THE ROYAL ENGINEERS JOURNAL AUGUST 1989 VOL. 103 No 2

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Guidelines for Authors

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

Subject. Articles should have some military engineering connection but this can be fairly tenuous, specially if an article is witty.

Length. Normally, chance of publication is in inverse proportion to length. More than 4500 words (5 pages of text) tends to lose most of our readers. Blockbusters can sometimes be serialised.

Clearance. Opinions are an author's own. The wise man clears an article with his boss on any policy matters. Security clearance must be obtained locally.

Copy. Ideally the text should be double space typed and include the author's pen picture and captions for art work.

Photographs, should be black and white. Coloured photographs rarely reproduce well unless they are very good quality with sharp definition. A head and shoulders photograph of the author would also be helpful.

Line drawings, if possible, should be drawn in proportion with the page (5.75in x 8.0in). Size is immaterial.

Rewards, can be generous. The committee has about £250 in prize money to allot for each issue plus the valuable annual prizes. All authors receive £5 to cover costs.

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

Contributions to the Journal *should reach the Editor by:*

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Contents

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Editorial

Half a Century

In this issue we recall the events of 1939 through the eyes of three Sappers: Martin Hotine, then a major in Survey, whose eventual distinction has only recently been recognised in a ceremony, also recorded in this *Journal* and of whom we shall hear more in future issues; Hugh Hamilton, a regular who had been commissioned with the Corps 18 months before the events he describes in "Recollections of the Phoney War" and who eventually retired from the Corps as a Brigadier in 1968; and Tom Beaumont, who in 1939 had recently left school and spent a holiday in Germany, served in the TA and then obtained a wartime commission which took him to East Africa and Burma with the Bengal Sappers and Miners. His later experiences are recorded in personal memoirs and photographs which he has donated to the RE Corps Library.

All three, in their different ways, convey the spirit of the times in a personal way. In all three there is a certain dispassionate professional attitude to something that had to be got on with without emotion beyond a certain apprehension and some bewilderment. Perhaps the colour of such personal contemporary records changed in the ensuing four years as the nature of the enemy became more clearly identified and the aim of the fight came more sharply into focus. We would be pleased to receive any similar records reflecting such attitudes as they developed in the six years of war.

A Case For Unilateral Disarmament

On 9 May 1989 the *Times* republished in its "On this Day" column, a letter dated 1903 from Lieut General Dunham Massy, Colonel of the 5th Royal Irish Lancers. In it he extolled the virtues of the lance in war and made the case for its retention. It seems that this weapon was under some threat despite its record as the "queen of weapons" being "both in moral and physical effect incomparably superior to the sword". Apparently it was not until 1927 that the lance was abolished, except for ceremonial purposes. It all seems a bit silly looking back.

The same day in 1989, a brilliant fresh summery one with the new planted trees around the square at Brompton bursting into leaf, found the time honoured ceremony of sword drill being undertaken by the latest newly commissioned batch of warrant officers. Is it not time for the sword to be finally laid to rest, even for ceremonial purposes? The ceremonial sword all covered in chrome and patent leather can look a pathetic shadow of its businesslike ancestor, a sort of deposed monarch living out its declining years in pampered surroundings. We do it little honour to treat it thus.

Of course the sword may have its uses in today's Army — handy perhaps for forcing jammed filing cabinets or impaling increasing piles of paper print-outs; so these must be taken into account. Then there is the problem of keeping in step with the rest of the Army whom the Corps supports. However, as general agreement would be unlikely to be forthcoming, is there not a case here for the Corps to take a lead in the name of progress and unilaterally disarm in favour of a more serious weapon?

Engineer Reconnaissance In Support Of The Battle Group In 1 (BR) Corps

CAPTAIN J A H WELCH BA

Captain Welch was commissioned directly into the Army Air Corps in 1983 and his first tour was as a medium reconnaissance troop leader with the 13/18 Royal Hussars. Following that he attended flying training at Middle Wallop where after seven months he was invited to join another Corps! After attending the Royal Engineer Young Officer Course he served as a troop commander with 32 Armoured Engineer Regiment, which included tours in BATUS and Berlin. In February 1988 he was an instructor on the first Engineer recce concentration in BAOR. He is currently Second-in-Command of 4 Field Squadron, 21 Engineer Regiment.

Introduction

At a time when Royal Engineer support to the Battle Groups in 1 (BR) Corps is under close scrutiny, particularly with the advent of the Close Support Troop concept, it is necessary to examine areas that may have been overlooked in the past. Sapper reconnaissance (recce) is one of these areas and the following comments made about exercises in recent years highlight this problem: "The two most noticeable areas that require attention are communications and reconnaissance. Both were poor ..."(1), "Engineer recce appeared technically competent but often lacked tactical awareness."(2), "...engineer recce is a very obvious weak point in this all arms context."(3), "There were many cases of grossly inaccurate information being passed back to the troop commander."(4).

Background

The process and conduct of recce is considered as one of the most important factors in the execution of any task. Precisely for this reason a battle group's recce troop is made up of it's most experienced and proficient soldiers. This is generally reflected in the fact that the recce troop's tactical drills and signals procedure are the slickest in a battle group. Consequently, the sapper recce element will always face comparison with a battle group's recce troop and it is from this comparison that many of the frequent criticisms are made. It is standard practice that sapper recce has to be integrated into the Recce Troop in order to obtain accurate and timely information, it follows therefore that the sapper recce should be equally well trained in a tactical environment. In short, the sapper recce sergeant must be as tactically aware as he is technically competent.

This article aims to examine the role and training of Royal Engineer Recce in 1 (BR) Corps and make recommendations for it's improvement.

Role

To maintain credibility within a battle group, the sapper recce must be able to perform all the tasks associated with the recce troop as well as carry out its specialist role. An indication of the importance put upon the role is that a senior NCO is allocated. Two elements will be discussed: the tactical role (associated with recce troops) and the specialist role.

Tactical Role

Depending upon the Phase of War, it is often necessary for the sapper recce to work as an integral part of the Recce Troop. This is increasingly true of the training carried out in

Captain J A H Welch BA
Engineer Reconnalssance In Support of the Battle Group In 1 (BR) Corps

an all arms grouping, particularly with a renewed emphasis on speed and mobility. In BATUS, for example, the sapper recce sergeant is almost constantly attached to the Recce Troop. To enable smooth integration into the Recce Troop the sapper will require the following tactical skills: familiarity with low-level recce tactics, slick signals procedure, good recognition ability and a thorough understanding of the battle group's equipment and capabilities.

Familiarity with low-level tactics. Sapper recce must be familiar with some of the following drills and procedures: occupation of and routine in OP lines and hides, patrol procedures (both on foot and in vehicle mounted snake patrols), leapfrog and caterpillar movement in the Advance and the Withdrawal, the art of jockeying for new positions and selection of alternate routes, and finally the conduct of chemical recce (particularly for the selection of assembly, harbour and waiting areas).

Slick signals procedure. Frequently Sappers appear to be poor on the net and recce is an all-too-frequent offender. The problem lies in a lack of familiarity with the battle group's procedures which result in a poor performance and regular reprimands. The result is a reluctance to use the battle group (tac) net and a failure to pass back essential information. The answer lies in better training in order to ensure that the sapper is as proficient on the net as the Recce Troop. This will involve a complete working knowledge of the BATCO system, excellent signals discipline, competence in the use of reporting procedures such as Army Unit SOPs (particularly reports applicable to sapper tasks such as Obsreps, Crossreps and Minereps) and SOCs (Secure Orders Card). Finally, Sappers must be more willing to call for helicopter and artillery support in order to provide a better service to the battle group.

Recognition Training. Recce troops pride themselves in being "second to none" in the skill of AFV recognition. While it is generally accepted that the average sapper does not need to be finely tuned in this skill, sapper recce elements must be particularly so if they are to continue to participate in divisional concentrations. Essentially, this is the only way to ensure that accurate and detailed information is passed up the chain of command. Again then, the sapper must be as well trained as his recce troop counterpart and equally as competent at identifying enemy equipments and organisations.

Understanding the battle group. Sappers are often criticized for being insular and if this is reflected in sapper recce then it will be unable to provide a satisfactory service to a battle group. The sapper recce must be completely familiar with all the battle group's assets and, more importantly, their capabilities. Without such knowledge the recce information passed back would be of a dubious quality.

Specialist Recce

The skills associated with sapper recce vary according to the phase of war and the types of engineer assets that are available. Different skills are also required by armoured and field engineer recce, and to the same extent will be the differences by close support and general support recce. In general terms, however, sapper recce must be sufficiently well trained to be able to complete recces in all phases of war regardless of differences in role.

In the Advance. In the advance, mobility support in the form of gaining information about obstacles such as minefields, river lines, craters and anti-tank ditches most of which will be covered by enemy fire is important. The successful acquisition of information requires tactical awareness and stealth; however, it will also need specialist knowledge in order to decide the best (or indeed only) method of breach. This information will form the basis of the advice given to the battle group commander by the sapper troop commander; indeed, it is fair to say that the quality of that advice will be almost entirely dependent upon the information gained by recce.

In the Withdrawal. Sapper information for both mobility and counter mobility options will be required in the withdrawal. Any of the following tasks may require recce: hasty minefields, demolitions or route denials; obstacle crossing, route maintenance or waiting and assembly areas. In this phase of war, time is of paramount importance and a sapper recce element that was also capable of closing minefield gaps or creating real rapid obstacles would be particularly useful.

In Defence. Although Sapper involvement will be predominantly concerned with counter mobility and

protection tasks, plans for counter moves will have to be made and that will entail sapper mobility support. Consequently, as well as the usual sapper tasks in defence, the following may also require recce: deception tasks, assembly areas, FUPs, routes to and from start lines. Although these may be completed by recce troops they will need sapper confirmation, particularly for areas that require preparation. The type of recce associated with the defence may lean in favour of the specialist as there is time, in peace, to plan and prepare obstacle lines.

Organisation

The current sapper support to a battle group incorporates elements of armoured and field engineers. Together, they provide two recce teams (as practised on FTX, on SLTA, at BBGT and in BATUS). However, this may provide a false lesson; firstly, because there are simply not enough recce sergeants for all battle groups to have two and secondly, because they are not similarly trained and are therefore not able to complete each others tasks with equal proficiency. This is particularly evident when field engineer recce sergeants are faced with an armoured type of task. This situation arises because the field recce sergeant usually has very little experience of armour, while the armoured recce sergeant may be career streamed Armoured/MT, Armoured/EOD or Armoured/POM and consequently will not be as well trained or as proficient as his counterpart in combat engineering. This system has effectively created two specialist engineer recce elements which have, in the past, been the subject of some confusion within battle groups. The new close support troop will continue to require two recce teams (as currently practised in BATUS) unless moves are made to unify training and to bring all recce elements up to the same standard of skill.

Summary Of The Current Situation

The problems involved with sapper recce may be summarized as follows:

- The current sapper recce teams are not as well trained in "tactical" recce procedures as their recce troop counterparts and consequently receive frequent criticism.
- The organisation of the Sapper troop includes a recce sergeant who is an integral part of that troop and trains with it. However, on exercise and operationally he will frequently be attached to a battle group's recce troop. It is fair to say that the recce sergeant will spend the majority of his time away from the Sapper troop.
- There is a discrepancy in the training and career pattern of recce sergeants in respect to armoured and combat engineers; and, this will continue to be the case with close support and general support engineers.
- There is a general lack of tactical awareness. This may be the result of the lack of teaching recce in a tactical environment.

Current Solutions

Some measures have already been taken to try to improve recce within the tactical environment; they include a Sapper recce concentration, selected attendance at divisional recce concentrations and an emphasis on the subject during commanders training. However, as the CCRE 1 (BR) Corps was forced to write to the RSME in July 1988 expressing his concern about "hasty" (tactical) recce the suggestion is that little improvement is being made. A closer look at the current solutions is required.

Sapper Recce Concentrations. Initiated by 32 Armoured Engineer Regiment last year, the Sapper recce concentration was held during a week on Soltau and Lüneburg Training Area (SLTA). The training included the study of recce in all phases of war, followed by practical application on the training area. The Recce Troop from 1 Staffords assisted with the instruction, which allowed the training to be a two day process. The use of such concentrations allows uniformity of training while also improving standards. However, for it to be really effective then attendance at such concentrations must be made mandatory for all BAOR engineer regiments.

Divisional Recce Concentrations. There has been a limited move towards sending Sapper recce teams with their battle group recce troop on divisional recce concentrations (such exercises as *SCARLET PIMPERNEL* which the author attended). This undoubtedly improves all arms cooperation and enhances mutual understanding; however, there must be a greater injection of Sapper-type scenarios in future. The benefits from these exercises are numerous, yet it is the increased understanding between arms that is probably the most important factor. To explain further, the training for effective recce must be a two-way

process: the recce troop must know what is expected of it by the sapper recce as much as the sapper recce must know how to integrate into recce troop. For example, a battle group is in the advance with two squadron groups forward: the recce screen contacts a minefield; all too often the recce troop is quite happy to simply sit still and call forward the sapper to find a breach site. However, with eight recce cars it is recce troop that should be finding the possible breach sites and then calling the sapper recce to confirm and report (to include an appreciation of the best type of asset available to breach). Only with mutual cooperation like this will a battle group maintain momentum and the sapper recce not be criticized for the amount of time taken or his lack of tactical awareness. How many times has the recce sergeant been forced to forsake tactical procedure because "zero" (note that I have not said zero alpha!) has been insisting on speed?

Training Establishments. There is renewed emphasis being put upon "hasty" recce in the training establishments. However, while the RSME and RE Wing (Bovington) continue to produce excellent results in the teaching of specialist recce, they do not have the facilities to teach the tactical aspects that are required in 1 (BR) Corps. On the Field Sergeants Course the RSME must cater for a wide cross-section of roles and therefore should concentrate on teaching the specialist recce. The RE Wing (Bovington) is primarily a driver and maintenance training school and has little, if any, capacity to teach tactical recce. Yet, if a solution had to be found through the training establishments then Bovington would be an option and the suggestion would be to allow the sapper recce sergeants somehow to attend the final exercise of the RAC Recce Troop Commanders Course and to inject the necessary Sapper play. This aspect of training could be scheduled as a module in the Field Sergeants Course for those bound for 1 (BR) Corps.

A Radical Option

Given the fact that the above measures are only happening to a limited extent and that the training establishments will not be able to meet the demands, attention must be turned on how to improve the standards within 1 (BR) Corps. One option is to form a recce troop within engineer regiments. This would allow central and uniform (in theatre) training and would present a united picture to all battle groups within a division. If then all sapper recce troops were directed to attend a central concentration at the beginning of the training year a united front would be presented to all battle groups in 1 (BR) Corps. Within the engineer regiment the Sapper recce troop would have a clear allocation of its assets to the armoured/field troops so that the same recce sergeant supported the same troop throughout the year. The removal of a SNCO from the troops would undoubtedly meet great opposition, however a troop commander and a staff sergeant are quite sufficient to run a troop. Indeed, much of the recce sergeant's time is taken up with such things as microfiche and GDP recces; all of which could be run more efficiently by central organisations. On exercise, the recce sergeant tends to be away from the troop for the majority of the time and does not act in a command capacity. It is the emotive issue of removing a SNCO from the field troops that would be difficult to overcome.

The Sapper Recce Troop

Command. It is unlikely that a new post would be established for the recce troop commander and therefore it would have to be found from the current organisation. The job would entail a second tour in BAOR as troop commander and two options exist: the troop would be commanded by a RHQ troop commander with all the administration being done by RHQ or alternatively it would be commanded by one of the squadron operations officers with the squadron administering it. The advantage of the former is that the troop has regimental status, but care would be required to ensure that the RHQ troop commander had sufficient time to devote to the recce troop. Such extra duties as RSO, NBC Officer and CPRI account holder would have to be delegated to others. Either way, the troop commander would require his own CVR(T) and crew.

Role. The allegiance of recce teams to particular troops for exercise and operations would have to be strictly adhered to. However, during transition to war and on initial deployment there would be a regimental role for the troop. During the phase where the regiment moves and works as a complete entity then the recce troop could be involved in such tasks as: route clearance and marking; chemical recce of survival areas; escort and protection tasks; and local patrolling. This use of

the recce troop would prove invaluable when the pre-laid began to falter!

Composition. The recce troop would comprise all the recce sergeants in the regiment. Nine SNCOs in a troop is quite a prospect and the troop commander would have to be carefully chosen. However, the recce sergeant is meant to be a specialist as well as a tactician and when in battle groups he will be dealing with senior commanders. The troop would have to be fully manned with dedicated drivers and operators.

Conclusion

The current training of sapper recce teams is inadequate and as a direct consequence they face regular criticism from other arms and commanders. The response to the challenge of improving standards may be a combination of attending in-theatre concentrations and expecting the training establishments to pay more attention to the teaching of "hasty" recce. However, these responses alone will not produce significant results and sapper recce will continue to face criticism unless radical moves are taken to improve standards and understanding. The changing emphasis in 1 (BR) Corps towards greater mobility and counter moves means that Sapper recce teams have to be more flexible and develop "hasty" recce techniques. This is particularly important for the close support troops who will be required to provide fast mobile support to armoured battle groups. As a consequence there will be greater emphasis upon Sapper recce to be tactically aware and to be an integral part of a battle group's recce troop. To provide the necessary training to meet this challenge, regiments must be prepared to form their own recce troops and to devote the time, effort and resources to their training. As with all ambitious ideas there will undoubtedly be adversaries to forming such recce troops, however the fact remains that action needs to be taken to improve Sapper recce; and that action needs to be taken now.

NOTES:

(1) (2) BATUS Report 1986.
(3) CCRE's letter to RSME dated Jul 88 (open publication).
(4) BATUS Report 1987.

AFTERNOTE

The following extract, taken from the 1988 BATUS Training Report, emphasizes the need for a radical look at the training of Sapper recce:

"**Reconnaissance Sergeants.** *It has been good to see that the Engineer Reconnaissance Sergeants have been deployed in the main with the battlegroup reconnaissance. However they often forgot or did not appreciate the importance of keeping their Troop Commander or Command Vehicle informed of what they had discovered, thus slowing down engineer battle procedure. Their engineer knowledge and reconnaissance skills have not been good, in particular, gap-measuring. Due to inexperience, or perhaps lack of confidence, they have shied away from telling the battlegroup and the Troop Commander if they have noticed things going wrong at obstacle crossings.*"

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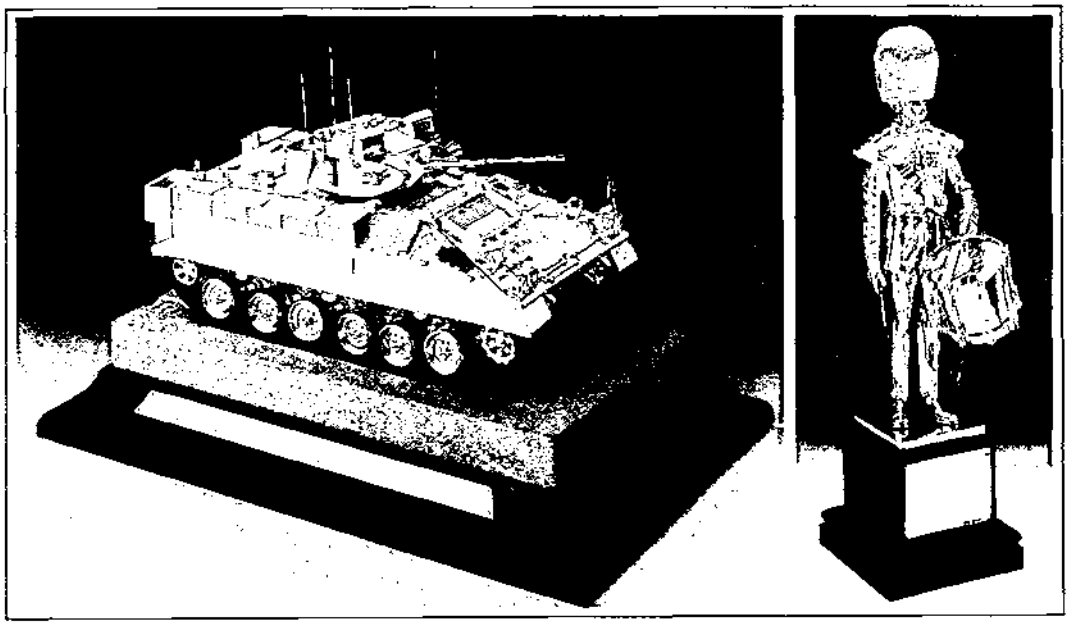

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Recollections of the Phoney War

BRIGADIER H G W HAMILTON CBE BA DL

The Author was educated at Wellington College, RMA Woolwich, and Cambridge University, and was commissioned into the Corps in 1938. During the War he served overseas with the BEF, BNAF, and BLA. After various staff and regimental appointments, including being a DS at the Staff College Camberley, he commanded 125 Engineer Regiment TA, attended the Imperial Defence College, and commanded 29 Engineerr Brigade. He retired in 1968 and was General Manager of Corby New Town Development Corporation for twelve years. He is at present Chairman of the Forces Help Society and Lord Roberts Workships and a Vice President of SSAFA.

THE Southern Railway guard came up to me with his flags in his hand, "ready to move off Sir"? — "yes guard ready to move", he waved his green flag and with a toot on the whistle the train moved slowly out of Chatham station on its way to war. It was 0800 hours on 3 September 1939, and I had been given the task of commanding a train taking some 300 recalled regular reservists to their mob postings. Some were to accompany me to my own posting to 105 Corps Field Park Company in Liverpool, others were to be dropped off at Manchester and other points on the way. We took the long route round London via Guildford and Reading and were in Oxford station at 1100 hours where we heard Neville Chamberlain announce that we were at war.

At Liverpool the party for 105 were met and taken out to the racecourse where the Company was mobilizing. It was a supplementary reserve not a Territorial Army company, being a technical unit, which meant that it had done comparatively little training, and consisted of a workshops section, an electrical and mechanical section, (most of the men coming from the Liverpool Tramways) and a stores section. The stores section was the cinderella of the unit and had not previously been formed, as the OC did not really know what it was for and was only interested in the technical side. Needless to say I was given the stores section to command and, luckily for me, was allowed to recruit mostly from the regular reservists I had brought with me. The next day was spent drawing our vehicles and G1098 stores from the Ordnance depot, getting to know my section and trying to understand the company establishment, as I had also been appointed "OC Advance Party" and was due to proceed, via Southampton the day after, to arrange and requisition billets for the company at an as yet unknown destination somewhere in France. Whilst I had little idea what I was doing (as such things were not taught to YOs at Chatham), I was much better off than our young LAD (Light Aid Detachment) officer (also a Supplementary Reservist) who arrived the evening before I left straight from a Manchester garage with no military training or experience whatsoever. He was given four specialist vehicles, a Royal Ordnance Corps warrant officer and ten men to form the Corps Troops RE LAD. Dicky Poole, our OC, was even less interested in having this odd unit permanently attached to the Company and so gave him little help which must have made life even more difficult as he (the LAD officer) had hardly any idea what he was there for or how he was to operate.

I was given an inexperienced SR corporal and a 15 cwt truck, the sort with an open canopy front, and off we set for Southampton having loaded what stores I thought might come in useful. There was not time to sort out my own kit so off to war I went with the regulation tin trunk containing my sword, best Huntsman's breeches and SD, (I must have managed to send my mess kit and

Brigadier H G W Hamilton CBE
Recollections of the Phoney War

civilian clothes home before I left Chatham). At Southampton we picked up signs directing us to an assembly camp and soon were told to take the vehicle down to the docks to await loading and, as we were to go on a different passenger boat, we returned to the camp. I remember going to the cinema that evening and getting a big lump in my throat, when "the King" was played, at the thought of going to war in France the next day. We embarked for Cherbourg on the evening of 6 September and expected to find our vehicles arriving at about the same time but there was no sign of them so we had to wait, but where? With two other advance party officers and their drivers we commandeered what had been a perfume shop in the Transatlantique terminal and this became our home for four days. Luckily I had purchased a small cooking stove in Southampton which was our salvation, as we had few francs to go out and purchase meals but were able to get eggs, bread and things cheaply and so cooked for ourselves amidst the strong scent of our quarters. We were all getting very worried that our main bodies would arrive before we did but on the fourth day found our vehicles on the quay and, on the radiator of mine, there was a card reading "this vehicle is not to be shipped." Apparently the Southampton dockers had gone on strike. We set off at speed for our concentration area about 50 miles south, and found our allotted village where, in co-operation with the local mayor, I requisitioned the school, a house for the HQ and officers and sufficient barns and other buildings for each section. We were only just in time as the main body arrived from Brest the next day and took up residence on their allotted billets.

We were only there a few days and then I set off again as advance party officer up to the Pas de Calais area to organize billets in the village of Izel les Equerchin which turned out to be our home for the next seven months. Izel was a typical farming village about half a mile off the main Arras to Douai road, surrounded by treeless fields of "betteraves" or sugar beet, and it had its own railway sidings for shipment of agricultural produce. Much to the chagrin of the OC and the workshops and E&M officers, there was little or no work at this stage for their sections but a great deal for the stores section, which I soon set up close to the railway sidings. The Company was the Field Park for 1st British Corps, which was constructing a strong defensive position within the Belgian border as an extension of the Maginot line. We were there to supply not only 1st Corps troops with engineer stores but also the three divisional field park companies, and there was an immediate demand for tons and tons of sandbags, barbed wire and pickets and the like. These were eventually sent up to us by rail from base and as far as possible I redirected individual wagons to the divisional field park companies rather than off-loading and re-loading. In the early days we had to use the workshop and E&M sappers to do the labouring, much to their disgust, but soon got our own detachment of the Pioneer Corps. Such was the demand that in many cases base could not supply in time and so I was given what appeared to be an unlimited imprest account, and set off round Arras, Douai, Lens and even Lille to purchase shovels, picks and other tools, as well as CGI timber, XPM and so on. As winter drew on we were also called on to supply materials to help make billets more comfortable, including miles of electric cable, light bulbs and fittings and plumbers materials for improving water supplies.

I soon came to think in French for some items rather than in English, and my schoolboy French improved out of all recognition. How do you ask for a "plumbers reamer" in French when you hardly know what it is in English?!! We did have an interpreter, Jacques Delcroix, who was a journalist, but I found that it took very much longer to do anything with him than on my own, as apart from the inevitable chat about the weather, grandmother's health and so on, he was always slipping back into the shop or warehouse after a deal, and costing me more time. I soon realized that we never got a 'remise' or discount for cash on the bill because he went back afterwards to pocket it. So I used to go on my own and ensured that the account was adjusted for cash, though in certain shops like the electrical supplier I got them to put the discount towards purchasing items like a radiogram for the PRI. Everything was paid for in cash and sometimes I had to warn the Paymaster that I wanted very large sums indeed in maximum-size notes, but even then one was sweating after paying over say the equivalent of £100,000 in 100 Franc notes out of a suitcase for tons of special steel channel which I had purchased for roofing gun shelters! The French counted every single note, whereas I had had to accept certified bundles from the paymaster. The Pas de Calais area is pretty

bleak at the best of times, being flat and, as a result of the 1914/1918 war devoid of trees. The main crop was sugar beet or *betterave* which seemed to extend everywhere and as the winter approached it was cold and damp. Anti-freeze was in short supply and this meant the guard having to start up and run all vehicles for a period throughout the nights that frost was forecast. As the youngest and most junior officer it always seemed to be me who had to supervise this operation. There was little outside entertainment provided for the men, so they had to rely on what I could think up — yes, I was entertainments officer and PRI. The local estaminet did a roaring trade under the *patron* M Dupont, and he did a lot for the troops. The officers were able to get into Douai, Arras and occasionally Lille and I managed to get the occasional ride at the Douai cavalry barracks; from my 'shopping' expeditions I had made a few friends, including Anne-Marie, the daughter of the shop where I bought electric and household goods, and occasionally went out to meals with them. I did not aspire to keeping a flat and a mistress in Douai like one of my brother officers, whose main worry after the Germans had pushed us back was that some fat Boche was not only using his mistress but was probably wearing his silk pyjamas and slippers as well!

Life settled into a routine and the defence line continued to be built up with concrete pill boxes, anti-tank trenches, and overhead cover for the field guns, and battalion defence positions which were tailor made for particular battalions. The E&M section and the workshops section spent a lot of time, energy and stores in strengthening Corps HQ, and were eventually able to withdraw the corps lighting set so as to have it ready for more mobile operations. All this work was of little use as the Big Plan was for the whole of the Corps, and the Army to move forward into Belgium when and if the Germans attacked. When we retreated most of this line was in the wrong position to make a stand as the Germans had outflanked it and different troops who did not know the layout were not able to make full use of it.

Our routine was shattered on the 10 May 1940 when the Germans started the *Blitzkrieg*. We hardly had time to say goodbye to M Dupont and moved up to support the Corps on the line of the River L'Escaut and found ourselves a few miles to the west of Brussels in a factory with very tall chimneys which we thought might be dangerous in the event of an air attack or shelling. I had been given a platoon of RASC transport for transporting defence stores, and was soon helping take explosives up to prepare various bridges for demolition. We then started the retreat back into France, and I was given the task of collecting defence stores from the French engineer depot at Lille to take up to one of the divisions. By the time we had loaded, the division had moved further back and the arranged RV was already in enemy hands. Luckily for me I was stopped just in time by the rearguard section of some battalion, who informed me that *Gerry* was only 400 yards down the road, so we managed to turn and get the hell out of it and try and find the Company again who had moved on back in the meantime. We were making our way through crowds of refugees who were straggling west, so I decided to load as many as I could on my vehicles and gave them some little help. Eventually we found the company near the place where Madamoiselle came from, Armentières, and the RASC vehicles were taken off me for more pressing supply duties. Information as to where the enemy or even our own troops were was scarce and at one village where there was a big bridge we were defending one end and some French troops were holding the other against an attack from both directions! I can well remember our very volatile French interpreter rushing into the room where the officers were sleeping at about 0300 hours and shaking the OC, Claude Parkman, (a well known civil engineer who had designed the Mersey tunnel and who had now taken over from Dickie Poole), "Quick Major Parkman we must move out — the Germans are coming". The imperturbable Parkman turned over, "Go to sleep Jacques, I'll do something about it when it is reported that they are at the other end of the bridge."

Orders were then received to proceed to Dunkirk and I led the company in an open fronted 15cwt compressor with a Boyse anti-tank rifle across my knee as we did not know what we might meet on the way or from which direction, not that I had much confidence in my ability to see off a German *Panzer*, as the weapon was really of little more use than an elephant rifle. We seemed to lead a charmed existence as we passed through villages which had just been dive bombed by Stukas, and not once were we attacked. On arrival at the outskirts of Dunkirk, which at the time was under Stuka attack, Parkman went forward to report to the Town Commander, taking with him a couple of

DRs. One soon came back with the orders that we were to empty sufficient vehicles to carry the whole company, who were each limited to only their large pack and rifle and to immobilize the remaining vehicles and to follow the DR down to the docks immediately. I emptied the first six vehicles, other than the special workshop lorries, and went down the convoy passing on these orders. As we could take so little with us, I was determined to take my best SD, breeches and Greenlee boots and to leave the Germans my dirty battledress, so on the side of the road changed everything even down to clean vest and pants! To get the last few men from the rear of the column on to the vehicles, we had to pull down the tailboards but with an assurance that there were no more to come, I gave the order to move off, only to realize that there was no room for me, so I somehow hung on the outside of the last truck. The last vehicle of a convoy always seems to travel at double the speed of the first, and ours was no exception as we drove hell-for-leather through the burning streets of Dunkirk; at one stage our camouflage netting caught fire but I knew if we stopped we would lose the other vehicles so on we went.

Eventually we reached the main quay, and embarked on the *Mona's Queen* an old paddle pleasure steamer on which I had returned from UK leave via Boulogne only a few weeks before. We made our way below and within a short time were moving out of the harbour. During all this the Stukas had kept away and only returned when we were some distance out to sea. We landed at Dover and entrained as a complete unit for the first of a series of relocation camps, but during the night the officers' carriage somehow got detached from the main body and we finished up at Camberley where we were provided with hot baths at the Staff College. After a lot of telephoning we found that our men had been sent up to a camp near Newark, and the train from Kings Cross left at 0200 hours the next morning so I was able to ring a friend's sister, who was nursing in London, and take in a night club on the way, still of course in my best SD, field boots and breeches and tin hat. The only trouble was that I was so tired that I kept on going to sleep between courses and dances. We were fortunate in arriving as a complete unit compared to almost everyone else who had come across the beaches and had been split up, so we were two or three stages ahead in the reforming process and therefore able to go home on leave immediately. So ended our "Phoney War", which was certainly not Phoney for the last few weeks.

Postscript Four years later in August 1944, as SORE II of 30 Corps, I found myself with Corps HQ camped near Arras behind the Guards Armoured and the 11 Armoured Divisions who were speeding north east — clearing only the main roads and towns, and having already reached Douai and Lens. With nothing much to do I set off on the Douai road to see if any of my old friends at Izel les Equerchin were still there. Turning off the road at the airfield at Vitry where we used to have Lysanders and Gladiators, I found a young French boy who said that the Germans had just evacuated Izel only an hour before, and that the road in was clear of mines; with him riding on the bonnet we drove into the village to find all the villagers and my old friend M Dupont waiting for the first allied soldiers to come and "liberate" them. He recognised me immediately "Ah — le Lieutenant Hamilton" and greeted me with the usual French embrace. The floorboards of the estaminet were pulled up and champagne produced. To have been the last British officer to leave in 1940 and the first to arrive in 1944 was something to celebrate. Hours later I drove on into Douai and had an omelette and more champagne with my friends in the electric shop. Anne-Marie had been machine gunned as a refugee on the roads south during the German advance in 1940, so sadly I was unable completely to renew my friendships of the "Phoney War."

World War Two — 1939 Letters

TOM BEAUMONT

In 1939 Tom Beaumont, went to stay at Brandenburg/Havel, near Potsdam, in Germany with relations of his family, Alfred and Hanna Kummerlé. Alfred Kummerlé owned a wool-spinning factory at Brandenburg and had an English mother. His only son, Herbert, was later killed while serving in the army.

Later Tom Beaumont joined the Corps, and served throughout the war with the Bengal Sappers and Miners in India, Sudan, Eritrea and Burma. After the war he became a solicitor and is now retired, living in Sussex. His accounts and photographs of the various campaigns in which he took part are now lodged in the RE Corps Library.

Tom Beaumont's early letters home and one from Frau Kummerlé, capture so well the atmosphere of the country preparing to go to war, that we publish them here with his permission.

Lewes, 3 July 1939

Dear Daddy,

I ought to have written to you a long time ago and apologise for the delay. But since I got back from Germany I have spent the whole time packing things and unpacking things and moving them from one place to another, and I am not settled yet.

It was very interesting to see Germany at this time, and I am very glad I went. My affection for the country generally and my respect for certain aspects of the present regime is certainly no less, but there is no doubt at all that the pleasant aspects are accompanied (perhaps inevitably in view of the state to which Germany sank after the war) by many very unpleasant ones, and these are not yet decreasing.

Externally I fear there is very little hope of peace... logically none at all. Germany is quite clearly making it a point of National honour to recover large parts of Poland and Danzig, and also eventually her old colonies. In the same way we are making it a point of national honour to stop her... at any rate to stop her doing it by the methods which so far are the only ones which she has been able to make successful. Germany is in the position of somebody who has been knocked down in a street brawl. We have missed the chance of helping her up and dusting her coat for her (which I am convinced would have been the best way of securing permanent peace) and she is now getting herself up and dusting her coat, and admittedly doing it in a rather sullen and threatening manner. There is no great wrong, as I see it, on either side... just hopeless incompetence more or less evenly distributed on both sides.

