THE ROYAL ENGINEERS JOURNAL

DECEMBER 1990 VOL 104 No 3

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, photo and captions for art work.

Computers. Articles prepared and sent in to us on an IBM compatible 3.25in disc would be most welcome. Text should be typed onto disc without modification ie no italics, indents etc, and a printout sent with the disc. Our computer software can read most word processing packages, or text-only files (ASCII), so long as the file has the correct extension added to the file name ie ASCII files: .TXT, Microsoft word: .DOC, Wordstar 3.3: .WS (a quick telephone call to Mrs Scanlan on Chatham Mil 2299, will confirm the extension you will need to use).

Photographs should be black and white. Coloured photographs rarely reproduce well unless they are excellent quality with sharp definition and no red colouring.

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:

11 February for the April 1991 issue
10 June for the August 1991 issue
9 October for the December 1991 issue

Submissions before the deadline will be particularly welcome.

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Editorial

ONE of the pleasures of being Secretary of the Institution is the need on occasion, to delve into a volume of *Corps History* in search of a piece of information. The danger is that the eye lights on a fascinating, but quite irrelevant piece of information, and the reader's attention is diverted from his proper aim. I have to report that I frequently fall prey to this temptation.

The Publications and Library Committee has been concerned recently about the lack of articles for the *Journal* from serving officers and the Committee is seeking to remedy this. But I took comfort when I had occasion to open Volume III and Colonel Sir C M Watson's preface caught my eye. He wrote on 10th July 1914:

> "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 work that they have been engaged upon. If officers would do this, it would much assist future historians of the Army."

After a fruitless (and entirely irrelevant) search to try to find why Colonel Watson, as a serving major, had been appointed a CMG which would be a most unusual event today, my thoughts were bludgeoned back to the job in hand and I reflected that we should be careful of those who tell us that things were fine in the old days. Nevertheless an increase in the flow of articles from serving officers is still needed and would be appreciated.

In this *Journal* are two very welcome articles on training. In an environmentally conscious age, realistic training for the Army will become increasingly difficult in the years ahead. Without imaginative and well prepared training, however, the Army will become a moribund organisation. But Colonel John Russell-Jones' article, also in this Journal, shows that initiative and enthusiasm abound in today's Sapper units.

Also, in this *Journal* are an article on *Operation Vantage* which was mounted in 1961 to deter an Iraqi invasion of Kuwait, and the first part of a history of the British Forces in the Arabian Peninsula 1958-67, by Brigadier H N Baldwin. It would be nice for the author of the former article, Major General Fursdon, and the Editor to claim that they had foreseen the recent invasion and planned the article for the December issue. It is, however, purely fortuitous that this article appears at this time. But taken together both articles provide an interesting insight into the Gulf.

In conclusion, may I wish you all and your families a peaceful Christmas and a Happy New Year.

New President – The Institution of Royal Engineers

MAJOR GENERAL J A M EVANS CB MA FBIM

MAJOR GENERAL JOHN EVANS has been elected to succeed Major General Ted Willmott as President of the Institution of Royal Engineers from 17 October 1990

Major General Evans has recently retired from the post of Senior Army Member of the Royal College of Defence Studies. Before that he was Commandant of Shrivenham. He has had the varied army career typical of many senior sapper officers. He started as a troop commander in 2 Field Squadron in the 1960s in Germany and has filled other sapper posts, serving as an assistant instructor in 1 Training Regiment when it was at Cove and being the Staff Captain in AG7. He commanded 3 Field Squadron while it was part of 3 Division in the early 1970s and returned to 22 Engineer Regiment at Tidworth as CO in the mid 1970s, when its role changed from being part of 3 Division as the UK strategic reserve to 8 Field Force and home defence.

His staff appointments include being an MA in Headquarters Far East Command in Singapore before the UK withdrawal and serving in the Ministry of Defence as a Colonel GS on the staff of ACGS(OR). He has been a DS at the Staff College and later returned to Camberley as the Deputy Commandant. He is one of the three sapper officers who have had the good fortune to command the Berlin Infantry Brigade during the many years Berlin was a divided city in a divided Germany. He is married with a son and a daughter; his interests include music, particularly opera, the reluctant DIY inevitable for anyone who owns a house and elderly motor cars, and travel.

In his time as President Major General Evans will seek to encourage the "promotion and advancement of the science of military engineering" which is set out as part of the object of the Institution. He is proud of being a military engineer and of the contribution the sappers have made to military science, to the development of the engineering profession, and to the efficiency and effectiveness of the armed services. At a time of considerable and rapid change in world and military affairs he hopes that the Institution can be both a lively and useful forum for ideas and a bridge between serving and retired members, as well as a link between the Corps and civilian engineers.

New President -The Insitution of RE
Major General JAM Evans CB MA

Operation Vantage

MAJOR GENERAL EDWARD FURSDON CB MBE DLitt FBIM

General Fursdon enlisted as a Sapper in July 1942 and was commissioned in March 1945, serving with West African Engineers in India, Burma and the Gold Coast. Regimental and staff appointments followed in the Far East, UK, the Canal Zone, Cyprus, Operation Musketeer *in Port Said, and in East Africa (including* Operation Vantage *in Kuwait). He later commanded 25 Engineer Regiment in BAOR before becoming first AA and QMG, then Chief of Staff and Deputy Commander Land Forces Gulf. BAOR again was followed by Aberdeen University lecturing on strategic studies to post-graduates, MOD as Director of Defence Policy (Europe and NATO) and then as Director, Military Assistance Office. His last appointments were Adviser to the Governor of Rhodesia and Senior British Officer Rhodesia — and then SBO Zimbabwe. Retiring in July 1980, until March 1986 he was Defence and Military Correspondent of* The Daily Telegraph, *covering such stories as the Iraq/Iran War, the immediate Falklands Aftermath and The Contras. He is now an independent consultant and correspondent, writing for editors both at home and overseas.*

THE desert of Northern Kuwait in the hot season of 1961 was a harsh place in which to survive, let alone to have had to fight. Frequently one was sandblasted by a *shamal* combination of heat and sand, powered by a searing wind as if straight from a white-hot furnace, which sometimes lasted for days. You did not then touch bare metal, unless you wanted to get burnt. The sand penetrated everywhere and the gritting crunch of it in one's food persisted for ages afterwards.

British and Kuwaiti troops faced Iraqi forces across this featureless empty desert from early July to early October 1961 in the now little-remembered Operation *VANTAGE*. In the event there was no fighting and the only known Iraqi incursion was one aircraft on a recce mission. Deterrence had worked; the Iraqis did not invade Kuwait as they had planned to do; and after eventually being relieved by troops of the Arab League, the British forces withdrew leaving behind a small British-manned Kuwait Liaison Team with a stockpile of armour.

'But why Operation *VANTAGE*?', is a good question. On 21 June 1961 the United Kingdom and Kuwait announced an Exchange of Notes which cancelled the Anglo-Kuwaiti Agreement of 1899, acknowledged Kuwait's independent sovereign status and reaffirmed the United Kingdom's readiness to come to the assistance of Kuwait should its Government so request. On 22 June Kuwait applied to join the Arab League. On 25 June General Kassim, the Iraqi Prime Minister, announced that Kuwait was an integral part of Iraq, the Anglo-Kuwaiti Agreement of 1899 had been illegal and that he totally rejected the UK-Kuwait Exchange of Notes.

On 26 June Kuwait countered by declaring itself an independent Arab State prepared to defend its territory. On 30 June, following reported Iraqi troop movements south of Basra, the Ruler of Kuwait — His Highness Sheikh Sir Abdullah al Salim al Subah — requested the British assistance on offer under the Exchange of Notes. The contingency plan for such help, codenamed Operation *VANTAGE*, had been lying 'in the bottom drawer' for years, and was one of the responsibilities of 24th Infantry Brigade stationed in Kenya.

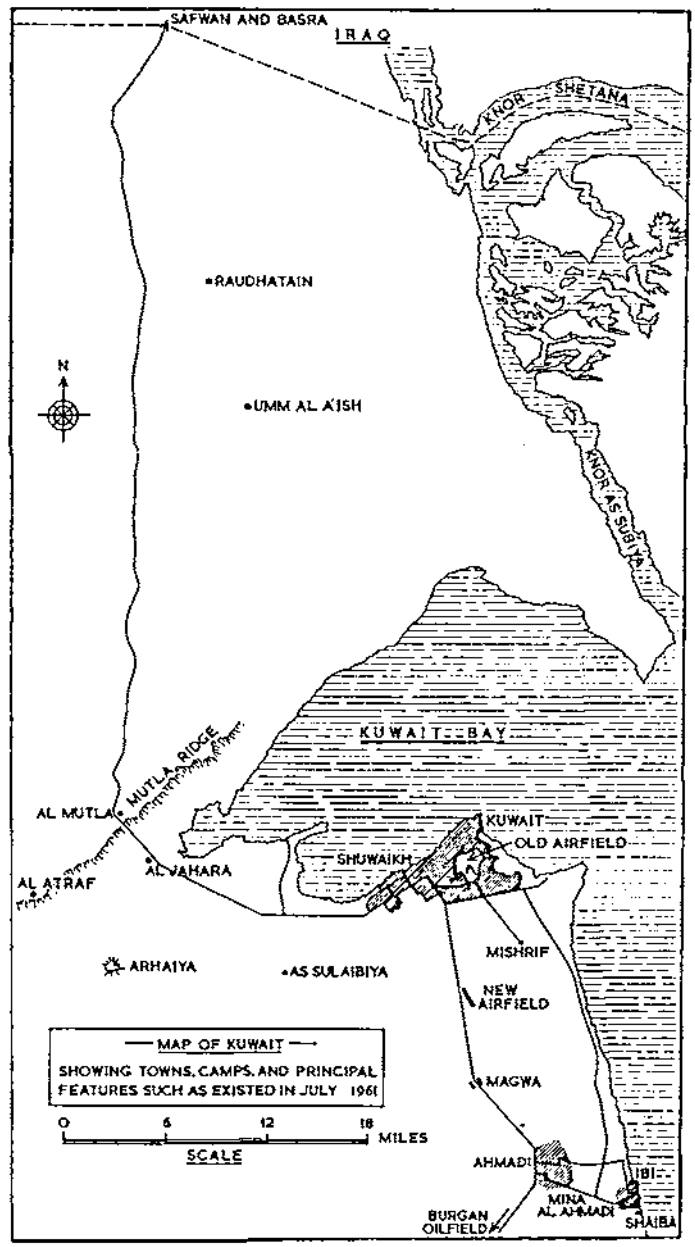
The main difficulty for the OC of the Brigade's 34 Independent Field Squadron — and his fellow COs — was that extreme secrecy had precluded him from being told anything about Operation

Major General Edward Fursdon CB MBE FBIM
Operation Vantage

Vantage, let alone the Squadron's role or likely tasks.There had been neither maps nor prior intelligence about Kuwait: of its terrain and engineer resources available locally the OC knew nothing: and no prior recce on the ground had been permitted. Apart from knowing the rough geographical area of the Operation, this absence of information had made the OC's operational planning very difficult and, inevitably, of a 'crystal ball' nature especially as regards the priorities of what manpower and airportable engineer equipment to fly in first.

On 29 June 61 the OC 34 Independent Field Squadron with a small recce team was in the Karamoja District of,north-east Uganda with 4th Battalion The King's African Rifles (4 KAR), undertaking his final recce of a new mountainside border security track in the Pirre/ Kamion area, designed to help curb the fierce campaign of spear-armed cattle raiding then being mounted by the Turkana tribe of Kenya into Karamoja. 3 Field Troop (Lt A C D Lloyd RE), due to arrive at HQ 4 KAR at Kaabong that evening to undertake the task, was worryingly overdue. At 8 pm the OC received an urgent signal from Brigade HQ recalling him to Gilgil by midday the next day.

