1969 he became its first Honorary Colonel, a post he held until his retirement in 1979 after 32 years service in the TA. In recognition of his outstanding contribution to the TA in Derbyshire, the TA Centre at Chesterfield was named Wallis Barracks in his honour.

George had many interests, including music. As a young man he played the organ at morning service for many of the local churches. He later became president of the Chesterfield Male Voice Choir. However, his main interest was the TA and he is fondly remembered during his ten- year tour as Honorary Colonel for the energy he devoted to promoting the interests of the regiment and his unrivalled witty speeches after Mess dinner nights.

George married Jean (nee Robinson) in 1940 and is survived by his daughter Zillah, son Stewart and six grandchildren and four great grandchildren.

PEW

LIEUTENANT T A CROTTY BE CEng MIEI
Born 22 March 1920, died 13 May 2001, aged 81.

TOM Crotty, like many others of his generation in Eire, went north to join the British Army to fight against the Nazis during the Second World War. Commissioned into the Royal Engineers in 1943, he joined 617 Assault Squadron in Suffolk which was reforming with AVREs and training for the forthcoming invasion of Nazi occupied France.

Soon after his squadron was ordered to Normandy in August 1944, Lieutenant Crotty joined No 2 Troop, then involved in the clearance of the Scheldt Estuary and later took part in the liberation of Knokke in which his troop was at the forefront of the battle. The fierce fighting continued when in November 1944 he took part in the Petard action on the pillboxes in the Siegfried Line, near Geilenkirchen, in support of 84th US Division. His troop commander was later awarded the US Silver Star for this action. The History of the 84th US Division comments on the "wonderful support from the British Tankers" which comprised AVREs, gun tanks and flame throwers.

Wounded in an accident on Christmas Day in Belgium, Tom Crotty soon recovered and was posted to 3rd Divisional Engineers, serving with 15 Field Park Company until the end of the war. He then went to the Middle East, serving in the Canal Zone and Gaza before being demobilised and returning to his hometown of Kilkenny. There he went on to become a distinguished member of the community and was elected mayor of the city on no less than three occasions, as his father had been before him. However, he never forgot his wartime comrades and was an enthusiastic and regular supporter of assault engineer reunions. He is remembered by all of his former comrades with admiration and affection.

Tom Crotty married Anna King in 1949 who, together with three sons, three daughters and one grand daughter, survives him.

Memoirs in Brief

Brief memoirs are published below of distinguished people whose deaths have been notified recently in the press and who served in or with the Royal Engineers.

Cynthia Freeman, who died in July 2001 aged 79, was a much respected member of the Engineer Resources Organisation for over 30 years. From the mid 1950s until retirement in 1987 she was the personal assistant to the commander of the Central Engineer Park (as it was eventualy known), at Long Marston. Her knowledge of the resources organisation and local matters was invaluable to the commanders of the CEP who changed on average every two years, most not having previously served in the organisation. Of particular value was her knowledge of the local civic authorities and personalities which ensured that events such as the Stratford upon Avon Freedom Parades were well prepared and smoothly carried out by the Corps. Cynthia devoted much of her life to the interests of the Corps. She never married and died in a Stratford hospital after a short illness. It was fitting that her funeral service was taken and addressed by the vicar of Quinton and Long Marston, who was a former CEP Deputy Commander.

Correspondence

CORPS PICTURES COMMISSIONED FOR CONTEMPORARY CAMPAIGNS

From: Major J D Beaumont

Sir, – On a recent visit to Chatham, I was able to view the "Entry in Kosovo" picture commissioned to commemorate the work played by Sappers in that campaign. Whilst appreciating that art, and pictures in particular, are symbolic rather than factual, I could not help remarking that the three most recent campaigns celebrated by pictures – the Falklands, the Gulf and now Kosovo – are all of a similar composition. In each there has been the desire to represent every aspect of the Corps with the inclusion in one scene of, say, red and green berets, armoured engineers, specialist engineers, mine clearance/EOD, etc.

Whilst it is a legitimate aim to attempt to reflect the wide-ranging nature of military engineering, it does not necessarily make for great art. We are all proud of the Cuneo paintings of the Second World War, but I am sure no Sapper is concerned that, for example, the Crossing of the Rapido does not depict the Engineer Resources organization that prepared and delivered the bridge, or the mine clearance that may have taken place prior to bridge construction commencing.