Alfred K says war is quite inevitable. He says "As in 1914, so now, England will not realise that Germany cannot be kept down, and that Germany intends to and can expand without hurting England in any way". I think he is more or less right (he admits that Germany is going about the business, as before, in a tactless and not too convincing manner). At any rate I respect his views as he is in a better position than anybody I know to give an unbiased opinion. His *Observer* and other weekly papers from abroad are read from cover to cover, and he says that they have never on any occasion been stopped in the post.

I think I can see the position and the hopelessness and incompetence which have brought it about fairly clearly. But I don't quite see what, given the present circumstances, our government could do beyond what they are doing. The first shot in the coming War was undoubtedly

WW2 -1939 Letters

the creation of the iniquitous Polish corridor. The second shot was our recent guarantee of Poland: we guaranteed an admitted and glaring injustice and circumstances prevented our putting forward any suggestion as to how the injustice could be rectified without force. Those "circumstances" were Hitler's responsibility... in that he walked into Prague at precisely the moment when he should not have done so.

Our recent Policy has been based on the idea that Germany will climb down, which she can't and won't, and theirs on the idea that he will climb down, which we won't and (now) can't.

The German people are in much the same depressed state as we are... making all plans subject to there being no War... and trying to be cheerful and carry on as if there was no bogey just round the corner. There is no hatred (they all admit that their papers are nothing but lies) but just a rather tragic acceptance of what seems to be inevitable, coupled with a pathetic interest in the prophesies of various astrologists and sooth-sayers who say there won't be a War.

It is this personal knowledge that so many Germans are thinking and acting just as we are, and regarding the whole chaos in such an unbiased manner, attaching no great blame to anybody or any country in particular, which makes the whole business so sad. But if the worst comes they will regard it as their duty to fight to the last ditch "for Germany" as we will "for England".

The Kummerlés were kinder than it is possible to imagine... and Lord knows what he didn't give me in the way of expensive cameras and photographic apparatus. He admits he is richer than he has ever been (he told me that he would comfortably be a millionaire in England) but they live very simply in their cottage by the lake, and they are always entertaining numerous friends of all types, so that nothing could be pleasanter than staying with them.

I could meander on like this for ages but have no more time. It takes too long to put all these things in writing as they should be put, but if you wade through this letter you will understand some of the things I am thinking about.

I am thinking of joining the local sappers down here... most of the clerks and people in the office are in them and they are a good lot... and I have neither the chance nor the desire to get a commission at any rate for the present. I hope you are having good fishing. Love to Uncle C. Mum is now at Burwash... Auntie D and Pam and Jeremy and I drove her over for lunch on Sunday and she is staying till Thursday.

Love, *Tom*

I ought to add that both Alfred K and others I met admit that Germany can **not** win the War in the long run!!!

Lewes, 31 August 1939

Dear Mummy and Daddy,

Thank you for your letter. It was a shame you had to come back early from Scotland. By the way how did you (Mum) get on with my little camera? Remember that if you decide you don't want it I hope you won't hesitate to say so, as Pam does.

I have just listened to the 9 0'clock news, and must say it was not very encouraging. It looks as though we shall be called up tomorrow. I gather we shall be billeted in Seaford for a time, though of course nothing is certain. How many children have you got? Are they with or without mothers?

I have just finished the book which Alfred K gave me, *Germany's Revolution of Destruction*. It is very deep and intelligent and I think it would bore you, but if you get a chance you ought to read the last two chapters. It has certainly altered my view of things, although much of it was beyond me.

The author says Hitler is leading a revolution of world destruction with a view ultimately to setting up a sort of world domination by Germany in which England and Italy and Russia are to be junior partners. Having been one of Hitler's admirers, and being still a fervent German patriot, he is forced to admit now that Hitler is pursuing a worn-out policy of refusing to compromise, and he prophesies terrible disaster for Germany, war or no war. He says Hitler quite openly admitted to him in conversation that he would be quite prepared to enter into a formal undertaking one day and break it the next if it were in Germany's interest to do so! He says Hitler has amazing powers of cool deliberation mixed with brilliant intuition: that he deliberately puts forward demands which are preposterous, induces the other side to be reasonable, and then increases his demands: and that because the sobriety and desire for Peace in England and the other older countries has enabled him to succeed once he is perfectly confident that he can do the same again now as he did before. He says again that Hitler shows some of his brilliance in refusing to define a Policy, but that he seizes every little chance of picking the existing order

(such as it is) to bits, doing the damage and pretending it was all part of his plan when he has done it... in short that he is out to promote and maintain unrest, and will carry on on that tack until he has secured the world chaos he wants for his scheme.

It is impossible to summarise the conclusions reached in the book, but I am more than half convinced (coming as they do from a patriotic German who was a leading Nazi till very recently) that unless we can drive Hitler to a very crushing surrender now, War now is probably a good thing. If only, oh if only, though, we can be wise enough to follow it with a peace treaty which is less asinine than Versailles. If you knock somebody down in a street fight, however much in the wrong he was, your one chance of securing decent relationship with him in the future and of healing any grudge is to help him up and dust his coat. It is the same among nations. The present regime in Germany is the logical consequence of Versailles and of our obstinacy in refusing to revise Versailles in the 1925-1930 period. Without the solid background of the righteous Versailles grievances Hitler could not exist.

To revert to the book. Rauschning the author, says that Hitler's trump card, which he nearly played last September and which he will certainly play if he gets into a difficulty, is a Russian Alliance. How good the prophesy, but how mediocre the trump now that is played!

I am sure the danger of War is far greater now than it was last year. But thanks to the despised Chamberlain, and apart altogether from the material fact that we are stronger, I for one am not half so miserable as I was last year because I am far more confident that we shall be fighting for a cause which can be justified. The only pity is that we shall be fighting Germany, a country of which I am and shall remain immensely fond.

One can't work in the office these days, and in fact it is almost impossible to DO anything when one can't look ahead more than about a couple of hours. It has been bad enough during the last year when one could not look ahead more than about a couple of weeks. Even I now feel myself being swept off my feet into hoping something will happen to clear the air soon, even if it is War. A week ago I should not have thought that was possible. It is a dangerous reaction, and not I fancy what Hitler intended to be the outcome of his "war of nerves".

Last September I was hoping and hoping the Government would swallow their pride and try to be fair to Germany. This time I am rather apprehensive lest they should now bow too much to Hitler. How odd it all is. I am afraid Hitler has set far more stones rolling down the mountain side than even he thought he would.

I repeat what I said before that I don't think much of our so-called civilisation can survive a War today for very long. I don't suppose that any invested money, unless perhaps it is invested in something tangible such as agricultural land, will be any use at the end of this War. I wish I was a skilled craftsman or a doctor and not a lawyer who depends and will always depend upon the more unsatisfactory features of civilisation for his livelihood. I hope I am wrong in all these gloomy forebodings.

Keep this letter it might be of interest later on!

Best love, also to Aunt W, *Tom*

Brandenburg H, 12 September 1939

Dear Edith, (Tom's Mother)

Thank you and Tom so much for the book you sent me. I was away in Switzerland till the 23 August and found it at home. Herbert came home on the 25 August and went away on the 26 again. He is somewhere on the front, we had news from him only once up to now. That we should live to see another war! The girls are well and the baby. Son-in-law is away too. Let us hope for the best, my dear.

We all here send our love to you all.

Yours affectionately *Hanna*

(Frau Kummerlé, *Mailed from Rotterdam 15 October 1939*)

Gravesend 29 September 1939

Dear Mummy and Daddy,

Thank you very much for your letters.

Well, I am still alive, though I doubt whether I should be if I had not purchased large quantities of extra food outside the mess. The badness of the feeding is incredible — I think it is even worse than New House Repton, which is saying a lot. Breakfast has on more than one occasion consisted of bad mashed potato, bread, and margarine, and tea and nothing else! The tea is made with sickly artificial milk out of tins — and you can't get it without milk. As for lunch the first course has been the same everyday we have

been here — miscellaneous stewed meat (? horse), bad unskinned potatoes and either cabbage or dry beans. The sweet course is alternately prunes or sickly tinned peaches — and nothing else. Tea consists of bread and margarine — occasionally a little butter and jam. And as for supper (so-called soup), I understand that yesterday evening 5 out of about 450 men in the barracks turned up to look at it and 4 went out without even tasting it.

It matters little of course to me as I can afford to buy my own food — but how those who are married and have to rely on their 2/- day can stick it I don't know.

The officers of course feed in their own mess on separately cooked food. This is of course dead wrong — except if they are entertaining distinguished visitors: they should eat at a sort of high table on the same food, at a Cambridge college. One sees these things so clearly if one can (metaphorically) change ones spectacles as I am doing at the moment. The men are really an excellent lot and such grumbling as there is — and it is astonishingly little — is remarkably light-hearted and tolerant of the acknowledged difficulties of the officers and of the powers that be generally.

So much for the food. The barracks are now much cleaner, though of course there are few comforts. I have been in the office a certain amount — mainly trying to operate an archaic switchboard which connects the various telephones in the barracks. It was and is a monotonous and unpleasant job but perhaps I have escaped far more unsavoury ones. The sergeants are on the whole remarkably careful at trying to fit the right man in the right job — and I am told that our Sergeant Major (a delightful person, who went through the last War) has said that I and the other 2 people who have been doing shifts at the same job as me are far too good for the job — in fact "we are the best 3 men in the whole division — and he is not going to have us wasted there, officers or no officers!" Of course I can't vouch for that however.

I am glad Daddy mentioned me to Sir Edward le Marchant. I don't really think I could have got a Commission straight off, as I did not get Cert A (I failed one part at Repton and was sick when I should have taken it the second time), and I don't think it would have been much use my going up to Cambridge as I never had anything to do with the OTC there, believing in my folly that there would and could never be another War and that playing at soldiers was just a waste of time.

However I am toying now with the idea of writing to our Major — a Brighton builder (not too high class) whom I am rather inclined to like — setting out what qualifications I have and asking his advice as to whether I should apply for a Commission and if so how. I don't think he will be able to advise me to apply but if he does I am sure I shall not be able to get an RE commission, as I don't know enough. However I should have to lump that. I don't really want a Commission badly, but I do certainly feel that I might well be making more use of myself than I am at the moment. I have come to that conclusion only after observing the short-comings of some of the younger officers I have come across whilst serving in the ranks.

I don't know how much influence Sir E le M has with the War Office, but the more the merrier. If I had to leave this Coy — which I don't want to do — I should of course prefer to join Richd if that is likely.

Gravesend is a rotten hole, and I rather fear we shall be here for ages, though there was a rumour that we might be sent back to Lewes or Seaford if we were sent anywhere. I like watching the ships in the Thames if I get the chance. I notice all our merchant ships have been painted grey and armed. There are swarms of Dutch boats coming in and out, clearly marked "Holland", and one or two contraband-carrying prizes have been brought in.

Well I must stop. I don't see much chance of getting leave for a bit, but I might be able to work a short weekend in about a month's time if you could spare the petrol to meet me at Newark. Have you put the Vauxhall up in favour of R's "Woeful"? It would save tax and petrol wouldn't it?

Love, *Tom*

Aldershot, 9 November 1939

Dear Mummy and Daddy,

The address will no doubt surprise you! I was told at 11.30 pm on Tuesday evening — being on duty till 1 am as Regimental Orderly Sergeant — that I had to report (with one other from our Coy) at Aldershot at once. So here I am and that is about all I know.

This is an RE officers' course and of course they may consider me not sufficiently qualified for that. But if I stay I gather the course is a

5½ month one, and very thorough. I don't get a Commission until the end of it of course and then only if I am good enough. But it is what you (and I) wanted now — the only snag being that I am afraid I shall not now get my week's leave before Xmas. I might however get over to Liphook now and then at weekends.

The "Barracks" are a colony of militia huts in a pine forest — brand new and very nice and clean and warm and (even I say it) quite attractive. Lovely hot water and baths and apparently good food. There are a number of young officers on the course but the majority of the cadets are ex-NCOs — a mixed crowd, some very Public School indeed (Artists, Rifles, HAC, Inns of Court etc) and some very competent and superior Territorial NCOs — in fact largely the cream of the ranks, and also of the 1st batch of Militia.

I have not had a chance to observe much more, but will write again soon. There are obviously more comforts here than I had at Gravesend. The only snag I can see so far is that it is about ½ an hour's walk from Aldershot — and no buses — but that is not too great a disadvantage.

You asked if I wanted anything. A home-made cake (not too dry and crumbly) would go down well now and then, I think. Apart from that I don't think there is anything. More news when I know more!

Love *Tom*

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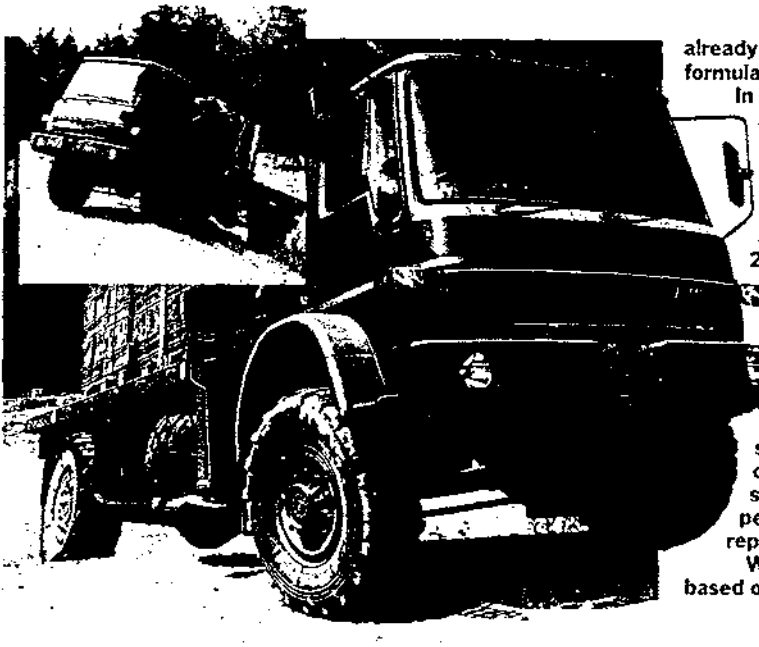

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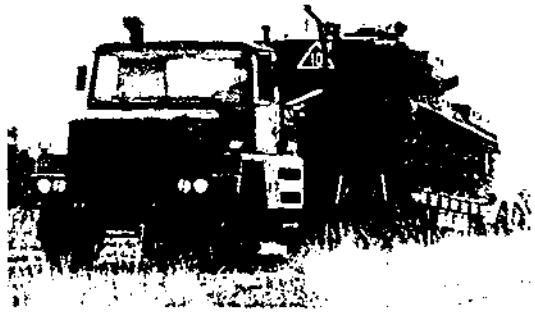

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World War Two — 1939 Letters

MARTIN HOTINE

Martin Hotine was commissioned into the Corps on 6 June 1917, just before his nineteenth birthday. He wrote long letters to his family throughout his army career (some to be published in future Journals*) and the following are extracted from those written when serving with the British Expeditionary Force in France — September 1939 to January 1940. He later became a brigadier and was Director of Military Survey during 1941-46 (See article "Wartime Director of Military Survey Honoured by London University", this* Journal*). On 1 September 1939 Major Hotine was serving at the Ordnance Survey, Southampton, but holding himself in readiness to be posted to France should war be declared. He had already taken his wife and three children out of Southampton to stay with friends in the country — everyone believed that English towns would be bombed as soon as war began. By deliberately misunderstanding an order from the War Office, he got himself on to the forward party of senior officers sailing for France on 4 September, and so was there before the BEF. Mrs Hotine kept all his letters home from his arrival in France until just after his first leave in January 1940.*

Although restrained by censorship — about which he had some amusing things to say — he still described such things as life in the French village where the (Survey) unit was billeted, both for the British and the French; a visit to Paris; the visit of Lesley Henson with an ENSA party; listening to the BBC and getting English papers; Christmas on 'active service'; the excitement of going on leave, and fear it might be cancelled — it was, but only for a few days.

The letters from home were not kept, but his replies give a good idea of what was happening in Britain. Matters were not helped by the fact that his allowances for being in Southampton were lost before the War Office got around to paying active service allowance, so there was less money to manage on, to add to other problems. His feelings about the war generally, whether it would be long or short and about the Germans, are a personal comment on the events — or lack of them! — at the time. He shared the tremendous enthusiasm to get on with the war prevalent at the time, though the letters also show that there were those at home in particular who were taking advantage of other people's problems. Although he got on with the French — he spoke excellent French — he was well aware of the tensions between the allies, which were exploited by the Germans.

We are indebted to his daughter, Margaret Hotine, for letting us publish extracts from his letters, for editing them and providing the background information.

Somewhere in France, 8 September 1939

My own darling Kate,

I expect you will have heard from someone that I had to push off in a hurry, but may otherwise wonder why I haven't written and what has happened. Arch Clough† had to report to the War Office on Black Saturday (2nd) and I knew that he had to embark on a destroyer with a party of other very distinguished officers shortly afterwards to initiate some arrangements for the reception of the Expeditionary Force. On Sunday, a laconic movement order arrived at Southwick for "one" officer to embark next day by destroyer. I realized this must be intended for Arch and that the first move in the Round Game was accounted for by the fact that the people who issued the movement order weren't the same as the people who had first moved him up to London, thereby cancelling his appearance according to plan at

†Brigadier A B Clough, CBE MC SGM, who died in 1989 aged 100. His memoir appears in this issue

WW2-1939 Letters (2)

Southwick. However one obeys orders if there is no good reason for doing otherwise; so "one" officer from Southwick duly presented himself with kit at the destroyer. I reckoned that I could at least get in a word with Arch on one or two matters, give him the balance of his kit, and hand over the movement order in case he wanted it. At best I could edge on to the destroyer as well, and get over here, where I could be more use than falling over everyone else at Southwick. I duly met Arch, who seemed quite pleased at the latter prospect. There was of course the usual air of inconsequence about any show which the British Army tries for the first time, and I had no difficulty whatever in joining the glittering throng aboard.

There is a considerable air of secrecy about the whole outfit; which, in view of the natural aversion of glittering throngs from being bombed or torpedoed, is natural enough. However, the wives of all other officers in the outfit know there is such an advance deputation in France, so I see no reason why you shouldn't. But don't splash the information about too much. We were clapped below decks on the destroyer and only allowed up when out of sight of land. We have strict orders not to divulge to anyone by any means (such for instance as sending a post-marked letter through the civil post) where the party is located. So the only way I can write even now is to take advantage of an official trip to Paris (where we are NOT located) and to post there. However, I don't expect to be going there again just yet, so you won't get another letter until a Field Post Office is opened, which may not be for some weeks. Until then, also, you cannot write to me. *C'est la guerre!* The alternative would be to broadcast our whereabouts, even into the ears of the possibly omni-present Boche agent in which case the Boche Air Force might well have a crack at quickening promotion into the higher ranks of the British Army and also dislocating the concentration of the Expeditionary Force by setting all the paper alight.

There has been plenty to do since we arrived, though I can't of course go into any detail. We are well ahead with preparations as a result of two heads and four hands on the pumps. Arch is a delightful bloke to work with on a clean sheet with no clerks to stir up trouble. We are both very fit and enjoying it all immensely. *Voila tout.*

France seems to be getting down to the prospect of war with her acquired resignation. There are no men and no horses (all are mobilized); and the women are settling down grimly to do the work of both. We in our island have no right to complain of inconvenience. Here no-one complains but all hope that Hitler and Co will crack soon. The proprietor of a small café where I stopped for lunch yesterday told me he had spent nineteen years in England. I told him jocularly that in return I expected to spend the next nineteen years in France. He was not amused. All the same it is difficult to see what master-stroke can turn the wishful thinking of a few-months-war into fact.

I should pack the house into store and give notice before the end of the month. According to present regulations I lose about 2/6d a day compared with Southampton and have to pay out about another 6/- for messing here; so we shall be very close to the bone while that lasts. In time I don't doubt the benign British Government will cease to fine officers for going on action service and will weigh in with field allowance and maybe separation allowance, possibly with retrospective effect. But I doubt that will be inside three months; meanwhile sit back and don't worry.

Well, darling, I must shut down now. I do hope you and the kids are fit and shaking down well in new surroundings, and am longing to hear from you. But meanwhile I daren't think too much. There is no occasion at all to worry about me. Love to all, Your very own, Jack.

Survey Directorate,
GHQ, c/o Army Post Office,
23 October 1939

You asked about our accommodation etc here. Well, of course, tiny French villages don't run much to gin palaces and hardly any of them have an empty, swept and garnished Hotel Magnifico standing by until the population is suddenly trebled with brutal and licentious soldiery. But all the same we contrive to be fairly comfortable. I have a room in a farmhouse containing anyway a bed, and have not so far had to put my camp bed into commission. Our offices are in the same building and we have contrived to get and to fix a stove. We are better without carpets on the floor in this mud; and curtains and aspidistras would only get in the way of the black-out frames. As a mess we have a small room at the back of the one small cafe and Madame la Proprietere cooks most excellently for us. There are just the five of us but plenty of good cheer. Our rations are very good and for

the present are easily supplemented with such things as coffee, fruit, sardines and even that masterpiece of the French cuisine — the omelette. But oddly enough eggs are scarce, although the fowl population of the village must run into hundreds; maybe the hens have gone on strike for the Winter or the War. In the same strange way milk is not abundant, because it pays better to turn it into butter.

The men are reasonably well housed in the village hall. Some necessarily have to put up with barns, but I imagine (and hope) that huts will be built before long. To begin with there was nothing in the way of cooking, washing and latrine arrangements for such an influx but we soon attended to that without having to call in the Engineers(!!!). A little timber, sacking and corrugated iron go a long way; and we were able to get a very fair share of these early by undertaking to do the work ourselves. These matters are of course much easier to attend to in a unit, with a lower proportion of directing brains to ham fists; but there wouldn't be much point in life if it consisted solely of pressing buttons.

The main difficulty is still bathing. There is one bath only in the village — my canvas one — and that does duty for all officers. My own duties take me frequently (say once a fortnight) to dizzy heights of civilization where I endeavour to teach our noble and gallant Allies the rudiments of surveying as applied to their own country; and on these occasions I contrive to get two baths in under thirty hours. There are plenty of women around who are prepared to wash clothes; in fact the sheer normality of women and pleasant children around is the most abnormal feature of this abnormal war.

Survey Directorate GHQ, BEF,
3 December 1939

YOU really mustn't bother about sending me cakes and chocolates. Already in this life of ease and luxury I am getting fatter than ever. And it is best to leave to the imagination the remarks in this Mess when I produce a cake and start cutting it with a sword. It is difficult to give you a true picture of life here without offending the censor, but at any rate we do not lack food and drink and you must not use up precious butter and eggs on any other assumption ...

...Meanwhile the longer the War goes on and the more it boils up, the greater the legacy of misdirected hate. Nowadays we have to contend against a fourth — or is it a fifth? — Arm; wireless propaganda. I am not sure, but I think the Germans may be pastmasters at this. They shoot across a puerile line in English at us via Lord Haw-Haw and we are led to under-estimate it. At the same time they tell the French soldier that he is a fool to risk his life at our bidding while British troops have a cook's tour of the Continent and sleep with his wife. It is folly to under-estimate this. In our insular consciousness of virtue, we put it down as more Haw-Haw tripe, but is it?...

I had some trouble in this village because a bunch of chaps who hadn't much to do during the day wouldn't clear out of an Estaminet when the worn-out French woman who had been up before sunrise wanted to shut down. Technically they had disobeyed an order and I suppose I ought to have punished the lot. Instead, I invited them to put themselves in the position of her husband in the Maginot line; and to imagine *their* wives trying to carry on a small business at home in spite of a bunch of lousy foreigners who delighted in making matters worse. Half a dozen sheepish individuals have been washing up for her ever since, though they don't realize I know this. Hardly any of these chaps were soldiers three months ago, and none of them has been outside England before. But they are the salt of the earth and it would be better for the Boche to shoot them than to malign them.

Army Technical School (Boys) Royal Engineers Fort Darland 1939/40

MAJOR G YOUNG MBE MBIM

George Young enlisted as a Darland Boy in February 1939 and was trained as an Apprentice Fitter A3. He was posted to 1st Airborne Squadron in Palestine, where he was Mentioned in Dispatches, and eventually became the SQMS at the age of 23. The OC(EOC) and 2IC(GSH) were also 23! The oldest man in the Squadron was the SSM who was 25. He served with 9 Independent Parachute Squadron in Hameln, 131 Airborne Engineer Regiment TA, 35 Regiment in Cyprus, and 30 Squadron for Suez in 1956. In 1959 he was the first RSM of the new Regular Training Regiment. In 1962 was posted to 43 Wessex Division Engineers and in 1964 was commissioned. In May 1967 he joined 10 Field Squadron in Aden, then to BAOR with 65 Field Support Squadron, and on to OIC Stores Park 62 Squadron, Cyprus where, during the Turkish Invasion in 1974, his workshop built among other things 50 seater latrines for refugees. In 1975 he was posted to Willich as OC 303 Stores Park where he was awarded the MBE. Major Young retired in 1977 and went to work for Fairey Engineering. In 1979 he moved to work for Southern Water Authority in Kent and finally retired for health reasons in 1985.

In 1938 the Army began a vast mechanization programme. It is hard to imagine nowadays that at that time much of the Army's equipment was only just moving away from the horse-drawn wagon.

To overcome what was obviously going to be a problem in future years the Royal Engineers proceeded to increase the number of Apprentice Tradesmen entering the Corps. Up to this time there had only been a company of RE Boys based at Kitchener Barracks, Chatham, and a small group of Boys at the Mounted Depot, Aldershot, who were then in the process of converting to Mechanical Transport.

The new intake was to comprise some 600 Boys who would obtain a place at the Army Technical School for Boys at Darland, Gillingham, by taking a competitive examination in Mathematics, English and General Knowledge to a very high standard.

In December 1938 the first Darland Boys arrived in Chatham and were temporarily based in Kitchener Barracks. These first Boys were from India, Egypt and one from China where their fathers were serving, and came home under the pre war trooping system. Finally 30 boys were assembled at Kitchener Barracks and at the end of March 1939 were marched by LCpl Topper Brown, the man NCO IC Darlanders, to occupy Fort Darland.

The camp was a standard "Spider Camp" which some years later was to become Gordon Barracks. However, in addition to the barrack rooms there were new workshops which were classed with the most modern in the country, classrooms for academic as well as technical training, gymnasiums and a church. The trades ranged from fitters and electricians to carpenters, bricklayers, blacksmiths, tinsmiths and painters, all of whom were urgently needed to help the Royal Engineers carry out their world wide role.

In March/April 1939 A Company was formed and 275 boys arrived, followed by 300 boys to form B Company in July 1939. Darland was now going flat out on its training programme under its first Commandant Lt Col (later Brigadier) R D B Perrott DSO OBE MC who was killed at Alamein in June 1942. Locally they were known as the Darland or Belisha Boys and both the national and local press took many pictures of them, including the partaking of their morning milk ration, a beverage that was to change over the years.

In May, 1940 the Boys were sent on extended leave because the barracks were needed for the returning British Expeditionary Force who were being evacuated from Dunkirk, and then in September 1940 the Darland Boys began reforming at the Army Apprentice School at Chepstow. Before they left Chatham their numbers had been increased by the M Company or Depot Boys and a group of Royal Artillery Artificer (tiffys) boys.

By mid-1941 the first Darlanders were posted to the ranks to commence their man service, and in the next six years were to be spread world wide.

In 1981 the Darland Boys held their first get-together which developed into an annual Reunion. Over the years the paths of the Darland Boys diverged. Some were commissioned and others sought their fortune in civilian life. Counted in their numbers are Chartered Engineers, Members of Professional Institutes, several have obtained degrees, and others military ranks up to Lt Col. Sadly there has of course been a reduction in their numbers through death, some killed in action and others through ill health.

To date many of the Boys have been traced and we express our gratitude to the Controller REA and PB7 who have helped us in our search, and to many other individuals who have assisted us in reuniting the Darland Boys. In Boys we now include those members of the staff who were responsible for our well-being in that so important first 12 months of our Army lives, our widows, and children of both Staff and the Boys themselves.

In 1989 we celebrate 50 years of being soldiers of The King and Our Queen.

Royal Engineer Geologists and the Geology of Gibraltar
Part I — Tunnelling Through the Rock

COLONEL E P F ROSE TD MA DPHIL MIWEM FGS and
CAPTAIN M S ROSENBAUM RE(V) BSc PhD ARSM DIC EurIng CEng MIMM FGS

Both authors hold first class honours degrees in Geology, lecture in the University of London, and serve in the RE Specialist Advisory Team (V). Ted Rose graduated from Oxford, and transferred from the Geology to Zoology department for his doctoral studies, thereby relinquishing award of the Burdett-Coutts prize of the University. He developed specialist expertise in Tethyan (Caribbean-Mediterranean-Middle East) limestones, and is now Senior Lecturer in palaeontology/stratigraphy at Royal Holloway and Bedford New College. Mike Rosenbaum graduated from Imperial College London, receiving both its Murchison and Watts Medals, and later returned to doctoral studies at the College after several years in industry. He developed specialist expertise in engineering geology, and is now a Lecturer in engineering geology at Imperial. This is their first joint paper, but both authors have received awards for individual articles in the RE Journal.

Introduction

Sappers and Gibraltar have long been associated with one another. 1772 saw the establishment on the Rock of a Company of Soldier Artificers, one of the parent units of our present Corps. Sappers in varying, sometimes considerable, numbers have served there continuously through succeeding generations to the present day.

The Rock is such an obvious physical feature, and it occupies such a relatively small area, that one might reasonably assume that the geology of Gibraltar quickly became well and accurately known during this long association. However, such is not the case. This is even more surprising when Gibraltar's regional setting is considered. The Rock stands near the junction of the continents of Europe and Africa, and close to the boundary of the Mediterranean Sea with the

Colonel E P F Rose and Captain M S Rosenbaum
Geologists and the Geology of Gibraltar

Atlantic Ocean. It thus lies in an area of particular interest, fundamental to the interpretation of the geological evolution of the western Mediterranean. Yet only one detailed geological map of Gibraltar has been published, and preparation of that dates from 1876 (with a descriptive account published in 1878). During the subsequent 100 years, Sappers have proved that the map and its interpretation are in some respects very significantly flawed, but their work is largely unknown, and therefore not available for use by the international scientific community. It is time this omission was corrected, so that the geological jig-saw of the Straits of Gibraltar region can be more accurately pieced together.

Two former members of the Corps above all others laid the foundations for a modern interpretation of the geology of Gibraltar during their service there: A L Greig and G B Alexander. Alan Launcelot Greig was the first of these. His achievement was remarkable because it was undertaken during the constraints of the 1939-45 war, and, quite exceptionally, whilst he "enjoyed" only the rank and pay of a Sapper. Alan Greig died recently, in the late spring of 1988, so this analysis of his work is intended as a timely tribute to a man who "opened up a new chapter in geological research in Gibraltar" (Bailey, 1952).

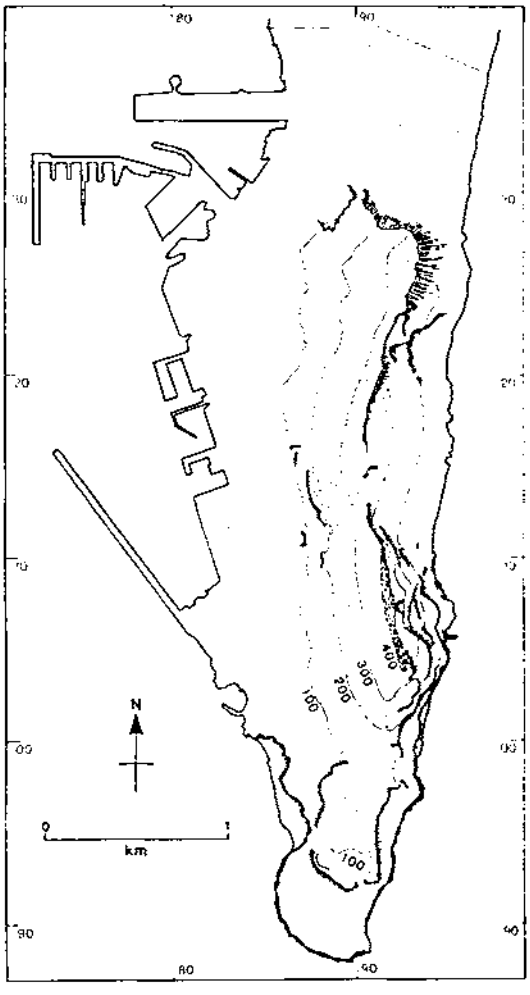
The Shape of the Rock

Gibraltar is only some 5.8 km² in total land area. It forms a narrow peninsula 5.2 km in total length and 1.6 km in maximum width, jutting southwards into the Mediterranean Sea from southern Spain.

Topographically (*Figure 1*), the peninsula can be described in terms of three parts. From north to south these comprise:-

The Isthmus (otherwise known as the *North Front*). A narrow neck of low-lying land, at most some 3 m above sea level, joins northern Gibraltar to the Spanish mainland. The Gibraltar airfield has been developed on this flat isthmus, which extends from the sheer North Face of the Rock northward for some 800 m to the frontier fence of the British Lines and beyond into Spain.

The Main Ridge (otherwise known as the *Summit Ridge*).From the North Front southward for nearly 2.5 km, the Rock of Gibraltar forms a sharply ridged crest rising to a maximum height of 424 m above sea level. High points are at Rock Battery (412 m), Signal Hill (385 m), south of Spyglass Battery (424 m), and O'Hara's Battery (416 m). In east-west profile the ridge is asymmetric. The eastern side slopes very



KEY (metres above sea level)

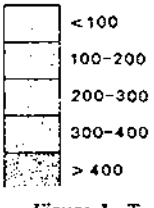


Figure 1. Topography of Gibraltar: contoured at 100m intervals above sea level, cliff lines hatchured. Based on Gibraltar Town Plan 1:5,000, map series M984 Edition 5-GSGS. Co-ordinates shown are those of Universal Transverse Mercator Grid, grid zone designation 30S, square identification TF (north) and TE (south).

Photo 1. View of Gibraltar from southeast. Southern Plateaux in foreground; the lower sports field is on Europa Flats and the darker area above comprises Windmill Hill Flats. These are succeeded northwards by the Main Ridge with its gentle dip slope to the west contrasting with the steep scarp to the east. A major fault zone (the "Great Main Fault" of Ramsay & Geikie) runs along the contact between Windmill Hill Flats and the Main Ridge, from the South Mole breakwater on the left across to the small promontory below Hole-in-the-Wall on the right. Finally, the low-lying isthmus of the North Front which joins the Rock to southern Spain can just be seen behind the farthest point of the Ridge.

steeply down to the sea. The lower parts of this slope are moderated by scree breccias (of angular rock fragments) and windblown sands, but the limestone cliffs above are nearly vertical. Much of the upper part of the eastern slope has been covered with corrugated iron sheets to form a rain-water catchment area. In contrast, the western slope is less steep., Midway down the western slope there is a north-south trending cliff-line, possibly a relic from a time when sea-level was significantly higher than at present. The lower parts of this slope are covered by sands, and it is on this lower slope and along the western coastline that the city and dockyards of Gibraltar have been constructed.

The Southern Plateaux. South of the Main Ridge, the Rock slopes steeply down to the Windmill Hill Flats, which is a flat plateau inclined gently southwards from 130 m down to 90 m above sea level. This plateau is bordered further south by a second abrupt slope which leads down to the Europa Flats plateau, inclined further southwards from some 40 m down to 30 m above sea level. Steep cliffs fringe this plateau where it abuts the Mediterranean Sea.

These very obvious topographic features (*Photo 1*) all have a geological origin, and provide a key to understanding the geology of the Rock.