Abandoning his recce team and hitching a ride back on a passing Kenya Police Cessna at dawn, the OC spotted Lt Lloyd's Troop convoy stranded by flash floods, seven miles short of Kaabong. Still in ignorance of what the flap was about, using the aircraft's radio, he ordered Lt Lloyd to make haste to 4 KAR at Kaabong. Back at Squadron HQ in Gilgil, however, Captain P J Dickison, the Sqn 2IC , had already put the Standing Orders into operation; he eventually got a message to 4 KAR to send 3 Troop back to Gilgil urgently.



As successive signals from Brigade HQ overtook each other in shortening the notice to move, no-one could say whether the forthcoming Operation was *VANTAGE* or not. The only guidance an increasingly frustrated OC could get in deciding on his top priority air freight was "Well, its rather like *VANTAGE* but definitely not the *VANTAGE* as planned. We think you will move direct to Kuwait but no-one is sure."

Living in the Shuwaikh Technical College Staging area

Meanwhile, up in the Gulf, 42 Royal Marine Commando were put ashore in Kuwait on 1 July by helicopter from the carrier HMS *Bulwark*, which just happened to be within striking range. 2nd Battalion The Parachute Regiment, with 1 Troop of 9 Parachute Squadron RE, arrived by air and deployed behind the Mutla Ridge near Al Jahara. Centurion tanks of 3rd Dragoon Guards, the Gulf's permanent afloat armoured reserve, landed from their LST and a detachment of 1st Battalion the Coldstream Guards flew in from Bahrain. Units of the Kuwait Army were deployed — with the British armour — to the country's northern frontier with Iraq.

On 2 July the OC 34 Squadron, a small TAC HQ, and 2 Field Troop (Captain R W M Eagle RE) took off from Nairobi with the Brigade Major (Lieutenant Colonel P Joynes RA) and 24 Infantry Brigade's Advance HQ in a Rhodesian Air Force Canadair aircraft which had been specially diverted there. There were delays at Aden, then again at Bahrain where, because a sandstorm had closed down Kuwait New Airfield, all passengers were offloaded and put into a makeshift tented transit area on the airfield. The sandstorm having cleared, RAF Movement Control started to re-load the Canadair with RAF men instead of its original 24 Brigade Army passengers, whose personal kit and priority stores were still on board anyway. There was near revolt, but RAF Movements refused to budge on the issue. The ridiculous situation was finally resolved when, to his eternal credit, the Captain of the Rhodesian Canadair flatly refused to take off without his original 24 Brigade load on board! The aircraft landed in Kuwait at 0420 hrs on 4 July.

Commandeering a blue civilian bus, the 34 Squadron party joined the general melee sleeping out rough on very confined areas of pavement in the improvised staging area of the Shuwaikh Technical College. Whilst waiting for deployment orders — living on compo, improvising a little shade and drinking a great deal of water — the top priority was trying to find out what unit stores had or had not arrived from Kenya. Suddenly the Brigade was faced with an extremely immediate problem which the contingency planners had never foreseen. All the lavatories in the Technical College were of the squatting type, each fitted with a conveniently placed small water tap for dealing with matters Arab-style which does not involve the use of paper.

The result of an influx of hundreds of soldiers daily using the appropriate paper from their compo packs, for which the flushing system had not been designed, was all too immediately and predictably self-evident. The system blocked solid and back-filled, flooding all the ablution rooms with their product: it was a recurring problem, and everyone was thankful when the time came to move out into the desert.

Brigadier D J Horsford, the Brigade Commander and who had arrived earlier, had to give out orders successively to his unit commanders as and when they arrived in a somewhat unpredictable sequence by air from Kenya and elsewhere. For 34 Squadron, his orders were first to dig in and occupy a defensive position between the rear of the Mutla Ridge and the sea which would block any Iraqi advance around the western edge of Kuwait Bay. Second, to constitute a mobile force ready to deploy at very short notice to defend Brigade HQ, which was to be co-located in Al Jahara Fort with that of Brigadier Mubarrak, the Kuwait Army Commander who had recently graduated from Sandhurst. Third, to undertake engineer tasks in support of the whole Force established ashore. With its various 'chalks' now arrived, and following the OC's recce, 34 Squadron moved out to an area of barren desert north-east of Al Jahara — locally known, for reasons never established, as 'The Hill of Shame'! — and dug itself in tactically.

The British force had arrived at the beginning of the hottest time of the year in one of the hottest parts of the world, with shade temperatures often over 140 degrees Fahrenheit. Heat exhaustion was a new and ever-present hazard and its prevention

became a priority, especially for the Sappers whose tasks demanded hard physical work in the extreme temperatures. Any major Squadron task work therefore started at 5 am to take full advantage of the cooler part of the day: the temperature was usually up to 130 degrees by 8 am, the expanding mercury regularly breaking locally acquired Coca-Cola thermometers. One morning in August, visiting the Squadron cookhouse which by then was centralised in a sand scrape covered by a desert camouflage net, the OC was not unduly surprised to find four newly hatched baby chicks cheeping away happily from what a few moments before had been just a tray of ration eggs!

In the first week or so, with the prospect of an Iraqi invasion high, the Squadron's trench positions had to be continuously manned at a certain strength, despite the pressing demands of its sapper tasks. When not out working, everyone lived in them and, apart from the necessary continuous maintenance of making them habitable, the provision of some form of discreetly improvised overhead shade — quickly removable in case of action — became top priority.

The bulk of the Squadron's defensive position consisted of two-man trenches, and so it was extremely important to operate the paired 'buddy system' whereby each kept an eye on the other for signs of heat exhaustion which could then be treated urgently — initially by all-over sponging with the coldest water available, until evacuation was practicable. Staff Sergeant Lewis became the Squadron's expert 'treater', and luckily the men's high fitness and Kenya heat acclimatisation resulted in very few Squadron casualties.

The officially recommended quantities of water to be drunk per day were either 10 pints per man plus one extra pint per hour of work, together with one salt tablet per pint: or from 12 to 22 pints per man plus 6-12 salt tablets: in practice, the Squadron operated on two gallons a day per head. Extra salt had to be added to bulk fluids such as soup, tea and jungle juice. The chaguls brought from Kenya were a godsend, and these were supplemented by locally purchased chattis. But the Squadron's liquid mainstay were tins of '7 UP' of which it must have consumed thousands during the period of Operation *VANTAGE*: the record was held by

34 Independent Field Squadron Headquarters

Sergeant J F Cridge (later commissioned) who one day drank 23 tins before breakfast.

Initially the Ruler of Kuwait provided two free cans of extra fruit juice a day to all ranks, but orders soon came down from 'on high' for this very popular gift to be stopped. 'On high' also soon stopped use of the free 'On Active Service' air letter forms the Force had initially enjoyed: and, later, it turned down the Ruler's well-intentioned idea of issuing a special Kuwaiti medal to all ranks of the British Force who had so successfully deterred the Iraqis from invading his country.

The extraordinarily high temperatures affected normal eating habits — it became too hot for one to want to eat, certainly by day: consequently one wanted to eat only very early and very late. This lack of appetite was a deceptively dangerous tendency because, although one did not need to eat so much as usual to obtain calories for body heat, nevertheless with the hard physical work the sappers were required to do, food was essential. Worse still, the normal British compo ration of the day had been designed for consumption in temperate climates. Jam and cheese of any kind, and Irish stew, in particular, were totally unpalatable in the heat.

Captain Roger Eagle used his Troop's rejected unopened compo tins to reinforce his command post's protective defences — had they ever been hit by an Iraqi shell the mess would have been indescribable! Tins of fish of any kind were the most popular item, with any salad item — preferably fresh — a close second. An egg for breakfast had to be eaten immediately it was cooked, or else the hot wind turned it to rubber in seconds! The message finally got back to where it mattered

in the UK, and Army compo has never been the same since.

Everyone became expert at washing all over with an absolute minimum of precious water. One soon learnt the best priority sequence of parts to be washed using the same increasingly dirty water over and over again. Those used to brushless shaving cream quickly gave it up because within seconds of application it had completely dried into uselessness.

Good communications are, of course, the lifeblood of any operation, even more so in large tracts of featureless Kuwaiti desert where emergencies unrelated to enemy activity can endanger life and limb. Standard procedures dictated that the Squadron maintained its own radio nets and also a station on the Brigade command net: but a Squadron private bonus was the occasionally successful 'HF bounce' link direct to Gilgil when the evening conditions were just right!

The two best operators in the Squadron were Lance Corporals Palmer and Reynolds — otherwise known as 'the Heavenly Twins'. Close friends, they were highly competent in many fields and both should have been senior NCOs — in fact one frequently was, in between repeated misfortunes, whereas the other enjoyed himself too much to want the responsibility which went with senior rank. They were cheerful, lively characters who disliked the lack of excitement in what they felt was irksome peacetime soldiering. But from the first to the last day of the Squadron's sojourn in the Kuwaiti desert, 'The Heavenly Twins' ran all the Squadron nets. Constantly cheerful, with never a complaint, they would not let anyone else take over: and, unlike some Force units, thanks to their dedication and skill the Squadron's radio nets were continuously 'through' 24-hours a day throughout the whole of *VANTAGE*.

Britain's swift action in establishing a deterrent presence in threatened Kuwait having obviously thwarted General Kassim's invasion plans, the British Force ashore was soon reduced to organic units of 24 Infantry Brigade, a combined armoured presence of 3rd Dragoon Guards and 11th Hussars, 29 Field Regiment RA, and a number of support units in the rear area of Kuwait town.

The immediate sapper tasks to be undertaken were very varied. Extensive recces of desert 'going' and routes had to be mounted. Sites for improvised RAF Beverley and Army Air Corps airstrips had to be found out in the desert in tactically likely areas for the rapid deployment of Brigade reserves, 'stops' and patrols. The terrain was such that in some areas selected, virtually the only work required was to clear the chosen alignment of stones and rock: others just needed simple oil stabilisation. Demolition plans were made to impede any Iraqi advance: natural anti-tank obstacles were improved by rock blasting: and a major effort was put into discovering what 'in country' engineer stores and resources were available.

The only two natural geographical features in Kuwait which could be developed into defensive positions were occupied by the Brigade's two infantry battalions. The first, the Mutla Ridge, lay 48 miles back across the desert from the Kuwait-Iraq border. A newly completed road ran from Al Mutla, the Kuwaiti Customs and Border Post on the Ridge, to the border post of Safwan on the Iraqi side, and from thence on up to Basra. The Ridge's rock outcrops, behind which the ground dropped steeply to the plain extending into the town of Kuwait itself, were occupied by 1st Battalion The Royal Inniskilling Fusiliers. In the desert at Arhaiya, about eight miles south of Al Jahara, was a small pimply cluster of rock outcrop in an otherwise flat desert plain. As a base from which to intercept any Iraqi move to strike at Kuwait by a wide outflanking move from the south, it was occupied by 1st Battalion The King's Regiment.

Both infantry battalions needed considerable sapper assistance in the drilling and blasting of their defensive positions in the rock, with defensive wiring and, initially, with the building of sangars. Although the Squadron organised water points at the main water distillation plants in Kuwait town, nevertheless additional forward points and reservoirs (which, to avoid excessive evaporation from the heat, had to be well covered) were required in both battalion positions. Improvised showers were a very popular sapper offering.