I feel that we are in danger of getting into the position of having too many pictures of the same style, as happened in the 1970s and early 1980s when every unit seemed to have a Ken Howard picture, with the additional sketches of unit activities around the border. Although not displeasing in themselves, they became, after a few years, a bit repetitive in style.

I am not privy to the procedure by which the subject of paintings to be commissioned is decided, but I suspect that it was the Corps that dictated to Mr Jonas how to tackle his subject. May I suggest that such an approach will stifle the imagination of the artist. We are, after all, not paying him merely for his technical ability to apply paint to canvas, but also for his artistic interpretation of events. Of course we will want to ensure that the final result is worthy of the occasion, but we must also be careful not to put too many constraints on how he fulfils his commission. Perhaps a little bit of mission command would be appropriate! Yours sincerely, Derek Beaumont.

CDEE PORTON

From Maj Gen (retd) P J M Pellereau

Sir, – The review (*RE Journal* August 2001) of the book by G B Carter about the history of Porton Down prompts me to add some further random comments on this unique Establishment. I was lucky enough to live there in the mid 1930's whilst my father was serving as a Military Experimental Officer, and many years after I had dealings with Porton from Fort Halstead and finally the Ordnance Board.

The reason why Gradon Carter's book has little to say about the between-the-wars period may well be because not a great deal of military significance took place. I can remember there were trials of spraying liquid from aircraft, presumably to ascertain whether the enemy could be attacked with mustard gas in this way. There were also indoor trials to test the effectiveness of insecticides against locusts. These might well have tied in with the aircraft spraying efforts.

But most days the extensive ranges were free for riding on the many official chargers which Royal Artillery units seemed to accumulate before mechanization displaced the horses. There was space for serious kite flying and moonlight picnics in our own "Happy Valley". The empty roads were fine, too, for learning to drive when still under age. To ensure that motorists passing along the A30 were not tempted to encroach within our boundaries, evil smelling Piridene was spread strategically our side of the appropriate gates.

The Sappers were more than adequately represented during the majority of this time by Colonel Tony Kent. He knew all about Livens Projectors and had more than a hand in everything that went on. But he was not backward looking and was the first person I can remember saying quite categorically that World War II was close upon us. He was right within a couple of years.

Meteorology was recognized as being of immense importance to chemical warfare and the Establishment Met Officer made daily forecasts for the morrow. However, he had none of today's scientific aids and he was not all that accurate. This prompted a "Lay" friend to challenge him to a contest. For a month each had to write their ideas down overnight and the next

day the results were judged anonymously by a neutral panel. The "Lay" solution was to write down each evening precisely what that day had been like. As the weather frequently stayed the same for two or more days in a row the poor Met Officer had to hand over the stipulated bottle of whiskey.

With all those happy memories of Porton I was pleased to include it on the list of locations to which the RARDE outstation at Potton Island might move if Mapling Sands was lost to a third London airport. However, I stood back in admiration at the formidable range of reasons why our small trials activities could not be fitted into the extensive Porton domain. Apart from the risks of uncleared mustard gas there were precious orchids, unique flint stones and the last remaining UK based Bustards which could not be disturbed or put at risk. Their defence was magnificent. In the event of course London's third airport went elsewhere.

My final official contact with Porton came towards the end of my tour at the Ordnance Board making the first visit for some years. One of the eminent civilian scientists delivered a splendid contribution to our discussions. He recalled that soon after he arrived at CDEE as a young man he had been rebuked for making some ill-thought suggestion about the design of a chemical weapon. His boss had told him "The Ordnance Board won't like that!". For many years he had lived in fear of this mystical organization and tried to do nothing which might upset it. Now, just as was he about to retire, he was meeting the Board and they didn't seem too bad a lot.

I always felt that provided we kept up to date with the field of chemical warfare we should not be the victims. With all the encumbrance that is involved such warfare slows down fighting and is therefore of least value to the attacker. We had a case, too, for using chemicals defensively (not just protectively) in the form of mines, telling any enemy they would cross those minefields at their own risk. However, politically those days probably went when we won the Cold War and irresponsible laying of unmarked anti-personnel mines led to near abolition of all types of land mines.