Early Geological Surveys

The first "mineralogical" description of the Rock, in 1798, had a military author: Major Ninian Imrie. Subsequent publications, however, were essentially civilian in origin. The earliest volumes of the *Quarterly Journal of the Geological Society of*

Geologists and the Geology of Gibraltar

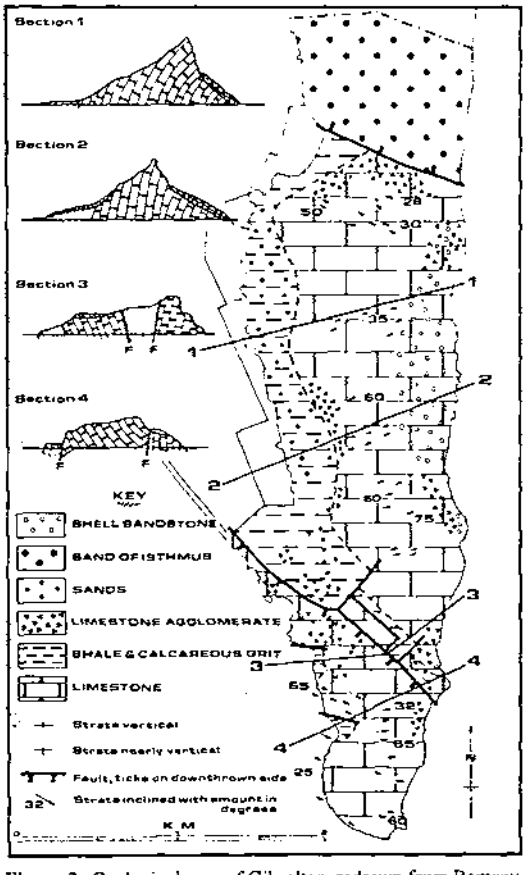


Figure 2. Geological map of Gibraltar, redrawn from Ramsay & Geikie (1878) but retaining their terminology.

London, the world's oldest geological society, carried observations in 1845 and 1846 on the geology of Gibraltar by James Smith. Numerous other publications relate directly or indirectly to the geology of Gibraltar, but nothing more of substance was published until 1876. In 1876, a coloured geological map at 1:2,500 scale was produced by the Geological Survey of Great Britain as the result of a detailed survey by Professor A C Ramsay and Dr J Geikie. In eight sheets, this hand-coloured map in the Survey's Library is the only detailed geological map of Gibraltar ever made publicly available.

Ramsay and Geikie had visited Gibraltar earlier in 1876, at the request of the Colonial Office, to conduct a joint survey in order to assess potential groundwater resources. From their subsequent report, it seems that they spent at least three months on Gibraltar making a detailed geological survey of the ground. Ramsay (1877) then reported specifically on groundwater, but they jointly produced the geological map and the descriptive account subsequently (1878) published to amplify it.

The geological map is very important. First, because it is the only detailed geological map ever published for Gibraltar, and therefore even today the only such map generally available. Second, because in the town area especially, it records observations on rocks now obscured by building development or else removed by quarrying, and so no longer visible. Third, because the map has been accepted as definitive by many later authors dealing with the adjacent areas of Spain and Morocco, and has as such influenced regional geological interpretations. Even later geologists working on Gibraltar itself (A L Greig, E B Bailey) accepted the position of its main rock boundaries without revision. A redrawn but unrevised version of this map, incorporating cross-sections to show the geological structure of the Rock copied from Ramsay and Geikie's (1878) account, was produced by the Ordnance Survey for use on Gibraltar and formed the basis of geological assessments at the start of the 1939-45 war. Internationally, the most widely available version of the map is still that at 1:31,680 scale (ie 2 inches to 1 mile) which illustrates Ramsay and Geikie's (1878) published article.

A simplified version of the Ramsay & Geikie map is given here as *Figure* 2, together with 4 of their 7 cross-sections. Their map shows two types of bedrock:-

Limestone. From their map, cross-sections and 1878 account, Ramsay & Geikie clearly believed limestone to be the basement rock on Gibraltar. In their account, they dated it as Jurassic in age (ie about 200 million years old in terms of a modern time-scale). Limestone strata are shown as highly inclined (ie dipping, in geological terminology) to the west in the Main Ridge area, at angles of up to 60° or 75° to the horizontal. In the Southern Plateaux, the dip is also very high (up to some 65°), but in an *easterly* rather than *westerly* direction. The asymmetry of the east-west profile in the Main Ridge clearly reflects the westward dip of the Limestone strata in this region: the relatively gentle dip slope to the west contrasts with the steeper scarp slope to the east. The shoreline in the town area has been eroded into relatively weak shale, and lacks cliffs,

whereas around the Southern Plateaux the shore is formed everywhere by relatively resistant Limestone, therefore now eroded into steep cliffs.

Shale and calcareous grit. Shale is mapped only along the western coast of Gibraltar. The main area of outcrop lies beneath the town, bordering the Main Ridge. Since the Limestone appears to dip beneath the Shale, Ramsay & Geikie inferred that the Shale must be younger in age than the supposedly underlying, and therefore older Limestone. Two small outcrops of Shale along the west coast of the Southern Plateaux have faulted boundaries.

Several categories of superficial deposits are distinguished overlying the bedrock, notably:-

Limestone agglomerate. Ramsay & Geikie used this term to designate the massive deposits of fragmental limestone which fringe many of the lower slopes. In modern geology, the term agglomerate is restricted to a fragmental rock of volcanic origin. The Gibraltar rocks have no volcanic associations, and must now correctly be described not as agglomerates but as breccias. Most are scree breccias, formed by erosion of the Limestone cliffs above. Some are now known to be tectonic breccias, in which the rocks have been fragmented by faulting.

Sands. Sands are shown covering the whole area of the Isthmus. Shell sandstone is shown forming the slope along the eastern part of the Main Ridge now transformed into the main water catchment area. Other sands (such as the red Alameda Sands visible even today in the Alameda Gardens) cover Shale in the region of the town.

Two major faults are shown on Ramsay & Geikie's map:-

At the base of the cliff on the North Front. The sheer North Face of the Rock was interpreted as a normal fault, with Limestone down-faulted to the north beneath the sand of the Isthmus.

The "Great Main Fault". A zone including several faults is identified extending northwest-southeast approximately from what is now the Dockyard South Gate, via Devil's Bellows, to Hole-in-the-Wall and on to the sea north of Governor's Cottage Camp. This fault zone separates the westward dipping Limestone of the Main Ridge from the eastward dipping Limestone of the Southern Plateaux.

From their 1878 description of the geology of Gibraltar, Ramsay & Geikie clearly recognised (as had James Smith before them) that the two plateaux of southern Gibraltar were ancient wave-cut platforms, and that numerous raised beaches notched the Rock at different levels — evidence of global sea level change during Pleistocene times, as polar glaciers periodically advanced and retreated during the Ice Age (within the last two million years on a modern timescale). Ramsay & Geikie inferred an Ice Age origin for the "agglomerates" on the grounds that present day temperature ranges on Gibraltar were insufficient to provide the freeze-thaw conditions necessary to fracture blocks from the Limestone cliffs on the massive scale evident around the Rock. Their account is a very detailed, seemingly comprehensive, and initially convincing interpretation of the geology of Gibraltar.

However, the survey period of 1876 pre-dated the main period of tunnelling through the Rock in the 1940's; the clearance of scree slopes at the turn of the 19th/20th centuries as quarries were developed to provide fill for construction sites; drilling of deep wells and exploratory boreholes for groundwater; and advances in geological knowledge of the countries adjacent to Gibraltar and therefore the regional geological setting of the Rock. New observations and new ideas have subsequently led to new interpretations.

Geology During The 1939-45 War

During the 1939-45 War, tunnelling activity on Gibraltar reached a peak, leading eventually to the construction of some 30 miles (50 km) of tunnels, chambers and reservoirs within the Rock. It became obvious during the course of this tunnelling that the Ramsay & Geikie (1878) account of the geology needed revision, particularly with regard to the distribution of Shale and the position of faults. Problems encountered by the Royal Engineer tunnelling companies during rock excavation prompted the demand for a new geological map.The Governor himself, in a letter to the Director of Fortifications and Works at the War Office in London, dated 14 May 1943,

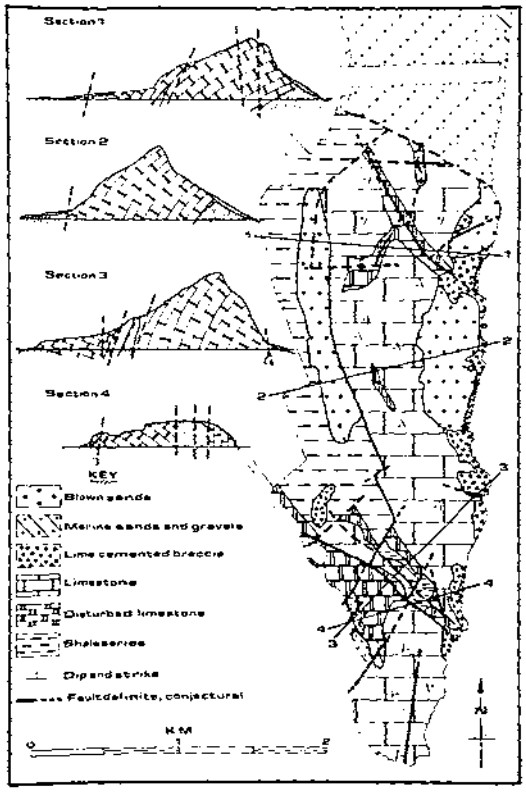


Figure 3. Geological map of Gibraltar, after Greig (1943, unpublished), slightly modified from Rose (1980).

admitted "Geological information is of the greatest importance in preparing new tunnelling projects and two false starts for Harley Street and Gort's Hospital at Viney Quarry and Marble Arch might have been avoided had more been known of the geology of the Rock at that time".

The need was recognized by the then Director of the Geological Survey of Great Britain, Dr E B Bailey MC, FRS (later Sir Edward Bailey). Bailey stopped briefly at Gibraltar twice in 1943, on his way to and from the beleaguered Maltese islands. He spent less than five days in total on Gibraltar, subsequently providing advice to the Fortress Chief Engineer in the form of two brief unpublished reports (Bailey, 1943a; b). That advice was made possible by background information provided essentially by one man: Sapper A L Greig. Bailey's final recommendations were that a new geological map and descriptive memoir should be produced, and that Greig should be the man to undertake the work.

Greig had graduated in Oil Technology as an Associate of the Royal School of Mines (now part of the Imperial College of Science, Technology and Medicine, University of London), having studied there from 1927 to 1931. In consequence, he had been trained in geological principles (although his record at the School indicates greater proficiency on the rugby pitch than in the examination room!). From military correspondence in 1st (Fortress) STRE archives it appears that he had arrived in Gibraltar late in 1941 (September) and a letter from the Fortress Chief Engineer to the War Office Directorate of Fortifications and Works dated 30 April 1943 records that "He was an RASC driver and we got him transferred to the Sappers. He was offered the opportunity of going before an OCTU Board but declined owing to the fact that he did not think he would be any good in command of men, knew he was doing very useful specialist work here, and was not worrying about finance. He is a very decent chap."

Greig's expertise had already been put to effective use through the tunnelling companies RE then active on Gibraltar, but following Bailey's recommendation, it seems that he was allowed to devote some three months of his time in 1943 essentially to field work for a new geological survey. The result was a new geological map, at scale 1:5,280 (ie 12 inches to 1 mile); a sheet illustrating six geological cross-sections through the Rock; a stratum contour map for the Limestone-Shale junction; a generalized stratigraphic table for the Shale sequence; a diagrammatic interpretation of the geological structure of Gibraltar; and a descriptive text variously circulated as 18 to 21 pages of typescript. None of these has ever been published as such, but the work influenced tunnelling operations on Gibraltar for the rest of the War, and provided the basis for a post-war article (1952) by Bailey which discussed the geology of the Straits of Gibraltar region as a whole.

A simplified version of Greig's map is included here as *Figure 3*, together with four of his sections which cross the Rock in positions similar to those on *Figure 2*. Comparison of the two figures therefore illustrates the major differences in geological in erpretation.

Greig's survey was occasioned by the need to re-interpret bedrock geology for the benefit of the tunnelling companies. In consequence he made little attempt to map or describe the superficial deposits in any detail, grouping the deposits described more fully by Ramsay & Geikie into three categories:-

FORMATION	LITHOLOGY	FOSSILS	THICKNESS
LIMESTONE SERIES	MASSIVELY BEDDED, COMPACT, CRYSTALLINE, LIGHT GREY LIMESTONE	ALGAE, FRAGMENT OF RHYNCHONELLA (?) AT OIL TANKS	TOTAL 2,000 FT ?
	Ditto: MORE SANDY AT C.B. QUARRY, MAY CONTAIN IRREGULAR BANDS & NODULES OF CHERT OR OOLITE	BELEMNITE AT DEVIL'S BELLOWS	6 - 8 FT
UNCONFORMITY ?	CALCAREOUS SANDSTONE: RATHER MASSIVE BEDDING AT TOP, MORE FLAGGY & SHALEY TOWARDS BASE	—	8-10 FT (C.B. QUARRY) 10-15 FT ON W. SIDE
SHALE SERIES	ALTERNATING BANDS OF SOFT SHALEY SANDSTONE & HARD BLUE-BLACK LIMESTONE, BOTH WITH CALCITE & PYRITE NODULES, AND CARBONACEOUS MATTER	PLANT REMAINS FRONDS(?) WEST SIDE TWIGS AND WOOD AT C.B. QUARRY	120 FT (BOREHOLE)
	Ditto: SHALES MORE MARLY, LIMESTONES HARDER, WITH CONCOIDAL FRACTURE. LIMESTONE PREDOMINATES	AMMONITES AT C.B. QUARRY AND THE SCREE (N. FRONT)	
	GREENISH-GREY MARL, WAXY AT FRACTURE. ALMOST UNBEDDED	AMMONITES THE SCREE (N. FRONT)	45 FT IN BOREHOLE 20 FT(?) ELSEWHERE
	BLACK AND DARK-GREY CHERT BANDS 1-6INS THICK, WITH GREENISH-GREY MARL PARTINGS OFTEN STAINED PURPLE-RED, ESPECIALLY NEAR FAULTS	—	UNKNOWN (AT LEAST 100 FT)

Figure 4. Generalized stratigraphical table for Limestone and Shale Series, not to scale, produced by Greig (1943, unpublished). (C B Quarry = Catalan Bay Quarry, now a Gibraltar Government Public Works Department depot. Identification of plant remains fronds lacks confirmation and may well be in error, based on dendritic mineral deposits. When a student, Greig's performance in palaeontology, the study of fossils, drew adverse criticism from his lecturers. The figure preserves erroneous spellings of conchoidal and shaly: the errors still circulate on Gibraltar!).

Blown sands (and *Alameda Sands*). "Extensive banks of blown sand can be seen between Catalan and Sandy Bays", along the east coast of the Main Ridge, "very probably covering deeper deposits of boulder breccia". "On the other side of the Rock can be seen the loose red Alameda Sands under-lying the Gardens and the greater part of the Town. They are known to attain a thickness of 50 ft".

Unconsolidated marine sands and gravels. These comprise Recent beach deposits, the most extensive of which occupy the Isthmus area. "Patches of foreshore material are seen at various points round the coast, but these do not attain much thickness. At Camp and Little Bays, however, they unfortunately cover much of the outcrop of stratified rock".

Lime-cemented sands, breccias, etc. "Ramsay & Geikie split these mainly Pleistocene deposits into an older and younger 'agglomerate' (ie boulder breccia) group, with the calcareous sands and bone breccias intermediate in age between them. For the purpose of this account, however, they have been considered together since they present similar obstacles to mining and are very local in distribution." The "Buena Vista Agglomerate", interpreted as a sedimentary breccia by Ramsay & Geikie, is reinterpreted as a fault breccia.

Greig's major discovery concerned not the superficial deposits, but the bedrock. He was able to observe that "Shales" occurred not only along the western margin of Gibraltar and within the "Great Main Fault" zone as seen by Ramsay &

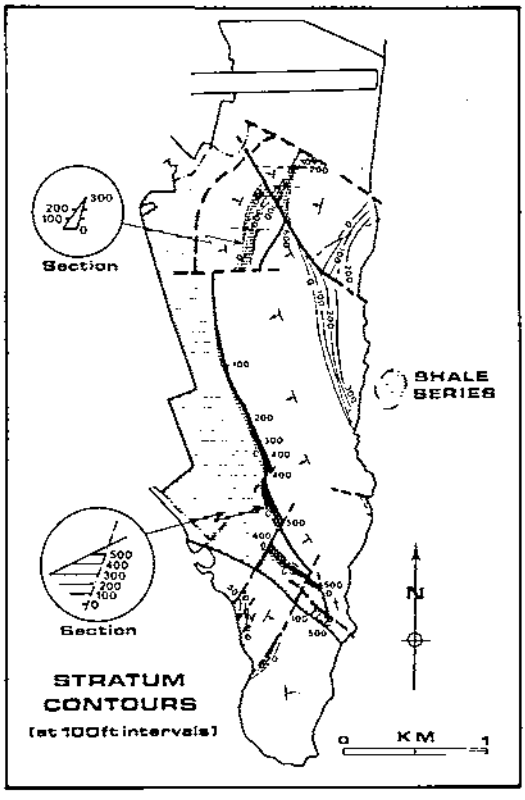


Figure 5. Outcrop map for the Shale Series together with stratum contours for the junction of the Shale Series with the Limestone (after Greig, 1943, unpublished).

Geikie: they also occurred beneath scree breccia at the base of the North Face of the Rock, at several localities along the eastern coast, as patches penetrated by some of the tunnels through the Rock, and in boreholes. Greig inferred that these separate shales were all part of a single rock unit (*Figure 4*). Moreover, he inferred that this Shale Series lay *beneath* the Gibraltar Limestone rather than *on top* of the Limestone as claimed by Ramsay & Geikie. His stratum contour map of the Limestone/Shale junction (*Figure 5*) illustrated the position and orientation of the boundary where seen in major outcrops both west and east and within the Rock. Clearly this was an interpretation fundamentally different to that of Ramsay & Geikie, with important engineering and hydrogeological implications.

Greig's map and account document a more precise and detailed pattern of faults on Gibraltar than shown by Ramsay & Geikie, based primarily on new information obtained during tunnelling. Faults and zones of fractured rock are mapped for the first time within the northern part of Gibraltar, and a more detailed pattern of rock types and faults is shown in the complex "Great Main Fault" area. Rocks of the Shale Series and disturbed (ie fractured) limestone are significantly weaker than massive Gibraltar Limestone, causing problems during tunnelling, hence the practical emphasis on these features in Greig's mapping and account.

To explain the very obvious difference in dip direction between the Limestone of the Main

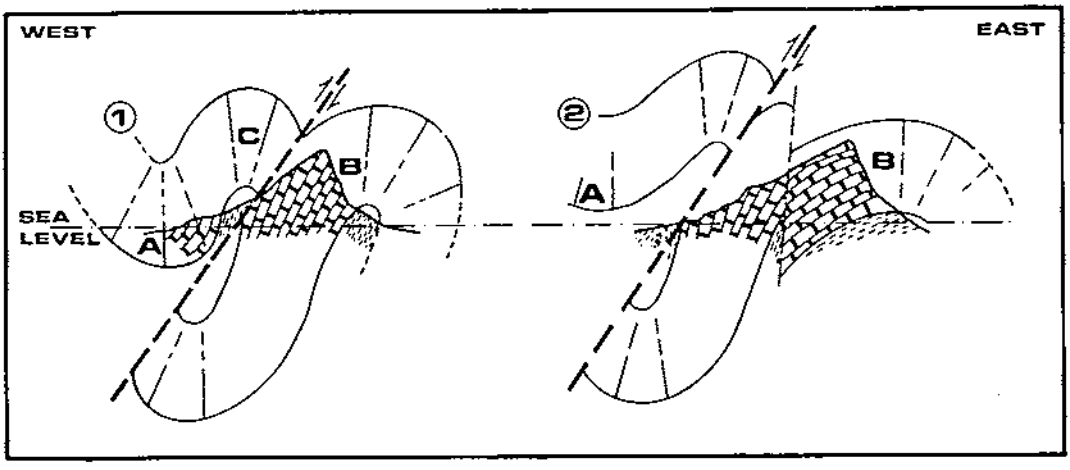


Figure 6. Greig's suggested geological structure of Gibraltar. Diagrammatic geological cross-sections through: (1) Rosia Dockyard — Sandy Bay, (2) Causeway — Catalan Bay Road. Interpreted as a syncline (A) with adjacent anticline (C) thrust from the west (left) over the westerly limb of anticline (B). (After Greig, 1943, unpublished.)

Ridge and that of the Southern Plateaux, Greig interpreted the geological structure of the Rock in detail for the first time, as a thrust-faulted anticline-syncline (*Figure 6*). He inferred that the originally horizontal sheet of Gibraltar Limestone, some 2,000 ft thick, was folded during earth movements until eventually it produced "an overturned fold of the Gibraltar Limestone overthrust on the west by another; the thrust increasing in severity southwards until it is succeeded by a break or fault. The accompanying diagram is intended to make this clear." (*Figure 7*).

Greig's account carefully documents his observations on the geological structure as well as the rock sequence of Gibraltar, and concludes with an assessment of their relevance to tunnelling and to water supply.

Conclusion

Greig's achievement was remarkable when one considers that it was completed without the laboratory, library, and specialist technical facilities that normally support a geological project. It is a splendid example of what one able geologist can accomplish, even in relative isolation.

Greig did send rock specimens and some fossil ammonites to the Geological Survey of Great Britain, and these, together with Greig's observations, were used by Bailey to produce a much simplified map of the bedrock geology on a very small (1:30,303) scale to illustrate Bailey's (1952) account of the geology of the Straits of Gibraltar region. This map and its accompanying cross-sections (*Figure 8*) summarize Bailey's reinterpretation of Gibraltar geology: there is no fault along the North Face of the Rock as claimed by Ramsay & Geikie; their "Great Main Fault" may be primarily a fold; and, as claimed by Greig, there is a *single* "Shale" unit which *underlies* rather than *overlies* the limestone. But Bailey, as duly acknowledged in his article, went further than Greig in his interpretation of the geological structure. He interpreted Gibraltar as a "Klippe": a mass of rock thrust over the adjacent Spanish deposits of later (Tertiary) age during the earth movements which formed the Betic mountains of southern Spain and the Rif of northern Morocco. Moreover, on the basis of scanty fossil evidence from Gibraltar, he inferred that the Rock was not in its original orientation. Rather, this spectacularly large Rock was the eroded remnant of strata that had been completely overturned. Ramsay & Geikie had inferred (wrongly it now seems) that the Limestone of the Southern Plateaux was inverted, but that of the Main Ridge they considered to be uninverted. According to Bailey, the *whole* of the Rock was *upside down*.

Greig concluded his report with a cautionary note: "Lest the foregoing account should sound too assured, giving the impression that it is regarded as the last word on the geology of Gibraltar, the writer hastens to add that he makes no such claim. Clearly the subject is full of difficulties; violent tectonics, doubtful stratigraphy and hampering surface deposits are all compressed within a very small and isolated compass, giving rise to problems which must be in some respects unique. In view of this indeed, the objection may be raised that too much has been inferred from too little; it is suggested however, that with the geologist, as with every other branch of life, the exercise of imagination is not only permissible but mostly necessary. All

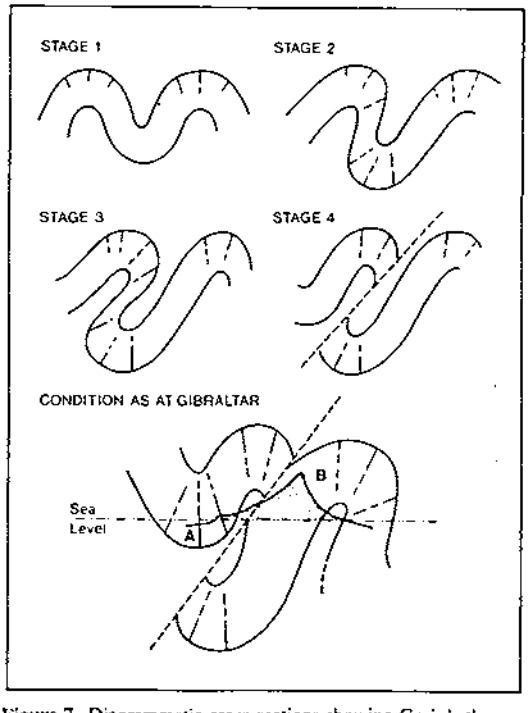


Figure 7. Diagrammatic cross-sections showing Greig's theory for the development of an overthrust in Gibraltar in order to produce the relationships illustrated in Figure 6(1). (After Greig, 1943, unpublished.) (Modern research in structural geology indicates that the thinning shown in stage 3 prior to thrusting as shown in stage 4 cannot occur in rocks like the Gibraltar Limestone deformed at shallow depth in the Earth's crust. Moreover, Greig depicts the Limestone of the Main Ridge as uninverted, in contrast to Bailey's (1952) interpretation of the Rock structure.)

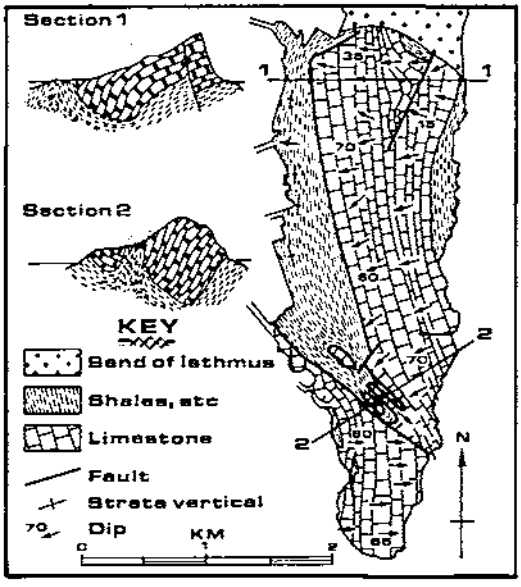


Figure 8. Geological map of Gibraltar, after Bailey (1952), slightly simplified.

scientific research is based on the construction of imaginary structures known as hypotheses, and as the work proceeds these structures are modified, or if necessary completely scrapped and rebuilt, in order to fit fresh facts as they emerge. This account, then, is in the nature of a hypothesis constructed to fit geological facts as reasonably as possible, and it necessarily follows that the degree of reliance placed upon any part of it must vary in accordance with the amount of supporting evidence."

Sapper Greig served in Gibraltar until August 1943. After the war he returned to civilian life in Britain where he joined the firm of V C Illing & Partners, consulting petroleum geologists. He worked there in the drawing office until about 1963, and subsequently (preparing route maps) for the cartography department of the Royal Automobile Club. He retired some fifteen years later, moving then to Ilminster in Dorset where he died in the late Spring of 1988 just after his 81st birthday.

So far as we are aware, he never returned to Gibraltar, nor published an account of his geological activities there. Even before Bailey used Greig's work to publish what is still regarded as the most recent definitive account of Gibraltar geology, another Sapper, Lieutenant (later Captain) G B Alexander, was recording fresh geological facts on the Rock. Some of these were to substantiate conclusions reached by Greig and Bailey, others to amplify or to significantly challenge them. But that is another story, to be continued in a sequel to this article.

ACKNOWLEDGEMENTS

THIS article is based on part of an unpublished report by the senior author prepared in 1975, following an earlier report jointly with S C L Hobden (then a Major in the Engineer Specialist Pool (V), now a Colonel in the Engineer & Transport Staff Corps). Mrs Margaret Dobson drew our attention to the death of A L Greig, her former colleague when at V C Illing & Partners, and provided details of his post-war career. We are indebted to Majors J E Champion RE and R G Taylor RE, as OC's 1 (Fortress) STRE, their predecessors in command, and many members of Property Services Agency (DOE) and Public Works Department staff in Gibraltar (notably George Palao BEM) for help with our geological studies on Gibraltar; to Norman Sinclair-Jones, Christine Flood and Craig Hildrew of Royal Holloway and Bedford New College (University of London) for drawing the figures; to Sarah Viggers for typing the manuscript; and to Fortress HQ Gibraltar (through Lt Col T R Cottis MBE) for authority to publish and provision of *Photo 1*.

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*Unpublished reports of early date have all been retyped, sometimes more than once, and now circulate on Gibraltar as documents differing in length (and sometimes slightly in accuracy) from the originals.

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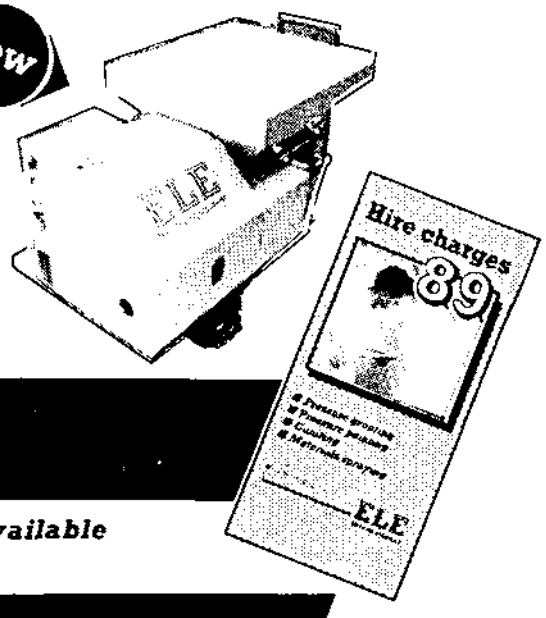

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No 1 Welding Platoon RE and The Citroen Truck

MAJOR R B CROFT CEng FICE

The author joined the Sappers in April 1943 but his active service really began in the early hours of 9 September 1940 when he was engaged as resident civil engineer responsible for the extension works at the Fulham Power Station. That morning a lone German bomber planted a rack full of 200 pounders neatly into the operating part of the turbine house taking out of commission the four generating units totalling 190 MW. The author's brief thereafter included responsibility for supervising reconstruction and repair of the heavy steel structures and reconstruction of the turbine house roof as well as the completion of the extension works.

On completion of this work he enlisted and was commissioned at 140 OCTU in November 1943 and posted to No 1 Welding Platoon RE, the work of which during 1944/1945 forms the background to this article.

After VJ day the author completed his service in Hamburg as OC 176 Workshop and Park Company RE and finally as 2IC 6 Engineer Stores Base Depot.

Demobilised in April 1947, the author worked for many years in Upper Egypt as senior representative on the site of the 360 MW Aswan Hydro-Electric Scheme which began generation in 1960. Returning to the United Kingdom in October 1960 he took up the appointment of Associate and Chief Civil Engineer for Kennedy & Donkin and was responsible for major civil engineering works on many large power generation and electrical transmission projects in Scotland, Northern Ireland, the Middle East and other overseas locations. He retired in 1978 but was retained as a Consultant.

In those seemingly far off days at the dawn of 1944 when No 1 Welding Platoon RE was formed near Clacton, there were only vague ideas on the precise role it was to play in the European theatre of war. Established as a Captain's command, the unit comprised three sections supported by an HQ, and totalling 120 men as follows:

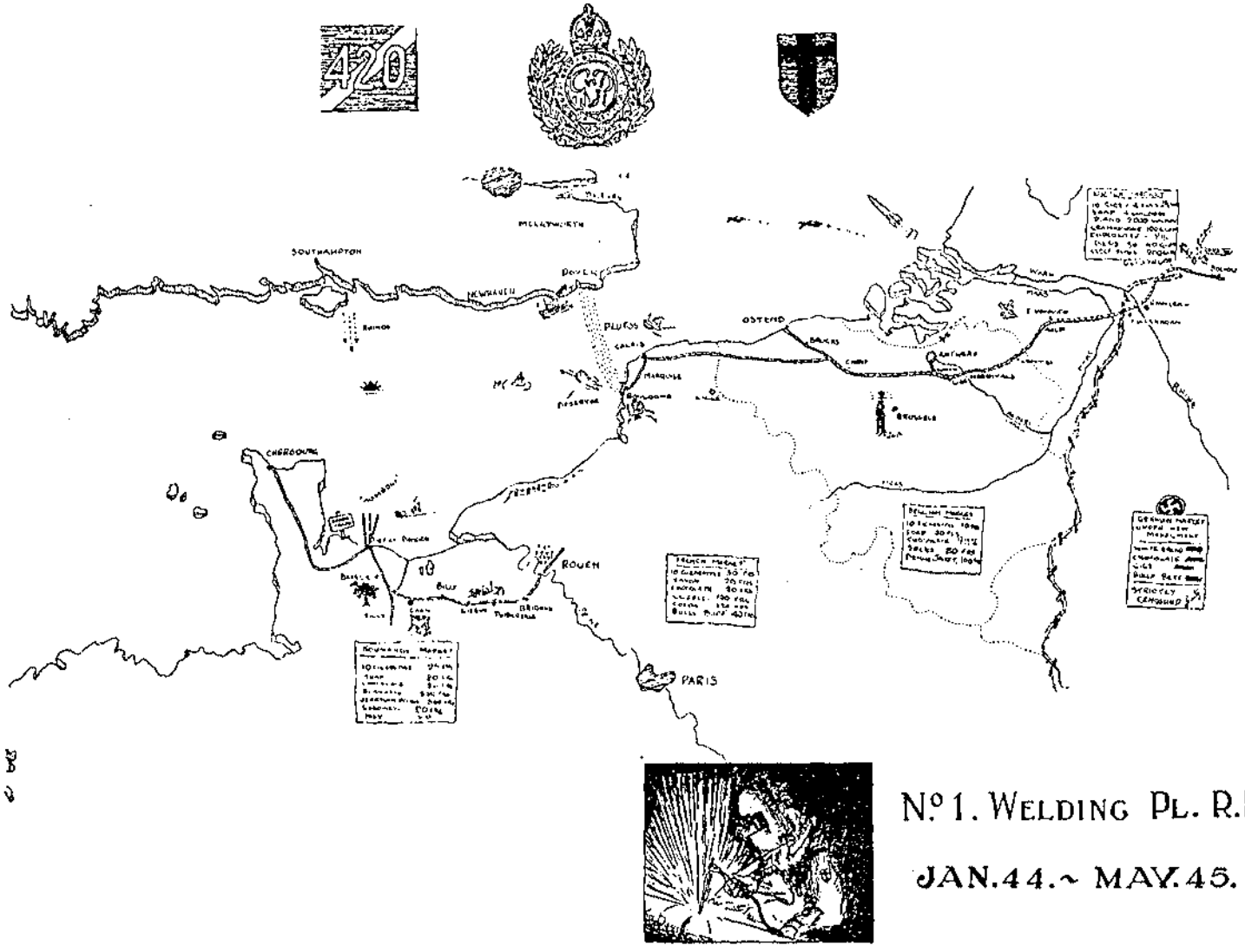
3 subaltern section commanders, NCOs and a complement of welders, fitters and drivers.

Unit equipment consisted of 4 pick-ups, 2 motor-cycles, 14 three-ton TCVs, 12 trailer-mounted motor-operated DC electric welding sets, 12 sets of oxy-acetylene cutting and welding equipment, bottled oxygen and gas and a range of workshop tools and tackle. Thus the unit was completely flexible and had the capability to put into the field a total of 15 mobile welding crews equipped to carry out welding and gas cutting.

The anxiously awaited news concerning deployment of the unit came in late May 1944 when two sections were attached to 106 CRE and were destined to join the Normandy landings. The third section was landed at Ostend on 23 June but remained there for several months until the channel ports were liberated.

Established as a colonel's command the 106 CRE (No 1 Oil Construction Group) comprised a highly specialized HQ supported by several companies of field and artisan works Sappers units, two companies of Pioneers, a REME mechanical equipment unit, RAC units and the Welding Platoon. The role

Major R B Croft CEng FIC
No 1 Welding Platoon RE and the Citroen Truck



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of the latter was to carry out all the welded fabrication work required for the installation of a petrol supply system extending from the Normandy beaches, across France, Belgium, Holland and into Germany hard behind a rapidly advancing front.