The scope for laying minefields in the vast areas of desert was very limited because they could so easily be outflanked. The only place which made tactical sense was the narrow gap in the Mutla Ridge rock line through which the Kuwait-Basra

road passed. It was here, therefore, covered by fire from the 1 Royal Inniskillings position and leaving a marked minefield gap for the road, that the Squadron laid one of the very few phoney minefields laid operationally since World War II: orders from 'on high' had decreed, sadly, that it could not be a 'live' one. Minefield warning triangles marked in Arabic do not exist in engineer stores, so they had to be quickly improvised. As one could never take for granted on whose side some of the watching robed onlookers might be, the OC decided that a little further deception might spark off some interesting reports to Baghdad. He therefore ordered that instead of laying no mines at all, as with a normal phoney minefield, this particular one be very visibly and correctly laid by standard minelaying drill using unopened compo tins as mines — after all they were fully detectable! Also, that the 'mines' be all correctly brought up in appropriate boxes during the laying, and that a number of them be seen to be connected to realistic-looking phoney 'booby traps'.

On 20 July the Arab League decided to accept Kuwait as a member. Tension in the area eased as the League's membership collectively assumed responsibility to ensure the survival of its latest recruit through the provision of a strong military force from Arab League countries, excluding Iraq, to take over in Kuwait from the British Force. The latter, at last able to relax a bit, now started planning its withdrawal. Formal Agreement to the Arab League Force was signed by the Ruler of Kuwait and the Arab League's Secretary-General on 12 August. However, his Kuwaiti contacts told the OC 34 Squadron at the time that there was no way that any Arab Force would take over from the British at the hottest time of the year: the participants would deliberately delay things until about 1 October when the temperatures became acceptable: in the meanwhile they would just let the British 'sit out the heat' — and this is exactly what they did!

On 23 July Staff Sergeant Lindsey, Lance Corporal Tooke and Sapper Harcombe of the Squadron's Park Troop Detachment were undertaking a routine route recce up to the forward edge of the 11th Hussars's positions near the Kuwaiti border with Iraq. Unfortunately they became disorientated in the desert and ended up at the Iraqi frontier post of Safwan where they and their Ferret Scout Car

1st Battalion The Royal Inniskilling Fusiliers' position at the Mutla Ridge

were immediately surrounded, captured and taken off as prisoners to Baghdad. A senior Iraqi source told the OC 34 many years later he had told General Kassim that, as there had been no declaration of war, he could not hold the men as prisoners-of-war: they really *had* simply lost their way. Eventually the General was persuaded, but insisted that the soldiers were guilty of entering Iraq illegally without passports or visas! The problem then was not to lose face, but the calendar conveniently came to the rescue and on 13 December General Kassim was able to announce the men's release 'as a gesture of Christmas goodwill'.

It was awful for the Squadron to lose three men in this way, but quite another thing to lose a Ferret, as became only too clear following all the inevitable Boards of Inquiry into the incident. What made it more difficult was that no-one in the Park Troop knew in detail what the Ferret had contained: luckily, in the event, its gun had not been mounted. Eventually — months later, back in Kenya — the Squadron was ordered to submit detailed AFsG 1033 for write-off to the War Office for the Ferret and all its 'on board' equipment.

To the despairing SQMS's relief, it so happened that same week that the OC's mother in England had sent him a copy of the *Illustrated London News*. Idly turning the pages, the astonished OC was suddenly faced with a brilliantly clear full page photograph of his Squadron Ferret, taken by the Iraqis in Baghdad, with all its contents neatly laid out on the ground in front of it in true QM fashion. The SQMS grinned all over his face, licked his pencil, and started writing some £18,000 worth of vouchers for the OC's signature! The postscript to the Ferret story came some

SSM Quicke at a Troop desert trench position

years later when the OC was a Staff College DS. During conversation, it emerged that the Iraqi student in his Division had been the Battalion Commander at Safwan whose men had captured the Ferret. With typical Iraqi humour, "I must belatedly thank you for letting us have your Ferret", he said: "We hadn't had one before and I found it most useful. But I think I am right in saying that we never paid you for it. Let me know the figure and when I get back to Baghdad I will send you a cheque for it." Twenty-four years later the cheque has yet to arrive!

Logistic support for Operation *VANTAGE* was run by a Joint Administrative Headquarters (JAHQ), based at the Kuwait Technical College, which included a CRE Works Kuwait (Lieutenant Colonel F W L Shepard RE) with a team of five, all ex-UK. The principal RE Works tasks — some of which were undertaken by 34 Squadron — included improvements to Kuwait Government accommodation made available to the British Force; the provision of camp structures for Army and RAF units; and assistance with the provision of engineer stores, plant and defence stores for units of 24 Infantry Brigade. Following the departure from Kuwait of most Army units not organic to 24 Infantry Brigade, the JAHQ closed on 27 July. Handing over his CRE Works (Kuwait) responsibilities to OC 34 Independent Field Squadron, Lieutenant Colonel Shepard and his team left for the UK on 28 July.

On 21/22 July over half of 34 Squadron returned to Kenya — including Captain Paul Dickison (2IC), Captain Roger Eagle and his Troop, Captain Dan Burnet and the bulk of his Plant Troop, and SSM Quicke — leaving the OC and a HQ element, No 1 Field Troop and a Composite Troop (comprising elements of No 3 and Park Troops) in Kuwait. The Squadron's assumption of the RE Works responsibility now added a new interest, especially since no Iraqi attack had materialised. The Squadron officers' new responsibilities became:

Maj Eddie Fursdon	Squadron Commander and CRE Works Kuwait.
Lt Chris Lloyd	2IC and Garrison Engineer, Kuwait Town.
2nd Lt Stan Davies	Troop Commander and Garrison Engineer, Shaiba, IBI Camp and the RAF New Airfield.
2nd Lt John Barr	MT/Sigs Officer and Garrison Engineer Al Jahara, Mutla and the KOC installations at Umm Al A'ish and Raudhatain.

The OC's biggest surprise, when he asked what were the limits of his financial powers as CRE Works generally, and for local purchase in particular, was to be told officially "It is at your discretion — there are no limits." A rare 'Works' moment indeed! — and one he used to the full with Flefel Brothers, Costains, CAT, Saleh Jamal & Co, the Kuwait Furniture Store and others: the price of timber, alone, was unbelievably high and he soon learnt to check every invoice in the greatest detail!

Once the immediate combat engineer tasks had been completed early in July, the impetus changed to one of improving the quality of life for the men of the Force living uncomfortably in the heat and sand — as indeed the Squadron itself was doing. Its sappers set up 'S' tanks as improvised plunge pools so that the hot sand-ridden infantrymen at the Mutla Ridge and at Arhaiya could enjoy a few moments of blissful total immersion: constructed more improvised showers; used powered augers to drill out deep trench latrines and 'gash' pits; installed, repaired and maintained electric generators; built a stage in 27 Field Regiment's

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desert camp for a visiting ENSA party; made and erected open-air cinema screens: and later built and maintained a Bgigade 'R & R' camp at Shaiba. It also disposed of unsafe grenades and ammunition, investigated a mid-air explosion on a RAF Beverly, provided simulation for Brigade exercises, laid Sommerfeld tracking for a Brigade beach landing exercise, was regularly exercised in its task of instant re-deployment to defend Brigade HQ, and undertook the constant maintenance of the Brigade's airstrips and it's units' desert field defences.

Before the 'R & R' Camp by the beach at Shaiba had been built, 24 Brigade had organised a special rota scheme with the Kuwait Oil Company (KOC) by which a few all ranks at a time could come in from their desert-based units and spend 24 hours enjoying the comparative 'heaven' of the KOC Rest House's baths, meals, air-conditioned bedrooms and swimming pool. Certainly the experience of a sand-free non-compo meal and a two and a half hour soak in a bath there was blissful: but for many, accustomed to sleeping out under the desert night stars, the noisy air-conditioning proved unsettling and ruined their sleep — and they were glad to return to their Bedouin-like existence.

Brigade HQ even organised a full two-day Sports Competition. The sight of the Squadron's Seven-a-Side Hockey Team battling it out in the hottest part of an already overheated Kuwaiti day was sheer Noel Coward's 'Mad dogs and Englishmen': the Arabs thought we were crazy!

The KOC Staff were always very helpful to the Squadron. Later in its stay, they arranged Squadron visits to the Company's drilling rigs and other installations in the Burgan Field, and to the main refinery.

Whereas everyone in Kuwait had to clear their cars off the road, get out of them and stand to attention when the Ruler drove by, the agreed compromise for members of the British Force was to clear the road and just sit to attention without getting out. The Ruler's car — and he drove out to visit old friends near Al Jahara nearly every day — was instantly recognisable from afar because of its accompanying motor cycle cavalcade.

Sheikh Mubarak Sabah Al Nasser El Sabah was No 12 in seniority of the twenty Royal Sheikhs of the Ruler of Kuwait's family — a seniority recorded by number on the special car number plates of all but the Ruler. Early in the emergency he had called his personal followers in from the desert and had set up camp in the sand about a mile away from 34 Squadron. Feeling he ought to be friendly, the OC 34 decided to call on the Sheikh and so, one afternoon, following strict Bedouin etiquette, he duly approached the huge black Bedouin tent from the east and halted about fifty yards from its opening.

Escorted in, he sat cross-legged on a cushion on the Sheikh's right, with two long rows of similarly cross-legged and heavily bandoliered silent followers — with kunjas in their belts and holding their assorted rifles — stretching away down the tent. The Bedouin coffee ritual followed — later came the traditional sweet Arab tea — whilst Tewfik Abed Dobh, the Sheikh's water bowser driver, who spoke a little English, was summoned and instantly promoted to interpreter.

The OC's visits became frequent, and resulted in the most welcome regular gifts to the Squadron of delicious huge water melons and of large blocks of ice for its cookhouse from supplies the Sheikh had organised for his own desert camp. In return, shadowy figures of a few of the Sheikh's followers, sitting either side of the Squadron's desert cinema screen, were accepted without question. By way of special thanks, one day the OC invited the friendly Sheikh back to inspect the Squadron camp. He duly arrived with a band of followers, and the tour went without incident until it came to the large, camouflage-netted sand scrape which doubled up as dining area and canteen. Suddenly remembering both the photographic array of naked female talent displayed there, and appreciating what the strict Moslem reaction to it would be,

Sheikh No 12 with his car and key followers

the OC started to steer the Sheikh's party in the other direction. But the Sheikh, reacting quicker than the OC, immediately bade his followers stay outside whilst, with a smile, he carefully inspected the displayed talent!

The Sheikh then became extremely interested in a Squadron SLR rifle which, remembering that in Bedouin society if as a guest you extravagantly praise one of your host's possessions, he is in duty bound to give it to you on leaving, began to worry the OC considerably. Imagining his evidence to an appropriate subsequent Board of Inquiry, he had to think quickly. Luckily the Sheikh accepted the OC's explanation that, whereas he would be only too honoured to present the Sheikh with six SLRs for his followers, nevertheless all the Squadron's weapons belonged personally to Her Majesty the Queen and so were not his to give away without her Royal authority. The tour then moved on to inspect the Squadron's Ferrets, and of course the Sheikh wanted to drive one. With some difficulty his plump figure was eased into the driving seat for a short drive round; then with rather more difficulty he was eased out again. An excited Sheikh then asked how much a Ferret cost: but sensing that the problem of making a present of one to the Sheikh was becoming imminent, the OC quickly extolled the virtues of the much larger Centurion tanks held by 3 DG further up the road. At least, when the Sheikh left, he radioed 3 DG that they might have a little diplomatic problem on their hands!