The days that have not gone, nonetheless, are those in which we speak on level terms with the United States on this and one or two other key military topics. Such matters cannot be put in the hands of "A European Army" nor even put out to private industry. The Americans will cut us off. Our special relationship built up through many years of confidential contact should not be lightly thrown away. Yours faithfully, P J M Pellereau

BOER STATUES

From : Captain (retd) J E Borer LCG MISM

Sir, – I was particularly interested in the article by Major G C Jones in the August *Journal* concerning the Boer Statues, particularly the fact the photographs were actually old postcards. At the behest of Lt Col Alan Miller, the immediate past Chief Instructor of Command Wing, I am engaged in "fleshing out" the presentations given to our Troop Commander and Senior NCO Courses on the memorials and artefacts within Brompton Barracks with the object of instilling in them a sense of pride in our heritage. I have almost finished and last week I was looking at the Mandalay Cannons which today sit either side of the Burmese Bell in front of Command Wing. I know from a photograph of the unveiling of the South Africa Arch that, at one time, they were positioned either side of it, inside the Boer figures, but I wondered where they were before that. Last Saturday, my wife and I visited an antiques fair at Detling, and although I had seen postcard vendors before, I have never looked at their stock. Remembering Major Jones' article, we looked through the "Gillingham" section. We found a coloured postcard bearing a King Edward 7th halfpenny stamp and postmarked Rochester at 10.00 pm on May 30th 1904. The card was entitled "Gordon's Monument, New Brompton" and shows the statue in almost pristine condition – not the weathered version we see today. In the background is one of the cannons so, at that time, they obviously flanked the main door of the Institute Building. What caused me to write was that in 1904 someone had parked a bike against the trail of the cannon. When I came into work this morning in 2001, guess what, someone had parked a bike against the trail of one of the cannons – some things never change!

At the risk of making this note too long, I would like to add that in connection with my tasking from Colonel Miller, I received a great deal of help from Leslie Smallman, particularly with the RE HQ Mess about which he knew practically everything. I remember his words from the last time I saw him before he died because I wrote them down and included them in our script. He said I must make it clear to all

who will listen that, since 1856, the word "Headquarter" in the Mess title has always been in the singular, never the plural and it is churlish to add the "s". Also, when referring to the HQ Mess, it is a tautology to add the word "Officers" before "Mess" in that when the Mess was originally formed, the Royal Engineers was a corps of officers and that therefore the Mess had to be for officers – the soldiers were Royal Sappers and Miners. He was particularly vehement on the subject and I am glad to pass his message on. Yours sincerely, J E Borer.

Amendment

THE Web address in the letter on Colonial Towns in the August 2001 Journal should have read www.idforum.org.uk. We apologize for the error.

Reviews

WELSH BRIDGES TO THE ELBE
The Royal Engineers – 53rd (Welsh) Division Bridge Builders of the Northern France and North-West Europe Campaign 1944-1945
JOHN H ROBERTS

Published by Boldacre Books.
20 Kingsfield Crescent,
Newlands, Witney, Oxon, OX8 6JB.
Price £20 Hardcover.
ISBN: 1-898893 00 4

THIS book is not only about the Royal Engineers of the 53rd (Welsh) Division and, despite the title, it is not only about bridging. It does, of course, draw heavily upon Welsh sources and many of the characters mentioned are, naturally, from Welsh units. However, the overall impression created is to leave one in awe of the major contribution which the Royal Engineers, as a Corps, made, across the board, to the campaign in Northwest Europe. This contribution began long before the landings on the beaches of Normandy and continued for the gruelling eleven months after D-Day, then into the reconstruction of Germany and the other Western European countries which had been devastated by the war.

It might be wondered if there is anything left to say about the Second World War but here is a freshness which comes from the memories and photographs of those who took part at the sharp end. The author has reproduced individual contributions verbatim so, inevitably, there is some repetition. He has drawn heavily, also, on relatively few sources of material. His narrative is a little disjointed and it is couched in the heroic style adopted by those who defer to their forbears with "real" experience. However, these are relatively minor points and they do not detract from the fact that this is a valuable record of personal stories which give a very good flavour for the actualities of the Sapper at war. It also serves as a testimonial to Welsh heroism and endurance which will make any Welshman proud.

The book is well-illustrated with photographs and maps which bring to life the overall image of innovation, doggedness and heroism which were bywords for Sappers from Normandy to the River Elbe. It was a pity that your reviewer's copy was badly bound and the pages detached from the binding. It is to be hoped that this is not a general fault with the rest of the batch. The content deserves better.

CMD

LEADERSHIP IN CONFLICT 1914-1918
EDITED BY MATTHEW HUGHES & MATTHEW SELIGMANN

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ISBN 0 85052 751 1

THE title of this book is something of a misnomer; any reader seeking enlightenment about the art of leadership would be disappointed. Rather, it is a collection of academic essays on the trials and tribulations experienced by selected generals, politicians and sovereigns on both sides during the First World War. There are fourteen chapters, each by a different author. Most of the authors are lecturers in history or

related subjects at English universities; two are currently members of the Defence Studies Department at the Joint Services Command and Staff College.