The first section of the Welding Platoon landed in Normandy on 7 June and immediately set to work on the welded pipework for the petrol storage tank farm and pumping station on the beach at Port-en-Bessin. Their tasks also included the connections to the ship-to-shore lines from the off-shore tanker berths installed by the Navy. PLUTO 'Hamel' lines successfully reached Cherbourg in August 1944 and an inter-connection was installed overland from Cherbourg to the pipe system from Port-en-Bessin so that by 12 August the system was carrying petrol pumped from the Isle of Wight. The work was completed in time to welcome the arrival of the second section who were beached at Arromanches and the two sections then combined to complete the pipe system inland along the side of the 'Bayeux bypass' towards the city of Caen, approaching as close to the northern limits of the town as seemed prudent.

Thereafter, until mid-August, the two sections were under canvas in the increasingly congested area north of Caen, training sapper welders and distributing the talented and the promising technicians amongst the welding teams in order to secure an optimum overall efficiency. During this time the 'Front' proved impossible to define exactly and it became abundantly clear that by whichever route one took out of Bayeux towards Caen, a journey of more than ten minutes carried the risk of stumbling into a forward German unit or a tree-squatting sniper.

For the 'Welders' the breakout came at the middle of August and after spending a night in a deserted French chateau and another in a low-lying mosquito-infested field for the purpose of extending the pipeline around Caen, they moved out in a convoy of eight trucks and trailers and headed rapidly in the direction of the River Seine and Rouen.

It was a bright August morning and the route was littered for mile upon mile with a continuous line of wrecked German armoured vehicles, trucks and cars. The air was filled with the sickly stench of rotting cattle and horse flesh and the somewhat different odour of unburied human corpses. Clearly the RAF's squadrons of rocket-firing Typhoons had taken a heavy toll on the retreating enemy columns. Rumour was rife that somewhere along this road, Rommel had sustained injuries which were to end his further involvement in the campaign.

The convoy paused at the top of a hill to gaze at a scene which reminded one of the picture on a packet of Camembert cheese popular back home. There on top of the opposite hill, gleaming white in the sunshine, stood the basilica Saint Therese, seemingly untouched and serene in all its architectural glory. But in the valley below were the piles of rubble, once the town of Lisieux. The convoy picked its way through the shattered and devastated town and, near Brionne, a few miles short of Rouen, made camp in an apple orchard.

There the welders remained for about ten days to complete their tasks on the multiple six-inches diameter pipeline where it was laid and buried at all road junctions and also where it needed to cross streams, rivers and other topographical features which prevented the use of the victaulic flexible coupling system used on the straight uninterrupted stretches of the pipeline by the gangs of pipe laying Pioneers. There was also the detail fabrication work at each intermediate storage tank and pumping station locations all of which contained a large number of tasks.

During the first evening at Brionne an approach was made by a Frenchman, from a nearby small farming community, who had a problem. He explained that he was from Le Havre but evacuated with his family to a small cottage nearby. The problem was a German deserter who, a few days previously had parked his truck in a barn in the centre of the community and barricaded himself in, threatening to blow his truck and the community sky-high if he was approached by French civilians.

On investigation the deserter proved to be a very frightened Pole serving with the Wehrmacht, who was only too ready to surrender himself and to be passed down the line to the nearest POW compound. Within the barn was discovered an almost brand new Citroen truck of about three tons capacity and resplendent in its newly painted mustard yellow colour scheme and unit markings. The wheels and tyres were missing as were the battery, generator and starter motor.

Our examination of the contents of the truck revealed the cause for concern by the local community. The load consisted of a large quantity of armed anti-tank and anti-personnel mines and box upon box of explosives, mortar shells, ammunition, detonators and igniters. In a careful

The Platoon displayed

inspection we discovered no trace of any specific preparation to detonate the load, nor of any booby traps.

Retiring to the local cafe, wherein the smoke laden atmosphere reeked of French home-grown tobacco and artificial coffee, we met the Mayor, a portly character of massive girth and of few words. Over a cup of 'coffee' well laced with Calvados, we explained that nothing could be done without the missing parts of the truck. The Mayor indicated that this presented no problem and in response to his ejaculations two or three customers shuffled from the cafe. Three coffee/ Calvados's later the first wheel was trundled through the cafe entrance and laid on the floor. The remaining wheels followed in rapid succession. The missing electrical parts were apparently located at a nearby coastal town and so the following morning, a PU and driver accompanied by a French guide was despatched to collect them whilst a working party returned to the barn.

Before long the wheels were replaced and the truck towed out of the barn a short distance down a lane away from the farm and the cottages. The task of carefully and meticulously dealing with every item of the cargo then got under way. Detonators and igniters were first separated out and sent away. The mines were disarmed and made safe and then all materials were loaded on to a unit truck and despatched to the nearest dump. The electrical parts had meanwhile arrived and before long the Citroen was fuelled up, running and added to the platoon's transport strength.

Work meanwhile continued on the pipeline system to and across the Seine to a point just to the north of Rouen where the petrol supply system from the Normandy beaches was terminated.

In September 1944 came the rapid dash through northern France and into Belgium to the town of Lierre. From that base work was started on the petrol pipeline system which was to run from the vicinity of Antwerp through Herenthals and eastward towards the Dutch border. During the course of this work the channel ports were liberated and the platoon's third section arrived from Ostend in mid-September eager to get into the act.

Thus all three sections, together for the first time, combined to start work back at Boulogne where, at low tide, the ends of the 17 three inch diameter PLUTO 'Hamel' lines, dropped by the Navy at high tide, were picked up and connected to the pipeline which was to wind its way around Bruges

No 1 Welding Platoon RE and the Citroen Truck (1)

The last weld at Bocholt

and Ghent and join the system which was already completed to the Dutch border.

Petrol could now flow from the English coast at Dungeness and Isle of Wight, under the English Channel to Boulogne, and along the overland pipeline system which by December 1944 had reached Eindhoven.

The Citroen truck shared in all this work and became a familiar sight along the pipeline route with its unconventional colour but reassuring 106 CRE and Welding Platoon unit markings. It carried one of the heavy duty welding machines in the back with its welding crew. When on the move forward it towed a trailer carrying not welding equipment, but a barrel of Calvados, a present from a grateful village community. Carefully rationed, the latter provided a very welcome unofficial 'rum' ration during the bitter winter of 1944/1945.

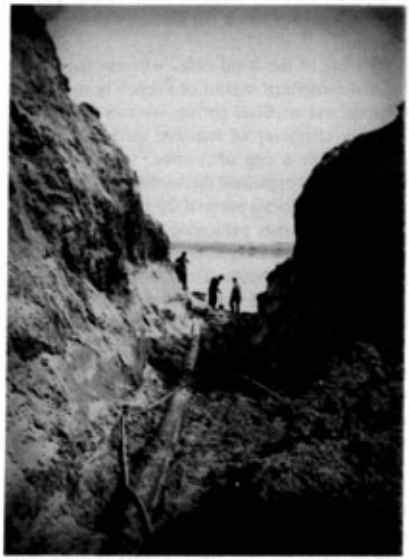
The continuation of the work from this time on was undertaken in bitterly cold and freezing weather accompanied by driving sleet and falls of snow. In these conditions it proved increasingly difficult for the welders to control the electric arc and the reflective nature of the snow cover caused several cases of 'arc eye' burn. Moreover when, in mid-December, General von Runstedt mounted his massive counter offensive through the Ardennes with 24 divisions, the rapid transfer of heavy armoured units to the area south of Brussels, caused enormous damage to the cobbled stone paved roads and for a time movement of the unit trucks and trailers became very difficult indeed.

Nevertheless the pipeline with its intermediate storage tanks and pumping stations pushed rapidly ahead in a north easterly direction from Eindhoven, and on to the terminal installation at Bocholt which was completed in May 1945.

In all this work it was forbidden to route the pipeline across Bailey bridges and, moreover, it was not permitted to use Bailey bridge materials.

Under-water crossings were welded up along the canal or river bank to the required length consistent with the width of the gap. The ends were sealed temporarily and improvised floats were attached with lashings. The pipe was then launched and floated to the desired position across the gap and the lashings then cut or blown with gun-cotton primers. Such crossings became a speedy routine after a little practice, the important trick being to allow adequate length to provide sufficient free-board at the banks above the water to enable the connections to be made.

The pipes under the rivers Maas and Rhine were welded up in long continuous lengths on rollers aligned at right angles to the left bank and hauled across from the opposite bank with a heavy steel wire rope attached to the rear of a bulldozer. The main problem here was getting the pilot cable across using a powerful motor launch which experienced some difficulty in overcoming both the load and friction of the pilot cable and also the force created by the river flow. The



Under the Rhine between Matterborn and Emmerich

No 1 Welding Platoon RE and the Citroen Truck (2)

resulting combination of the vertical and horizontal curvatures were inevitably transferred both to the main cable and then to the pipe with consequent effects on the length of the crossing and the towing load. The problems were however overcome successfully.

Overwater crossings, of which there were many in Belgium and Holland, often had to be provided with adequate headroom to meet the requirements of canal and river traffic. Using available sizes of pipe materials, the larger span pipe bridge eg over the Turnhout Canal, consisted of braced welded tubular towers on each bank carrying a braced welded tubular bridge structure of triangular cross section, the two main bottom chords being used as petrol conduits. The structure proved quite elegant and in fact the design was very similar indeed to the 1989 modern practice favoured by architects and their structural consultants for the roofing in of exposed areas of town shopping precincts.

Turning back to the Citroen truck, there were two events which the author finds hard to forget.

The first concerns the arrival somewhere in Belgium, of an ACI warning all unit commanders of the hazards when disarming German anti-tank mines. Evidently the Germans had devised an ingenious connection to the igniter which caused it to detonate when attempting to unscrew it from the body.

The second event concerned a journey from Holland back to the Mulberry harbour in Normandy, to pick up some urgently needed mechanical spare parts. The route passed near to Brionne and we took the opportunity to make a brief call on our French friends. There we learnt the story of the village padre and his young niece strolling to the church one Sunday when they spotted a German gas mask lying in the undergrowth near the spot where the Citroen had been cleared. They retrieved it and playfully put it on each other and then the padre, either from idle curiosity or, perhaps because he could not understand the

Over the Turnhout Canal in Holland

reason for the weight of the nose-piece, unscrewed the filter cap. There was a violent explosion and both lost their lives.

No more could be done than to sympathize, visit the graves with a few flowers and visit the church to offer up a little prayer for them ... and for us.

The 'Welders' celebrated VE day at the border village of Gendringen where, before returning to the United Kingdom, the Citroen had to be disposed of. The opportunity was taken at this time to note some of the vital statistics of the pipeline operation:-

1200 miles of 6" diameter pipe
330 pumping units
100,000 tons of petrol storage
15,000 cubic feet of acetylene gas
58,000 cubic feet of oxygen
38,000 hours running of welding machines
280,000 miles travelled by unit transport.

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No 1 Welding Platoon RE and the Citroen Truck (3)

Early Days

MLC

GENERAL Sir Lothian Nicholson, the IGF, speaking as Chairman of the 1889 AGM of the RE Institute, named "the event of the year" as being the publication of Major General Whitworth Porter's Vols I and II of the *History of the Corps of Royal Engineers*. In his effusive thanks to the author, the IGF felt sure he spoke not only for those present but for "every officer in the Corps." Presumably the author received no pecuniary gain, as such, for his monumental effort, since he thanked the meeting for the £100 presented to him, with which he had bought "a silver mounted claret jug and a diamond brooch for his wife."

In his detailed review of the *History*, the reviewer "TBC" (a little research reveals this to be Major General T B Collinson), stresses the difficulties the author must have had in organizing and compressing such a mass of material into a coherent whole. This was especially so, he goes on to note, when the story down the ages is concerned not only with the purely military events, but also with the application of science to military activities, and the opportunities open to those able to apply an all-round education (particularly that imparted at Woolwich and Chatham) to an immense variety of administrative and technical problems in both peace and war. This, Engineer officers had been able to do in no small measure, and to record all this from 'scratch' was indeed an admirable effort. The readers of each generation, present and future, will without doubt agree, and General Porter's own place in Corps History is certainly secure.

General Porter, in his introduction to Vol I, gives his own explanation as to why the Corps had been playing its part for so long, before its History had been attempted. This was because, in his opinion, the work could only be satisfactorily undertaken by someone who had a proper feel for the Corps by having served in it. Such a man, while on the active list, would not have sufficient time for the "laborious research necessary. Hitherto, Engineers have generally clung to the Service until old age or infirmity have compelled them to seek repose in retirement ... A Grateful Country has decreed that her officers shall not be permitted to spend too much of their lives in her service, and they are now pensioned off while still in middle life, many of them with energies by no means exhausted."

Since Porter's example, the Corps seems to have done very well with its subsequent 'in house' volumes. But the really difficult and laborious foundation, Vols I and II, would nowadays probably best be a question of money and hiring a suitable PhD historian!

A letter, then only recently discovered, written by the Duke of Wellington in April 1812 directly after the third (and fortunately this time successful) attempt to capture Badajoz, was quoted in the June 1889 Journal. In it the Duke complains bitterly of the lack of a "regular trained Corps of Sappers and Miners ... I never yet knew of an Army undertaking a siege without the aid of such a Corps excepting the British Army." Porter comments that at Badajoz, had there been a properly trained Engineer force, the necessary advance to the crest of the glacis might have been made by sap and many lives saved. At Badajoz there was one unit of Royal Military Artificers consisting of 27 NCOs and men. These were backed by carpenters and miners drawn from the infantry. As Porter records, (Vol I p 291), the men under the superintendence of the Engineers were "utterly uninstructed in sapping and the construction of field works, the most simple details being left to the personal direction of the officers, who alone had the slightest knowledge of the subject."

The demands on such officers of the Corps of Royal Engineers as were present, were severe indeed. These included advising and planning how best to conduct the siege operations, setting out saps and batteries by white cord on the ground, demonstrating how the work was to be done, organizing the necessary stores, and finally supervising the work and, in due course, leading the assault if only because they alone could act as reliable guides. It was not surprising that casualties were very heavy, and officers of the line were required to volunteer as assistant Engineers, so that some ofthe burden could be shared.

Such comments, as typified in the Duke's letter and as we all know, led to the establishment of the School of Military Engineering, which, as Porter stresses in his history, has played such a beneficial part in the development of

the Corps — professionally, socially, and in national life as a whole.

A lecture to YOs by Colonel E Wood on "The Duties of the Royal Engineers in the Field", and published in the 1889 *Professional Papers*, underlines in full measure the later acknowledgement of what the Corps may be called on to do and the necessary order of battle and training required to do it. The author stresses that "before everything else we must fully realize that we are soldiers first and engineers afterwards." He exhorts the young officer always to be prepared to assume responsibility and by "experience and reflection" to prepare for such occasions. "Keep your eyes and wits open to see what can be done ... whenever you have stated a certain work will be done by a certain date, do it ... If things go wrong remember that cheerfulness will help you out of most difficulties."

Colonel Wood illustrates the duties of the Corps by developing an imaginary (albeit 'colonial') campaign. It is well done. Perhaps someone would like to write an up-to-date version — it would undoubtedly be welcome to the Editor of today's *Journal*!

Early Days has not been lacking in criticism of those early *Journals*, in as much as they did not seem to be worthy of the Corps in almost the heyday of its world-wide activities. Colonel Sir Charles Watson, the author of *Vol III* of the *Corps History* (which covers the period 1886 to 1912) seems also to have had the same impression. In his preface he writes: "The Royal Engineers Journal contains a mass of useful information, but it is somewhat to be regretted that the officers of the Corps do not make more use of it to record the work that they have been engaged on." Colonel Watson only uses the word 'somewhat' to indicate the measure of his disappointment. One suspects that his first draft was more explicitly critical!

The October 1889 *Journal* contains a detailed extract from a French military publication on the shortcomings of *L'Armée Anglaise*. The Army is chiefly criticized for its conservatism (perhaps a little unfairly, the retention of the feu-de-joie, eg on the Queen's birthday parades, a ceremony which, as far as the French were concerned, they gave up almost since 1654, is given as an example!), the lack of proper reserves, especially for a small army like the English was particularly criticized, and the lack of cohesion between the Regular Army (active and reserve), Militia, Yeomanry and Volunteers, which were alleged to be too independent of each other to provide the parts of one whole, came in for caustic comment.

The daily pay of a soldier was also considered to be a major weakness as it did not produce a good standard of recruit. Lord Wolseley is quoted by the French author as being in support of this comment. The *Annual Register* for 1889 does indeed record an address at Oxford by Lord Wolseley in which he is quoted as saying: "to a foreigner this patchwork army of ours was a curiosity. However, our insular position saves us from the necessity of maintaining a great standing army. Until some mad Prime Minister allowed a tunnel to be made under the Channel, we could afford to do with a standing army of very moderate proportions. It was to be regretted that the Army was not composed of the same class of man as were the police. The soldier was not paid at the same rate as the police. The pay of the soldier in the days of Cromwell, and even in Queen Anne's reign, was better than now. For all that, crime had almost ceased in the Army — except for a few ruffians in each Regiment, who were discharged and then, as often as not, re-enlisted ..." Clearly the French author must have been familiar with the Oxford speech. He ends his article by saying: "the presence of bad characters in the Army also detracts from its quality and a necessity is felt for a *Corps de Discipline* like that existing in the French Army."

In contradistinction to this, Colonel Wood in his paper on the *Duties of the Royal Engineers*, mentioned above, ends by saying that such is the relationship between officers and men in RE Units "that we can go anywhere and do anything." The December 1889 *Journal* features drawings of a machine for cutting square holes. Clearly the Corps was able to accommodate soldiers of every configuration — square or round!

Readers may remember that at the 1888 AGM there was the suggestion that the RE Institute might share accommodation — library, meeting room, etc — with the RUSI. The IGF reported that this proposal was submitted to the PUS at the War Office. The reply acknowledged that it was an excellent idea, but the present was not a suitable time, and the matter would be considered again "in due course". And so presumably has it remained!

Major T W Savage, writing from the SME in a letter published in the August 1889 *Journal*, complains somewhat bitterly that the Corps had adopted that "vapid song *Wings*' as the regimental march." He wonders why that "fine old classical

tune, *the British Grenadiers*, which could have been shared with the Royal Artillery, Fusilier Regiments and those bearing the title Royal, had not been chosen instead". Major Savage could not see that "*Wings* was in any respect appropriate to the Corps, unless it be supposed to contain an allusion to a 'flying sap'." He presumed that it had been chosen according to "some commanding officer's fancy." Few, today, one supposes, would agree with him!

[1]The story of *Wings* is told in the June 1986 issue of the *Journal* in an article by the late Lt Col R S Hawkins.

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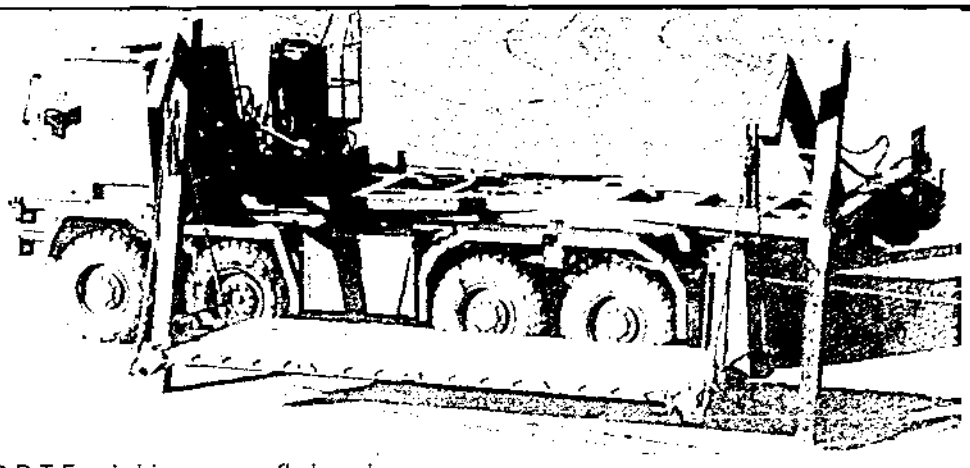

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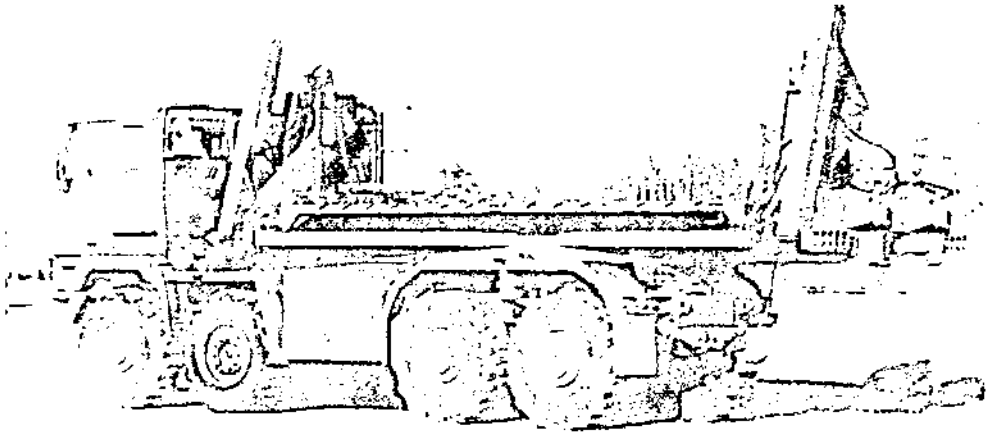

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Construction In Kathmandu

CAPTAIN (GE) R N BUTCHER

Ray Butcher was commissioned from the ranks in September 1984 and became a Garrison Engineer two months later. Following a four and a half month Falkland Island tour he spent over three years in charge of the construction of the British Gurkha Transit Camp (BGTC) in Kathmandu. He now works as Assistant Instructor, Civil Engineering Wing, RSME.

THE Kathmandu valley houses three towns, the largest of which is Kathmandu, separated by the Bagmati river from the second town, and long-time rival, of Patan. Bridges span the river in several places and the two towns now form modern Kathmandu city, the capital of Nepal.

The BGTC has an annual throughput of between 10,000 and 12,000 enlisted British Gurkhas and their families, Nepalese recruits and a small number of Singapore police recruits. On average there are 76 return flights to Hong Kong, twelve to Brunei and four to Singapore every year. The camp also handles unaccompanied baggage belonging to the transitees and pays pensions to ex-Gurkha Servicemen living in the area.

The original camp occupied part of a Rana Palace (known as Bikram Bhawan) built in 1940 out of hand-made clay bricks bedded in mud mortar. By 1980 it had become completely inadequate for its task and therefore the decision was taken to build a new camp on the same site.

The design embraced some of the Nepalese building traditions found in the more important civil and private buildings. Details included pitched roofs with gable ends, skirt roofs to gables and angled timber struts under large oversailing eaves. Construction also assumed local aesthetics with expressed lintels and sills, and the floors cast as slabs to show as a plinth line on the external facade. Local red bricks and clay tiles were chosen to provide a warm orange/red finish and the gable ends rendered with inset timbers highlighted in dark brown. The main buildings were designed to earthquake resistance standards as Kathmandu lies on a fault line, and the disaster last year in Dharan reinforces the wisdom of this decision. Reinforced masonry walls provided continuous reinforcement between the foundations and floor slabs but larger span areas used a reinforced concrete frame construction with non load-bearing reinforced masonry walls.

The largest building in the complex is the transitee block, *Photo 1*. Because of its size it forms the centrepiece of the camp and includes all living facilities for 270 occupants in single or linked family rooms planned along a central corridor around an open quadrangle. There is a centrally placed badminton court and children's playground. Four married officers quarters, each semi-detached with individual servants quarters *Photo 2*, are situated within a walled compound opposite the main camp and guarded by ex-Gurkha servicemen. Within the camp, three detached houses serve as quarters for the Queen's Gurkha Officers while a two-storey block of flats accommodate the five Gurkha Other Ranks *Photo 3* on permanent strength. Other buildings include

Captain R N Butcher
Construction In Kathmandu

Photo 1. Transitee N wing and NW corner

Photo 2. British officers quarters

the office/communication centre, accommodation for 36 locally employed civilians *Photo 4*, medical centre, guardroom, MFO store, MT section, a small complex for PSA maintenance and various ancillary buildings. Services included main drainage, a new 100mm diameter water main and a dedicated HV supply being transformed down to 415V. Nepal, being a developing nation, has a limited supply of prime energy resources which results in frequent power failures and wildly fluctuating voltages. Standby facilities are provided by two 57KVA generating sets which serve the main kitchen, maintain refrigerators, freezers and minimum lighting to the married quarters and essential services to other buildings. A low temperature hot water system using oil-fired boilers and calorifiers provides hot water and heating to the transitee block. One underground diesel tank is dedicated to this system, another to the generators, while two further fuel tanks allow both diesel and petrol to be dispensed by pump. Total cost was about £3,500,000.

Before taking up my post the PSA project team in Croydon invited me to visit them for a briefing, where I learned I was to report directly to them. Design and finance came from them, but I could make any alterations I deemed necessary providing I could substantiate them. This last point giving flexibility proved invaluable as physical communication was protracted. The installation of a FAX machine occurred just as building handover was taking place!

I arrived at Kathmandu on April Fools Day 1985. One third of Bikram Bhawan had been demolished, some boundary walling, foundation excavation to one pair of married quarters, the external sewage line and the beginnings of temporary site huts were constructed. So I was there virtually from the beginning and left the day after the opening ceremony. I enjoyed a unique situation in seeing a job all the way through in a beautiful part of the world and the job satisfaction surpassed anything that I had previously encountered or am likely to have in the future. However, it very soon became apparent that work in Kathmandu entailed all sorts of difficulties.

The workforce, over 400 at its peak, was engaged and administered by my project team, and consisted entirely of locally employed civilians who knew nothing about Building Regulations or

Photo 3. Gurkha other ranks flats

Photo 4. Accommodation for locally employed civilians

Construction In Kathmandu 1,2,3,4

Codes of Practice. Tradesmen learn from their fathers, who can only pass on practical skills as their knowledge of theory is non-existent. Labourers were farmers from the nearby hills who have never seen western digging implements and I devoted many of those early days to trade training — teaching the labourers how to swing a pick axe or showing the bricklayers the mysteries of bonding. Most of the clerical, stores and supervisory staff had never worked on a building site, so training had to be extended to include them.

Because of the very restricted range and poor quality of building materials available in Nepal, many stores had to be imported. PSA Croydon ordered all M and E equipment, windows, doorsets, ironmongery, some sanitary ware and many specialized stores from the UK. Most were shipped out by container but some smaller urgent items were sent air mail or air freight. Discrepancies occurred between stores ordered and goods received on site; often the suppliers packed the wrong items, included substitutes or sent incorrect amounts. Sometimes pilferage occurred somewhere within the supply chain and some orders failed to arrive or were damaged due to poor packing and, because of the lead time, often as long as 12 months, this caused serious problems on site. Stores from other countries were ordered from site and included reinforcement steel from Japan, cement from Korea or Malaysia and many relatively common items from India.

Even the acquisition of common materials like bricks caused particular problems. Money for bricks had to be deposited with the Government-run brickworks well in advance of required delivery dates and the amount paid in by all depositors far exceeded the number of bricks that could be produced resulting in the usual vying for position amongst the customers. During the monsoon the clay became too wet to win and brick production ceased for about four months.

One of my biggest headaches was inviting tenders for the supply of sand and aggregate every six months. The original supplier proved very reliable but when the contract period had expired, another firm had undercut him and the tender winner was asked to commence delivery immediately. The first load of 1" aggregate arrived that afternoon when I learnt that in Nepal 1" aggregate meant that retained on a 1" sieve. Prices were quickly renegotiated for ¾" aggregate, ie that passing a 1" sieve but retained on a ¾" sieve and on that basis the previous supplier proved cheaper. Upon retendering six months later another firm quoted lower prices and instructions were issued to deliver three loads of aggregate the following morning. He immediately replied that he could not supply in such quantity as he did not have a crusher and only employed a few people with small hammers to break up rocks into aggregate! Despite being undercut many times, we maintained the same supplier throughout.

The lack of local facilities meant that the site had to be as self-sufficient as possible. Temporary buildings, for use by the site staff included offices, stores, bar- bending area, blacksmiths shop and welders bay. PSA Croydon ordered a Universal Woodworker for use in the carpenters workshop and a hollow block making machine from Singapore. Both machines proved invaluable and were in constant use, yet with good maintenance retained a high resale value.

Timber is sold by cubic foot and delivered in large baulks which could be converted in one of the local sawmills but a quick calculation revealed that the purchase of a second-hand band saw on the local market would prove cost effective. The moral soon learnt is that on a large project "think big", as trying to save a few pennies can be very expensive in the long run.

My initial worry was how to keep the transit camp operational during construction on a very restricted site and not allow the programme to slip too much. Very careful phasing had to be observed but, with the cooperation of the occupying unit, the sequence of build fell rapidly into place and apart from a few minor hiccups, my concern proved groundless. To provide flexibility of construction the main transitee block was divided into eight distinct sections each separated by expansion/movement joints. The original concept was to construct this building in three phases but the elemental design allowed programme refinements and helped to reduce slippage to a minimum. Most other buildings could be completed in one operation although temporary facilities had to be provided from time-to-time usually within existing buildings to enable demolition to take place on schedule.

Running the site itself presented little difficulty once the tradesmen had learnt the UK methods and had been indoctrinated to my way of thinking. Each building had its peculiar problems but the sequence and method of construction

varied very little. Provided we kept a careful watch on what was happening and could provide instant answers to problems, the buildings continued to grow.

On the other hand, services were a constant problem, especially drainage. As more and more of the camp was brought on to mains sewage, we found that the external line overflowed, bringing irate visitors to site. On investigation, I discovered that our 200mm diameter drain was connected to a 150mm diameter local authority sewer which followed a tortuous route and was laid to very shallow falls. In consequence, the sewer could not take the effluent from the camp and our sewage was bubbling out of the last manhole. Protracted negotiations started with the local sewage authority during which the problem of the overflowing sewage had miraculously disappeared from the bottom of the run but had been transferred higher up causing effluent to pond around the broad beans of the owner with whom we had negotiated a wayleave. I ordered the site foreman to check the line and he found that the irate householder had plugged the pipe with a sandbag filled with concrete! Eventually I received permission from the local authority to extend our outfall to a more reliable discharge point.

In comparison, one of my most enjoyable tasks involved the selling of scrap materials. Customers queued for old corrugated iron sheets, bricks, doors, windows etc from the demolished buildings and a ready market was found for spoil from excavations and for hardcore. Everything in Nepal has a scrap value — even bent nails, empty cement bags and old paint cans! The money recouped in this way enabled many thousands of pounds to be credited to public funds but I found the task most amenable and it helped to offset the many frustrations encountered with the other work.

Gradually the work settled into a routine and the first buildings were handed over to the unit enabling us to demolish vacated facilities to make way for the next building. The handovers consisted of a series of mini-boards attended by people within Nepal which allowed occupation by the unit and set the dates for maintenance liability periods. In a few instances occupation took place prior to the mini-boards which, although not ideal, allowed greater flexibility in programming. In early November 1988 the main formal handover took place, attended by representatives from J4 Quartering Hong Kong, PSA Croydon, PSA Hong Kong and PSA Nepal. Reports by the fire adviser, environmental health team and catering officer, all from Hong Kong, were prepared shortly before the handover and their observations/recommendations were taken into account by the board.

Throughout my tour I had very able assistance from a project works officer, Captain (QGO) Jogindrasing Gurung MBE QGE, who was succeeded by Lieutenant Judbahadur Gurung QGE. The M and E work was entirely supervised by a PSA senior foreman from the UK, Mr Wally Jubb. I am deeply indebted to these three men for their invaluable assistance, expertise and total dedication to the project. I was also fortunate in having the same Croydon based PSA group manager and project architect throughout the project.

On 19 November 1988 the rebuilt British Gurkha Transit Camp was officially opened by Major General G D Johnson OBE MC, Major General Brigade of Gurkhas.

Today's Territorial Army

LIEUTENANT COLONEL J C H MOORHOUSE

Lieutenant Colonel Charles Moorhouse was commissioned in 1967. His first tour was as a troop commander in 59 Field Squadron in Singapore. A tour at 1 Training Regiment was followed by two years on the staff in Hong Kong. 2IC 26 Armoured Engineer Squadron was followed by Training Major 72 Engineer Regiment, then Shrivenham and Camberley. Between SO2 Operations in HQ South East District and SO2 C Mobility in LSOR5 he commanded 8 Field Squadron. He is now SO1 D Pers 3 in the MOD.

I HAVE just ended my tour as Commanding Officer of 71 (Scottish) Engineer Regiment (Volunteers), the most enjoyable and rewarding thirty months of my life. It was my second tour with the Territorial Army, I was Training Major of 72 Engineer Regiment in the late 70s. In the intervening period, the knowledge and awareness of the Territorial Army by Regulars has improved, but in many areas it is still very poor and many prejudices remain.

The aim of this article is to try and increase the reader's knowledge of today's TA. A secondary aim is to give COs and OCs a better feel of the qualities required of a Regular who is to serve in a TA unit, before they tick the box on the front of the confidential report form.

The modern TA is twenty-two years old. Its establishment is expanding, if not its numbers. Current strength is 72,000 against an establishment of 84,000. It consists of independent units and sub-units, and small specialist sponsored units. It has a somewhat convoluted one-star structure, but only two infantry TA brigades, 15 and 49, go to war as brigades. The Royal Engineers have two brigades, 29 and 30, who remain as formal brigades in war. 12 Engineer Brigade is mixed Regular and TA in peace. 29 Engineer Brigade takes numerous regular and sponsored units under command and has a wartime establishment of 7,000.

TA units very nearly mirror their Regular counterparts in establishment. The main difference being the conditions of service of the components. My regiment had 20 regular staff consisting of: CO, Training Major, Adjutant, QM, RSM, Chief Clerk, CO's Driver, 13 Permanent Staff Instructors (PSIs). Also four Permanent Staff Administration Officers (PSAO) who hold TA Group B commissions and four Non-Regular Permanent Staff (NRPS), these are SNCOs and JNCOs. The civilian staff including caretakers is 30 strong, but two drivers posts are undermanned. The TA establishment is 39 and 739, strength currently is 40 and 602. The officers figure is a little inflated by currently having a non-established padre, a second MO, an assistant paymaster and a 2IC in the Workshop. Six officer cadets are attending commissioning courses this summer.

71 Engineer Regiment consists of an RHQ, HQ Squadron and Engineer Workshop REME in Glasgow, 102 (Clyde) Field Squadron is in Paisley, eight miles west of Glasgow. This squadron has a troop in Irvine on the Ayrshire coast, a further 30 miles away. 104 (City of

Lieut Colonel JCH Moorhouse
Today's Territorial Army

Soldiers of 71 Engineer Regiment ready for lunch on a Sunday at Drip Camp, Stirling

Edinburgh) Field Squadron is in Edinburgh, 50 miles from RHQ. It has a troop at Livingston, twelve miles west of Edinburgh. 124 (Lowland) Field Squadron is in Coatbridge, twelve miles east of Glasgow, with a troop in Cumbernauld some ten miles to the north. This layout is very compact compared with the majority of TA units. 73 Engineer Regiment based in Nottingham has squadrons in Hull, Chesterfield and London.

The main point to realize from this dispersion is that, except on drill nights and training weekends, the squadrons are manned by a PSAO, a QMSI, two SNCOs and five civilians. The civilians, except those who are also in the TA, very rarely meet any of the TA soldiers in their squadron.