The Sheikh had been so kind to the Squadron that, before leaving Kuwait, the OC felt that he had to be given a present. But what could anyone give to a Royal Sheikh who had everything? After much thought came the answer — a NAAFI dartboard: and so, with due ceremony, the OC formally presented it to a delighted and obviously intrigued Sheikh. A week later, the Sheikh's desert camp having by then been abandoned, an invitation came to the OC to visit his Palace, just south of Kuwait town. Imagine the OC's amazement, on entering the Palace courtyard, to find the Sheikh, lying back on a reclining couch, happily throwing darts at a board held just above his head by an extremely worried kneeling follower!

Three of the Squadron's tasks for the RAF will never be forgotten. One day the senior RAF officer at the New Kuwait Airfield asked the OC 34 if his sappers could undertake two very important operational tasks. The first was to make a very large special wooden board, with various holes very accurately positioned in it, which he said was urgently needed in order to check the alignment and sights of their Hunter aircraft's guns: the second was to make a meteorological plotting board. Believing both to be urgent genuine operational tasks the OC accepted them and, to his slight surprise, was immediately provided with all the necessary detailed working drawings.

Put on their mettle, the Squadron's chippies — working with their tool kits under the difficult conditions of the Squadron's desert defensive position — set to work. In a few days they had done a magnificent job.

When handing the two boards over to an extremely grateful RAF Senior Officer, the OC could not help asking him why the RAF had not brought such obviously vital boards with them from Aden. "We have not got any", he replied: "We have tried for ages to get the MPBW to make them for us in Aden, but they just won't ever get on with it. We thought we'd try you instead, so that we'd have them to take back with us."

The third task arose because the RAF's Hunter pilots, operating in conditions of low desert haze, were experiencing difficulty in knowing exactly where they were in the featureless Kuwaiti desert north of the Mutla Ridge. The RAF Station Commander therefore asked the Squadron to 'paint' a series of very large, accurately surveyed map grid reference numbers directly onto the sand, by which the pilots could orient themselves on their maps. Sergeant Cridge was accordingly despatched, complete with a Squadron surveyor, a KOC crude oil bowser and a number of very large watering cans, to do just that! The RAF were immensely grateful.

One afternoon in September the OC 34 was intercepted near Al Jahara by a Kuwait Army jeep. To his immense surprise, out of it stepped a British Sapper Sergeant in local uniform who explained he was training the Kuwait Army's sappers. He was keen to contact the Squadron to see if they could be of mutual assistance to each other. The Sergeant made the point that from experience — "and essential in a place like this" — he always carried an excellent tool kit

fitted under the jeep's rear seat. "Would you like to see it, Sir?" he said with an inviting smile. "Of course" came the reply, upon which he removed the cushion, undid the catches and pulled up the metal cover to reveal the very neatest of ice boxes. "Ready for one?", he said, pulling out two deliciously frosty beers!

On the RE Works side, the Squadron's tasks now centred round the installation and maintenance of air conditioning, fans, water coolers and camp structures and other minor services at the Force's rear static locations and at the RAF airfield. An additional major task was to make out inventories of all the engineer fittings and installed equipment in the Kuwait Oil Company's accommodation which had been, or was still occupied by, Army and RAF units.

The Arab League Force troops from the United Arab Republic, Saudi Arabia, Jordan, Sudan and Tunisia started to arrive late in September. The actual handover of unit positions was a weird business because, due to Arab factors, no discussion, direct contact, physical handover or the passing over of any information was allowed between the British and their relieving, opposite number Arab unit commanders. Positions were abandoned and taken over via an extraordinary 'vacuum' procedure operated and co-ordinated by the Commander of the Kuwait Army, Brigadier Mubarrak. To this day, the OC 34 wonders how the relieving Arab League unit at the Mutla Ridge dealt with his phoney 'compo' minefield there: did they eat it?

34 Independent Field Squadron's final task was to plan, supervise and undertake the physical 'March Out' of the British Force variously with the Kuwait Army, the Kuwait Government Housing Department, the Kuwait Oil Company and a firm of German Contractors. This meant jointly checking and mutually agreeing the condition of all accommodation ever occupied by the Joint Task Force ashore, together with its associated fittings, fixtures and furnishings: and then obtaining the necessary clearance certificates for it all on behalf of the British Government, duly certified by the Kuwait Government's representative, Abdulla Ali Khalifa.

The OC finally abandoned his Squadron's desert position on 1 October, and withdrew back into the Shuwaikh Technical College to join the Commander 24 Infantry Brigade with his small TAC HQ. But, leaving the desert for the last time, as the OC lifted up the one foot square of cardboard mat by his sleeping bag, what should be revealed but a perky little sand viper who had obviously been his unseen close companion, living under the mat, throughout the long hot desert months. To his dying day the OC will swear that, before vanishing into the sand with a couple of wiggles, the snake winked at him.

Staff Sergeant Lewis unloading ice to Sapper Neil at the Squadron's desert position

Part of the Squadron flew back to Kenya that night; Lieut Lloyd's Field Troop left at dawn on 3 October, leaving just the OC, 2nd Lieut Barr, Lance Corporal Bassil, Lance Corporal Grant and Sapper Eagles in Kuwait: the latter three left at the end of the week. The Technical College was 'Marched Out' during the morning of 9 October and the OC 34, 2nd Lieut Barr and the final Brigade party — which included Brigadier Derek Horsford — moved up to Kuwait New Airfield ready to fly out that afternoon. Because the waiting RAF Britannia then went unserviceable, however, everyone had an extremely uncomfortable further 24 hours wait there. The aircraft finally took off at 9 pm on Tuesday evening and landed at Nairobi at 8.30 am on Wednesday 11 October 1961.

The OC and elements of 34 Independent Field Squadron had arrived on the first 24 Infantry Brigade aircraft 'chalk' into Kuwait and had left on the last one out. Many of its Sappers had endured the gruelling heat and desert conditions of Kuwait longer than men of any other unit which had served ashore on Operation *VANTAGE*.

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A Nine Days Wonder – Dunkirk Revisited

LIEUT COLONEL M G LE G BRIDGES BSc(ENG) MIMECHE

Lieut Colonel Meryon Bridges is currently commanding 64 CRE at Chilwell, having followed the PQE (E & M) flag since 1977. This has taken him to Australia, Gibraltar, Hong Kong, and HQ AFCENT in Holland. With the exception of the latter posting he has managed to include a good deal of sailing in an otherwise busy existence. In the following article contemporary sailing is combined with a review of the remarkable events of the evacuation of Dunkirk, 50 years ago this summer.

In nine days in 1940 between 26 May and 3 June, a minor miracle was performed at Dunkirk in which some 190,000 troops from the British Expeditionary Force (BEF) and 125,000 troops from the First French Army, in all over 315,000 men, were lifted from complete encirclement and apparent disaster at the hands of the then unstoppable German Army. Four bitter years later, in June 1944, the tide was turned, and the largest invasion fleet in history brought the allied forces ashore on the beaches of Normandy, beginning the campaign that was to end the war in Europe. As an essential part of that landing process, a vast harbour, the size of Dover, was constructed in a mere 14 days to provide the necessary unloading facilities to supply and reinforce the forces put ashore. I had the privilege of attending the 50th Anniversary celebrations of the former event and, within nine days, of visiting the megalithic remains of the latter.

Exercise DYNAMO, named after *Operation DYNAMO* which was the codename for the evacuation in 1940, was a sail training exercise in which three Nicolson 55ft yachts from JSASTC joined the fleet of "little ships" on their pilgrimage from Dover to Dunkirk, and back to Ramsgate to commemorate the evacuation. The three service yachts, one Navy, one Army, one Air Force, were there to represent the forces of today, and to play the good shepherd to the fleet of little ships. Their qualification for being there was that, one and all, they participated in the original event. Seventy-eight of the little ships took part, together with an escort of Royal Naval vessels, RNLI Lifeboats, and spectator vessels.

I joined HMSTC *SABRE* as Mate on Sunday 20 May, and we made our way from Gosport to Dover via Cherbourg (to collect a stock of Duty Free). That first passage, which was surprisingly unpleasant, showed that we had the makings of an unusually good crew; a congenial bunch who showed bags of spirit, and this boded well for the future. The 23 May was Gala day in Dover. It was brilliant weather and the fleet, dressed overall with flags, made a colourful spectacle.

In the morning there was a very moving church service of commemoration, and in the afternoon the public came *en masse* to look us over. Actually they came mainly to look over HRH The Duke of Edinburgh, who graced us with a visit and a tour of the fleet. A remarkable fleet it was too. There was a little inshore trawler, *Shepherd Lad*, which was still at work 50 years after the evacuation. There were three magnificent Thames barges, described affectionately by one owner as, "200 tons of soggy wood". There was a perfectly preserved MTB, No 102, and a London river fire boat, built in 1935, and still running on her original, low profile,

Lieut Colonel M G Le G Bridges
A Nine Days Wonder Dunkirk Revisited

straight eight, dry sump, diesel engines. This latter vessel had the unique honour of receiving a personal "Mentioned in Dispatches" for her efforts. There was also a wide range of motor launches and river boats, a few yachts, and a handful of lifeboats which were in service at the time of the evacuation.

The following day, despite rather marginal weather conditions for some of the more fragile old timers, the fleet set sail for Dunkirk. We moved according to an elaborate convoy drill, each boat having a nominated station. Fortunately we were tasked with bringing up the rear and, in due course, the stragglers, so we were fairly free to manoeuvre. It was another lovely day with a moderate north east wind and the mass of little boats made an amazing spectacle. Halfway across a Spitfire appeared for a low level beat up, which it did superbly, and which quite completed the picture.

As we approached the French coast however, things took a turn for the worse, in that a turn to Port of 70 degrees or so was necessary to follow the line of the shore up past Calais to Dunkirk. This took the fleet more or less head to wind, and the steep short sea started bouncing the river boats around quite a lot. Most of the little ships had spent the 50 intervening years floating on placid inland waterways, and 50 years of accumulated sludge in their diesel tanks escaped to dive joyously into fuel pumps and injectors. Calls for help came thick and fast as engines spluttered and died. The escorting RNLI boats did sterling service, but soon it was our turn to pick up a dead launch, which had been unceremoniously parked on the Sally Line terminal jetty in the Dunkirk West Harbour. As a ferry was due shortly, there was a detectable and growing edge of alarm in their calls for a tow. We plucked them off before disaster overtook them, and set off up the eight mile canal to the main harbour.

A second launch was hitched on behind and so, like a marine string of sausages, we proceeded to the town. In fact we had the best of it for the remainder of the fleet outside was punching against 20 knots of wind and a 2.5 knot tide, and took forever to cover the distance. They were further frustrated by the two hours it took to pack them all into the lock to raise them to the level of the inner harbour.

There followed two days of indolence and social exchange in Dunkirk, during which several members of our crew distinguished themselves by rendering service to the disabled boats, sorting out fuel systems, engines, gearboxes and electrics.

Let me now digress to the events of 50 years previous. Operation *DYNAMO* was conceived and executed under the full stress of war in an incredibly short time. On Sunday 19 May a meeting was held in London "to consider the maintenance of the BEF through Dunkirk, Calais and Boulogne, and secondly the possible evacuation, which was considered to be unlikely, through these ports". On 21 May, another meeting was held "to consider the emergency evacuation of very large forces, the necessity for air protection, and the need of a large number of small boats to carry troops to the off-shore ships". By 23 May, the German army had invested Boulogne and Calais, and was bombing Dunkirk so heavily that it could not easily be used. Re-supply of the BEF, let alone extracting it from a perilous situation, now posed extreme difficulties. At this stage evacuation plans were based only on the BEF. It was as late as the fifth day of the actual evacuation that the Officer in Command of the operation was tasked with lifting out the French Army as well. Initial figures given for them were 40-50,000. In the end nearly 125,000 were got out.