The most interesting chapters are about the subjects which are less familiar – at any rate to your reviewer. These include Trenchard's control of the Royal Flying Corps in France, the crisis faced in 1914 by von Moltke, Pershing's imperious command of the American Expeditionary Force, and Cadorna's travails on the Italian Front. Most of the chapters do not address the subject of leadership at all; for instance, the essay on Rawlinson's command of Fourth Army concentrates on the difficulties he experienced with the French on his flank. Other chapters are rather heavy going, particularly the strange essay on James Gerard (the US Ambassador in Berlin), and the barely readable chapters on the launch of the National Party in Britain, and on shell shock. Some of the chapters read like PhD theses, and one rather suspects that some of them were originally just that. All are followed by pages of notes, mostly bibliography, which in some cases take up almost as much space as the essays. Despite mentions of innumerable place names, there are no maps. There are 28 photographs, mostly portraits of the subjects covered in the essays.

There is nothing of specific interest for Sappers – only a very brief mention of Brigadier General Coffin VC in command of 25th Brigade, in the chapter on Major General Henecker's sojourn as a divisional commander – probably the chapter which comes closest to living up to the book's title.

CPRB

TOURNAMENT OF SHADOWS THE GREAT GAME AND THE RACE FOR EMPIRE IN ASIA

KARL MEYER & SHAREEN BRYSAC

Published by Little Brown & Co (UK).
Price £25.
ISBN: 0 316 85589 8.

THIS excellently written book describes the classic struggle, initially between Great Britain and Russia, for the mastery of Central Asia.

Anyone likely to be interested in this book will probably have read already *The Great Game* by Peter Hopkirk, published in 1990, which is quite superb. So why read this latest account? Your reviewer recommends you do for several reasons. First, the timescale is considerably extended. Hopkirk's book ends with the First World War and the Russian Revolution. Meyer and Brysac take us further on to the Nazi interest in Tibet ('Swastikas to Lhasa' is the dramatic title to the chapter), to the Chinese occupation of Tibet and the Soviet invasion of Afghanistan. Also, the authors have had access to a great deal of recently available material. As a result the book is weighty but really well researched. Being American, they have included a dimension which covers their national interest together with those of Germany and Sweden. Finally, the book is an enthralling read.

There is some mention of Royal Engineers. Captain Thomas Montgomerie made his name by supervising the survey of Jammu and Kashmir and had the idea of training native surveyors who could penetrate the porous borders of the Himilayas in disguise. Then there is Holdich, famed for his survey of the Pamir Plateau where he worked with a Russian team defining the frontiers of Central Asia, and who later became Surveyor-General of India and President of the Royal Geographic Society. Finally, Captain Henry Morshead, another member of the Survey of India, trespassed into China in 1912 to probe sensitive frontier areas.

This book is strongly recommended as an excellent Christmas present for any Sapper with an interest in the fascinating history of Central Asia.

SRG

VALOUR & GALLANTRY HEIC AND INDIAN ARMY VICTORIA CROSSES AND GEORGE CROSSES 1856-1956

CHRIS KEMPTON

Published by The Military Press, 1 Gallagher Close, Milton Keynes. MK8 0LQ.
Illustrated, Maps.
Price (softback) £25.00.

THE author is Chairman of the Victorian Military Society and for many years has been Secretary of its India and Burma Special Interest Group. His meticulous and painstaking research has added a most valuable contribution to the inventory of books on the subject. The chronological list of citations and biographical details are interspersed with introductory descriptions of the campaigns and extracts from contemporary and personal accounts of many of the incidents.

The aim has been "…to produce a valid listing of recipients of the VC, GC, Albert Medal and Empire Gallantry Medal who can reasonably be said to have belonged to, or had close connection with, the HEIC or Indian Armies." It thus most usefully fills a gap and is likely to remain a complete authority for many years to come.

While this is primarily a book for reference, dipping into it and reading some of the stories is an uplifting experience. It again calls to mind the bond between India and Britain as reflected in their armies, and the debt owed to India by the free world for her part played in both world wars.

It is particularly moving to be reminded of the diverse nature of the George Cross and the breathtaking deeds of cold courage not "…in the presence of the enemy " that have earned this award. One only has to read the case of Captain Dorrani, who resisted interrogation under appalling torture over a prolonged period to protect the lives of others or of Subedar Subramanian of the Madras Sappers and Miners, and who sacrificed himself by falling on an S-mine before it could jump and kill the remainder of his mine-clearing party.