It is also important to realize the responsibility and isolation of the PSIs. Trying to keep to the chain of command is difficult. It is all too easy to pass everything through the QMSI during the week and forget the OC. The PSAO is *in locum tenens* OC during the week. However, he is mainly an administrator and the QMSI is the OC's training officer. In my Regiment we made one of the PSIs responsible for Q matters and one for MT. For understandable reasons REMRO cannot always post to meet this plot, so combat engineers have to be extremely flexible.

In my experience the majority of PSIs gain from broadening their knowledge. So for PSIs we are looking for broadminded, ambitious men with high standards. The high standards are essential because, quite rightly, the Territorial officers and soldiers expect it from the professionals. It should go without saying that we require high quality officers as well.

Now I want to turn to the Volunteer himself. Firstly, you have to find him. Although there are national advertising campaigns for the TA run by Director of Army Recruiting, TA units are self-recruited. In RHQ and in each squadron we have a small recruiting staff. The TA Association gives us a recruiting grant of some £1500. Recently The TA Association has paid more attention to

recruiting officers. This has been a help, but over 70% of our officers are self-recruited.

Who are these Volunteers? They range from men who have been serving since 1951, to young 18-year olds, living in the Central Lowlands. The more elderly gentlemen are getting fewer. The youngest national serviceman is 47. The upper age limit for warrant officers and SNCOs is 48, and for majors RE, 45. Although these barriers can be broken, you can see that those with national service are a dwindling number.

The 30-48 year olds may have some regular service, normally an upper limit of 12 years. There are exceptions and warrant officers with 22 years are quite often commissioned in the TA. The majority of older men have between 10 and 25 years service in the TA, nearly always in the same squadron. The number of under 30-year olds varies between a new recruit, (upper age for enlistment is 40,) and the man who is coming to the end of his first 12 years. They are all civilians who volunteer to serve in the TA. The majority have jobs and families. The number with jobs is increasing all the time. Therefore, I am competing with their families, work, and whatever other hobbies they have, for their time.

The commitment I want from the individual varies with rank. To remain efficient and earn his bounty the Territorial must complete 15 days continuous training, ie, camp; and 12 days out-of-camp training, ie, weekends. He must take various tests as well. The allocation of man training days (MTDs), which is the accounting unit, varies each year in an effort to save money. In 1988/89 it was based on capitation rates. We were allocated 29,119, which on 1 April 1988 gave 41 days for each man on strength. In fact we used 35,820. The average per officer was 70 days, for warrant officers and SNCOs 97, and soldiers 49. The mean for all ranks was 56 days.

I would be lying if I said each of these days was effective training. Much of our time is taken up with administration. Our load is greater than a regular unit's. The reason I say more, is that each TA Centre has a fire inspection, a catering inspection, an environmental health inspection, etc. The standards are set the same as required by regular units.

The priority for training is survival on the battlefield and therefore the tests for bounty consist of Annual Personal Weapon Test, Basic Fitness Test, First Aid and Nuclear Biological and Chemical Defence. Second priority is training for role; in our case combat engineer training, signalling, driving and plant operating. Artisan training is not undertaken, but qualifications earned in civilian work or colleges are accepted in many cases. Signallers, drivers and clerks do not have to be combat engineers as well.

Of course, before any of the above can start we must carry out recruit training. Two weekends are spent on this before the man goes to Minley for the two week TA recruit course.

We run our own JNCOs' Cadre. Corporals and sergeants attend the two week TA Section Commanders and Field Sergeants courses at RSME. Apart from attendance on parts of the Combat Engineer Class 1 course, all combat engineer, basic signalling and basic driver training is carried out in the Regiment.

I hope by now that those of you still reading will be reviewing your ideas about the TA.

The 'One Army' concept did the TA a great deal of harm. With the limitations on time for training the TA could never hope to match the Regular Army. 'One Family', General John Akehurst's term, is a far better concept. Unfortunately, the Marilyn Report uses the 'One Army' concept again. In this context it refers to a manpower pool with much more movement between the Regulars and the TA. It is worth noting that the RE TA has 700 officers and over 7,000 other ranks, more than half the size of the Regular Corps.

Recently our masters have realized that the TA will need time to train after Queen's Order and plans for post mobilization training are being drawn up. I welcome this realistic approach to the TA. After all, how many of you commanding regular units would like to drive out of the barrack gates tomorrow to face an enemy without any additional training?

A TA regiment in the second week of camp on an FTX like *KEYSTONE 87* achieves remarkably high standards, bearing in mind the time it has had to train. Battle drills may not be as slick as we would like, but any deficiencies are more than made up by enthusiasm, determination and sheer guts. The first successful major night assault boat river crossing by the British Army during the last ten years was carried out 71 Regiment. During exercise *KEYSTONE* 1987 , in front of the †CDE visitors, six companies of 24 Infantry Brigade were put across the River Weser in three hours.

†*Conference for Disarmament in Europe*

Ex Lionheart 1984, 124(L) Fd Sqn RE(V), Sennelager Trg Area, TCK charges

Unloading PUE at Iserlohn, 1987

In the planning of *KEYSTONE* many staff could not understand why the TA units had to leave the exercise on the Wednesday of the second week. The reason is fairly simple. Annual Camp is fifteen days, a Saturday to a fortnight Saturday being the norm. For a BAOR exercise many have to report on Friday, including the road party. To ensure all our Pre-stocked Unit Equipment (PUE), roughly two-thirds of vehicles and equipment, can be returned we need a day in our sponsor unit to clean and repack it. 71's Road Party left Iserlohn on Friday pm and arrived in Glasgow Sunday early am. All our UK equipment had then to be off-loaded. Some men returned to civilian work that night after a 16½ day camp. Perhaps now some budding staff officers will see the problem.

The TA's R & R at camp also causes cynicism. A day off to see the part of the world they are visiting is essential. Whether it be BAOR or Weymouth. The young ones perhaps want a deutsche mark in their pockets, want to try out their German in the pub and chat up a bird. The older ones like returning to their old haunts. Fifteen or sixteen days solid soldiering without some fun will soon reduce camp attendance.

The TA will suffer from the "demographic trough" and is already feeling the effects of higher employment. The TA is already helping the Regular Army out of its shortages. Many TA soldiers join on S type engagements, a troop from 74 Engineer Regiment went to the Falkland Islands with 3 Field Squadron in 1984. If you are short of manpower for an exercise or an overseas tour, sound out the TA. You will be pleasantly surprised at the quality of soldier.

If you are still sceptical, visit a TA unit, talk to the soldiers and officers. Find out what their jobs are and try to put yourself in their shoes. It's easy thinking Army 365 days of the year. A bit more difficult, if you are project manager of the Channel Tunnel Digging Machine and Second in Command of a TA Regiment.

To summarize, I hope I have succeeded in giving you an insight into today's TA. The best way fully to understand these enthusiastic men and women is to meet and talk to them. They are extremely proud, keen to succeed and, like all good soldiers, willing to show you what they can do.

For 5% of the Army Budget the nation gets a very good deal. The TA deserves to be taken seriously and supported. After all, the Territorial is the Army's closest link to society because he is a member of society. As Winston Churchill said "the Territorial Volunteer is twice a citizen".

Presentation of Colours to the Bengal Sappers

MAJOR GENERAL I H LYALL GRANT MC

A remarkable occurrence took place in India recently when the Bengal Sappers were presented with Colours by the President of India. As this is a very unusual honour for Sappers this short account may be of general interest.

FOR those unfamiliar with the history of military engineers in India a brief word of explanation may be helpful. When the British East India Company first went to India in the 17th century they established trading posts on the coast, the main ones being at Madras, Bombay and Calcutta (Bengal). By the beginning of the 19th century these had developed into the three Presidencies of Bengal, Madras and Bombay, the Bengal Presidency being the largest and most important. The local guards for the trading posts had developed into three separate armies, largely of Indians trained and led by the British. Initially the Directors of the East India Company in London had resisted the request for engineers, "those sort of men being alwaies found very expensive". However India was a land of poor communications, wide rivers and massive fortresses, all of which obstacles required engineers to overcome. To meet this need temporary companies of unarmed pioneers were raised in the 18th century for specific campaigns but their lack of training proved a severe handicap. Hence at the end of the 18th and beginning of the 19th century each army raised its own regular corps of Indian engineers who came to be known as Sappers and Miners. These quickly built up a remarkable reputation, notably in the assault on fortresses, both in India and overseas. The British officers who, supported by Indian junior officers, trained and led these units initially held the East India Company's commission but in 1861 the British received commissions in the Royal Engineers and the Indians were awarded the Viceroy's commission. At the end of the 19th century the three Presidency armies were combined into one to form the Indian Army but uniquely the Sappers and Miners retained their old titles of Bengal, Madras and Bombay. In 1876 the Madras Sappers, who had the earliest roots, were awarded the title 'Queen Victoria's Own', in 1906 the Bengal Sappers became the 'Prince of Wales' Own' (and in due course 'King George V's Own') and in 1921 the Bombay Sappers added the title 'Royal'. In World War 2 there was a huge requirement for engineers and the Corps of Indian Engineers (which in 1946 became the Royal Indian Engineers) was formed to include not only the Sappers and Miners but also the many other base and L of C units that were raised.

The Bengal Sappers, correctly now the Bengal Engineer Group of the Corps of Engineers, were selected to be the first Group to be awarded Colours and the Presentation ceremony took place at the Group Centre, Roorkee, on 12 January 1989. The Commandant of the Group, Brigadier Vimal Shinghal, issued an open invitation to any British ex-Bengal Sappers who were able to attend to be his guests for the occasion and seven officers (five accompanied by their wives) accepted.

The celebrations spread over three days. In the evening of the first there was a grand display in the fine new sports arena including Gurkha dancing with drawn kukris, colourful Punjabi dancing and a gymnastic display, followed by an impressive Beating of Retreat with the national flag being lowered at sundown. After dark five hundred men each armed with two blazing torches gave a most original and effective torchlight display. All the activities were extremely well done and the whole performance was conducted with great precision. After this there was a buffet supper for all officers and their wives in the 'Three Feathers Club', suitably extended and provisioned for the occasion, and this gave a fine opportunity for the several hundred guests to meet each other.

The next day the formal parade was held on the main parade ground. It was a remarkable spectacle with eight field companies of sappers on parade, all being dressed alike in a very smart uniform consisting of a brown shirt and dark green trousers, a scarlet and gold headdress and similar cummerbund, a red and blue scarf and long white spats. The parade, commanded by the Commandant, followed the full British ceremonial pattern with the President of India, Shri R Venkataraman, taking the salute,

Presentation of Colours to the Bengal Sappers

inspecting the parade in a glistening jeep and presenting the Colours which were then blessed by Hindu, Sikh, Moslem and Christian priests before being slow-marched back to their position to the strains of 'Bonnie Prince Charlie'. The President made an excellent short speech in English referring to the many achievements of the Group extending from 1803 through both World Wars, the post-Independence wars and in aid to the Civil Power during floods and natural calamities. He also remarked on the fine esprit-de-corps which was exemplified by the presence of so many veterans including those from abroad. The parade then marched off to 'Wings' followed by a column of APCs, bridgelayers and pontoon lorries. Altogether it was a superb and faultless display which very few countries could now emulate.

Old Bengal Sappers will be interested to hear that the ten battle honours selected to be emblazoned on the Colours stretched from Ghazni 1839 to Cassino 1944 and Meiktila 1945. Naturally enough no battles fought inside India's present boundaries were included although such epics are by no means forgotten and are included in lists in the Museum and elsewhere.

After the parade there followed a group photograph of officers and visitors with the President and a formal luncheon for the President at the old Headquarters Mess. Before the latter the President was introduced to some of the British guests and he made a point of thanking them for coming so far.

This ended the official ceremonies but in the evening the officers' wives put on a remarkably talented variety show, partly in Hindi and partly in English, in the old garrison theatre and this was followed by a buffet supper for officers and their wives in the Mess. During the latter Major General Lyall Grant, having conveyed to Major General Sen (the Colonel Commandant of the Bengal Sappers) a congratulatory message from the Chief Royal Engineer, presented to him, on behalf of the KGV's Own Bengal Sappers and Miners' Officers' Association, a memento of Field Marshal Lord Napier of Magdala (the most famous Bengal Sapper to date), a finely mounted and executed silhouette portrait of Lieutenant General Sir

Presenation Of Colours To The Bengal Sappers

Clarence Bird and two books for the library, as well as a silver salver, engraved with the crest of the Prince of Wales' feathers, from the British guests. In return the Association was presented with a silver replica of the Ghazni Tower which forms the centrepiece of the Roorkee war memorial.

The final occasion was an all-ranks lunch (bara-khana) for some 1500 officers and men in a huge hangar, a legacy of World War 2. Meanwhile the Commandant's wife hosted a memorable luncheon party for the ladies. All in all it was a most enjoyable three days and one that the many guests, who strained the accommodation of Roorkee to the limit, will long remember. A notable feature for the British guests was the extremely friendly welcome received throughout and the great deal of trouble that was taken to ensure that they were properly cared for, a very helpful major being assigned to look after the party, an orderly being provided for each officer and a retired ex-Commandant going out of his way to act as guide, philosopher and friend.

It is sometimes said that the Indian Army is more British than the British and it is certainly true that the best of the British systems and traditions seem to have been retained. However there has been no hesitation in Roorkee in changing out-dated methods where better ones are now more suitable, the most notable change being a social one. Volunteers of any caste or creed who are up to the necessary standard are accepted as recruits from the whole of North India from the Punjab to Manipur; they wear identical uniform, feed from the same cookhouse and are mixed up together in units. The same system applies to the other two Groups and it is, of course, a change of great advantage both politically and militarily. The second new feature which struck the British visitors was the great size of the Group which now has a strength of about 50,000. This compares with some 4,000 (including affiliated sapper companies of the Indian State Forces) before World War 2 and 25,000 at the height of that war's expansion. The total of all three Groups of the Corps of Engineers is around 150,000 and one can see that Lieutenant General P S Roy, the Engineer-in-Chief, who is also responsible for the Military Engineer Services and their many projects, is a busy man. There was one other very noticeable feature which was that the fine esprit-de-corps of British days is as strong as ever. This is perhaps not surprising as many officers have had war experience either in the Pakistan wars or in skirmishes in Baltistan, Assam and Sri Lanka and well realise its fundamental importance. Patriotic and regimental songs are encouraged and no doubt it was not only in recognition of their outstanding war record over nearly two centuries, but also to foster regimental spirit even further, that the decision was taken to present Colours to each of the three Groups.

Join The Territorial Army

The Territorial Army is an essential part of the Nation's defence and is currently being expanded. The military experience and skills you gained during your service with the Corps could be of immense value to the Royal Engineers TA.

You may not be aware that being a Reservist does not prevent you from joining the TA. You can apply at any time, but if you join within one year of leaving the Colours and you complete the TA training commitment you will be eligible for the full TA Annual Tax Free Bounty in your first year (which would normally take 3 years to attain). This applies to both Independent and Specialist Units. Moreover you may be immediately awarded your regular trade classification and re-granted your regular rank provided a vacancy exists in your TA unit.

If you are interested and feel you could fulfill the training obligation then contact your nearest Independent TA unit for further information (you can find them listed under "Army" in your local telephone directory).

Alternatively, if you do not live close to an Independent RE TA unit, you can join the RE TA Specialist Units who recruit on a UK-wide basis and who have a lower obligatory military commitment of 19 days annually. The units consist of a Combat Engineer Regiment (Regimental Headquarters, 120 Field Squadron, 130 Field Squadron and 198 Engineer Park Squadron) and ten specialist teams (Works, Bulk Petroleum, Railways and Well Drilling). Further details can be obtained from CVHQ RE, Minley Manor, Blackwater, Camberley, Surrey, GU17 9JU. Telephone Yateley (0252) 876622 Extension 3378.

We trust that you will give enlistment into the TA your earnest consideration as there are rewarding opportunities for the right man.

An Introduction to NATO Infrastructure

LIEUT COLONEL M D REYNOLDS B Sc(Eng) C Eng MICE FI Plant E C

The author was commissioned from Sandhurst in 1966, and his pastimes include squash, running and antique furniture restoration. Other activities have included troop commander tours in Berlin and with the Gurkha Engineers in Borneo. Squadron 2IC was with 4 Fd Sqn prior to an AI appointment at the RSME, then followed the PQE course. Squadron command was with QGE in Hong Kong followed by another RSME tour, and then as an SO2 in HQ EinC. A gap between postings allowed for five months as expedition leader on Operation Raleigh in Patagonian Chile. The author is currently serving at SHAPE as an SO1 in NATO Infrastructure.

The word infrastructure comes from France where it has long been used to denote all works that are necessary to support railway networks such as tracks, embankments, bridges, stations and communications. Within NATO there exists an infrastructure programme commonly funded by the fifteen participating nations, though this infrastructure is far more wide-ranging than the original meaning of the word. The fifteen nations include France who, although she withdrew from the NATO military command structure over twenty years ago, still participates in parts of the NATO infrastructure programme. This is only the second time in over two thousand years that an alliance of states has agreed to contribute to a common fund as the cooperative approach to meeting a shared threat. In the fifth century BC ten Greek city states formed the Delian League in response to the Persian threat and agreed to contribute to a common treasury. Shortly after World War Two five members of the Western Union Defence Organisation, UK, France and the Benelux Countries, recognised that in the effort to rebuild defence installations following the devastation of the war the burden would fall more heavily on some nations due to their geographical position to the new post-war threat. They agreed to share in common the costs of an infrastructure programme. This programme was adopted by NATO on its formation in 1949. The outline NATO military command structure is shown at *Figure 1. Figure 1* includes more detail for Allied Command Europe (ACE) since the author is in ACE. The emphasis and examples will use the ACE case; however the situation for Allied Command Atlantic (ACLANT) and Allied Command Channel (ACCHAN) is identical.

Funding

Infrastructure funds for any given year are known as Slice*. The Defence Ministers meet every six years to agree upon the funding level for the next Slice Group* of six years, currently Slices 36-41 for the years 1985-1990. The funding level set by the Defence Ministers derives from the amount of infrastructure required to support the Force Goals* drawn up by the three Major NATO Commanders (MNC), see *Figure 1*. Thus sovereign nations have given up control of the allocations of substantial financial resources to NATO Military Commanders without strings. The financial benefit to participants being determined solely on military priorities. The funding level for the current Slice Group is £6 billion of which ACE is allocated over 90%, the other 10% is shared between the other two MNC, ACLANT and ACCHAN. Of the ACE share, approximately 70% is spent on civil, electrical and mechanical works. In other words SHAPE spends £630 million on these works every year. Thus infrastructure represents by far the largest common funded activity of the NATO Alliance.

Lieut Colonel M D Reynolds
An Introduction To NATO Infrastructure

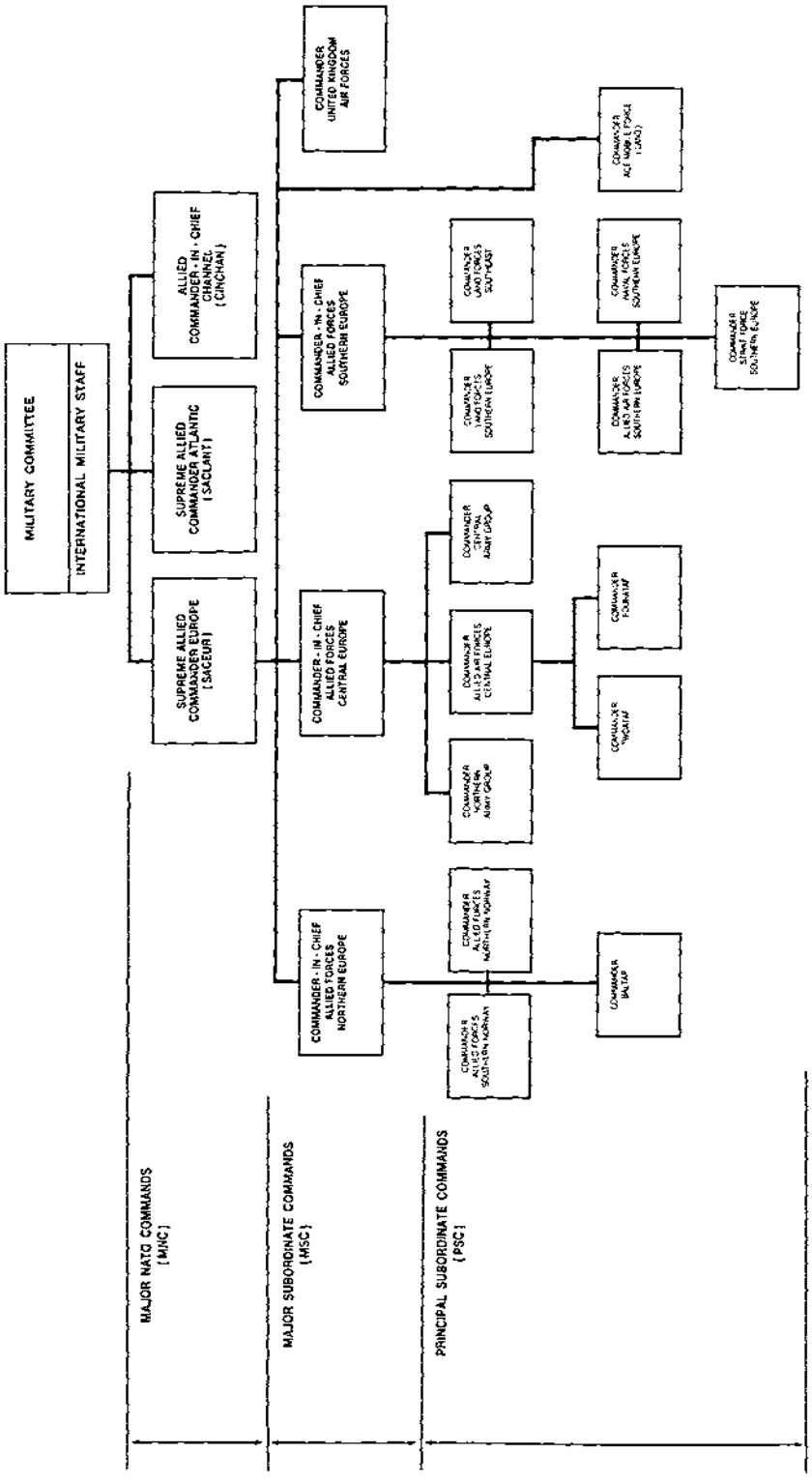
NATO MILITARY STRUCTURE
MILITARY COMMITTEE
INTERNATIONAL MILITARY STAFF
SUPREME ALLIED COMMANDER EUROPE (SACEUR)
SUPREME ALLIED COMMANDER ATLANTIC (SACLANT)
ALLIED COMMANDER-IN-CHIEF CHANNEL (CINCHAN)
COMMANDER-IN-CHIEF ALLIED FORCES NORTHERN EUROPE
COMMANDER-IN-CHIEF ALLIED FORCES CENTRAL EUROPE
COMMANDER-IN-CHIEF ALLIED FORCES SOUTHERN EUROPE
COMMANDER UNITED KINGDOM AIR FORCES
COMMANDER ALLIED AIR FORCES SOUTH-EAST
COMMANDER AIR FORCE (LAND)
COMMANDER ALLIED AIR FORCES SOUTHERN EUROPE
COMMANDER NAVAL FORCES SOUTHERN EUROPE
COMMANDER STRIKE FORCE SOUTHERN EUROPE
COMMANDER ALLIED FORCES SOUTH-EASTERN NORWAY
COMMANDER ALLIED FORCES NORTH-EASTERN NORWAY
COMMANDER BALTAP
COMMANDER NORTHERN ARMY GROUP
COMMANDER ALLIED AIR FORCES CENTRAL EUROPE
COMMANDER CENTRAL ARMY GROUP
COMMANDER NORTHAG
COMMANDER FORNORTH
MAJOR NATO COMMANDS (MNC)
MAJOR SUBORDINATE COMMANDS (MSC)
PRINCIPAL SUBORDINATE COMMANDS (PSC)

Figure 1

Cost Shares for NATO Infrastructure

Country	' at 15 '	** ' at 14 '
Belgium	3,96	4,59
Canada	5,56	6,42
Denmark	3,26	3,77
France	13,34	--
Germany	23,16	26,76
Greece	0,69	0,79
Iceland *	--	--
Italy	6,99	8,07
Luxembourg	0,19	0,22
The Netherlands	4,49	5,19
Norway	2,75	3,18
Portugal	0,20	0,20
Turkey	0,81	0,81
United Kingdom	10,51	12,18
United States	24,06	27,82
	100 %	100 %

* Included in US Share
** Projects which France does not participate in.

Figure 2

The amount of money that nations contribute to infrastructure funds was determined in 1953 after a single sixteen hour session of ministers in Lisbon. The matter was finally solved by the then NATO Secretary General, Lord Ismay, by asking each minister to write down what he thought would be a fair national percentage contribution. Naturally enough the total did not reach 100%. So the balance was split in the same proportion again and added to the original national percentage. The ministers agreed, and the proportions remain essentially the same today. Adjustments have been made, for example when Germany entered NATO in 1956. The cost shares are shown at *Figure 2*. In order to share equitably the financial burden in accordance with the agreed percentage shares, a fiscal unit known as an Infrastructure Accounting Unit (IAU)* was devised. The agreed rates of exchange are revised every six months and those for the first half of 1988 are shown at *Figure 3*. NATO does not collect and disburse any infrastructure funds but draws up a monthly account of spending and issues instructions to the nations for a balancing transfer of funds between the nations.

Categories and Eligibility

At the outset of the programme it was agreed that NATO infrastructure would provide for operational facilities essential to accomplish the wartime mission. Facilities required purely for peacetime would be otherwise funded. The facilities provided must also meet the Minimum Military Requirement (MMR)*. In the early years the facilities constructed were largely airfields, fuel storage, pipelines and communications. Now fifteen categories have been developed:

- Airfields
- Naval Bases
- POL
- Communications
- Navigational Aids
- Warning Installations
- War Headquarters
- Training Installations
- Surface to Surface Missile Installations
- Surface to Air Missile Installations
- Ammunition Storage
- Forward Storage Sites
- Reinforcement Support
  - Prepositioned Storage Sites
  - Ammunition Sites
  - Theatre Reserve Sites
  - Emergency Water Crossing Sites
- Anti-Submarine Warning Installations
- Miscellaneous

The last category provides for the one-off case not allowed for in any of the other categories. For example forward defences in certain locations in ACE have been deemed a necessary military requirement in the infrastructure programme, and placed in the last category as an exceptional case. For each category of infrastructure SHAPE has prepared a set of commonly approved Criteria and Standards*. These give details of the threat against which the facility must be designed, including NBC, blast and electro magnetic pulse protection. Space, power supply including uninterrupted power supply, heating and ventilation, sanitary and messing are specified. Protective measures such as fencing, access control, CCTV and NBC

Figure 4. War headquarters under construction

Rates of Exchange to the IAU
First Half 1988

Currency :	Value of 1 IAU :
Belgium Fr	139,61
Canada $	5,056
Denmark Kr	25,648
France Fr	22,284
Germany DM	6,728
Greece Dr	502,77
Italian Lira	4.776,00
Luxembourg Fr	139,61
Dutch G	7,587
Norwegian Kr	25,066
Portugese Esc	522,56
Turkish Lira	3.075,00
United Kingdom £	2,256
United States $	3,773

Figure 3

detection are also included. These provide merely a few examples of the comprehensive list of requirements.

Thus, when a design is proposed the eligibility of each component of the design can be determined to ensure that the MMR is achieved. A design may knowingly be prepared by a host nation (HN)* which is in excess of the MMR to meet purely a national need. This is noted at SHAPE when screening the design and arrangement is made for payment for that portion from national funds.

Project Programming

The programming of projects is initiated by a NATO Military Commander whose staff prepares Part I of a Type "A" Cost Estimate (TACE)*. This states on one or two pages together with a sketch, what the requirement is. Part II is completed by the HN who provides a cost estimate. The HN also sets aside at this stage national funds to provide the real estate, connecting roads and utilities. Finally Part III is completed by the MSC which validates the military requirement. SHAPE reviews each of the four MSC project lists to confirm their eligibility and to ensure that the MMR is

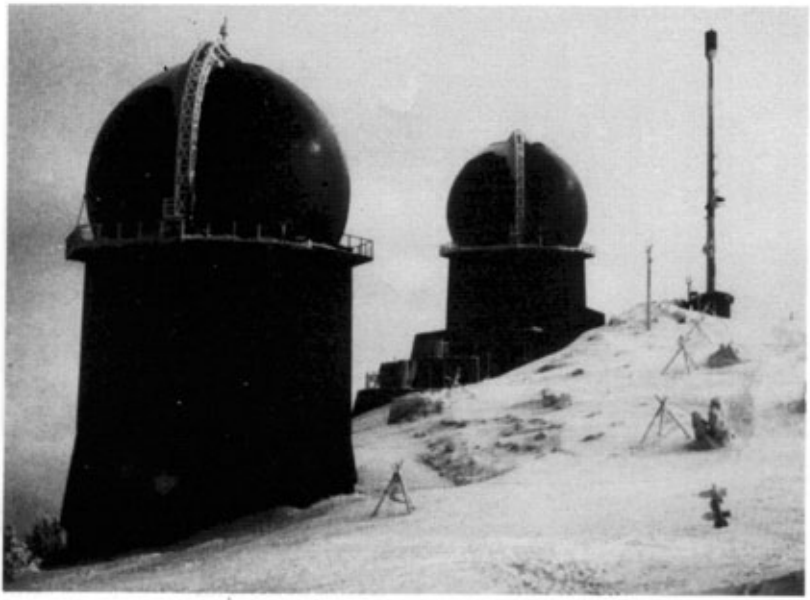

Figure 5. Warning installation

met. Each TACE list is collated to include projects up to the ACE fund allocation for that Slice. The balance of projects are placed in a reserve list to top up the main list in the event of a project dropping out.

The collated project list is known as the SHAPE Recommended Slice* which is forwarded to HQ NATO in Brussels. There financial and technical screening is finalised for approval of the North Atlantic Council. The one year programming cycle ends with the publication of an Approved Slice*. The HN can now request funds to spend on construction contracts. As an exception to this programming cycle an abbreviated procedure exists for projects with a value of less than 100,000 IAU (£225,000). Allocation of funds for these projects, known as Minor Works*, takes three months.

Project Implementation

Simultaneously with project programming the HN can begin implementation by drawing up to 3% of the project cost in Advance Planning Funds*. These funds are used for the preparation of a Type "B" Cost Estimate (TBCE)* which comprises a detailed design, including drawings and bills of quantities. This is again screened by SHAPE to ensure that the MMR is met, and by HQ NATO to ensure that the technical solution is the most efficient and economical. The TBCE forms the basis of the HN fund request to NATO. The HN, normally the NATO Infrastructure Branch of the MOD, can use an in-house agency or engage an engineering consultancy to undertake the design work. The latter is the most common method used by NATO nations. In the case of the UK the in-house agency, the PSA, is used. MOD UK is also unusual in that it does not have a properly established tri-service NATO Infrastructure Department. Once the design and contract documents have been prepared International Competitive Bidding* procedures are employed by the HN to award a contract to the lowest compliant bidder. The HN is responsible for supervision of the contract. Thus it is left entirely up to the HN to implement the

project. However in any construction project variations occur or the user may modify the requirement. Thus, SHAPE and the HQ NATO perform a monitoring role during this phase to agree such variations.

Project Acceptance

Once the contract is complete the HN prepares a set of as built-drawings and quantities. A Joint Formal Acceptance Inspection* is then conducted under the chairmanship of HQ NATO and comprises members of the HN, SHAPE and the user. The team inspects the facility and compares it against what was authorised to be built in the TBCE. A NATO International Board of Auditors* finally conducts a financial audit. The HN now formally hands over the facility to NATO.

Current NATO Infrastructure Inventory

Airfields — 227

The paving alone equates to a three-lane motorway from London to Cairo. With fuel Storage enough to fuel 3600 Jumbo Jets.

Ammunition Storage Magazines — 2380
Aircraft Shelters — 665
POL — 11,000 Km Pipelines
— 3 million m^3 Storage
Naval Bases — 80
— 3 million m^3 Fuel Storage
War HQs — 32
Surface to Air Missile Sites — 267
Surface to Surface Missile Sites — 21
Forward Storage Sites — 490
Reinforcement Support Sites — 131
River Crossing Sites — 200
Navigational Aids — 100
Communications Satellites planned — 6
Satellites in orbit — 4
Satellite ground terminals — 71
Telephone system
Signal system

Figures 4 and 5 show some typical installations.

RE Involvement

There are currently twelve RE PQE officers serving in NATO Infrastructure appointments with representation at SHAPE, AFNORTH, AFCENT, AFSOUTH, NORTHAG and in SACLANT. The NATO international environment in which we work is very stimulating and broadens the perspective to the wider NATO horizons. The projects are large and complex, individually normally running into several £ million. Travel is frequent and diverse. For example the author has made over 100 commercial air journeys to such diverse locations as Turkey, Crete, Gibraltar and N Norway, also site meetings for forward defence projects in Greece on the Albanian, Yugoslavian and Bulgarian borders. Dealings are made with every MOD and a wide variety of consultants and contractors to plan projects or deal with construction problems. NATO too provides for a high quality of life with first class clubs, excellent sports and recreational facilities; far better than one would expect on a British Garrison.

*Denotes commonly used and defined terms used in NATO Infrastructure

Portrait — Major John Stewart Liddell CMG DSO

THE Headquarters Mess has recently been presented with a portrait of Major J S Liddell CMG DSO. This fine picture was discovered in the cellars of the Royal Naval Medical Museum at Gosport and, after cleaning, was handed over to the Corps on long loan under arrangements made by Surgeon Captain D Lammiman.

Major Liddell joined the Corps in 1887 and, after service in both India and back in England, was seconded to the Egyptian Army in 1898. He was on the Nile expedition in 1899 and was then appointed to the Telegraph Department. He retired as a major in 1908 but continued in Egyptian Telegraphs of which he became Inspector-General. It was said of him that "it was fortunate for the British Government that he was head when war broke out and that he had worked the service up to such a high standard of efficiency". He was recalled to the colours during World War One and served on the staff in a special appointment until March 1916 and in the Egyptian Expeditionary Force until October 1918. After the war he became Under-Secretary of State in the Ministry of Communications in Cairo and later Inspecting Engineer, Egyptian and Sudan Government in London until 1924 when he retired.

He died in 1934 aged 65.

Portrait Major John Stewart Liddell CMG DSO

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MAJOR R W ALLAN C ENG MI PROD E M WELD I

Major R W Allan was commissioned into the Corps at the end of 1942. He was educated at Greenwich Higher Technical School and Goldsmiths College, London and joined the Home Guard at its inception where he attended a number of weapon training courses at Altcar and was then commissioned as Lieutenant Weapon Training Officer, 5th Battalion Shropshire Home Guard. Received Commander in Chief Home Forces Certificate of Appreciation 1 January 1942. A member of Army Officers Emergency Reserve until January 1964.

Not many people know of the part played in World War Two by the Port Repair Ships. We are indebted to Major Allan for the notes reproduced here.

FIVE Port Repair Ship Units were formed during the 1939-45 war. They were coasting vessels of approximately 2000 tons taken over from the Merchant Navy and converted in the Nelson Dock in Liverpool, using private and military personnel. Four had permanent catheads built into the bows, the other had a withdrawable one and these were capable of lifting 40 tons with a heavy windlass fitted. The forward mast was fitted to take 20 ton lifts in order to handle the diving bell weighing nearly 10 tons. The after mast was standard to take up to 5 ton lifts. The ships were:

975 PRS RE *SS Progress* ex Co-op Wholesale Society. This went out to North Africa with the 1st Army.

976 PRS RE *SS Nyroca* name changed to *Sir Walter Venning* the then quartermaster general. During the whole of 1943, 976 PRS was engaged in testing and checking different units being constructed in different sites around the coasts of Britain (many of which went to make up the Mulberry Harbour at Arromanches), converting Thames river barges to landing craft, assembling wooden sections of Canadian "MINCA" barges, and checking and servicing small TID Tugs run by the IWT. 976 worked at Cairn Ryan, Stranraer, Liverpool, Wigtown, Southampton, London Docks, Grimsby and Hull, was the first to be fully operational and the first to which Major Allan was appointed.