The evacuation started on Sunday 26 May. The first ship returned to Dover at 10.30 pm that night, carrying 1312 men, mainly from the lines of communication. Initially, as might be expected, there was a lot of inefficiency. Getting together at one time a ship, enough small boats, soldiers on the beach ready to load, and someone to supervise them clambering into boats from three to four feet of water posed problems enough, without the continuous shelling and bombing by the enemy. The total on the second day was around 6000 men brought off, and with 300,000 still to come, the prospect of failure began to loom.

On the 28th there was a surf on the beaches and a good many boats were swamped. Because the Dunkirk waterworks were destroyed by bombs on the 25th, recovery of troops was additionally hampered by the need to bring water ashore for the defenders and those who waited. By this time Dunkirk was ablaze in several places, most notably the oil storage, and the smoke was so thick that at

This photograph is reproduced with kind permission of *The Times* newspaper

times the relieving ships had difficulty finding their way into the port. The area was continuously bombed and mined by wings of German bombers which came over 30-50 at a time. On this day two trawlers, two drifters, a troopship and a minesweeper were lost.

During Wednesday 29th there was a continuous flow of troopships using the East pier of the harbour. Due to the flames from fires on the docks and wreckage in the inner port, only the East pier could be used to bring ships alongside to load. This was the mole forming the East side of the harbour, which stretches almost 1.75 miles out from the shore. This too was the only means of getting ashore food and supplies to the beleaguered defenders, so there was often congestion along it. It also made a focal point for the bombers and it was frequently breached. All other evacuations took place from the beaches. Men waded out to their chests or their necks to reach the small boats which would ferry them out to the larger ships waiting in the deep water channel a mile offshore. Others waited patiently on the beaches. One Naval Officer describes approaching the port in the early morning. As the ship came down the Eastern pass, he could see what seemed to be great black shadows on the pale sands. In front, as they went in, was a blackness of smoke with leaping tongues of flame shot through it. As the light grew the shadows materialised into vast formations of men, standing, waiting. "They did not seem to change, the men did not sit or lie down. They stood, waiting their turn calmly, patiently, amidst the racket of bombing, shelling and machine gunning, and the roar of the planes and fires." During this day, despite the surf which swamped or damaged many boats, some 38,000 troops were brought off.

The weather improved on the 30 May and the sea was calm. The Sappers started to build improvised jetties out from the beach out of vehicles, with gratings, ladders or any timber lashed on top to make a walkway. So long as these stood up, they greatly speeded the loading of boats, but they were fragile and were easily damaged when heavier ships, like the small paddle steamers, tried to come alongside them. The naval beach parties, who had spent the last three days up to their waists in the sea helping men into the boats, now enjoyed a small improvement in their conditions of work. The beach operations were the scene of constant experiment into the best ways of picking up the troops. Some schemes worked, others didn't. At one time on this day 4000 troops were embarked within the hour. One destroyer, taking advantage of the calm sea, returned with 1400 men on board. Apparently she handled like a pig, and speed had to be kept down to stop a roll developing, but she made it. One eighty foot yacht, the *Conidaw*, crossed with eighty soldiers in addition to the crew. In all almost 46,000 men came off.

By Friday 31 May, Belguim had fallen and the Germans on the East side of the town had advanced so that they could shell the Eastern end of the ship channel. The Western approach was covered by German-held guns at Calais. The only access was via a channel swept through the minefields across the shoals to the North. The return trip to England by this route was 108 miles, but more and more small motor boats (to become famous as the little ships) were coming over to help. Many were sunk or damaged by bombs, shell fire or machine guns. Additionally, a surf in the morning made loading very difficult. None the less nearly 60,000 got off this day. The troops were now totally exhausted

A Nine Days Wonder Dunkirk Revisited (1)

This photograph is reproduced with kind permission of *The Times* newspaper

and would lie down to sleep wherever the opportunity arose — on the mole amidst the bombs as they waited for a ship, on the beaches, on the decks of the ships. Some were too exhausted to swim out to boats and remarkable devotion to duty was displayed on every side. Mr Moodey, a fireman from the ship *Levenwood*, of 800 tons, kept going over the side to pick up men too weary to make it on board, encouraging some, supporting others. He did this in a heavy swell and surf for three hours. Mr Elton, the cook of the *Bystander*, had the day before saved 25 officers and men from the sinking *King Orry*, spending half an hour in the water. He then returned to his galley, equipped for feeding seven, and produced hot tea and food for 97 soldiers on board. Able Seaman Palmer put in to the beach in the 30 foot motor yacht *Maid Errant*. In the surf she was rushed by some French soldiers, swamped and washed ashore. He refloated her, and then with a stoker as his only crew, gathered up a British NCO and eight soldiers, and set out for England. The engine had not benefited from the experience, so when it broke down, Palmer broke up wooden fittings to make paddles and set his crew to paddle home — which they did.

By Saturday 1 June conditions on the East pier were getting very difficult from the concentration of enemy attacks. Heavy shell fire was coming from three six-inch batteries at Gravelines, besides the heavy coastal guns in Fort Grande Philippe. It was decided that the harbour could no longer be used in daylight. However, as darkness fell that night, a massive effort was made involving 24 British ships, some French ships, and up to 250 small vessels. Despite the potential for chaos in overcrowded unlit channels, compounded by exhausted overstressed crews, and enemy attacks, 62,000 men came off but at a heavy cost in troopships, destroyers and minesweepers sunk. Mr D T Banks brought back more than four hundred men in the two motor boats he had charge of. When one was sunk he continued in the other, making seven or eight trips. In the log of HMS *Sandown*, her Captain, Commander Greig DSO RN commented, "embarked nine hundred British troops. Heavy air attacks and six inch shelling throughout afternoon. Embarking carried out under difficult circumstances owing to enemy action and the heavy swell making boat work very arduous. The spirit of officers and men was excellent. Ratings volunteered from the stokehold for any duties required". In addition to the record of men brought off, some 78 enemy aircraft were destroyed over Dunkirk on this day.

A Nine Days Wonder Dunkirk Revisited (2)

And so it went on through Sunday 2 June. By 11.30pm the Senior Naval Officer reported "BEF evacuated". Operation *DYNAMO* was officially terminated by an Admiralty message at 2.23pm on Monday 3 June. In the intervening period the remaining British troops, pier parties, demolition parties and stragglers were all brought off. They left behind a blackened smoking ruin; dead ships lay either side of the entrance and in the harbour; dead men washed in and out on the surf; wrecked aircraft littered the ground. But they had done it. Never had the phrase, "out of the jaws of death" had more meaning. The Army had been saved.

The Dunkirk which we visited was again a living busy seaport. Traces of these events had almost disappeared. The East Pier is still there, and some of the scars remain, but the beaches were open and empty of those great silent shadows. Above the beach stands a memorial to those "qui se sacrifierent dans la bataille de Dunkerque Mai Juin 1940." On Sunday 27 May, a service was held by this memorial, attended by thousands of veterans of the evacuation. Offshore the fleet of little ships gathered, and a wreath was laid in the water to commemorate those who didn't make it, and those who gave their lives in trying to get others off. I had the privilege of meeting some of those veterans and hearing their stories. They were, one and all, very impressive old people.

On 28 May we returned our flock of little ships to Ramsgate. It was yet another fine sunny day, and with little wind spirits in the fleet were high. It was hard to visualise the baptism of fire through which every one of those little boats had passed.

The next day we broke off on our own and headed back to France. A slow overnight Channel crossing brought us to Fecamp and thence to the picturesque town of Honfleur at the mouth of the River Seine. An early start next day (0300hrs) was necessary next morning to catch the ebb tide, and thus we arrived at Arromanches by 0930. This gave ample time to negotiate the entrance to the remains of the Mulberry Harbour, and to go ashore to look about. Space does not permit a description of this incredible feat of engineering, which in any case is well

Memorial overlooking the beaches

covered by an excellent model in the RE Museum. Suffice it to say that there was an outer floating breakwater, a main breakwater constructed out of concrete caissons some 200 odd feet long by 50 by 60 feet, and a series of floating piers and pier-heads spudded on legs. Of this, the majority of the main breakwater only remains. Time and tide have wrought substantial changes, but the outline of this great wall against the sea remains. Of the outer breakwater nothing visible survives; the ships which were sunk to create a temporary breakwater have been removed, as have the piers and pierheads. Some half dozen of the pier pontoons are lined up on the beach, holed and flooding at every tide. In the town there is a small but excellent museum, equipped primarily with superb models of both the whole, and specific parts, of the structure. It overlooks the remains, and the parts displayed are thus easily related to what was built. The museum also offers photographs, mementoes, other models and displays, and a good documentary film and montage. On the cliffs to the West is a battery of German gun positions, massively protected in concrete, which had to be taken out by paratroops before the assault went in. These too have been well preserved. All in all, despite the depredations of the intervening forty-six years, the Mulberry Harbour remains a most impressive spectacle.

Our trip took us on down the coast to spend a night in Port en Bessin before a last duty free call in Cherbourg and home, re-crossing the Channel in only 8.5 hours. It had been memorable in many ways and thoroughly enjoyable at the same time.

A Nine Days Wonder Dunkirk Revisited (3)

Service of Thanksgiving to Mark the 50th Anniversary of the Formation of RE Bomb Disposal Sections St Paul's Cathedral – 25th May 1990

The following address was given by The Right Reverend Jim Thompson, Bishop of Stepney, at the Service on 25th May and is reproduced here with his kind permission. The Bishop served in the 3rd Royal Tank Regiment from 1959-61 and was appointed Area Bishop of Stepney in 1978.

I take as my text, words from the anthem the choir will sing, "Greater love hath no man than this, that he lay down his life for his friends".

It is a great honour for me to be able to speak at this celebration of thanksgiving to mark the 50th Anniversary of the formation of the Royal Engineer Bomb Disposal Sections. As a Royal Tank Regiment man I appreciate the invitation! One of my closest friends the Provost of Coventry, was a Royal Engineer and the only lesson I've learnt about Engineers from him is never go on holiday with one! It is not possible to lie on the beach in idle bliss — there is always a project to be performed like building the twelve foot high sand castle on the rock which provides a perfect course through tunnels and over bridges for golf balls to race each other down to the foot with sundry children screaming the odds, or even trying to find a way to stop the ocean coming in.

But on a more serious note, as Bishop of Stepney I hope I may speak for East Enders as a whole, who have a thousand potentially explosive reasons to be thankful to Bomb Disposal units and our gratitude for lives and houses and streets saved, rings down through fifty years. It is also appropriate that we should be gathered now in the City and especially in St Paul's because this great Cathedral Church was saved from almost certain destruction. One incident was when a thousand kilogram bomb was removed by Royal Engineers — the bomb landed outside St Paul's and embedded itself deep into the ground destroying a gas main. The bomb was armed with a long delay fuse which may have incorporated an anti-disturbance device. There was no known "render-safe" procedure for it at the time and the normal action was to blow up the bomb *in situ*. To do so would have severely damaged, possibly destroyed, St Paul's. However Captain Davies and Lance Corporal Wylie managed to extract it from the ground, whilst three members of the team suffered gas poisoning, and they drove it to Hackney Marshes (still fused), where it was blown up. They received the George Cross. Those inspiring, dramatic pictures of St Paul's standing unharmed with fires all round it which convinced a nation at war that God would stand by them — were owed to the Bomb Disposal units.