GWAN

ONE MORE RIVER TO CROSS THE STORY OF BRITISH MILITARY BRIDGING

J H JOINER

Published by Pen & Sword Books Ltd.
47 Church Street, Barnsley. S70 2AS.
Price £25.
ISBN 0 85052 788 0

THE last 300 years has been a busy time for British bridge designers, according to J H Joiner in his encyclopaedic opus *One More River To Cross*. His chronological list of equipments developed in that period records no fewer than 173 separate items. Consequently, this is the sort of book most Sappers will enjoy dipping into for reference and many will want to own for their further education and enjoyment too.

Colonel Jim Joiner knows his subject well and lays it out in chronological order. In doing so, his factual style tends to understate the technological drama of his subject, although glimpses of passion are occasionally evident in his telling of the great stories. These naturally include: Bailey; MGB; BR80/90; Gillois M2; and the Rhine and Irrawaddy crossings. But pontoons, ferries, fascines, trestles, rafts and even stepping-stones appear as well. On the historical side it is good to see the Congreve Trough and a wheeled assault bridge from the Napoleonic era, whilst in bringing the story right up to date he also gives the Mabey 200 Bridge (recently accepted as the Army's Logistic Support Bridge) an honourable mention for use in the Balkans. Well supported with appendices and a useful index, this is a comprehensive record of British military bridges and bridging operations. This reviewer's personal favourite is the "Wild Assault Bridge" of the 1930s that, despite failing to impress in UK, was subsequently revived by the Germans in the 1970s as the highly successful Biber Tank Bridge.

Reflecting on the wealth of facts and figures contained in this seminal work, one cannot help but wonder at the skill and ingenuity of the people involved. Many factors contribute to success, but a constant theme throughout this book is the quality of those exceptional minds at Christchurch that kept Britain at the leading edge of military bridge design for almost a century. At the end one is struck by how much and how little things have changed in 300 years. And if a single lesson does emerge, it might be the old Sapper adage: Keep it simple.

THEF

A RAIN OF LEAD THE SIEGE AND SURRENDER OF THE BRITISH AT POTCHEFSTROOM

IAN BENNETT

Published by Greenhill Books, Park House,
1 Russell Gardens,
London, NW11 9NN
www.greenhillbooks.com
Price £18.99
ISBN 1 85367 437 0

SIR Evelyn Wood described early 1880s South Africa as "The land of misunderstandings". Britain arbitrarily annexed the Transvaal in 1877, and bitterly antagonised the Boers who then withheld their support during the 1879 Zulu War. After King Cetewayo's capture in September 1879, the British immediately with-

drew their field forces from Zululand, rapidly reducing their overall military presence in South Africa. Relations with the Transvaal's former leadership worsened beyond peaceful redemption, and haughty British "diplomacy" ignominiously failed, as widely dispersed British garrisons tried to secure the British political mandate. One of these was Potchefstroom, a town of 6,000 people in the most militant republican area of the Transvaal. This book tells us how 213 British troops and civilians held it against the Boers for 96 days from a tiny, makeshift mud fort the size of a tennis court, finally surrendering it on 21 March 1881. His perceived need to relieve pressure on Potchefstroom by mid February, led the British Commander Sir George Colley into the fatal error of occupying Majuba Hill; lost in a humiliating defeat on 27 February that led to a hastily concluded armistice.

Constantly at risk from enemy fire, debilitating diet, lack of sleep and medical supplies, and harsh weather, this heroic group somehow endured until deceived into surrender. In it we find women and toddlers, survivors of Isandlwana, defenders of Rorke's Drift and the British square at Ulundi, and – at least initially – a menagerie of officers' chargers, and draught and slaughter animals; including the teams of two 7 pounder guns. The bulk of the garrison was from 2nd/21st (Royal Scots Fusiliers) whose defiant bugle calls and basic 'backbone' provided the heart of the defence under their intrepid leader Major Winsloe. Some harrowing episodes occur, the most chilling being the hastily improvised attempt by two subalterns to evacuate the 17 very young children in the dark of Christmas Eve. The toddlers' panicked cries drew Boer fire; which killed a ten year old, and severely wounded a babe in arms.