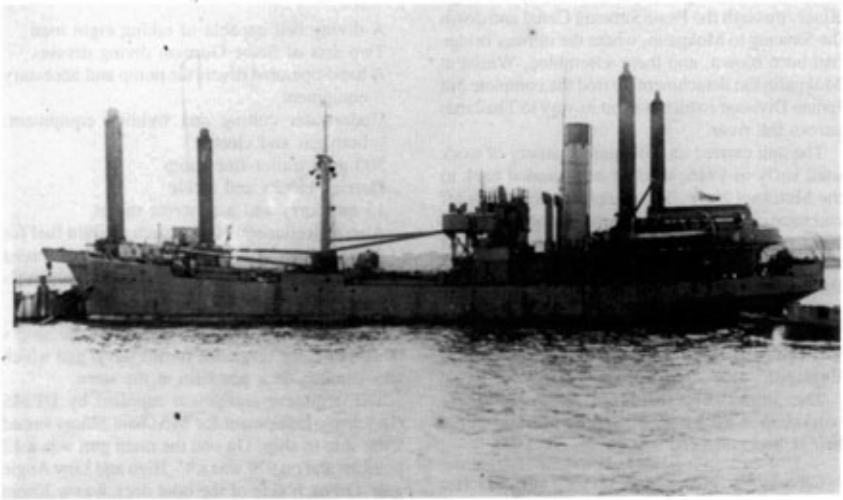
977 PRS RE *SS Thames Coast* ex Coastlines.

978 PRS RE *SS Vestra* ex Salvarsans. This unit went to Normandy and assisted with the construction, running and operation of the Mulberry Harbour at Arromanches until badly damaged in a gale when it was withdrawn to England for repairs.

979 PRS RE *SS Swift* ex General Steam Navigation Company. This unit did work at Boulogne and Ostend, in the Schelde, repairing lockgates to the Ghent Canal, and in the canal piled three Dolphins to which was moored an American floating power station which was coupled to the land station.

After this it was sent to Burma to be involved in marine salvage, moorings, floating landing pontoons, supervising two dredgers and their attendant hoppers, and making two railway ferries

Major R W Allan
Port Repair Ship Units



976 PRS RE *SS Sir Walter Venning* alongside "Hippo" or TN "Spud Pontoon", sections of which made up the Pier Head of the Mulberry Harbour. This was probably taken near Garlieston in early 1944, above the Isle of Whithorn, Wigtown Bay.

979 PRS RE *SS Swift* moored in Grand Harbour, Malta, March 1945 on the way to Burma

Port Repair Ship Units (1)

in Rangoon, taking them in sections up the Pegu River, through the Pegu-Sittaung Canal and down the Sittaung to Mokpalin, where the railway bridge had been blown, and there assembled. Whilst at Mokpalin the detachment ferried the complete 5th Indian Division (which was on its way to Thailand) across the river.

The unit carried on with quite a variety of work until early in 1946, when it was handed back to the Merchant Navy. The equipment was taken off and most of the workshop machines and generators went to replace machines in the Rangoon Port Commissioners boat and repair yard just outside Rangoon Harbour.

The personnel were split up, some to 980 HW Coy IWT and some to Singapore. Those left of low age, and release groups, were sent back to England.

The ships were fitted out with a machine workshop in the lower No 2 hold forward of the bridge and consisted of:

Circulating pumps for cooling the electric generators and air compressors
Shaping and Pipe Screwing machines
Welding, Fitters, Sheet metal workers and Electricians benches
Bench and Portable drilling machines
Workshop and draughtsman's offices
12" centre lathe with 10' bed between centres
Motor generator and converter set
International and Paxman diesel generators
2 Broom & Wade diesel-driven air compressors

Salvage pumps	Small hydraulic press
Machine hacksaw	Electric welding
Gas welding and cutting gear	generator
	5 cwt pneumatic hammer
Bench grinder	4'6" radial drill
Slotting machine	6" milling machine
Switchboard	6"centre lathe 4' bed

A very comprehensive stock of tools for all the above machines was held in storage cupboards situated above the machines and around the sides of the hold. In addition most of the above were duplicated on skids in hinged cases, so that if a suitable site on a quayside became available they could be set up ashore with a diesel generator to supply the power.

In No 1 hold there was:

A diving bell capable of taking eight men
Two sets of Seibe Gorman diving dresses
A hand-operated divers air pump and necessary equipment
Underwater cutting and welding equipment, both gas and electric
500 gpm trailer fire pump
Derrick blocks and tackle
15 cwt lorry and a concrete mixer
Also miscellaneous stores such as solid fuel for the galleys, lubricants, explosives, grenades and small arms ammunition for the unit's personal weapons.

The after hold held extra coal for the ship's boilers, and the magazine for the naval gun which was situated on a platform at the stern.

The defensive equipment supplied by DEMS (Defensive Equipment for Merchant Ships) varied from ship to ship. On one the main gun was a 12 pounder and on 979 was a 4" High and Low Angle gun. On each side of the boat deck was a 20mm Oerlikon and some had two pairs of FAM rockets, one fitted at each corner of the upper bridge.

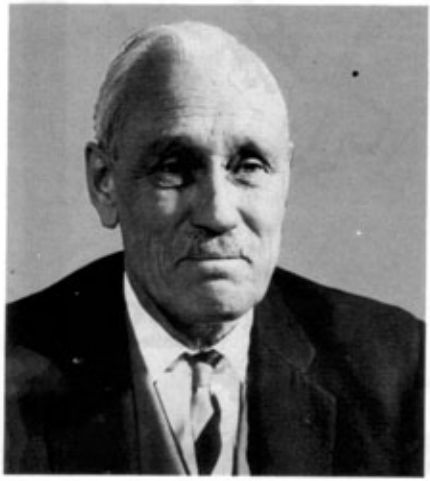
Personnel. The unit comprised eight officers and 72 or 74 NCOs/ORs. Officers were:

4 deck—1 maj CO	4 engineer—2 capts
2 capts	2 lieuts
1 lieut	

The deck officers were responsible for navigation and normal running of the ship; the engineer officers for the engine room, the workshops and engineering work. All officers were Marine Certificated having previously served time at sea in the Merchant Navy or Royal Navy, and were transferred to these units from others when volunteers were called for. The NCOs and men were skilled in one way or another to operate workshop machines, or as stokers and engine room personnel for running the ship.

Accommodation. Most of the Junior NCOs and men had accommodation in the 'tween decks above the workshop. Officers and senior NCOs had the cabins on port and starboard side of the bridge and under the boat deck—this had been the crew's accommodation in their Merchant Navy days.

Wartime Director of Military Survey Honoured by London University



"In two important Government services, the Ordnance Survey and the Survey of India, land surveying had the right type of man for 150 years because the senior surveyors were drawn, without exception, from the commissioned ranks of the Royal Engineers".

These words were spoken by Professor E H Thompson, previously a Royal Engineer Lieutenant Colonel, when he received the President's Medal of the Photogrammetric Society in 1957. They were quoted by Professor Ian Harley on 16 September 1988, when a Sapper flag from 42 Survey Engineer Group was drawn aside at University College London to unveil an Honours Board commemorating Brigadier Martin Hotine, who was Director of Military Survey during the period 1941-46.

Hotine, who died 20 years ago in 1968, was that "right type of man" and was one of the intellectual giants of his time. As Walter Smith, until recently Director General of the Ordnance Survey, said of him in a lecture in Cambridge last year, "Martin Hotine was many things to many men and women; to the Army he directed the British surveying effort during World War II; to photogrammetrists he wrote one of the first great English texts on the subject; to field surveyors he was the architect of the East African section of the Arc of the 30th Meridian and of the retriangulation of Great Britain; to mathematical geodesists he was the writer of vital papers on three-dimensional geodesy; whilst to countless others around the world he was the instigator, and for many years the first Director, of the Directorate of Overseas Surveys".

The unveiling ceremony, which was performed in the Department of Photogrammetry and Surveying by Hotine's daughter, Miss Margaret Hotine, was attended by senior members of the University and the surveying profession. The Director General of Military Survey was represented by Brigadier R Wood who is one of a dozen Military Survey officers who have gained a MSc in Photogrammetry in the Department. The ceremony, the Sapper flag and a subsequent reception provided a striking reminder of the wide influence of the Royal Engineers in this field and of the close links with London University.

Wartime Director Of Military Survey Honoured By London University.

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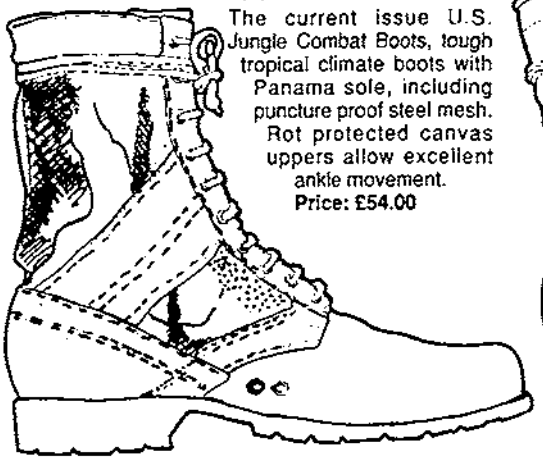

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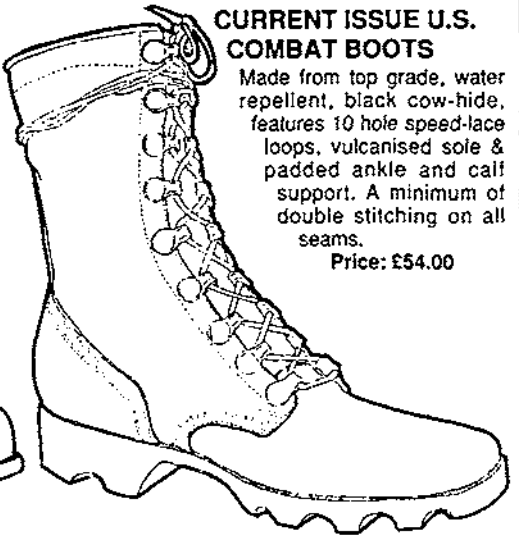

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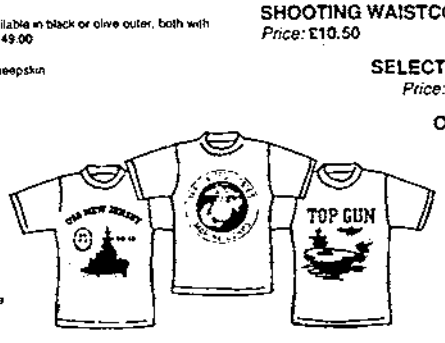

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Manda

ROGER MARSTON BA MSc (ECON) FRGS

Major Roger Marston served with the Royal Army Education Corps mainly in officers' education. Since retiring two years ago he has pursued a long-standing interest in the white settlement of Zimbabwe. He would like to thank Captain Haynes' grand-daughter, Lady Barbara Redman, for all her help with this article.

The Haynes medal was instituted in 1898 in memory of Captain A E Haynes, the subject of this article. It has been awarded variously to officers and NCOs for proficiency in field works. Since 1951 it has been awarded to the NCO passing out top of the Instructor/Field Section Commanders Course at 11 Engineer Group.

THE *SS Garth Castle* docked at Durban on the 26 June 1896. Throughout the voyage from England, and particularly since leaving Cape Town, the thoughts of the vessel's passengers, and especially those of the 110 military personnel on board, had switched from loved ones left behind or their ultimate destination in Mauritius to the news of the rebellion in Matabeleland. Not that there seemed anything to worry about; only three years earlier the settlers had, with minimal imperial assistance, comprehensively defeated Lobengula's 20,000 warriors with barely 700 men and duly annexed the Matabele kingdom. But now events had taken a serious turn. Press telegrams gave news of the spread of the rebellion to Mashonaland, it was even rumoured that Fort Salisbury had been captured by the rebels.

The following day Captain A E Haynes RE, commanding troops on the *Garth Castle* telegraphed the GOC in Cape Town:

"43rd Coy RE under my command, fully equipped and armed, leave Durban Sunday to augment Garrison Mauritius, also 50 men York and Lancaster Regt whom I could arm and equip. Could we not serve strengthen force proceeding Pungwe. I have experience of African expeditions having served on General Warren's Staff, Bechuanaland."

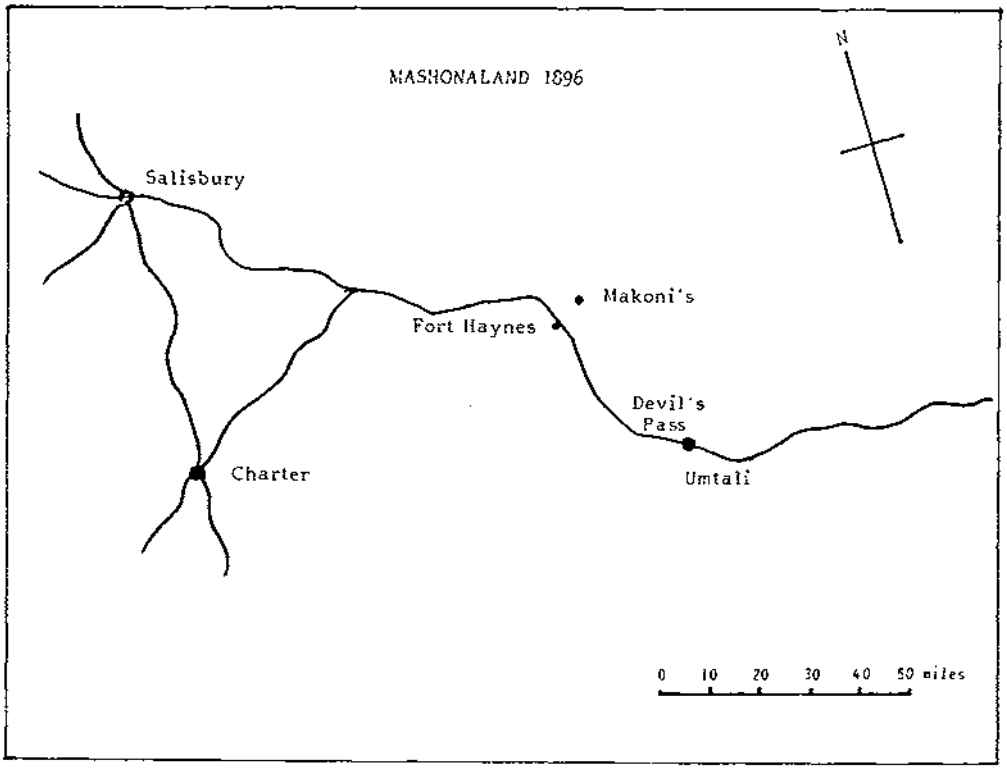
Conditional approval of Haynes' request awaited his arrival at Delagoa Bay (now Maputo) and he made arrangements for equipment to be shipped to Beira. With enviable speed his telegram was acknowledged the same day and the tools, including carpenters, bricklayers, masons and smiths chests, explosives and entrenching equipment, were despatched on the first of July. The previous evening Haynes had received approval from the High Commissioner in Cape Town to report to Lt Col Alderson, commanding the Mashonaland Relief Force, at Beira.

Haynes was accompanied by his wife Mary and their three young daughters; all of them were looking forward to a tour in Mauritius where the couple had met and married in 1888 whilst Alfred was employed on new works in connection with the defence of the coaling station. Mary had grave forebodings about "Fred" returning to active service and confessed to her diary that her "heart was as heavy as lead". But Haynes was a devoted officer and determined to do his duty; besides his career had spoiled him for routine soldiering.

Alfred had been commissioned into the Royal Engineers in July 1880. On his initial training at SME he was "adopted" by Colonel Warren, the two corresponded for many years, and in August 1882, before Haynes' YOs course was complete, he accompanied Warren on an expedition to Arabia. His experiences there had given him a taste for action and, after an impatient time back in England, he found himself back with Warren in December 1884 on the Bechuanaland expedition.

After this campaign and a spell with the Land Commission during which he experienced some clashes with the political administration, he was posted to Mauritius where he remained until March 1896 when he took over 43 Company which was destined again for Mauritius. The SS *Garth Castle* arrived at Beira on the 3 July 1896 and Haynes met Lt Col Alderson who had arrived earlier on the SS *Arab*. Two days later the men dis-embarked leaving their families on board the *Garth Castle* which immediately left. Mary Haynes stood at the stern and watched her husband go "he waved his helmet to me, and I waved back", like the rest of the wives she was bewildered and apprehensive, the more so because she was pregnant.

As the column gathered itself together, on the 5 July it had been designated the Mashonaland Field Force, Haynes and his men became



responsible for the transport of the forces's heavy equipment. Alderson had under command the Rifle Company, the Irish Company, 14 RA, 39 RE, 50 York and Lancaster, 14 Medical Staff Corps and some locally recruited scouts; a total of 358 men, 22 officers and 284 horses. After many difficulties presented by the terrain and the lack of draught oxen, Haynes and his sappers arrived exhausted in Umtali on the 25 July, only two days after the main column.

There was a pause for breath, reorganisation and the requisition of waggons and horses. Haynes was put in charge of the line of communications with detachments at Umtali, Devil's Pass and Headlands. This was a disappointment to him but it should not have been; communications were the key to the whole campaign.

Most white Rhodesians believed that the Shona were "unaffectedly pleased to see the white man in their country". Such a view was the product of arrogance and ignorance. The whites believed that all Shona had been subject to regular raids, and pretty brutal raids at that, from the Matabele. This had been true of many Shona living close to Matabeleland but the flood of guns into the country in the 1880s had stemmed even those depredations, but in the east Matabele raids were virtually unknown. Further, Matabele raids had the character of acts of God; they came, they exacted tribute and then they left but the whites, who arrived with the Pioneer Column in September 1890, had come and stayed. They exacted tribute, in the form of forced labour and hut tax, persistently, and imposed their own laws and moral values.

In addition the whites believed that the Shona's "principal characteristics are avarice, cowardice and a complete callousness to the sufferings of others". Consequently there was confidence in the established saw that "a white man with a sjambok and a box of matches can take any Mashona kraal. They're not fighting men." Thus the whites ignored early signs of discontent: the desertion of labourers, theft, abandonment of kraals rather than pay tax and violence against tax collectors, enforcers or the employers of labour. Despite this the actual rising came as a complete surprise and in a very short time almost 100 whites had been killed. After this "first ferocious wave of murders had expended itself, the rebels simply withdrew

Haynes' grave — photograph taken by the author April 1987

into fortified kraals and caves which had been well stocked up with water, grain, and cattle.''

Despite the rumours at Durban, Salisbury had not fallen to the rebels but morale in the laager there was fragile and it was vital to re-open links with Umtali and thereby the coast at Beira. Alderson determined not to cede ground to the rebels and strove to open the road and telegraph to Salisbury whilst at the same time establishing small garrisons along the route.

The major obstacle facing the MFF lay in the tumbled kopje country between the Odzi and Lesapi Rivers. Here lay the narrow defile of the Devil's Pass, the huge granite boss of Mount Zonga and the slug-like rock called Manda at the tip of which Chief Makoni had his kraal. Makoni had never paid tribute to the Matabele and had successfully defended himself against threats from the east; although he treated individual whites with courtesy he was understandably indignant at the pegging out of his territory for farms or gold claims. The kraal itself was defended by a series of concentric walls and fences constructed of thorn scrub; within the kraal passages led to caves deep inside the rock.

The column left Umtali at noon on the 28 July and reached the Rusapi River the following day. They skirted Devil's Pass, but came under fire from the right flank of its defenders, and without further incident rejoined the main road at 11 am on the 2 August. Alderson had decided to attack Makoni's kraal at daybreak on the 3 August after a night march and for the rest of the day the men made ready for battle with the engineers preparing dynamite charges and scaling ladders.

The Sappers were wakened at 1 am, to find Haynes already up, and stood to with their picks, shovels, scaling ladders and dynamite charges.

Alderson then addressed the whole force:

''Men, today is Bank Holiday and we are going on a little picnic. We shall attack Makoni's stronghold, and, in case of men and women putting their hands up, you must on no account fire on them. During the march there will be no smoking or talking: everything must be done as quietly as possible.''

The 295 men and 20 officers, amongst whom were 20 Sappers and two RE officers, Haynes and Sladen, with a Maxim gun and 2 seven-pounders, moved off at 2 am under a three-quarter moon and a gentle breeze blowing from Makoni's. The

Haynes Grave

chief had placed a piquet on top of a rock beneath which the direct route to Manda lay and this necessitated a detour over rough ground and through mealie and rice gardens. At 5.15 am the column reached a point one mile south of the kraal. Here Alderson split his force; the Rifle Company MI, machine gun and bulk of the volunteers under Captain Jenner moved to the south of the kraal to act as a stop group and to attack once the main attack had been launched from the north with the Irish Company MI and the detachment of RE supported by the two seven-pounders.

Forty minutes later the men were in position and the light had improved sufficiently for the guns to be laid. Two rounds were fired into the main kraal and in minutes "the whole kraal is like a stirred up ants' nest" with men shouting, drums beating and natives fleeing from their advanced positions outside the kraal. The main attacking force approached the kraal under heavy fire, some of which was uncomfortably accurate and, given that most of the defenders were firing "family guns", ancient muzzle-loaders that fired pot legs, pieces of glass, rough stones and even the entire necks of Worcestershire Sauce bottles, they moved with some caution.

The engineer detachment which, with the Irish Company, was aiming for the western corner of the kraal, took up a position behind some rocks where the natives' fires were still smouldering, with cooking pots set upon them and meat hanging in the trees nearby. Once the men had worked their way to within 150-200 yards of the corner and could see that the 7 ft high wall could be scaled, Alderson signalled for the force to the south of the kraal to advance. The Rifle Company charged with fixed bayonets and as soon as Alderson saw that they would gain the wall he ordered the advance of the Engineers and the Irish Company.

"Captain Haynes then gave the order for us to fix bayonets and get at them. This was done, and away we went at the double, charging up to the stone wall, the natives retiring before us. The Captain led the way over the wall, and we followed, pushing our way between the huts, which were entwined with brambles, and fired on the natives, who, in return, fired at us as they retired to their caves."

By 8 am the kraal had effectively fallen with both wings of the attacking force within the walls and the natives in retreat. But within the kraal there were many other walls and stockades which had to be cleared one by one whilst natives hidden in huts continued to fire. At this stage:

"our troops had become mixed up with the right attack, when Captain Haynes was struck by a bullet which passed through the right side of his helmet, through his head, and out at the front of his helmet-peak, laying the gallant officer low at once. Five of the six chambers of his revolver were empty when he fell. It was a melancholy sight to see our Captain, who only a few minutes before had been so full of dash and spirit, lying on a stretcher dead."

After the battle, the column continued on its way to relieve Salisbury having left a small garrison to contain Makoni and protect the telegraph line, and met little further resistance.

The rebellion simmered on for almost another year and in its final stages the campaign became one of attrition with the whites investing Shona strongholds, burning kraals and crops until the Shona were starved into submission. The imperial forces were not needed for this distasteful task and the MFF left Salisbury for the coast in December 1896 leaving behind them 26 dead.

Haynes' body, with those of Privates Smith Vicars and William Wickham, who were also killed in the assault, was taken to the laager from which the night march on Makoni's was started. Here they were buried in the shade of a tree just outside the earthen walls of the laager that Haynes had designed: Alderson had it named Fort Haynes. The 43rd Company arrived in Mauritius in October 1896 and reawakened Mrs Haynes' grief. On the 22 March 1897 she gave birth to a son who was given his father's name: Alfred Ernest.

'Mad' Exploits of a Happy Sapper

Sir Alan Harris gives a freewheeling description of a sapper's wartime life from the 'worm's eye perspective'.
This article originally appeared in the *New Civil Engineer*, on 12 Feb 87 and is reproduced with their kind permission.

THE Royal Engineers — the last non specialist arm of the British Army. Motto: *ubique* — one which we share with the gunners but with a difference. For us it means 'everywhere' for them it means 'all over the place'. (A field company building an assault bridge was in hazard from short-falling 25 pounder shot. The signal sent back said: Have we offended you in some way?)

The amicable sapper gunner antimony illuminate both. I say 'amicable'; a daughter of a sapper colonel reached the age of nineteen before she realized that 'bloody gunner' was two words. But the phrase can be seen, with an effort, as one of endearment.

Sappers are 'mad, married and Methodist'. 'Mad' doubtless refers to the nervous tic which tends to affect all who have often to do with high explosives, while 'married' reflects that inclination to regularity of conduct for which sappers are famous. As for 'Methodist', in a previous age the craftsmen who were welcomed by the RE were usually dissenters.

I am told that gunners are seen as 'poor, pious and prejudiced'. I can offer no comment.

An 'engineer' was a soldier (Shakespeare's 'engineer hoist with his own petard' was a sapper; they are still at it) until the mid 18th century when the French coined the phrase *ingenieur civil*; not the first but certainly not the least of the offshoots of the military art and mystery of engineering. (Whoever heard, by the way, of a civil gunner?)

Strictly speaking a 'sapper' is a man who digs a zigzag trench towards fortifications, the angles and depths of the trench being so ordered as to protect from fire. Once at the fortifications, either there was an assault of the engineers mined the walls, hence the common combination title 'sappers and miners'. The word sapper derives eventually from the Italian 'zappe' a shovel. They say that the only work of man visible from the moon is the Great Wall of China, surely built by the Imperial Chinese Sappers.

The engineers from time immemorial handled the engines of war — Aristotle speaks of the 'engineer who shot the catapult when he only wanted to show how it worked' — helping armies to move and to fight, building and breaching defences. The word 'artillery' is etymologically related to 'arc' and 'archery'. Perhaps with the invention of gunpowder, the gunners were the first of the specialist arms hived off from the engineers.

Joining up in the RE was, I suppose, much like joining any other mob. I had been working for the City Engineer of Coventry where I had gone to design a couple of RC bridges. I had extracted a promise not to be engaged upon air raid precautions so when the bridges were abandoned on the outbreak of war, I was not much use to anybody and the chief agreed to my volunteering for the Army. While waiting for call up (it needed influence to get into the Army quickly in those days) I did more work for the city architect, Donald Gibson (now Sir Donald) than I did for EH Ford.

It was the gracious life in Coventry. I was well paid, shared a stylish flat with two architects, Tommy Pinion and John Mallorie. We had a wide circle of friends and lovely ladies would look in from time-to-time to cook us a hot meal. Then the cultural shock. 'Tea' on arrival at Newark was a hunk of bread with margarine and a mess tin of near tea, eaten sitting on a heap of slag. Where was the napery, the dainty china, the toasted tea-cakes?

On an early route march, on receipt of the command 'march at ease' I lit my pipe, thereby anticipating the subsequent order 'march easy' and inviting the laughing comment from my sergeant: 'Bleedin' quick at some things 'Arris'.

Among the few hundreds in my entry was a dozen or so intended for OCTU. Most were straight from Oxbridge with whom I had little in common. They were so juvenile. Remember I was 24 and had got my degree five years before almost to the day.

I had a certain talent for protective colouration, so when I was made a temporary acting unpaid lance-corporal it was not universally acclaimed; I was one of the lads, was I not?

Our corporal, a grim faced Scot, ordered me: 'Get your lot formed up on parade'. I went into the hut and said: 'F-F-Form up outside'. The response was loud and definite: 'Eff off Arrisy'.

I seized on the sapper who I knew to be the mildest and most inoffensive of the lot and said 'What's your name and number?' 'What me' he said 'I ain't done nothing'. Soon they all drifted out on to the road. Crisis of authority; had I failed we might have lost the war.

At training battalion and later at OCTU we did fieldworks (digging in fact) map reading, demolitions, mines, knots and lashings, stick and string structures, bridges over wet and dry gaps (we did not have the Bailey yet), driving, vehicle maintenance, water supply and camouflage.

Much later I went on a camouflage course. Camouflage is *not* jazzy colouring though in the early days modish painters and architects sloshed paint on pill-boxes etc, after their fashion and one came to recognize an early Oliver Messel. Camouflage is matching the landscape and ever since my training, I instinctively place a small object on the desk or table to fit the pattern, the light and shade, and can never find the thing.

A quirk or two at OCTU: An old hand from India lecturing on riot control: 'If shoot you must, shoot at them. Never over their heads. What goes up comes down and washerwomen miles away have found themselves right in the centre of a fusillade.'

If you are unpopular and your name is inscribed on latrine walls in association with four letter words, look to you NCOs'. I liked the self confidence, it couldn't have been the officer's fault.

I was posted to a field company in my beloved Cornwall and given command of a section (now called a platoon) reputed to be the best subaltern's command in the Army. Picture it: 56 men, our own cook and cooking gear, our own compressor and tools, all of it on wheels. We could go anywhere and do anything and often did.

I began to establish a reputation. There are those who are slow but sure and I was the opposite. I could get my heap moving but fast and, after a while, I needed less often to send back a DR to seek some small but vital item unaccountably missing — like the detonators. In the mess I was known as 'Bloody' — 'Bloody Harris larking about again'; but who was Happy Harris of whom the troops occasionally *sotto voce?* (The term happy was equivocal in those days, 'slap happy', 'bomb happy', etc).

We built the 'Bodmin stopline' (I am still not clear as to whether it was to stop them going or coming) and also dug underground hideouts for deerhunting farmers, volunteer guerillas to be, in and around the Quantocks; we were careful over spoil and tracks to reveal nothing to recce aircraft. I have revisited one, I could not find the others. We got hold of a load of planks, scaffold tube and SWR and built fantastical improvised bridges as training. Huge fun.

My section had an anti-floating mine boom to test; we chose the river Exe. The brigadier came to have a look and asked: 'Where have you put your transport?' It happened to be ten yards away under huge elms and hidden by hanging camouflage nets. What a good tale it made — how I fooled the brig. But later I wondered. Perhaps there are better ways of letting a man know he has done well, and of spreading the gospel, than by telling him to his face.

I volunteered for the parachutists, foolishly, for I had injured a knee at Rugby just before joining up. 'Bloody fool', said the MO, 'go away and come back when the swelling has died down'. I should have known it would not stand up. I was ruled unfit for a field company as well.

Attached to HQ I had two months recceing all the rivers of south Devon for crossings to facilitate a counter attack from the West Country should they land in the east. I rode cross country on a BSA 500, measured the width of rivers by throwing weight on the end of a knotted string and guessed the depth of the water by the splash — all without dismounting. Aunts were everywhere and I always called on one at tea-time and they still had cream.

All bridges had been prepared for demolition (any mossy stone arch in those parts now has a chamber dug in). Oh the hassle when I pointed out to the field company responsible, a bridge they had overlooked! Oh the secret triumph!

The company mobilized for North Africa without me. We met again in 1945. I was working on reconstructing the Dortmund-Ems canal and they were removing the wreckage of bridges and replacing with Bailey. We still meet every year.

My fortunes were at a low ebb. I was posted to a training battalion in Chatham and was the obvious man to lecture recruits on the joys of parachuting. Happily I met an old pal who tipped me the wink that if a construction company was all that was left to me (perish the staff), port construction and repair (PC&R) was the thing.

A month after joining, my OC said in a wheedling voice: 'Would you like a course on diving?'

'Where?' (I'd been caught before). 'Chatham' he said. Now I had liked Chatham and was *persona grata* in the Wrens officers mess and had dear friends among the VADs. How nice to see them all again. A fortnight after my return there was a different tone of voice from the OC: 'Course on underwater bomb disposals; as diving officer you're going'.

So that's what I had bought.

PC&R was recruited from public works contractors. Nuttalls were the founders. Show a field sapper a Bailey panel and he will automatically team up with five others and run away with it somewhere whereas a PC&R sapper would suck his teeth, measure it, put a plumb bob on it, mark with a piece of chalk and look around for a crane. But for piling, timbering and such they were superb, the heavies of the RE.

It seemed to me that the most likely way in which they would lose their lives would be on mines and booby traps and I was given the task of training them. We made a game of it. We obtained a large supply of thunderflashes and igniters, and men going out on works would find the site booby trapped on their return.

One squad, having found and disarmed six trip wires and various other gadgets, laughed and turned to get on with the job and switched on the compressor engine, which was their undoing. Officers, returning late at night, would need to sweep their way to their kip. The second-in-command having studied the habits of the OC, booby trapped the WC, forgot all about it and sprung his own mine.

Our exploits stood us in good stead. In our part of Normandy we became known as the firm to turn to for mine trouble. One day we were called in by some infantry who showed us what looked very like a Teller mine only it was made of wood and in place of a fuse was a cork. Obviously used by the enemy for training in mine laying but what was it doing under the RSM's camp bed?

At Knokke in Belgium was a terrace of some dozen identical houses known to have been booby trapped. The locals said they went in by the front door and climbed down a ladder from the WC window. It seemed sensible to do the reverse. we soon established their plan and were able to approach every booby trap from behind, easy. But every house was dealt with exactly the same; an odd one or two might have got one of us.

I have few boasts; one is that we lost no one at this game. I speak not of senior officers whose casualties alas were heavy, but they had been used to supervising rather than undergoing training and were by definition mine-proof.

And so to Normandy, but that's another story.

After demob I did not do so badly, thank you very much. But I am still a sapper.

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Report from Brunssum

COLONEL J E NOWERS B SC(ECON)

The author joined the Corps in 1959 having obtained a B Sc(Econ) degree at London University. He served as a Field Troop Commander with 7 Field Squadron in Osnabruck, as a Troop Commander in the Junior Leaders Regiment and as 2IC 2 Armoured Engineer Squadron in Höhne. After Staff College he went as GSO2(W) to the Armour School at the RAC Centre, Bovington. As OC 45 Field Support Squadron in Nienburg, he became interested in steam traction and wrote a definitive history of Steam Traction in the Royal Engineers, published in the Journal in 1981–1982.

Three more tours in Germany followed including three happy years as BLO at the Pionierschule in Munich. After a further tour in England (at Chertsey) he moved back to continental Europe and is now Chief of Public Information at AFCENT.

SAPPERS who have served with HQ AFCENT (Headquarters Allied Forces Central Europe) at Brunssum in the Netherlands will be interested to know that the skyline there has changed.

The Headquarters is sited in the buildings of the old Hendrik State Mine. Coal has been mined in the province of Limburg for centuries. Deep mining began with the Industrial Revolution in the Netherlands.

Construction of Hendrik started in 1910 and coal output began in 1918, when four shafts were sunk. The Headquarters is built over no 4, the deepest at 1057m, with eight separate levels totalling 122kms of galleries. At the peak of its development in the 1950s, Hendrik employed some 5700 people and produced 1½ million tonnes of coal a year.

With the discovery of cheap natural gas in the north of the Netherlands, the Dutch Government decided to close the mines. At Hendrik, closure began in 1967 and was completed in 1969. The shaft was plugged with concrete at the 272m level and backfilled with rubble.

At about this time, France withdrew from the integrated military structure of NATO and HQ AFCENT had to move from Fontainbleau. The Dutch Government offered the site of Hendrik Mine as the new location. The arrival of HQ AFCENT helped to relieve some of the social and economic effects resulting from the closure of the mines.

HQ AFCENT took up residence on 1 June 1967, when extensive alterations were made to the mine buildings to make them suitable for a military headquarters. However, the prominent pit-head tower and the water tower remained. A redevelopment programme meant that these structures had to be removed but before demolition could begin, the communications antennae mounted on the pithead tower had to be resited and a new communications tower 80m high was built in 1987.

The demolition contract was let to the Dutch firm of Van Vliet for about 1 million Dutch guilders. The water tower came down very quickly. However, the pit-head tower was a very different proposition. The structure, which had been erected with no thought to its eventual removal, was 62m high and consisted of 6000 tonnes of reinforced concrete with up to 400 kgs of reinforcement steel per cubic meter.