The Sections were formed fifty years ago when it was realized that Civil Defence would not be able to cope. By the end of June 1940 there were two hundred and twenty sections and by September, ten thousand Royal Engineers were on bomb disposal duty throughout the UK dealing with up to two thousand unexploded bombs at any one time. The battle to counter the enemy's fiendish devices cost very dear — three hundred and ninety seven officers and men were killed and two hundred and nine wounded — thirty received the George Cross (two posthumously) but of course the majority who risked their lives daily received no awards, except our eternal gratitude and their reward in heaven.

Their roll of honour continues down to this day, because unexploded bombs are still being unearthed, and in the Falklands War Staff Sergeant Prescott died while defusing a bomb on *HMS Antelope*. He was awarded the Conspicuous Gallantry Medal and Captain John Phillips, then a Warrant Officer Class 1 in 33 Engineer Regiment was seriously injured and awarded the Distinguished Service Cross; so the professional skills, developed over the years, the outstanding bravery, goes on and there are many people here who know this in the vivid memories of many moments when you risked your lives. So we give thanks and pray for the continuing work not only of 33 Engineer Regiment and 101 Engineer Regiment TA but also all the others involved in this sacrificial work in the

terrorist era, the units of the Royal Army Ordnance Corps, Royal Naval and Royal Air Force EOD community. I add to them wives and loved ones who have had to wait without news, engaging in their own ways of coping with not being able to do anything but wait, perhaps in feverish activity, perhaps saying "be careful" into the air, perhaps praying, perhaps hiding their anxiety from the children — they also serve. There is so much honour and heroism I cannot tell it all and I hope that all those I have mentioned will symbolize the whole.

But we have come to God's house to thank God for all this. How are we to interpret it? There is an instinctive human response to the fear of explosion — to back away, to take shelter — here are people who, backed by immense professional skill and teamwork, have to advance towards it, to turn right into it, though no doubt they are saying to themselves "all we have to do is follow the procedure", they may also be asking "What if this one is different?" "What if there is an unexpected element?" One of the officers described it to me as: "You're sitting astride a bomb, even when you know all the procedures, even when the bomb has been there for fifty years, your legs can still go weak". Those words reminded me of Dr Strangelove, Peter Sellar's stark attempt to help us "live with the atom bomb and laugh", the last scene is of a mad airman sitting astride the bomb as it hurtles towards the ground, yelling out a wild shout of triumph. Yet in bomb disposal we have a totally opposite image, of men risking their lives to immunize the unexploded bomb, to protect their fellow human beings from danger and death.

I want to suggest that in this act of duty and self-giving they reflect in a human way the nature and character of God Himself as revealed to us in Christ. As He prayed in the Garden of Gethsemane "Let this cup pass Me by", as He faced up to certain death, as He looked towards Jerusalem, He knew what the risks were, He said those brave words to His disciples "Up, let us go forward". Instead of turning away from the sacrifice, He turned towards it, it was a deliberate act to save humankind. It was this sacrifice which demonstrated that God is love, not sentimental love, not erotic love, not selfish love, but self-giving love. It explains why the height of love was to lay down one's life for one's friends. In a world where we are described as "consumers", where we are encouraged to worship ourselves, where there is greed and envy, where we think the earth is ours to mutilate, this message of the Christian faith, this word that at the heart of our being, at the heart of creation, there is the energy of self-giving sacrifice, this is the Gospel our generation needs.

But when Jesus said "Up, let us go forward", as He carried His cross to Calvary He did not regard it as the end, just as Dietrich Bonhoeffer said as he went out to execution at Flossenburg in 1945 "This is only the end of the beginning". He, like Christ, knew that there was Heaven beyond, the eternal dwelling place of God. In our generation we don't find it easy to imagine it, but Jesus saw it ahead of Him as He turned to the man on the cross next to him and said "Truly my son this day you will be with me in Paradise".

In His sacrifice He was drawing the sting of evil, defying it, immunizing society and individuals against the explosive wickedness beneath the surface of human behaviour, seeing the danger and facing right into it at the risk of His life to save mankind. In some ways then, bomb disposal is a parable of the nature of God Himself. To be joined to that sacrificial love of Christ is to give our lives ultimate meaning, because love is the meaning of God, to be in harmony with Him is to be alive.

It is therefore a calling to all Christian people in our own way, certainly less dangerous, but also significant — to give our lives to the service and even saving of others, in the love of aged and ailing parents, in the love of the lonely and the homeless, in the service of our children, our friends. In the anthem we are about to have, St Paul puts it like this:

> "I beseech you brothers and sisters, by the mercies of God,
> that you present your bodies, a living sacrifice, holy,
> acceptable to God, which is your reasonable service."
>
> Amen.

Diaries of Lieut General E K Squires CB DSO MC

The Museum has recently been donated the diaries of Lieut General E K Squires CB DSO MC, by his daughter, Mrs L Essame. General Squires had an eventful and distinguished career in the Corps, being commissioned in 1903 and serving initially in India with the Bombay Sappers and Miners. In 1914 he went to France where he was wounded and won the MC at Second Ypres. Later he went to Mesopotamia, the subject of this extract from his diaries. By 1935 after a number of staff appointments of great distinction, he had achieved the rank of major-general and was appointed Director of Staff Duties during the hectic period of rearmament. In 1938 he was selected by the Australian Government for the post of Inspector-General of the Australian Military Forces. He died of cancer in 1940 but had maintained his diary up to the time he was in hospital with his final illness.

12th March 1916. Our General went away this morning — his departure was one of the saddest things I have ever seen.

Rain started again last night and continued at intervals throughout the day: so once more we are surrounded by quagmire.

Went to early HC Service (taken by Padre Ryall): paid a visit to the 3rd Division people in the afternoon.

13th March. As usual.

14th March. As usual — visit to 7th Div in the afternoon.

16th March. Two quite eventful days in one — Night before last River suddenly rose three feet, with rather disastrous results on the Bridge, which is still there (TG) but badly buckled and twisted and only fit for foot passengers, and still worse results lower down the River, where the Bund at the mouth of the Orah Creek is breached, and water pouring up the Canal like a mill-race and to some extent, over the surrounding country. Spent last night (9pm to 8am) over there with Stack and a working party of 1000, collecting materials and filling 20,000 sand bags for a new Bund about 400yds inland. This bund may be started tomorrow, but it is a tough job and heaven knows whether we shall put it through — canal about 120ft wide, 10ft deep in middle (at present) and a current of about six knots running! ...

29th April. Kut fell this morning — all guns, rifles and stores were first destroyed, but nothing can excuse the miserable policy of meanness and parsimony on the part of the Indian Government, which is so largely responsible for the disaster, nor Nixon's personal ambition which is the other main cause and which have resulted in the loss of a hitherto understated Division consisting of about 3000 British and 6000 Indian ranks and our most successful General.

Parleying's going on today about terms: we hope to be able to get back some of the sick and wounded.

The hottest day we have had: I spent it more or less in bed.

Max "in shade temp" 100+.

30th April. An uncomfortable and wearisome, though rather cooler day, spent shifting camp 300yds upstream, the idea being to give everyone more room (presumably for a prolonged stay in this inferno!): idea quite sound, but it's a pity it wasn't thought of some time ago.

1st May. A most pestilential day: dust storm from morning till evening, then a little lull, and then a tornado with a terribly violent dust storm — Flies intolerable: one avoids swallowing numbers of them on every mouthful with greatest difficulty.

1st June. rode with D ... to Twin Canals before breakfast, to look at road making and water supply work. Unlimited office work afterwards, chiefly caused by the fact that every scheme of every kind is completely altered once, if not more, daily: perhaps in days to come the humour of it all will strike one: in the meantime the amount of unnecessary labour given to everyone is merely annoying.

2nd June. Rode round looking for sites for a bathing place, and other things in and about the camp, this morning. New pumping installation in process of erection just north of our camp: there are to be two pumps there, two at Abu Roman, one at Magasis and three goodness knows where.

3rd June. A great anniversary![1]

Ride to Abu Roman in the morning.

Normal rather busy day — Quite a cool one for a pleasant change.

4th June. Great excitement and anxiety because this evening a wire has come bringing the first news of the big naval battle[2] on the 31st: apparently our and the German losses were about equal, which means that we are 'up' on the deal, but we have very few details yet.

Started packing up, preparatory to moving camp tomorrow. ...

13th June. The move to Twin Canals is mercifully off, for the present at any rate, and instead of that I had to superintend this evening large parties making dugouts all over our camp, for our reception when the expected shelling comes! This in addition to unlimited and other work — I shall be very glad when the Colonel comes back!

14th June. Digging of dugouts both morning and evening — various interviews with the CC; all very pleasant, but all productive of much new work both for me and our various units. There is no lack of "hares" in this part of the world!

15th June. The Colonel arrived back this morning, thanks be, having had a very cheery and restful time out with 3rd Div. A great relief to get him back. Usual kind of day ending up with a 'splash' dinner in honour of his return: soup, chicken, tinned peaches and finally a tin of pâté produced by Manners!

16th June. Berkeley, who is going to build the S Saad Light Railway, arrived here this morning and is staying till tomorrow. Day as usual except for the arrival of a most welcome mail from home.

17th June. Perfectly beastly night last night: 80 degrees and swarms of sand flies! Usual kind of day.

[1] A family anniversary probably the day he met his future wife

[2] Jutland — 31 May 1916

Beam Me Up Scotty! or at least Look! Here I am! The Military Applications of a Hand-held Navigation Device

MAJOR J F PRAIN MA MSc ARICS

Major James Prain was commissioned into the Corps in 1974 and served in BAOR before going up to Cambridge to read for the engineering tripos. This was followed by service in UK, Northern Ireland, BAOR and Rhodesia. He transferred into the Survey Branch in 1981 and served in Australia, Qatar, Feltham and Düsseldorf before undertaking a masters degree at Nottingham University. Following a second tour at Feltham, he took up his current appointment as Senior Instructor in Field Surveying at the School of Military Survey. He is the third generation of Prains to serve in Military Survey.

Introduction

The transportation system of the *Star Ship Enterprise* needed a hand-held communicator to enable the energizer to lock-on — this device fulfilled a number of functions including providing the crewman's position. Today this aspect of the sci-fi story is a reality. A range of hand-held devices is now being marketed at around £2500 each enabling the user to obtain his position in terms of latitude, longitude (or easting and northing) and height to an accuracy of 100 metres, anywhere in the world, any time and in any weather (by 1992). These hand-held receivers (see photo opposite page) operate by tuning into the navigation satellites of the US NAVSTAR Global Positioning System (GPS) now in its deployment phase. This article complements a previous one written by Major Mark Breach in the September 1987 issue of the *Journal*, and introduces one of the most recent aids to navigation and highlights some of the applications for the battlefield user (and REYC members!).

The Global Positioning System

Known as NAVSTAR or GPS, the system has been set up by the US Air Force as a real-time navigation aid to military platforms operating above sea-level ranging from warships to fast jets. It will provide *bona fide* users with an instantaneous three dimensional position fix to a 15 metre accuracy.