This is an oddly uplifting tale of "British pluck", self-respect, pride in Queen and country, the best kind of discipline, courage under robust but caring leadership, impressive esprit de corps, and the power of the human spirit. At the end, the survivors tidy up the graves and march away, nearly one third of them having become some form of casualty. No campaign medal was awarded – we lost – but five soldiers earned Distinguished Conduct Medals.

Ian Bennett wrote "Eyewitness in Zululand", the campaign reminiscences of Colonel WA Dunne in South Africa in 1877-81. Though he sparsely sets the scene, his carefully researched and skilfully honed narrative wisely restrains its commentary on the deepening predicament of the British garrison, letting this become self-evident. This subtly achieves a strangely more moving effect. The Potchefstroom siege had become an almost forgotten episode, in a muddled and ill-conceived campaign that many once preferred to forget. Ian Bennett has now put that right, in a thoughtful and atmospheric book that provides absorbing reading. Whether any of us could expect to behave as well as this garrison did in anything like those circumstances today is a searching question that we might usefully ask ourselves. Read this book carefully, and consider that well.

MCMcC

Explanation of Abbreviations Used in This Journal

ADC . . . . . .aide de camp
AER . . . . . .Army Emergency Reserve
AFPRB . . . . . .Armed Forces Pay Review Body
AFSOUTH . . . . . .Allied Forces South (Europe)
APOD . . . . . .Airport of disembarkation
ARRC . . .Allied Command Europe Rapid Reaction Force
ATRA . . . . . .Army Training and Recruiting Agency
BATUS . . . . . .British Army Training Unit Suffield
BOF . . . . . .Button on fence
BP . . . . . .Bulk petroleum
BSG . . . . . .Brigade Support Group
CCO . . . . . .Crowd control obstacle
CEP . . . . . .Central Engineer Park
CRE . . . . . .Commander Royal Engineers
DROPS . . . . . .Demountable rack offloading and pickup system
DSG . . . . . .Divisional Support Group
EOD . . . . . .Explosive Ordnance Disposal
ETB . . . . . .Engineer and Technology Board
FMD . . . . . .Foot and mouth disease
FRC . . . . . .Formation readiness cycle
FTRS . . . . . .Full time reserve service
FYROM . . . . . .Former Yugoslavia Republic of Macedonia
GSB . . . . . .General Support Bridge
GYC . . . . . .Gap Year Commission
ISD . . . . . .In service date
KFOR . . . . . .Kosovo Force
MACA . . . . .Military Aid to the Civilian Authority
ME . . . . . .Military Engineer
MGB . . . . . .Medium Girder Bridge
MHE . . . . . .Mobile handling equipment
MLC . . . . . .Military load class
MLRS . . . . . .Multi launcher rocket system
MNB(S) . . . . . .Multi National Brigade (South)
MND (SW) . . . .Multi National Division (South West)
MS . . . . . .Military Secretary
MSR . . . . . .Military supply route
NVQ . . . . . .National Vocational Qualifications
OOTW . . . . . .Operations other than war
OR . . . . . .Operational requirements
ORBAT . . . . . .Order of battle
OXT . . . . . .Overseas training exercises
PBR . . . . . .Plastic baton round
PO Ops . . . . . .Public order operations
PPP . . . . . .Private Public Partnership
RCB . . . . . .Regular Commissions Board
RCFV . . . . . .Rapid cover from view
REESR . . . . . .RE Employment Structure Review
REMCM Div . . . . . .RE Manning and Career Management Division
REMO . . . . . .Regimental Careers Management Officer
RERAP . . . . . .RE Recruiting Action Plan
REYC . . . . . .RE Yacht Club
RHOD . . . . . .Railhead of disembarkation
RO . . . . . .Retired officer
RSME . . . . . .Royal School of Military Engineering
SDR . . . . . .Strategic Defence Review
SFOR . . . . . .Stabilization Force
SHAPE . . . . .Supreme Headquarters Allied Powers Europe
SLA . . . . . .Single living accommodation
SPOD . . . . . .Seaport of disembarkation
STRE . . . . . .Specialist Team RE
TA . . . . . .Territorial Army
TQM . . . . . .Technical Quartermaster
UCB . . . . . .Universal concrete block
VJ . . . . . .Serbian Army
VLSMS . . . . . .Vehicle Launched Scatterable Mine System
WD . . . . . .Water development

Please note: the above abbreviations are those which appear within articles published in this edition of the Journal *only, and are printed for the benefit of our many foreign and non-military readers.*
Appointment abbreviations (which appear on the first page) can generally be found in the back of The Royal Engineers List.