The contractor brought on to site the largest mobile crane in Europe, a Japanese machine. The Hitachi KH 1000 is a crawler machine weighing 230 tonnes with a jib of up to 120m fitted. The crane hoisted a 20 tonne crawler and other machines on to the tower and demolition proceeded using concrete breaker and hydraulic cutting attachments. The crane was used to remove large pieces of debris and to reposition the smaller

Colonel J E Nowers
Report From Brunssum (P198)

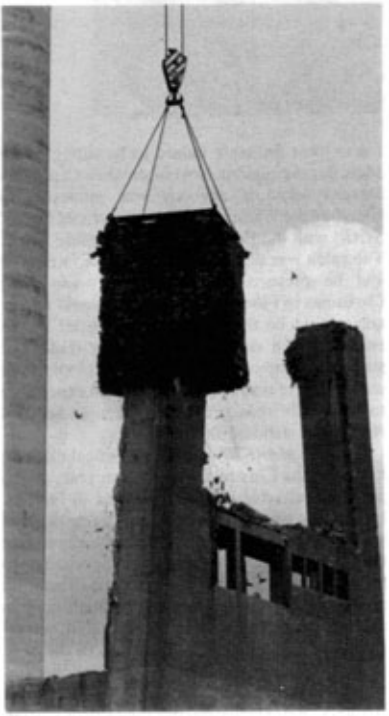
Demolition under way. The jib of the Hitachi HK 1000 is in the foreground

machines as the tower came down. Flame cutting and a swinging weight were also used. Bulk exlosives could not be used because of the restricted nature of the site, however, once the main structure was down, borehole charges were used to fracture the main supporting legs. A protective quilt was placed around the leg, suspended from the crane, to contain the effects of the explosion.

When the site was cleared (April 1989) what had been a familiar landmark for the past 30 years on the South Limburg skyline had gone.

As well as the population of South Limburg, the tower will be missed by the dozens of pigeons that have roosted there since it fell into disuse.

Concrete breakers and hydraulic cutters at work



Borehold charges firing. The two large pieces of debris are displaced pigeons

Report From Brunssum.

Ex Market Star

LIEUTENANT A BILOUS

Lt Bill Bilous was commissioned in 1985. After completing the YO Course he went to 82 Squadron, Junior Leaders Regiments • Royal Engineers. During his tour as a troop commander, he ran the Regimental Junior Devizes to Westminster Canoe Team, the Mountaineering Club and lead a small expedition to Norway. Since March 1989 Lt Bilous has served as a Troop Commander at 35 Engineer Regiment.

I WAS most fortunate indeed to be sitting in the Mess Bar one night in November when Capt Tony Stevens asked if anybody was interested in attending the Winter training camp *(Ex MARKET STAR)* with the Corps Freefall Parachute Team. The catch was that I had to learn how to freefall and be prepared to spend 3½ weeks over Christmas in Florida. The course I would undertake would be the Accelerated Freefall (AFF) course, which does not involve any traditional static line jump or the use of round canopies, but uses intensive instructions and freefall experience to drastically reduce the time taken to get to a reasonable standard of proficiency.

Exercise *MARKET STAR* is an annual exercise held over the Christmas period each year, and to guarantee suitable weather it is held in Florida. Its aims are twofold: To develop existing skills of the Corps Competition Team, and secondly to give the intermediate skydivers the opportunity to progress up to competition standard. The drop zone used on this exercise was a small civilian airfield in the town of Zephyrhills in central Florida. The drop zone is reputed to be the most famous in the World and has long-standing ties with the British military; the Royal Marines, Royal Artillery, Red Devils and our own Corps freefall team all train there regularly.

The Royal Engineers Sport Parachuting Association (RESPA) was formed in the early 60s and comprised of a central core of keen skydivers from 9 Parachute Squadron. In the early days the Association's display team were known as the Eagles and were sponsored by Barclays Bank. Now, thanks to Major Ian Rosenvinge's enthusiasm the RESPA is an expanding concern. It is based at Dover where it employs a full-time Display Team who provide displays for units and civilian events. The Association also has active senior and intermediate competition squads. Other aims of the RESPA are to train sappers (mainly Junior Leaders) on static line jumps and to encourage all ability groups to progress and compete.

Until my recent experience in Florida I had never parachuted. The thought of parachuting had always appealed to me but I was 'put off' by the prospect of the slow progression from static line to full freefall. It takes the average parachutist 50 jumps to become competent at freefall and to make 50 jumps requires dedication, time and expense. The round parachute on which the static line student will make his early descents will be grounded by the slightest crosswind, which could mean endless weekends sitting on the drop zone waiting for the weather to clear.

Accelerated Freefall (AFF) is a new concept in parachuting and has only been available in this country for four years. The course comprises eight levels which can be achieved in eight perfect jumps (on average a more normal figure of

Lieutenant A Belous
Ex Market Star

An early descent, my stomach is still in the DC3 (Lieut Bilous centre, Major I Rosenvinge on the right)

10 to 12) after which the student is able to:

Exit and fall stable (unassisted)
Turn 360° left and right
Backloop
Forward movement
Track — rapid forward movement

These movements allow the student to jump solo, safely and competently. The qualification gained in the British Parachute Association system is Category 8 (BPA Cat 8). In the first three levels of training the student is accompanied by two AFF instructors. Their job is to stabilise the student and then to give in-air instruction and adjust the student's body position. Both instructors are very experienced and are capable of deploying the student's parachute should the need arise. For the next four levels only one instructor accompanies the student and specific manoeuvres are carried out. All jumps up until this point are carried out from 12,000 feet and the freefall lasts for one minute. The final level is conducted from 5,000 feet and the student has to exit and deploy his parachute within five seconds of leaving the aircraft. The AFF student uses a "square" (steerable) Ram-air canopy and the complete set of equipment used is very similar to that used by qualified and experienced skydivers. Hence less time is spent converting to different types of equipment than a conventionally trained parachutist would have to do.

Ground training for my first jump took four hours and it was only when the engines on the ageing DC3 came to life that real fear gripped me. Inside the DC3 were 40 other qualified skydivers all of whom were actually looking forward to leaping out of a perfectly safe aircraft at 13,000 feet! My two instructors and I were the last to leave the aircraft on its third pass over the drop zone. Surprisingly it was easy to commence the countdown to leave the aircraft, Ready — Set — Go and suddenly I was hanging in the sky travelling at 120 mph towards the earth. The feeling was amazing and it took about 55 seconds to reach 4,000 feet where I deployed my own parachute — (I was quite surprised that it actually opened!) — and guided myself safely back to the drop zone. The first jump was the easiest. I now knew of the fear that I had to face each time I climbed into the DC3.

Ex Market Star

I attained level three of my training within the following two jumps and the training so far just centered upon falling stable. My fourth jump required me to turn left and right whilst in freefall, this time I was with only one instructor. My exit from the aircraft went wrong, I lost control and began tumbling through the sky. It took me 30 seconds to stabilise my position and I did not get around to performing my turns. That jump shook me a bit and I was in two minds as to whether or not to go up again. My instructor did not hold the same doubts and I was back in the air within an hour to repeat the jump, this time successfully. My confidence was renewed and I progressed through the next four levels of the course within five jumps.

Now that I had achieved my BPA Cat 8 my next task was to gain confidence by skydiving solo and to convert to a more advanced deployment system. It was only at this stage that I began to look forward and to enjoy my skydiving. I began to train on Relative Work (RW) which quite simply is working with others in the air. My aim at this stage was to reach BPA Cat 10 before the end of the exercise (BPA Cat 10 enables the skydiver to jump with others without the supervision of an instructor). Before I reached this level however I was fortunate enough to participate in an attempt to link 15 Sappers in the sky. The most that linked from the two attempts was 12 which equalled the existing record.

By my 22nd jump I had passed all the required tests and was awarded the BPA Cat 10 award. I managed to slot in only one other jump on *Ex MARKET STAR* which turned out to be the most rewarding and enjoyable.

Skydiving is certainly the most exhilarating sport that I have experienced. The feeling of 'flying' through the air is impossible to describe except to say that it is an amazing sensation and extremely addictive (once you overcome that initial fear). The Corps at present is short of officers interested in skydiving, possibly potential candidates are put off by the length of time it takes to become competent. AFF provides a safe, rapid and exciting entry to the sport and any YO's interested in taking up the sport should contact the Corps Team at Junior Leaders Regiment Royal Engineers, Dover or telephone: Old Park Military, Extension 8241, for further details.

LEARNING TO HANG GLIDE

When considering a course in hang gliding it is important to seek a professionally run school. All schools listed below have been inspected and approved by the British Hang Gliding Association, the governing body of the sport in the UK.

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Contact: John Clarke

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Contact: Mike Orr

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Contact: Eddie Bilous

Actions Speak Louder Than Words Or The Day I Halted An Army

DAG

RECENTLY a group of retired officers was gathered at the bar in the Headquarters Mess discussing past glories. The conversation turned to Orders and in particular those that had a major effect on the situation at the time. This reminded me of an action rather than a verbal or written order on my part which had stopped a complete Army Corps in its tracks.

In late 1944 the Japanese thrust into India had been halted and the enemy had been driven across the River Chindwin. By the end of December the XIV Army's push into Central Burma and towards the River Irrawaddy and Mandalay had commenced.

Initially because of the restricted terrain the advance was limited to a single armoured column consisting of a squadron of medium tanks, two companies of infantry, a forward observation officer and a Sapper recce officer. The route was the reverse of the one used for the withdrawal of Ist Burma Corps in 1942. The road followed the line of the Sipadon Chaung which ran east to west into the Chindwin at Shwegyin. Because of the sharp embankments and bends in the chaung the road crossed the river bed fairly frequently on timber trestled bridges. These bridges had accepted the wheeled vehicles and light tanks of 1st Burma Corps two and a half years earlier and presumably had been used by the Japanese in the interim period. However they would not take the weight of the medium tanks and therefore a diversion had to be made around each one before the advance could continue.

Very quickly it was appreciated that the armoured column could motor along the river bed and under the bridges instead of over them. The monsoon was long past and the chaung was dry with a firm sandy bottom. Thus the advance continued apace. Although the tracked vehicles negotiated the sand with no difficulty it was considered that wheeled vehicles would become stuck. So the infantry, FOO and RE recce officer rode on the backs of the tanks. In those days there were no APCs and battalions were limited in the scale of bren-gun carriers.

Shortly before Christmas on a beautiful sunny day I, as the RE recce officer, was riding on the top of the leading Sherman tank motoring fast down the Sipadon Chaung. There was nothing to disturb the peace and I was able to watch the butterflies flitting out of the trees on either side of the river. As we rounded a corner I observed a jungle fowl sitting on the branch of a tree overhanging the chaung. Although the tracks of the tanks were muffled in the sand there was considerable noise from the engines but this did not seem to disturb the bird.

I have no fame as a marksman and the chance of hitting a target from a swaying tank was remote. Nevertheless I could not resist the temptation and I let off a round from my .303 Lee Enfield rifle. Needless to say the bird was in no danger but the crack of the rifle shot echoing between the banks and rising above the noise of the tanks' engines caused the drivers to halt. In effect this resulted in the advance of the whole Corps coming to a stop.

The infantry company, from a renowned county battalion, which was riding on the leading half squadron, immediately deployed and proceeded to put into practice the advance to contact — straight out of the training exercises on Laffans Plain and watching it I was proud to be a member of the same Brigade. Turning around I noticed the rear company (not an integrated part of our division) was moving with equal speed but in this case to the rear behind the bend in the river.

I now realized that I had done nothing to speed the end of the war and the longer I delayed in correcting the situation the more trouble I would land myself in. By this time the leading point section was well forward of the halted column but it had had no luck in contacting the enemy. This was understandable as the nearest Japanese were some twenty or thirty miles further east.

I reported to the column commander who ordered the troops to return to the tanks. This took rather longer than the deployment but eventually the chaos was sorted out and some form of order was re-established. As the last of the infantry soldiers was climbing onto the tanks the brigade

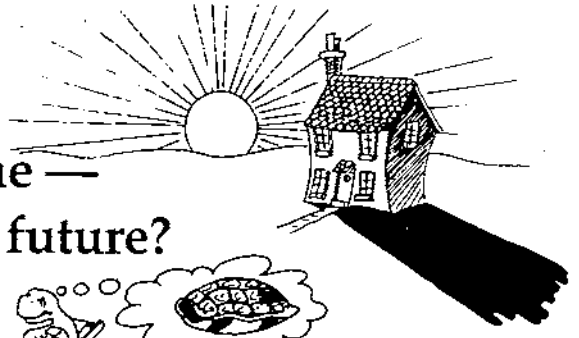
Tanks travel along the dried-up river bed of the Sipadon Chaung, monsoon River of Central Burma

commander roared up in his jeep to ascertain the cause of the delay. I was much relieved to note that as the column commander explained the situation to him a slight smile played around his lips. Nevertheless he still felt that it was incumbent upon him to slap my wrist for causing the delay.

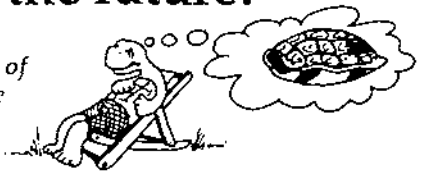
The order was given to continue the advance and once again I was riding shot gun on the leading tank, wondering how the brigadier had managed to negotiate the river bed in his wheeled jeep when we, the Sappers, had calculated that it was unsuitable for wheels.

Actions Speak Louder Than Words

Thinking of buying a home — now or in the future?



If so read the tale of Toby the tortoise

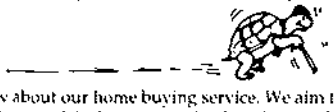


Once upon a time Toby decided to buy his dream home. He thought that having found the property it would be plain sailing. But alas, this was not the case. He needed a mortgage but didn't know how to proceed. Suddenly, everyone was trying to advise him, until he didn't know which way to turn.

He was told he needed a solicitor, which frightened him a little. The world had suddenly become a very confusing place. He seemed to be needing lots of money for surveys, indemnity premiums, solicitors' fees — the list seemed endless.

Nobody wanted to talk to him anymore it appeared. He didn't know what was happening to his mortgage and the solicitors said they were searching for something but still the home wasn't his. He seemed to be coming up against a brick wall. He was totally in the dark and very frustrated. Of course this fairy story has a happy ending. Toby did acquire his home — eventually — but decided never to move again!

(or only very slowly)



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Memoirs

BRIGADIER A B CLOUGH CBE MC SGM

Born 30 August 1888, died 5 January 1989

THE death of Brigadier 'Arch' Clough in his 101st year brought to an end a life of remarkable activity and achievement. Few survive to reach such a great age; fewer still are able to enjoy life to the last, as Arch most emphatically did. ARTHUR BUTLER CLOUGH was born in Hamilton, Lanarkshire, to the son of Colonel A H B Clough CB MVO, R Munster Fusiliers. He was educated at Clifton and then at the 'Shop', from which he was commissioned into the Corps in the Summer of 1909. His first posting was to 38 Field Company in Cork, a mounted unit in which he spent three very happy years learning soldiering and taking full advantage of the many sporting pursuits which in those days were matched to the slender purse of a subaltern.

Early in 1914 he was offered a survey job in Northern Nigeria, involving triangulation and detail survey in the tin mining area. The independence in very primitive conditions, not to mention the considerable extra pay, were attractive to a young man. However, the outbreak of the First World War brought it all to an untimely end and Clough soon found himself with the Anglo-French Expeditionary Force to the Cameroons, then forming in Lagos.

The Sapper contingent of the Force was not an established unit but, in his own words, 'an odd assortment of bodies who had some pretence of having engineering qualifications — railway engineers, public works specialists, surveyors, etc.' Initiative and improvisation were their principal resources. For example, map supply was virtually non-existent, so that the future D Survey SHAEF cut his teeth by making multiple hand tracings of a rough sketch map which was urgently needed for operations.

The capital of the Cameroons, Duala, fell early in the campaign, but clearing the Germans out of their colony completely was a slow and tedious process. The railway was the key to all progress, and the repair of its disabled locos and track were priority tasks. Since the railway served the retreating Germans as well as the advancing expeditionary force, Clough was on several occasions sent off to blow up bridges behind German positions along the line, these forays involving night movement up river or creek, first by motor-boat and then by canoe, and finally an approach march along bush trails to the target area which would usually be guarded by an ambush party. His GOC commended him as 'a most energetic and capable young man, ever ready to undertake difficult tasks, who on more than one occasion displayed conspicuous gallantry thereby rendering most valuable services'. Hardly surprising then, was his exploit as one of the crew of a small boat which saved the lives of the Senior Naval Officer and four others whose own boat had capsized offshore in dangerous surf. This earned him the award of the Sea Gallantry Medal, a highly unusual distinction for an Army officer.

After two years in the unhealthy West African climate, Clough was sent home to the even less healthy Western Front. He got to France during the Battle of the Somme and spent much of the next two years in the line North of Arras, in command of 210 Field Company. In 1917 he won the Military Cross.

Early in January 1918 he became the RE Instructor at the Senior Officers' School in Aldershot, with the temporary rank of Lieutenant Colonel. Shortly afterwards, in March, he married Doris Canning whom he had first met twelve years previously. At his centenary birthday party he told his guests a most amusing story of how he had become engaged to Dot while she was still at school; her headmistress, under the impression that he was a relative, allowed him to visit her and failed to notice the engagement ring which she wore round the neck under her school uniform!

Brigadier AB Clough CBE MC SGM

After the end of the War, Clough's survey experience in Nigeria led him to ask for another Survey appointment, and he was posted to Chatham as Assistant Instructor of Survey at the SME. He remained in this post for four years, during which time a very large number of officers passed through his hands. He found the work most rewarding, his enjoyment being considerably enhanced by the practical survey tours which in those days, were spent in delectable parts of Wales or Devonshire.

In 1925 he was appointed British Commissioner on the International Commission set up to delineate the boundaries between Albania, Yugoslavia and Greece. The topographical problems were that one might expect in such rugged terrain, and the task was complicated by political problems, by religious differences, and by such mundane considerations as the need to divert the boundary so as not to separate villagers from the grazing grounds of their flocks. There was also a considerable amount of banditry, so that the work was not without hazard — the entire Italian delegation had been ambushed and shot up in 1924. On his return to Britain, Clough received the Order of Skanderbe together with an illuminated address of thanks from King Zog; regrettably, Government policy required him to return these marks of esteem, which to him 'seemed a bit of an insult to the King'.

A short Works appointment in Colchester was followed by a similar one in Malta, this latter being rescinded in favour of a War Office posting just as he was embarking. With a true Nelsonian touch, he decided that it was by then too late to do anything about it and so he proceeded to Malta where he was able to enjoy a few restful weeks before returning home to serve his time with the Geographical Section General Staff. He found the work in London interesting, but was less enthusiastic about the daily office life in dark rooms which did not suit his open-air spirit. After less than a year GSGS he was delighted to be offered the appointment of Senior British Commissioner on the Anglo-Belgian Boundary Commission charged with determining the boundry between Northern Rhodesia and the Belgian Congo. This involved a triangulation framework astride the watershed between the Zambezi and Congo Rivers; the water-shed defined the boundary and therefore had to be precisely located by lines of levels and marked by pillars. After two very happy years, Clough's party was relieved and he came home to write his reports and sign the agreements in Brussels with his Belgian opposite number. For his services to the Commission he was awarded the OBE.

In the Spring of 1930 he was posted to the Ordnance Survey in Southampton and took charge of the Publication Division. At this time he set up his home in Romsey, where he lived for the next 35 years. In 1934 he was appointed, in the rank of Colonel, as Deputy Director and Executive Officer in the OS, where the years immediately before the Second World War saw a big increase in map production for the War Office. In 1939 he was told that he would be Director of Survey of the British Expeditionary Force if and when it mobilized, and so it was that on 4 September 1939 he opened his secret orders and left immediately for France, being one of the first members of the BEF to land there†. During the so-called phoney war period a structure of field survey units, map depots and controlling staffs was built up under Clough's direction, there having been nothing comparable in the peace-time Regular Army. Virtually all the men involved, Clough included, survived Dunkirk; but of course much valuable equipment was lost there.

In the post-Dunkirk phase there was a move to disband all D Survey units and staffs entirely. Some forceful persuasion by the then Director General of the Ordnance Survey, supported by other senior officers including Clough who saw clearly the folly of such a move, resulted in a proper establishment structure being authorized. Early in 1941 he was appointed Survey GHQ Home Forces with an office in St Paul's School. Once the threat of invasion had passed, thoughts began to turn towards an Allied return to the Continent. Among the early preparations was a huge project to re-map the Northern coastal region of France at a scale of 1:25000, for which purpose an RAF Spitfire Squadron was tasked with obtaining the thousands of air photographs required. In due course, GHQ Home Forces became 21 Army Group,with Clough still the D Survey. When COSSAC was set up, he was appointed to be its Director of D Survey, and eventually he became Survey SHAEF in which, of course, he was in very close collaboration with the Americans on all technical matters to do with maps and survey. Not surprisingly, Clough's personality enabled him to form an extremely cordial and effective working

†See also 1939 Letters by Martin Hotine page 136.

COURAGE REMEMBERED is about a unique organisation. The Commonwealth War Graves Commission was founded by Fabian Ware in 1917 and has provided a proud tribute to the war dead ever since. While it is not an official history of the Commission, this book pays tribute in turn to the many members of its staff who have contributed to the creation and maintenance of immaculate cemeteries and memorials around the world.

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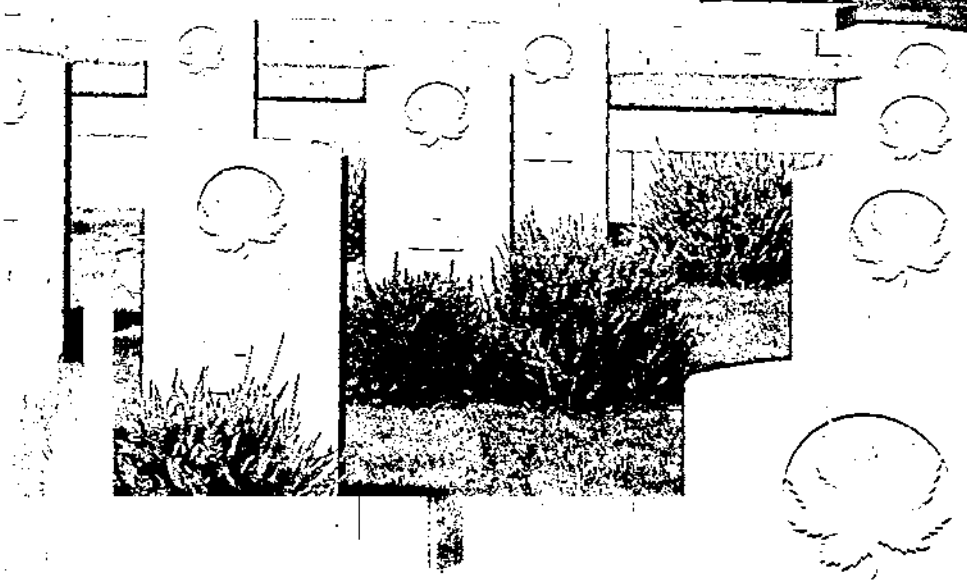
COURAGE REMEMBERED

T. A. Edwin Gibson and G. Kingsley Ward



relationship with the Corps of Engineers officer who directed the US survey effort at SHAEF. The break-out from Normandy posed huge problems of map supply and there were many other technical difficulties of an unusual nature to be resolved before the War finally ended. Clough's able direction of these major survey operations was recognized by the award of the CBE, the US Legion of Merit, and the French Legion d'Honneur and Croix de Guerre with Palm.

Arch Clough retired in 1945 and returned to live in Romsey. Never one to do nothing, he started work for a British company mining pyrites in Portugal. He learned the ins and outs of commercial life, and made a number of visits to the mine itself until, in 1960 the company was taken over and he resigned.

Shortly after the end of the War he was asked to write an Historical War Monograph covering the history of mapping and survey during the War years. Entitled "Maps and Survey: the Second World War" and running to some 330,000 words, this work took three years to complete and is accepted as the definitive work of reference on the subject.

Arch moved from Romsey to nearby Michelmersh in 1965, where he remained until his death. Living in the area for nearly sixty years, he naturally formed very close links with it. He was for a time the Chairman of the Romsey Conservative Association, for some twenty years he served the local branch of SSAFA, first as its Secretary and then as President; and until the early 1970s he was a Voluntary Visitor to war-disabled pensioners in the Romsey area. There are few people living in the Test Valley who have never heard of him, and he stood high in the regard and effection of all who knew him. Until recently, when advancing years finally reduced his mobility somewhat, his upright and unmistakably military figure was very much a part of the local scene. He carried with him to the grave the dignity, courtesy and good manners of the age in which he was born. Kind and gentle, especially with children of whom he was very fond, he was forthright when the occasion demanded it, and at such times there was no mistaking the authority in his voice.

His interest in the Corps never flagged. In his ninetieth year he accepted an invitation to a Guest Night in the Headquarters Mess, and was delighted to find that the high standards were little changed from those of 1909 when he had last attended such a function — on his Batch Night! In recent years he went several times to the Colonel Commandants' 'At Home' at Minley Manor, the last occasion being just two months before his 100th birthday.

On the morning of 30 August 1988, the Lord Lieutenant of Hampshire called upon him in person to deliver a telegram of congratulations and good wishes from Her Majesty The Queen. He also received a telegram from The Queen Mother, who had remembered that he had been an usher at her wedding. Later in the day, an official Sapper delegation called on him and presented a gift from the Corps to mark the occasion.

The family celebration of the centenary was attended by nearly 200 relatives and friends, and was a very happy occasion. Arch's speech at the end of lunch was a tour de force, spoken firmly and clearly with the aid only of his astounding memory, and covering with much gentle humour the span of his long and eventful life. He was clearly a very contented man and had every reason to be so.

His family has been his great pride and joy, and an immense support to him. This was especially true in the dark days following the very sudden death, in 1976, of his beloved wife Dot. He is survived by his daughters Angela and Patricia, by six grandchildren and by eight great-grandchildren.

BStGI, UHK

MAJOR R C MATTHEWS MBE TD

Born 14 June 1900, died 17 February 1989, aged 88

Major R C Matthews MBE TD

REGINALD CHARLES MATTHEWS Reg or Reggie as he was universally known, was a much loved and loyal friend of the Corps who served with great distinction in the 1939-45 war, after 15 years with the TA. He was commissioned in 1924 into 208 Field Company (he had already had a spell with the Royal Flying Corps in 1918 having concealed his true age) but served throughout the war mostly as OC 211 Field Park Company which he raised in 1938 and remained with until 1944, when he was carried off on a stretcher, (44 Div was disbanded before Alamein). His service took him to France with the BEF, to North Africa in time for the battles of Alam Halfa and Alamein and in Sicily from which the Company returned to prepare for the landings in France where he landed at Arromanches on D-Day (he was very proud of this). He lost part of his foot in an incident at Nijmegen and was evacuated back to England where he spent the rest of the war recovering. In 1945 Reggie rejoined Caffyns in Eastbourne becoming a director of the firm for which he continued to work part-time after his retirement. AC, in Caffyns own memoir to Reg, remembers him thus: "Reg Matthews was a legend in his own lifetime. He joined the Company in 1922 when my grandfather 'P T' was at the helm, and served him, my father and uncle, and finally my generation loyally and steadfastly for 60 years.

"When I suggested to him in 1982 that at 82 he ought to think about retiring, his response was — 'Your father did say I could go on as long as I wanted!' And in a way he did, for he was still selling cars right up to the end."

So much for the facts, but Reggie will be better known for his marvellous outgoing personality which filled his own life and those with whom he came in contact with carefree fun and laughter, and a spirit of good cheer and fellowship. Again, Caffyns memoir recalls: "Reg went there as Assistant Manager, and straightway established a reputation that was to last a lifetime, for a tongue-in-cheek look at the various *Caffyns Characters* of 1928 says: 'Mr R C Matthews. When business is quiet Mr Grinstead gets him to laugh loudly and people stop and look in at the windows. When commercial travellers stay too long the same laugh sends them away, without any orders, but so happy.' Similar stories are legion. There was the messenger frequently sent over to Head Office from the Town Hall across the road with the request, please stop Mr Matthews from laughing so much — he's interrupting the Council's deliberations." Always on the go, he loved sport. He had been an expert roller skater, captaining the Eastbourne team and, with his first wife Mignon, becoming undefeated champions in the All England Roller Skating competitions. Cars and motor cycles were a passion. He was a regular racer at Brooklands and was for a time Chairman of the South Eastern Section of the British Automobile Racing Club. This love of machines was particularly helpful to him as a field park company commander where life was often dominated by the need to coax old and hard-used vehicles and machines into prodigies of performance.

His goodwill and ingenuity were further assets often put to the test. In one celebrated incident in North Africa he was invited to manufacture a bird-cage for the Army Commander (Monty). Faced with a shortage of suitable materials he improvised by dismantling an abandoned grand piano.

Many are the monuments left behind by which Reggie Matthews may be remembered; his

successful business, the Eastbourne memorial Homes for Ex-Servicemen of which he was chairman, the Military Museum in the Redoubt which he helped to set up. Perhaps the one he would most wish to be remembered by is the flourishing REA Club at Eastbourne, in premises which his influence secured for the branch of which he was President since 1950 and is now enjoyed by so many ex-servicemen and their families. But the greatest monument of all must be the personal bonds of friendship which Reggie established with people of all ages from all walks of life and individuals to whom he gave so much personal support and encouragement. At his funeral in the very large All Souls church in Eastbourne they gathered to pay their respects and it was hard to find a seat.

Reggie's second wife, Rita, to whom he had been married for thirty years, died in 1983 and he leaves a widow, Edith (his third wife), a son Brigadier Michael Matthews (late RMP), and a grandson and granddaughter.

LFM, AC

BRIGADIER G O M JAMESON CBE MA

Born 29 December 1905, died 23 March 1989 aged 83

GUY OSCAR MAYSTON JAMESON was perhaps best known in the Corps and the Army for his sporting prowess.

He was a quite outstanding athlete. He won a half-blue for tennis at the university in 1927 and played as a competitor at Wimbledon for six years 1927-33, becoming a member of the All-England Lawn Tennis Club. In 1933 he had to play Fred Perry, who became champion three years later, in the opening round on No 1 Court as his first match, and won several games against him, entirely avoiding whitewash.

He represented The Shop and Trinity Hall at both athletics and Soccer and won the SME Gold Medal in 1932, winning the quarter-mile and hurdles. He was Army tennis singles champion in 1930, 1937, 1952 and 1953 and Army doubles champion with Lt C R D Tuckey in 1931, 1932 and 1933 (Tuckey and G P Hughes were the British doubles pair in the Davis Cup when Great Britain won the cup).

Oscar won the Army regimental doubles with Tuckey in 1932, and later was Army Veteran Champion twelve times. He won both the Army Squash and Army Lawn Tennis Championship when a brigadier. He was Chairman, and later President of the Army Squash Association for some years.

At squash rackets he was one of the leading players in England and was a finalist in the British Amateur Championship in 1933 and a semi-finalist in 1931 and 1946. For successive years in the 1930s he was beaten only by the undisputed world champion, the Egyptian Amr Bey, and indeed won the first two games against him (out of five) in the final one year. When a British Amateur Veterans Competition was initiated in 1951 for over 45s, Oscar won it for five successive years before retiring unbeaten.

Although in his own words "my squash and tennis careers were necessarily interfered with by my Army career" his successes should not obscure the fact of his professional prowess, all the more remarkable perhaps because of the time he spent both playing and organizing sport.

He was commissioned into the Corps in 1925 after passing out second in his batch at the Shop, and winning a Prize Cadetship and Cadet Scholarship. He was in the first YO batch to go to Cambridge as part of his Sapper training. He was a Party Officer and Assistant Adjutant at the

Brigadier G O M Jameson CBE MA

Training Brigade RE from 1931 to 1935 a time he described as "one of the most interesting and enjoyable jobs I have ever done", but this was virtually the last Sapper appointment he held as he then went to Staff College and became something of an AQ specialist. The War took him to India, where he held a number of AQ appointments; Iraq, where he was Director of Organisation for Paiforce and finally to 14th Army where as Brigadier in Charge of Administration for the Advance Echelon he was responsible for preparing bases and lines of communication from Dimapur to Imphal for subsequent advance into Burma.

A number of staff jobs then followed after the war in the War Office, in New York on UN Military Staff Committee and finally in Bielefeld as DAQMG 1st British Corps. He then retired early and was Bursar of Corpus Christi College, Oxford from 1956 to 1969; he became a Fellow in 1958 and an Emeritus Fellow in 1972. RGMN, a colleague from those days, remembers "When he applied for the post, the College was told that he was a quiet man, 'not a typical brigadier' (a cunning phrase to reassure suspicious academics). The testimonial went on to say that if he were selected, he would fit in very well and be liked very much. And so it proved.

"A College Bursar at that time was a mixture of civil servant, accountant, hotel manager, land-agent, and doer of whatever had to be done; nowadays, the job has been sub-divided, and there are more professional advisers, but Oscar seemed to do it all himself. His spare and lucid memoranda earned high marks from the dons, a hard lot to please when it comes to written work. He was responsible for much new building, he got rid of a lot of furniture that was antiquated without being antique, and he brought running water where it had never been seen before in the 450 years of the College. He won the loyalty of his staff, whom he supported in turn; when he said a thing was so, it was so, and when he asked for something to be done, it was done. But when his friends try to remember colourful incidents, they can think of none; the wheels went round noiselessly, as they should for a good staff-officer. He will be remembered with respect and affection by his Oxford colleagues, and by his college's tenant-farmers, no less than the Army." In his own words "So I had two very happy careers, the Army and Oxford".

He leaves a wife, Olive, three sons, one of whom served in the Corps from 1956-66, and a daughter.

SAS REJ RN

COLONEL V F CRAIG MC

Born 5 February 1896, died 14 October 1988, aged 92

Colonel V F Craig MC

COLONEL "MICK" CRAIG died last year after an adventurous life which included a full career in the Corps. He was born in Australia of Ulster parents and educated at Clifton and the Shop, where he spent only six months, being commissioned in 1915. While serving in France, he was awarded the MC "for conspicuous gallantry ... constructing a bomb block and holding it with an advanced party of infantry for many hours against determined enemy attacks"; and also served in Mesopotamia and Siberia.

Between the wars Craig served in Germany (he was at HQ the Army of the Rhine in 1925), in Egypt from 1925-30 and China from 1933-36 (where he commanded the Royal Engineers in Shanghai); and in the UK.

During his time in Egypt, Craig took part in a number of arduous exploratory expeditions by car and truck in the Middle East, five of them led by Major Ralph Bagnold, of the Royal Signals, in whose book *Libyan Sands* they are recorded. He played a crucial role both in obtaining supplies and

as navigator. A letter to Craig from the Ministry of Defence was found among his papers enquiring about a "new method of land navigation" invented by Bagnold, S Kennedy Shaw and Craig when stationed in Egypt. In reply Craig described it as a "sun compass".

Craig had always been a leading sportsman having played rugby for the Corps and (in 1926) for the Army. He was also a skier and a yachtsman.

He travelled widely both during his service and after retirement when he settled in London with his wife, Ursula, whom he married in 1931 and who died only three weeks before him. The couple who had no children, left generous legacies to the REA and REYC.

DW

BRIGADIER J C B WAKEFORD CMG FICE FIMechE FCIT CEng

Born 23 August 1898, died 13 October 1988, aged 90

Brigadier John Wakeford CMG was born on 23 August 1898, in Liverpool. He was educated at Malvern and commissioned in the Royal Engineers in 1917. He served on the Western Front and subsequently in Russia, where he was mentioned in despatches and where he obtained invaluable experience as a subaltern operating independently; his OC was so far distant that it would have taken three weeks to receive a reply to any message. He recalled that on their return to England his unit, 384 Company, landed at Gravesend during a rail strike. They obtained a brewery lorry for the baggage and marched to Chatham, being met at the top of Strood hill by the Corps band. They then marched through Rochester and Chatham being the first to return from the Great War as a unit.