The system is based on active or intelligent satellites which transmit two prime pieces of information: timing pulses against an atomic clock time base and the satellite's position. By tuning to four satellites simultaneously through a process of fast multiplexing a receiver's microprocessor can use the accurate timing pulses to determine the range to each satellite by measuring the propagation time delay of these timing pulses which are then multiplied by the speed of light. Then using the broadcast positions of the four satellites and the computed ranges, the receiver's position can be deduced. These four measurements are needed to solve the three position coordinates; the fourth measurement is needed to solve the error inherent in the receiver's own quartz clock which is inferior to the caesium clocks on board the satellites.

In order to provide at least four satellites in view 15 degrees above the horizon, at any location and at any time, there will eventually be 21 satellites in six orbit planes inclined at 55 degrees to the

Major J F Prain MA MSc

Equator at altitudes of 20,200km. Prior to the deployment of the full operational constellation of satellites, a test set was launched to prove the whole system. The first set of satellites, known as Block I satellites, started to be launched in 1979 and has given limited coverage over the past decade. Six of the 11 Block I satellites are still operational today — a measure of the high reliability of the system. Unfortunately, it was the Space Shuttle Challenger disaster of January 1986 which caused a severe delay to the deployment plan of the operational or Block 2 satellites. The latest US estimate is that the full 21 satellites will be deployed by 1992.

The whole operation is controlled by the Master Control Station at Colorado Springs. This facility receives tracking data from a network of tracking stations, including the one manned continuously by 42 Survey Engineer Group at Hermitage. This data is used to monitor the actual satellite orbit paths and to provide each satellite with an orbit path prediction for the next 24 hours. It is an estimated position that is transmitted to a user when computing a position fix and hence the ultimate system accuracy depends on this tracking data.

Because the system has performed well beyond expectation and specification, US military authorities are concerned that even the coarse measurement, readily available to the common user, is too accurate, and can give a potential enemy an equal tactical advantage. To overcome this, the US is now applying *selective availability* or SA to its satellites which is a series of techniques designed to degrade the signal so that a commercial user cannot get better than 100 metre accuracy (compared with trial results of 25 metres when SA was not applied). This degradation can be increased still further if warranted. This process does not affect accuracy available to the licensed user.

User Types

GPS was designed as a navigation system for military users and therefore has in-built access restrictions. Unrestricted access is available on one of the two broadcast frequencies. (The timing pulses are transmitted at a frequency with an equivalent wavelength of 300 metres). It is this set of pulses that simple hand-held receivers use. *Bona fide* military users are able to tune into a more complex coded set of timing pulses which have a higher accuracy: not only is the wavelength shorter — 30 metres thus providing greater precision, but it is broadcast on two carrier frequencies and hence enables the elimination of the errors due to the refraction or bending effect of the earth's ionosphere.

While the system has been designed as a navigation system, it can also be used as a geodetic survey tool with an accuracy potential of centimetres to millimetres by measuring the phase of the carrier wave as opposed to using the timing pulses. This level of accuracy is achieved by tracking with a geodetic receiver at one point for up to one hour then processing the data on a portable computer. This type of receiver will be one of the future tools of Military Survey; however, this aspect of GPS is outside the scope of this article.

Features of a hand-held receiver

As a solid state device there are no moving parts to break or get shocked; it is tough and lightweight and with a low power consumption, can be battery operated. Given a suitable seal it will float.

To give a position fix from initial switch on, the receiver needs to know where the satellites are. This information can be automatically stored in

Beam me up Scotty or at least look Here I Am (1)

memory from previous use. Using this data, the first fix will take between 2-4 minutes to compute.

Automatic tracking of satellites means that the receiver is easy to use: switch on and press the survey button! Some elementary understanding is needed in order to set up the navigation and way point modes.

Once locked on to a set of four satellites, the receiver recomputes its position every 20 seconds. The receiver can use these updates to compute velocity and heading. Alternatively it can give bearing and distance to a pre-defined way point.

A built-in memory enables the receiver to store a series of site coordinates for later evaluation or down-loading into a computer.

A variety of display modes is offered to the user. He can also select the coordinate system compatible with local mapping; such details are always given in the small print on the edge of a map!

One way of improving the accuracy of the system is to operate with two receivers simultaneously. If one receiver is placed on a previously coordinated base station, the difference between the receiver's computed position and the known position, can be determined. This difference can then be radioed to the remote receiver operating within 10-20km of the base station and applied as a correction. In trials at Hermitage with two Magellan receivers the positioned accuracy of the remote unit could be improved to 10m. This mode of operation is known as differential GPS.

Military Applications

So here we have a device about the size of a chunky car 'phone that will give positional accuracy of 100m, anywhere (provided there is a clear horizon), at any time; what uses does it have?

The most common method of land navigation for the Forces is by map reading, supplemented by prismatic or lightweight compasses. This method, though simple, has its limitations. Firstly, it requires a user to be skilled in map reading, especially in barren terrain where there are few man-made features such as roads and churches. Secondly, it is difficult to obtain a position fix or to navigate both at night if no stars are visible and in mist.

Some users have a navigation system which is an integral part of the weapon system or platform. Examples include the Royal Artillery's Multi-launch Rocket System, RAF's support helicopters and principal naval vessels. However, weak links on the battlefield include: the ammunition lorry resupplying the gun line, the fighting patrol debussing from the helicopter and the landing craft leaving the mother ship and the parachutist jumping from a plane; all know where they have just come from and know where they should be heading but do not know how to navigate between the two, other than by map, compass, skill — and good luck!

Patrolling is a crucial tactical operation that is dependent on accurate navigation. A GPS receiver could provide the means to confirm location and to provide an effective navigation aid between way points in terrain varying from jungle where fields of view may be short, to desert where recognizable features may be limited.

Search and rescue is an obvious area for the use of GPS. Both the searcher and the lost or injured could use GPS to reduce the search time through more accurate position fixes.

On-board vehicle navigation systems have until recently been expensive, given the engineering complexities of inertial systems relying on gyroscopes and accelerometers and thus only fitted to *capital* equipment such as armoured vehicles. Now GPS provides a navigation system which is cost effective for all vehicles, especially logistic vehicles carrying crucial items such as ammunition or bridging components.

Relocating supply caches and covert dumps can be made less risky by the use of a GPS receiver to provide an accurate fix of the target and a means to navigate back there.

Conclusions

GPS provides the common user with a navigation tool with an accuracy of 100 metres (with selective availability applied) which is as good as can be achieved by normal 1/50,000 scale map reading yet is guaranteed 24 hours a day, in any weather.

Today, receivers capable of this are as cheap as £2500. If development continues as it has for the pocket calculator, then such devices will be of the order of £500 by the middle of this decade. At this price the use of such a tool to aid patrolling, search and rescue and vehicle navigation should be easy to justify.

Royal Engineers Museum Progress Report

COLONEL G W A NAPIER MA

This Article is based on the Director's report delivered to Council in April 1990 but brought up-to-date in relation to the work in progress in 1990.

Introduction

This is the first full report since the demise of the Institution's Museum Executive Committee and since the acceptance by Council of their paper *Strategy for the RE Museum*. The Strategy was based on the Feasibility Study produced last year by Museum Enterprises Limited the main points from which were:

- A development and marketing plan to start in 1989 to achieve a target of 50,000 visitors per year by 1994; development to concentrate on the Ravelin building, enhancing the permanent exhibition to widen its appeal to a larger potential range of visitors.
- A business plan to provide for the running costs of the Museum by 1994.
- Measures for the care and management of the collection to be introduced over a period.
- Measures for improving the facilities both for the public and the Museum itself.

Both the strategy paper and current work in hand reflect a degree of deviation from the detailed approach of the Feasibility Study; and in the course of this report I will highlight the areas where this is particularly the case. That said, nothing has occurred in the past year to alter the basic ideals, which are to establish in the Ravelin building a home for our unique collection where these historic possessions of the Corps may be preserved and presented to the public; so as to tell the story of the Corps' worldwide and varied involvements in matters military, technical and constructional in an exciting and inspiring manner.

I will begin by telling you what was achieved in 1989 and then summarize the financial position in which we found ourselves on 1 January this year. This really dictates our plans for 1990 which I will outline for you. I will then say a few words on Museum policy before returning to the theme of money to tell you of the Foundation plans for capital funding. This leads on to a discussion of running costs and the revised business plan for the next five years. Finally, after a brief word about the Friends, I look ahead to the plans for 1991 and beyond.

1989

1989 was dominated by efforts to implement the organizational and financial arrangements for the Museum recommended in the strategy paper and to obtain agreement to the main points which effectively signify the Corps' commitment to the development plans. These were successfully accomplished in that the Museum Executive Committee has now been disbanded and their work is now done by myself as Director with the help of the home team here; primarily the Curator and the Project Officer with whom I meet on a regular basis to plan our progress. Our point of reference on policy matters is the Trustees Steering Committee, the group set up under Council authority to formulate policy and to make those decisions on your behalf which are outside my own terms of reference.

In line with this restructuring has been the establishment of my post as Director and the agreement to hand over my former additional responsibilities as Secretary of the Institution and Editor of the *Journal* to the Corps Secretary. (*Colonel Napier took over as full-time Director in January .)*

Two other key decisions implemented were the continuation of the Project Team to carry out the work in the Ravelin Building and the plan to reorganize the accommodation there to relocate the Museum staff in their new offices with sufficient space to allow for their planned expansion. The moves have meant the acceptance, by all those who work in the Ravelin building, of much disruption and in many cases, a reduced standard of

accommodation. I would like to record our appreciation to the Regimental Colonel and the Corps staff for taking it all extremely cheerfully and for giving up quite a lot for the sake of the Museum with a thoroughly good grace.

A key matter in this reshuffle has been the relocation of the Museum stores in the former REA offices. I shall return to the subject of storage later but it is a good moment to explain what I think few of us realize, which is that it is only ever possible to place on public display a small proportion of the artefacts. Since the amount of display space is finite, the proportion in storage is certain to grow and unless we can accord those items the proper environmental storage conditions the collection will gradually waste away. These items are not like the things which many of us keep in our attics because we cannot bear to dispose of them. They are an essential part of the collection to be used for reference, for research and temporary exhibitions. It is simply that they are not available to the general public except as and when we can make them available to researchers. We need much, much more space and will need, in the years to come, to continue to upgrade the environmental conditions although there is an even more pressing requirement for that in the main galleries. I really do pay tribute to our Curator for her patient but determined work in educating us over the need properly to look after these items.

Money will inevitably be a recurring theme in this report but at this stage I would just mention that agreement was reached on the contributions to be made respectively by Corps and Institution funds to the Museum's annual budget, namely £15,000 from each.

Within the Museum, as well as the planning of this development and upgrading the existing displays, the main achievement has been to set in hand a programme of activities designed to bring what we have to offer to public attention. We had three special events in 1989, the highly successful *Searchlight* day in February, some special arrangements for the RSME At Home in September, and a first class Medal Workshop in November at which we enjoyed the presence of three professional experts from Glendinnings, free of charge, and were able to invite members of the public along to talk about their own medals and have a free valuation. Events such as these are the breath of life for us not so much for the numbers they bring in, but for the opportunity they give us for advertising and obtaining press coverage. They are, however, expensive to lay on both in money and man hours and so we will need to pick our future events judiciously.

The Museum staff was also able to put together one temporary exhibition *Memories of 39*. It is very modest by the standards that we will be able to achieve when we have a proper gallery for this purpose but these exhibitions will continue to be of great importance in bringing people back to the Museum, to maintain its freshness, to allow us to develop themes in greater depth than the permanent exhibition can and to let us display our own reserve material and use items we can borrow from other sources.