Service with the Army of Occupation was interrupted by an engineering course at Cambridge University. After a number of UK appointments he went to Singapore in 1935. Three years later he returned to become Chief Instructor at the Railway Training Centre, Longmoor with the rank of Lieut Colonel. The Second World War took him to Africa; where he took part in contingency planning for the resupply of North Africa via Matadi in the Congo and thence overland down the Nile should Gibraltar have been lost. He then went to India and Burma where he became Director of Transportation as a Brigadier. He retired from the Army at the end of the war with Japan and was appointed Chief Commissioner of Railways Burma. His work in Burma involved the post-war reconstruction and reorganization of the railways which were in a chaotic state. For this work he received the CMG.

Subsequently after a brief tour as Chief Engineer Cameroons Development Corporation, he became Senior Engineer in West Africa for Rendall, Palmer and Tritton, consulting engineers to the Governor of the then Gold Coast for an ambitious programme of trunk road and bridge reconnaissance, design and construction. He returned to the London office in 1963 and remained there until finally retiring in 1966.

His first wife, Grace, died in 1965, his only daughter in 1986 and his second wife in 1988.

CFR REJ

Brigadier J C B Wakeford CMG

AIR COMMODORE A N DAVIS DSO DFC BA

Born 14 August 1918, died 28 October 1988 aged 70

Tony Davis is third from right

TONY DAVIS, who was educated at Cheltenham College, entered the Shop as a GC in January 1937 and was subsequently commissioned into the Corps in August 1938. He was a member of 40 YO Batch, all of whom went up to Cambridge in October 1938. He was at Magdalene where he read for the Mechanical Science Topics for one year as all the Batch returned to Chatham for a short three month course on outbreak of war in September 1939.

In early 1940 the shortage of pilots resulted in a call for volunteers for service with the RAF in the Army Co-operation Squadrons which were then equipped with *Lysanders*. Davis was one of five Sappers who volunteered (the others were Æ J M Perkins, R E Young, Basil P W Clapin and Gil W Cole) all of whom miraculously survived the War. He was posted to 16 Squadron RAF commanding "A" Flight as a flight lieutenant. At a later date Davis transferred to other activities in the RAF where he served throughout the war with distinction gaining both the DSO and DFC.

After the war he was accepted into the peacetime RAF — which was unusual. REY writes: "On 18 November 1945 he flew me from Hendon to Rivenhall, the last time we flew together. In 1946 he attended the Staff College at Haifa. Tony Davis was a pilot of very much above average ability. On one occasion, while flying Lysander V9286 he was caught in a heavy snowstorm which had not been forecast. In danger of icing-up he force-landed on a football field in the Taunton area and later successfully took off after having all removable items taken off to reduce weight." His further service included a tour as Air Attaché in Moscow. In 1968, having attained the rank of air commodore, he retired to reside in France.

His last appointment was with Western European Union at Fontainbleau.

ÆJMP, ACD, REY

Air Commodore AN Davis DFC BA

BRIGADIER E C R STILEMAN CBE MICE

Born 3 August 1902, died 3 April 1989 aged 87

EDWARD CHARLES RADULPHUS STILEMAN died in April after giving much of his life to the Corps both during his service and after retirement. He was commissioned in 1922 and after training, joined 55 Field Company serving with them at Catterick until going to Nigeria in 1927 for four years with No 2 Colonial Survey Section who were providing a new grid system for the country.

Three years in England followed including appointments at Shoeburyness and Tidworth and the by now recently married Major Stileman was posted to Egypt in 1934 for what was to turn out to be some twelve years overseas service. He was ACRE 3 Division Engineers in Egypt with responsibility for gas warfare and in 1938 was posted to Burma, again as ACRE for a hectic period during which he was responsible for all electrical and mechanical development as well as for the engineer works programme during the rapid and belated build-up of the Army.

He took part in the retreat in the first half of 1942 during which he was involved in the destruction of communication and supplies and the creation of the escape route to India. He was SORE 1 Burma Front, mainly on road construction from Manipur Road to Imphal and Chittagong to Maungdaw and in September 1943 was appointed CRE 5 Indian Division in which role he records the building of 120 miles of road including five miles total length of bridging first in the Arakan with its attendant problems of lack of stone and innumerable tidal streams and later through the mountains of Tiddim. Then in 1944 he was appointed Chief Engineer 4th Indian Corps for the planning and execution of the reoccupation of Malaya.

In 1946 he returned home to "normal" peacetime CRE's work which included taking command of 30 Army Troops Engineers for the project at Camberley to complete the expansion of the RMA which, because of shortage of time, it was decided would be done with troop labour. 65 per cent of the men were national servicemen and, despite the difficulties of post-war shortages of stores, the job was completed one day ahead of schedule albeit at the cost of round-the-clock work, seven days a week.

Tours then followed as Commander No 1 Engineer Stores Depot at Long Marston, where he reduced the wartime dump to its status as a permanent depot; as Chief Engineer Hong Kong, where amongst other projects he was responsible for the TWSK strategic road; and, finally, as Chief Engineer Eastern Command from which he retired in 1956.

Towards the end of 1955, Industry had raised £3m to help independent and direct grant schools to bring the teaching of science up-to-date and Stileman was appointed Technical Adviser to the Chief Executives of the Industrial Fund for the Advancement of Scientific Education in Schools. Then, in 1958 he was appointed Chief Engineer to Arthur Guinness, Son and Co based at their Park Royal Brewery from where amongst other things he was responsible for building breweries in Nigeria and Malaya.

Rest and retirement were clearly never to feature much in Ted Stileman's lifestyle. He gave his time generously to a number of voluntary causes. He was Chairman of the RE Benevolent Fund and a founder trustee when the Benevolent Fund and Old Comrades Association were combined. He is remembered with affection in the REA of which he was a very active and supportive life Vice President. He was also honorary Colonel of 114 (London) Engineer Regiment. HPM recalls:

Brigadier E C R Stileman CBE MICE

"Our Sappers took him to their hearts. One always knew when he was around as one heard his booming voice long before he came into sight... things seemed to go better when he was around. As CO on the disbandment of the regiment in 1967 his advice and guidance to me were invaluable. He remained a trustee of the Regimental Trust until his death." On top of all this he was a Governor of the Royal School of Bath, a Council Member of the Regular Forces Employment Association and involved in numerous local voluntary organisations in his adopted home town of Walton-upon-Thames.

He leaves a widow and three daughters.

CPC RWTB HPM

MAJOR SARDAR BASHIR AHMAD KHAN RIE

Born 23 June 1914, died 20 September 1988 aged 74

A recent letter from Pakistan brought me the sad news of the death last September of Major Sardar Bashir Ahmad Khan, Malerkotla State Forces and RIE. We were colleagues together with the Malerkotla Field Coy S&M, Indian State Forces, in Burma in 1942. Known by his initials of BAK, he was the officer who eventually took over as OIC Firing Point during the Battle of the Sittang Bridge and who had the unenviable duty of demolishing the 12-span railway bridge after orders had been passed on to him from Brigadier Noel Hugh-Jones, commanding the troops defending the bridgehead, by his OC — Major Richard Orgill RE. Two brigades retiring to the bridgehead had been cut off by 33 and 55 Japanese Divisions. The demolition was successful and the bridge was never repaired. It was dismantled after the war and a new bridge constructed further upstream.

In 1943 BAK left the unit to serve with HQRE 39 Indian Training Division (Lt Col Dennis Swan), with HQ Bengal S&M in Roorkee as A/CIF and with HQRE 7 Indian Division (Lt Col Tom Wright) during the opposed crossing of the Irrawaddi near the ancient city of Pagan in 1945. He took command of Malerkotla Field Company in 1946 in Madras, thus following in the footsteps of his father, General Sardar Ausaf Ali Khan Bahadur, Mashir-ud-Daula, CIE, who commanded the unit during the Boxer Rebellion in China in 1900. BAK was still commanding when the unit became integrated into the Indian Army in 1951. It was renamed 369 (Malerkotla) Field Company and still survives. BAK retired the following year and lived near Lahore on his farm.

BAK was a most experienced and fearless combat engineer officer. He was Mentioned-in-Despatches in 1941 (Waziristan) and 1942 (Burma). He followed the traditions of loyalty to the British Raj that had been well established by officers and men of the Malerkotlas not only since the unit serve as a Sapper & Miner company in the British Expeditionary Force in the Punjab, 1897, but also since it fought as Infantry Pioneers with General Lord Lake in the Battle of Leswarree, 1803. The Malerkotlas had 89 battle honours.

With BAK's death, I have lost a true brother-in-arms. He is survived by his wife, several sons and a daughter, to whom every sympathy is extended on the loss that they have sustained.

ERBH

Major Sardar Bashir Ahmad Khan RIE

COLONEL G A LINDELL DSO OBE ED

The following is an extract from the eulogy given by Colonel R C 'Dick' Pemberton, MC, at Colonel Lindell's funeral last year.

GORDON ANDERSON LINDELL was born in Taihape in 1906; his family moved to Mt Maungenui in 1913, and his schooling was at Mt Maunganui and Tauranga High Schools. He inherited the engineering skills of a Swedish father who 'could do anything with iron', and who managed the Public Works Department Workshops which built the components of the Mohaka Vaiduct. Gordon was very proud of that viaduct, and painted a water-colour of it not long ago. His studies in draughting and engineering were mainly done the *hard way* — by correspondence. As a youth he particularly liked yachting and rowing, sailed one of the first P-class boats, and later was joint winner in the NZ pairs Rowing Championship. He could still scull beautifully in 1945 when, on holiday after the European war finished, he borrowed the oars from an Italian boatman on Lake Maggiore.

Gordon married in 1933. In those days he worked at the Public Works Department offices at the mount, Tauranga, at Stratford and then Wellington. In the thirties he was in the Territorials in the Infantry. On the outbreak of war in 1939 he enlisted and joined 7 Field Company RNZE.

While the 1st Echelon baked on the sands of Egypt, 7 Field Coy, with the 2nd Echelon, sailed to England, trained and stood by to defend Britain. They joined the New Zealand Division before Greece, fought in Crete where Gordon was wounded, and later took part in the *CRUSADER* campaign in North Africa. By then Gordon was Adjutant. He was severely wounded near Tobruk and returned to New Zealand to recuperate and supervise the training of engineer reinforcements, became the Chief Instructor of the Engineer Wing at the Army Schools of Instruction at Trentham — the forerunner of the present day School of Military Engineering. He was also a Staff Officer NZE at Army Headquarters until 5 January 1944 when he re-embarked for the Middle East.

Gordon rejoined the Division in Italy, after Cassino, and commanded 7 Field Company from 30 March 1944 through the rest of the war.

It was on the approach to the Lamone River that Gordon earned the DSO for his energy and inspiring leadership. Part of the citation read: "Throughout the operations which resulted in the fall of Faenza, Major Lindell, as a Field Company Commander, displayed outstanding organizing ability and gallant leadership in clearing lanes through the mined areas, building roads, and erecting several important bridges in the face of the enemy". Subsequently a bridge built by his company at Faenza was named Lindell Bridge. A photo of this bridge inspired Gordon's recent paintings.

In the post war period Gordon kept up his Territorial soldiering; became CRE of the Engineering Regiment and in 1955 was awarded the OBE. Between 1964 and 1970 he held the Honorary appointment of Colonel Commandant of the Corps of Royal New Zealand Engineers.

After the war he returned to the Ministry of Works, was County Engineer at Eketahuna, before being appointed Designing Engineer to the Wellington Harbour Board. He remained in Wellington 'till his retirement, and shortly afterwards he moved to Auckland but continued to work for the Corps serving on the Committee of the Sappers' Association, particularly doing welfare work. For some years he was Newsletter Editor, and he was President. He has earned the Sappers' Association merit badge "For Service".

He was elected an honorary member of the Institution of Royal Engineers in 1960.

Colonel Gordon Lindell, DSO, OBE, ED, C Eng, MI Struct E, FNZIPE, was someone rather special — a loyal devoted husband, a loving and generous father and a loved grandfather; a skilled draughtsman and meticulous designing engineer; an outstanding soldier both firm and just, a careful planner, organizer and leader, a kindly thoughtful gentleman, and a 'gentleman' in every sense of the word. His passing leaves a great gap among his family and friends.

RCP

Memoirs in Brief

Brief Memoirs are published below on a number of distinguished men whose deaths have been notified recently in the national press and who served in the Royal Engineers at some stage in their careers.

BRIGADIER C P C S BRIGHT, CBE, died on 19 September 1988, aged 86. Christopher Bright was a regular soldier who was commissioned in 1923 and served in the UK and Gibraltar before going to France in 1939 with the BEF. He commanded 283 Field Company, was CRE 47 Division and then went to India and Burma. Postwar he served in the UK and Far East, his final appointment being Senior UK Army Liaison Officer in Canada.

GEOFFREY BINNIE, died in April, aged 80. Geoffrey Binnie served in the Corps in World War Two and was a distinguished civil engineer from a family of civil engineers. In the 1950s he designed and built the Dokan Dam in Northern Iraq and later, was responsible for the Mangla Project on the River Jhelum in Pakistan.

He became senior partner of his family firm in 1956, a Fellow of the Royal Society in 1975 and Fellow of the Fellowship of Engineering in 1976.

BRIGADIER J INNES CBE, died in March 1989, aged 81. He was Deputy Director of Freight Movement in the War Office in World War Two and after retiring from the Army joined the Bristol Aeroplane Company at Filton where he was in charge of administration.

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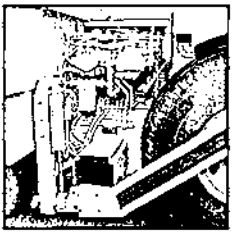

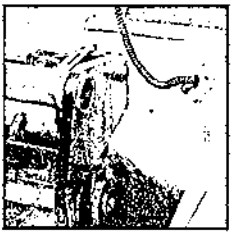

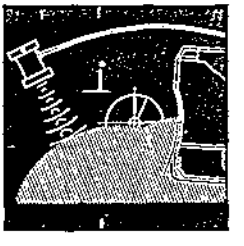

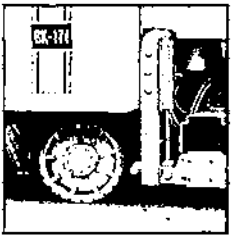

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Correspondence

Irregular Thoughts

From Capt P F E Salmon

Sir, — I studied with interest the letters of Brigadier Hooper (December 1988) and Major Whittaker (April 1989) on TA retention.

With a variety of TA experience over twelve years but currently standing back from the mêlée while at University I feel able to make some observation.

We should take a critical approach and study the work of the principal analysis of industrial management. For example — Henri Fayol's 'wheel' of management processes includes motivation as a key segment. Detailed research by psychologists Maslow and Herzberg on motivation reveal many clues about retaining TA soldiers.

Many have a reasonably good standard of living, a comfortable house and most of the material possessions they feel they should have. They have family and friends for support and social well being.

What makes them give up their spare time is challenge. They are seeking recognition, responsibility but above all a sense of achievement of having tested themselves both physically and mentally and *enjoyed* themselves *at the same time*.

If they do not reach this objective regularly they will leave the TA to do something more interesting instead.

This is clearly why such a high proportion leave so soon after the 'high' of having passed the recruits course. They cannot see a challenge ahead.

The answer lies in training. **Realistic, challenging, interesting, imaginative, competitive training**. (Since time is of the essence it has to be predominantly military).

Young troop commanders know this as do their squadron commanders, but too often they are frustrated by administrative difficulty.

Administration is very time consuming and TA officers are by their very nature very busy men in their civilian occupations. Often they are unable to spare enough time to wrangle with all the 'search for resources', the rule books in 'military-ese' to find clearances, authorities, bidding procedures, safety requirements, etc. Not to mention the differences between civilian and army ways. For example if 90,000 odd men train at weekends why are the stores depots shut? Or if Joe Bloggs Plant Hire has a machine standing unbooked in his yard and he gets a call it is on site tomorrow, not six months later if all the bids are in triplicate, monogrammed and stamped by all and sundry.

Even if all these things are necessary they are prohibitively cumbersome to the training planner. He needs help. Valiant efforts by the 'in-unit' regular staff who are laden with other more routine administration and who are faced with the task of familiarizing themselves with all the ins and outs in two short years in that locality are not enough.

Perhaps a district monthly magazine for each troop commander explaining and suggesting what is available might be a good idea.

The cost of full-time staff would soon show dividends in retention, heightened performance and full use of expensive facilities.

I don't know all the answers but someone should be finding out.

Everyone has their views on the problem of retention. The soldiers themselves both leavers and stayers are the only ones from whom the real reasons can be extracted. The trainers — troop and squadron commanders — are those who can explain the true difficulties in their own and others' proposed solutions. Those in authority should discuss with them, interrogate them, analyse their answers. Above all they should avoid the **right** answer to the **wrong** question and take effective action, properly followed through. (Study Drucker.) — Yours faithfully, Capt P F E Salmon, R Mon RE(M). *2 Lower Pulley Cottages, Pulley Lane, Bayston Hill, Shrewsbury.*

Ulster Defence Squadron Royal Engineers

From Major A M Roberts

Sir, — I would like to put forward a long held view that better use could be made of the civilian building tradesmen now serving in the Ulster Defence Regiment (UDR) as both permanent cadre (PC) and part time (PT) soldiers. Using these tradesmen on construction tasks would provide a more efficient and cost effective engineer force in the Province. I have formed this view after some eight years in Northern Ireland during varying stages of the present troubles and in

which time the wheel has turned full circle in Sapper strength levels. In 1976 there were three squadrons, in 1984 one squadron and in late 1988 a peak of three squadrons, which has again reduced to two.

All this illustrates the adage "... There is no future in Ireland, only the past played over and over again"...

The current Royal Engineers workload in the Province is high and a roulement squadron has been deployed from BAOR to help out. As either the workload or the skill content of future tasks increase (both of which appear likely on historical precedent alone) then I feel that the Corps could rapidly become over faced on specific operations. Ironically, training time in the Corps has decreased in the last ten years with apprenticeships at Chepstow now of two years duration instead of three. Similarly, the Class 2 & 3 Trade Courses, have been replaced in most trade disciplines by a single 0-2 course.

A recent "straw poll" carried out within two battalions showed that artisan tradesmen abound in the UDR both as PC and PT soldiers. They are attracted by higher pay than prevails on the local building trade and the prospects of a steadier income without layoffs given the current high unemployment levels in the Province.

I recognize that the formation of such a command would need to be reviewed by people who are more aware of the broader perspective that I. However, I would suggest that the unit should be under the command of the CRE Northern Ireland and have the following permanent staff to expect a measure of command and control over it:

OC
2IC Ops
SSM
Clerk of Works (C)
Chief Clerk
Signals SNCO
REME SNCO (VMB)
MT/Plant NCO

The strength of the unit would be in the region of eight officers and 125 other ranks. In the future I envisage a number of the permanent staff posts being filled by a locally recruited PC soldier as is currently the case in the UDR. Bearing in mind the demographic trough forecast for the 1990s, when recruiting sufficient soldiers of suitable quality will undoubtedly pose problems, such a unit may help to overcome any shortfalls. Because of its unique role, it would be less tied to specific age limits than the rest of the Corps.

Location would be a crucial factor in this concept. The unit would need to be located in one of the major centres of population with access to good roads. The attraction to the Royal Engineers and the Army as a whole may be summarized thus:

- No large administrative tail such as quarters or problem of family morale.
- A larger proportion of the unit employed on construction tasks, because fewer career courses and fewer administrative staff would be required than in a regular unit.
- Fewer trade courses needed as recruits would be "ready made"
- Speedy formation from soldiers currently serving in the UDR.
- It would relieve BAOR of the roulement squadron commitment and the resident squadron of some projects which are unpopular with combat engineers; thus releasing manpower for "Cam Cream Tasks" popular with sappers.

The idea obviously requires detailed discussion which cannot be gone into here because of the security and manpower implications. It is not intended to cast aspersions on the quality or enthusiasm of the present members of the Corps who are doing and have done a superb job in the Province for many years. However, only by thinking laterally and airing views based on experience and observation can we improve our performance. I welcome comments. Yours faithfully, A M Roberts, *325 Engineer Park, BFPO 808.*

Sappers Association of South Africa

From Major R J Francis

Sir, — I first saw the announcement about the above in the Supplement for December last, at which time I had already decided to take a holiday in The Republic. I wrote to them as invited, and in the event, made my visit on Sunday, 26 February.

The Club is handsome, and set in the most beautiful country. My wife and I were met at the gate, and shown every kindness and courtesy. We were given drinks before lunch, lunch, wine at table, two presentation bottles of Paarl River (by the National Secretary), and I was given a RSA Sapper tie. Had I been able to arrive in time I would have been asked personally to perform the page-turning ceremony in the Memorial Chapel.

The tone of it all was, I thought, impeccable.

If any other Sapper would like a first-hand account, and would care to telephone me one evening or at a weekend, I should be glad to help.—Yours sincerely, Dick Francis. *"Caludon", 19 Lynch Road, Farnham, Surrey, GU9 8BZ. Tel: Farnham (0252) 716030*

Monkton Farleigh Mine •

From Emeritus Professor Sir Alan Harris CBE

Sir, — Rumour has it that this job contained probably the first pre-stressed concrete beams manufactured in this country.

The rumour came to my ears in 1949 when I returned from three years with Freyssinet in Paris to be Chief Engineer of the Pre-Stressed Concrete Company in London, then a subsidiary of Monchel. The story was that the beams had been designed by Dr Mautner of Monchel, were pre-tensioned and were manufactured by the Vibrated Concrete Company whose director was a Frenchman, M Serret and whose engineer, Willey, became a good friend on later jobs.

My impression is that they were between 20 and 30 ft span and were used as a floor for stacking ammunition.

Had I thought at the time, it would be more than rumour — but in those days I was more concerned with the future! — Alan Harris. *128 Ashley Gardens, Thirleby Road, London, SW1P 1HL.*

Overdue

From Lt Col P O M Chitty MBE

Sir, — Whilst looking around the main house in Groot Constantia Vineyard near Capetown, I noticed that there were two old books on display. One of which had a familiar cover.

The book was C R Conder's *Heth and Moab* published in 1883 and signed out of the RE Library in 1887: Library No 915.691 - Con.

I don't know what the weekly rate is now for overdue books, but this one should be worth a few Rand. — Yours, Peter Chitty. *Talbots, Rope Hill, Boldre, Hampshire, SO41 8NE.*

The Bailey Story

From Col W H Bond

Sir, — I feel sure readers of Major Grove's letter on this subject will be interested to see the enclosed photograph of the completed HAMILTON BRIDGE over the River Gash at Tessenei.

The Gash at the time of building was a dry *wadi* with occasional rocky pools, and we were able to build it on false work consisting of steel scaffolding etc. — Yours sincerely, W H Bond. *Cage's Farm, Whepstead, Bury-St-Edmunds, Suffolk, IP29 4TL.*

The Bailey Story.

Reviews

THE ROCK OF THE GIBRALTARIANS
SIR WILLIAM G F JACKSON

Published by Associated University Presses, 25 Sicilian Avenue, London, WC1A 2QH — Price £30.00
ISBN 0-8386-3237-8

As Governor of Gibraltar for 4½ years from 1978-1982, the author was uniquely placed for the research and assessment of the History of Gibraltar from its origins to the present day. This learned volume follows the previous publication of nine books of military histories.

The purpose of the book is intended to tell the story of Gibraltar, its development and the evolution of the peoples of the Rock in the context of historic developments. It is a serious read and will provide a classical reference for future students of this Fortress, dealing as it does with the domestic history rather than the military dispositions.

A good knowledge of European history is helpful to the reader to comprehend the relationships from the middle ages to the eighteenth century, otherwise this would be a hard read in the opening chapters which cover the wealth of facts but with brevity.

In tracing the evolution of the Gibraltarian, in the context of Moorish rule of some 800 years ended by the Spanish conquest in 1462, in turn ended 242 years later when ceded to Britain in 1704; it is recorded that in the Census of 1725 there were 1113 civilians. This population doubled by 1751, again by 1801 and then again rapidly by 1811. Thereafter steady growth coupled with some emigration has seen the growth to just over 20,000 today. To all who know Gibraltar the limitations of natural fresh water and virtually no local food production clearly defines the limits to which an indigenous population can grow.

Progressing through the chapters, as you reach contemporary times, after 1704, the events are more readily digested and the palate sweetened by the references to military inventiveness on the Rock. All Sappers recognize the development of tunnelling during the Great Siege but not always the Artillery development of shot which proved so worthy both on land and at sea.

The text is adequately illustrated with photographs, sketches and simple readily understood maps, which at times offer a little relief to the otherwise deep concentration this erudite publication merits.

The latter chapters with expanded references are much more readable and to anyone who has visited or served in Gibraltar conjures fond memories demanding closer attention. However, there may be some disappointment in the way domestic events that occurred but of a military flavour, do not receive a mention or elaboration. The book is not a military history and matters of importance to a ship, regiment or group need not have a bearing on the inherent population. Likewise the book deals with the population at large and does not seek to exemplify families except as arise in the move towards self-determination in the closing pages.

The value of the book is enhanced by a most comprehensive sequence of notes, a very useful bibliography for the student of Gibraltar and a detailed index.

The volume is not an easy read, it contains some americanisms (the book is printed in the USA) and the published price of £30.00 does not endear it to the casual student. It should find a ready acceptance in any military or reference library.

PSW

THE BRITISH ARMY AND THE OPERATIONAL LEVEL OF WAR
Edited by MAJ GEN J J G MACKENZIE AND DR B H REID

Published by Tri-Service Press Ltd, 28 Emerson Court, Wimbledon Hill Road, London, SW19 7PQ — Price £10.95 (Paperback
ISBN 1-85488-009-8)

THIS important book is a compilation of papers by students from the first Higher Command and Staff Course held in 1988. They address an interesting selection of topics chosen for their relevance to a new dimension in British military thought: the Operational Level of War.

The contributors vary in rank from lieutenant colonel to brigadier, and include an airman, a Royal Marine and two senior Sappers. To their credit, the essays are easy to read, well researched and contain many useful references to historical works and official documents. Together,

the papers offer an ideal introduction to the concept of operational thinking, that is: the level of warfare between tactics and strategy. As such, the book is necessary reading for Royal Engineer officers at all stages in their careers. It will provide younger officers with an understanding of the operational framework in which they practise the tactics of the All Arms battle. Officers studying for the Captain to Major promotion examination could find no better, nor concise, presentation of current thought on difficult military problems. More senior officers will welcome the book as a stimulus to their own thoughts on formation operations.

The range and span of topics covered by the papers offer a fascinating glimpse of how doctrine, technology and training are set to develop in the Army. The quality of the work is impressive and augurs well for the promised, future editions — this is the pilot book in a series that will present the essential components of British military doctrine. From these ideas will flow a revised approach to our profession that will touch us all. It is as well that we should be informed at the beginning of the process, and this book permits us to be so.

CEES

SETTING OUT
A Guide for Site Engineers
S G BRIGHTY
Second Edition Revised by D M STIRLING B Sc

Published by Blackwell Scientific Publications Ltd Osney Mead, Oxford, OX2 0EL — Price £7.95
ISBN 0-632-02039-3

BRIGHTY's original text has for many years been an invaluable guide to engineers and technicians involved in setting out on construction sites. Though the basics still hold true, modern developments have meant that it was becoming a little dated. The revision by D M Stirling, Lecturer in Surveying and Photogrammetry in the Department of Civil Engineering, The City University, London, has brought Brighty up to date.

The Introduction contains many hints, stores lists and reminders in a concise format which, if heeded by the novice site engineer/technician, should enable him to avoid many of the pitfalls and delays born of inexperience. The main body of the book is divided into two main sections, Part One — the Survey and Part Two — Setting Out. Part One begins with coverage of the basics of optical systems and their applications to levels and theodolites; the latter section is devoted to methods and procedures and covers coordinated systems, datums and their applications to control and detail surveys. A brief section on Digital Terrain Modelling has been included.

Part Two of the book covers many of the diverse skills and techniques required by the site engineer to ensure that marks, profiles and datums are provided in sufficient number, at the correct time to ensure the successful completion of the works.

Each section is tackled in a logical sequence using techniques covered in the earlier parts of the book but with emphasis given to the more problematic aspects of the particular task.

This book, with its many helpful lists, hints and guidelines, is a useful addition to any engineer's library and military units, involved with construction tasks, would be well advised to have a copy to hand.

JB

STEEL DETAILERS' MANUAL
ALAN HAYWOOD & FRANK WEARE

Published by Blackwell Scientific Publications Ltd, Osney Mead, Oxford, OX2 0EL — Price £29.50
ISBN 0632 018 453

THIS highly illustrated manual will be particularly welcomed, as it fills a gap in knowledge not covered by previous publications. It describes the common structural shapes in use and how they are joined to form members and complete structures. The importance of tolerances is emphasized in order to achieve a proper site fit-up, and the vital link between good detailing and construction costs is discussed. Detailing practice and conventions are explained and detailing data for standard sections, bolts and welds are provided.

Examples of structures include single and multi-storey buildings, towers and bridges, a number of which are taken from actual projects. The detailing shown will be suitable, in principle, for fabrication and erection in many countries and the sizes shown will act as a guide to primary design. The manual will be suitable both as a reference for practicing engineers and draughtsmen, and as a teaching aid for students.

WMGM

THAT WAR IN KOREA

Video cassette produced by GMH Entertainments, 19-23 Monasty Road, Orton, Southgate, Peterborough PE2 OUP. Colour: black and white, duration: 85 minutes, Price £12.99 incl VAT plus postage, available from the Publishers

THE tape tells the story of the US Army involvement in the War in Korea 1950-1953, almost entirely from the American point of view. The outline historical framework is accurate enough, but too much emphasis is laid on the Soviet Russian responsibility for the invasion by North Korea of the Republic of Korea. The fact that it was a campaign fought under the flag and command of the United Nations is fleetingly mentioned and the part played by the British Royal Maines (sic) is briefly acknowledged. The part played by the Commonwealth Division and Commonwealth Naval and air support is not mentioned at all.

The video is made up almost entirely of the film taken by war correspondents on behalf of NBC of America, but does include some clips from Soviet Russian and Chinese sources. One has the feeling that although most of the footage was shot in action, a fair amount appears to have been staged. The commentary is spoken by an American film actor, Richard Boone, and was probably put together by a Hollywood script writer. This impression is heightened by a stirring musical score in the best American film tradition and based on the march of the US Marine Corps.

Nevertheless the tape shows clearly the terrain, climate and conditions under which the war was fought and gives a good, if slightly dramatic, picture of what it was like for the ordinary infantry soldier. The story of General MacArthur from his success at Inchon to his removal by President Truman is dwelt upon at length and sympathetically. The fate of PW on both sides is also covered in some length. The treatment of American PWs by the North Koreans and Chinese and the now familiar 'brain-washing' techniques they used are highlighted. On the other hand the extraordinary situation on Koje Island, where Chinese and North Korean PWs took control of their own camp for a while before infantry and tanks restored order, is reported in some detail.

An interesting sidelight to the story is the rise to prominence of Senator Macarthy and Macarthyism at that time, in response to suspicions that communist infiltration in the State Department had resulted in the serious reverses suffered by American troops initially from the North Koreans and later at the hands of the Chinese.

The truce talks at Pan Mun Jon and Kaesong, which were such a feature of the War from 1951 to 1953 and which have developed into the longest armistice in military history are also given considerable prominence.

If one discounts the bias towards the American effort and forgets the Hollywood film epic approach, the tape tells the story of that War in Korea clearly and simply. It should be viewed in contrast to the excellent TV film of the Korean War by Max Hastings.

It is an interesting tape, but quite expensive and mainly of interest to Korean War historians.

JNC

April 1989 Journal Awards

THE Publications Committee announces the following awards for articles of special merit published in the April 1989 *Journal*.

THE ROAD TO KHARTOUM
by Anne Cavendish — **£75**
THE WATERMANSHIP OF THE ATHENIANS
by Lieut A J Machin — **£45**
DIRECTIONAL DRILLING — ANOTHER ALTERNATIVE TO TRENCHING AS A MEANS OF INSTALLING SERVICES
by Lieut Colonel M G Le Bridges — **£30**

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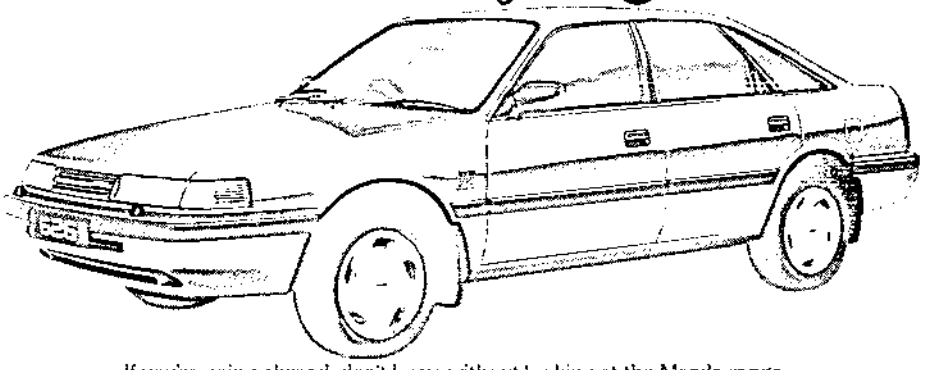

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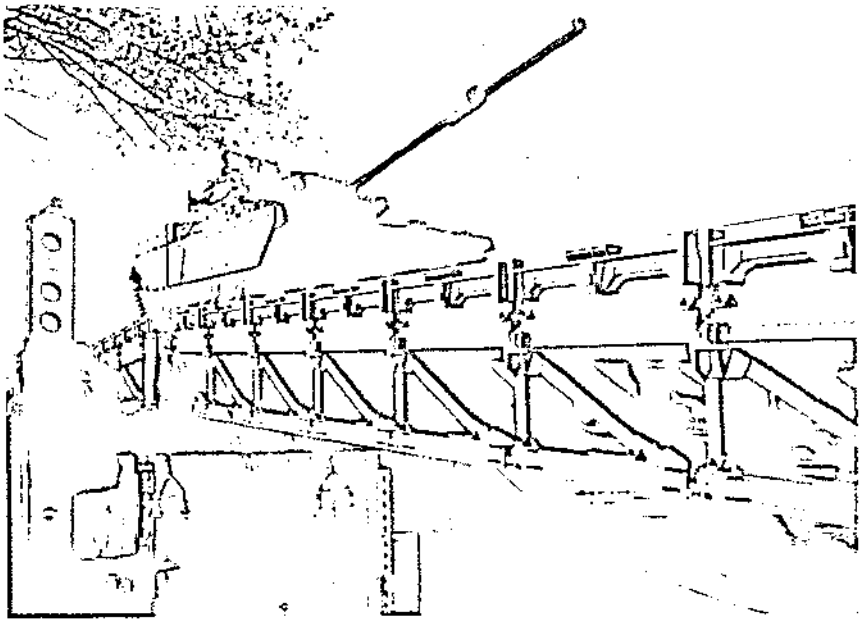

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30 metres Double Storey ..... in less than 1 hour
100 metres Floating ..... in 1 hour

Adaptable and versatile, MGB can carry loads up to Class 70 over dry or wet gaps using simple single span, multispan, single storey or double storey floating bridge or ferry.

With MGB, combat engineers can quickly and easily build virtually every type of bridge for every battlefield load...wheeled or tracked.

Williams Fairey Engineering Limited are the leading supplier of tactical military bridging in a free world. This leadership, at the forefront of bridging technology, is maintained by constant awareness of user needs and continual development.

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