But perhaps the most important step on the activities front has been the launch of our education programme. Last year we obtained the services of a young graduate working part-time for us to draw up a series of work sheets and teachers' packs to offer school parties. We have had continuing discussions with the North Kent Education Office to see how we can best use the collection in support of the new curriculum in schools and we find intense interest among both officials and teachers in the potential. So much so that we have now been able to obtain the services of a senior teacher on secondment to us for two terms to do the groundwork for a proper professionally based schools programme (*Photo 1 overleaf*). This is not going to bear immediate fruit. The fact is that the current upheaval in the teaching profession is such that schools have immense difficulty in just getting round to planning a museum visit. Nevertheless it is an area we see of utmost importance and we intend to continue to give it high priority.

In this section on 1989's achievements I must also mention the most important acquisition the Museum has made for some years, the manuscript report by Gordon on his time in command of the Ever Victorious Army and the defeat of the Taiping rebellion. (See August *Journal* page no 104).

So I think we can be reasonably satisfied that despite the fact that we were not able to implement the strategy immediately in the sense of getting all the measures through and the proposed staff changes

Photo 1 School visitors enjoying the Museum

made, nevertheless much has actually happened. The bare statistics are that visitor numbers in 1989 were 12,414 compared with 8,127 in 1988 and takings £5,918 compared with £3,937.

Finance

At this point the report discussed the accounts which have since been published in the Supplement. *It pointed out that the surplus achieved was largely due to a one-off refund of £14,000 VAT but that earnings were greater and expenditure slightly less than budgeted for. One result of this was that the Foundation's offer to contribute to running costs in 1989 did not have to be taken up.*

1990

Let us now consider the forecasts for this year.

Here the report discussed the budget for 1990, set at £60,700 which after taking account of the 1989 surplus and income and grants from various sources led to a bid for some £6,500 from the Foundation as a contribution to running costs.

We are quite determined to press ahead with the additions to the staff recommended in the Feasibility Study. The point is that the measures for developing the staff and for the marketing side go hand in hand with the capital development and although there is an element of risk, I believe that we must accept some risk if we are to get success. The two posts we propose to add are the registrar and the marketing officer. Without the registrar's post the Curator will forever be bogged down in the vital but time-consuming business of accounting for the collection, for which there is an enormous backlog. She will therefore be unable to put the required effort into researching and planning her side of the development plan, not to mention the day-to-day business of running the Museum. The requirement for the marketing officer is, I hope, obvious. The only other staff addition allowed for is a part-time education officer in September when we lose our seconded teacher. On the plus side we will not require to pay salaries for the clerical support we need, thanks to the negotiation of some YTS candidates.

The next major item of expenditure is on Publicity, Marketing and Hospitality. The figure I have used is less than that recommended by the Feasibility Study. It can be broken down into £6,750 for printing of posters, leaflets and tickets, £3,750 for publicity in tourism literature including postage and design fees, £2,000 for press advertisements and notices and £2,500 for hospitality. We only offer hospitality to those visitors who do us some good one way or another but a few lunches in the Mess do pay dividends from time-to-time. However this sum also allows for some sort of function for the completion of the courtyard roof.

The remainder of the Management budget for 1990 covers fairly routine items and is certainly well within that recommended by the Feasibility Study.

That said, on the revenue side, I am afraid I cannot hold out much hope for a very prosperous year. The main factor is that we shall have to close down part of the galleries for some time in order to allow essential repair work to take place on the roof. The glass section on the tall back part of the building has been in a bad way for some time and although we have been pressing for nearly a year, we have not been able to persuade the PSA to do anything about it until this year. They are going to re-roof this section completely and during that time we shall close that part of the museum and allow our public in free of charge. Naturally this means a reduction in the number of planned parties, such as schools, that we can put through.

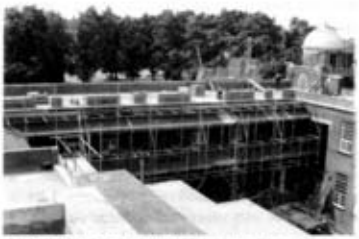


Photo 2 The Ravelin Building inner parapet wall being prepared by the contractors, Arnold and Nathan, for laying of the reinforced concrete bearing pads for the beams

Photo 3 One of the side trusses being lowered into position in July 1990

Towards the end of the year we hope to be able to make a start on upgrading the earlier galleries in accordance with the proposals of the Feasibility Study. The main elements of this area are:

- Installation of a *hands-on* item in the Fortifications section.
- Redesign of the Gibraltar Room turning it into a tunnel through which all visitors will pass, with suitable sound effects.
- Partial redesign of the nineteenth century galleries to enable us to produce a more coherent story line and rather more exciting high-lighting of such achievements as worldwide survey and the great economic infrastructure projects.
- The upgrading of the quality of captions and graphic panels from the rather amateurish efforts we installed in a hurry and on a low budget in 1986, together with better lighting and improved environmental conditions.

This work will also mean closing galleries some of the time but at least we will be able to tell people it is going to lead to positive improvements which they can look forward to visiting in the future.

Dominating all else will of course be the courtyard roof. The consulting engineers, Sir Alexander Gibb and Partners have been helping us on this for nearly a year and, after sending out tenders last autumn, four responses were considered. The chosen contractors are a Kent firm, Arnold and Nathan; and the price, much higher than we had hoped is to be £244,500.

The design for the roof comprises two central tubular truss beams spanning the courtyard to hold a triple skin polycarbonate translucent barrel vault roof. Either side of the barrel vault the two side roofs at approximately two-and-a-half degrees pitch are supported each on three tubular truss beams. They are clad with insulated composite steel sections.

Two particular factors governing the design were the need for ulta-violet protection for the artefacts on display and for maintaining as even a temperature as possible. The polycarbonate virtually eliminates the UV risk but the requirement for even temperature precluded using more than about 20 per cent for natural daylight so as to avoid undue "greenhouse" effects. Ventilation will be provided by special vents in the barrel vault which will double as smoke vents.

A substantial proportion of the roof steel is being provided as a donation by British Steel. (Photos 2 and 3 above).

The roof showing the completed barrel vault

There is no doubt that the extra cost of the roof is a set-back to our activities for 1990. While there are sufficient funds to complete the roof, the other items we had hoped to start will have to be postponed unless more funds are forthcoming. The main item remaining in the programme is the audio part of the audio visual enhancement. I have left this in because I think it is almost universally agreed that the Museum's top priority in the galleries is for something to lift the slightly religious atmosphere and add a bit of life. At £23,000 this may sound quite expensive but £14,000 of that is for the basic equipment, much of which will be compatible with the video side when that is introduced in due course. £9,000 is what we have allocated for the research and production of the sound effects which will be as authentic and realistic as possible. The net result will be a very high quality maintenance-free system setting the standard for the whole AV programme. The sounds will be heard in the Gibraltar Room, the World War One trench system, the 1940 house front case, the bridging scene and, in the form of a commentary by General Woollett, on the armoured engineer diorama.

Apart from these major items the only other works will be the completion of the alterations to the building by the project team both for the office moves and for meeting the Fire Officer's requirements for protecting the building, the move of the stores and a start on the cafeteria, most of which can be done on a no-cost basis, the expensive side being the finishing and equipping of the Twynham hut.

All office alterations were achieved and moves completed and by mid-September the Museum's stores had been substantially moved to their new location. Acceptable environmental conditions in the stores have been provided by the installation of ventilation fans and insulation of windows and heating pipes.

Even with these cutbacks, I am still forecasting a deficit on the capital account of some £17,500. However, as I will be explaining shortly, the Foundation's efforts should begin to show some results towards the end of the year and with any luck we should be in an improved climate of falling interest rates. This means that I believe we could overdraw on the strength of the moneys due in 1991. The Trustees Steering Committee have accepted this proposal and we trust that Corps and Institution Funds will look favourably upon us for a loan to fill the gap should it come to this.

Museum Policy

The policy matter I now wish to discuss is the question of trusteeship, control of the collection and registration. You may know that countrywide museums are being invited to register under a scheme administered by the Museums and Galleries Commission, that is the body through which government funding is channelled from the Office of Arts and Libraries to national, local authority and independent museums. But the Commission is much more than a money-dispensing organization. It is the most powerful voice on general museums policy, central government's principal sounding board.

To qualify for the registration scheme, which is of course voluntary, museums have to have properly set up governing bodies, a trust deed which meets certain criteria, and acceptable collections policies for management of the collection and for collecting, acquisitions and disposals. They also have to be prepared to accept the Code of Practice of the Museums Association. The Museums Association is the professional body of the museums world, somewhat analogous to the professional institutions such as the Civils and we are, of course, members.

The Trustees Steering Committee has agreed that we should apply for registration. Not to do so would seriously jeopardize our position in the museum's world in the future. The Committee has also agreed the policy documents and the Code of Practice. *(These were submitted to Council and approved.)*

As to the trust deed, I will be working on that in the months to come but we have established that there is no objection in principle to having a trust deed as well as the Charter of the Institution provided, of course, that they do not conflict.

Foundation

Now I return to more concrete matters to report on the Foundation's work. You will be aware, I think, that the Foundation Trustees have reorganized themselves as a result of the strategy paper, to achieve our new target of rather more than £1

million over and above the total so far raised amounting in cash, kind and pledges to some £700,000. A great deal of preparatory work has been done and a new committee system has been set up to get the campaign under way. They have decided not to go public with the campaign until the autumn when the courtyard roof will be able to bear tangible witness to the success of the earlier campaign. However a very fine brochure is in course of preparation and a number of approaches will be made in the summer with the aim of achieving a fair number of commitments before the official launch.

We are fortunate to have a very distinguished team of trustees and vice-presidents and I list them here:

President:	Chief Royal Engineer
Vice Presidents:	The Duke of Westminster Lord Prior PC Sir William McAlpine Bart Sir Kirby Laing JP DL Sir Nigel Mobbs DL Sir David Plastow The Rt Hon Robin Leigh-Pemberton Hugh Neill CBE TD DL JP Sir Anthony Bamford Alan Curtis Esq Lieut Colonel Richard Seifert
Trustees:	Sir Idris Pearce CBE TD DL — Chairman Sir William Francis CBE Colonel Danny Dennison CBE Colonel Peter Williams TD DL John Fitzmaurice Esq
Ex Officio:	Major General R L Peck (EinC) Major General E G Willmott CB OBE (President Institution)

We owe them a great debt of gratitude and it is difficult to know how we can repay this debt. I believe the form of repayment they would most appreciate would be a parallel display of support for the Museum and generosity from the Corps, and this thought really leads me straight in to the next part of my report, on running costs in the years to come.

Museum Running Costs

Introducing the question of running costs, and as a background to the updated business plan I am putting forward, I would like to remind you of the consultants' general observations on this matter in the Feasibility Study report. They said on average, museums in the UK acquire about 70 per cent of their total operating funds from government sources. At the time they assessed the in-kind contribution of the Ministry of Defence to our Museum to be about 60 per cent of the projected income. Their business plan to 1993 showed the MOD proportion to be diminishing as the development progressed. However the maximum contribution to running costs from museum generated sources which they foresaw as practicable was only 21 per cent starting from less than 10 per cent, the figure which in fact we achieved in 1989. That 10 per cent was entirely made up from ticket sales — of the 21 per cent projected by the consultants for the end of the development plan, 20 per cent was from ticket sales 0.9 per cent the shop and the cafeteria a negligible 0.01 per cent. The point I am making is that, unless we are going to go against the general trend in museums, the most serious source of our future income is ticket money. The shop and cafeteria are extremely important from the marketing and facilities point of view but are not going to make our living.

The next deduction is that there is a substantial gap to fill between expenditure and income. Even allowing for the subsidy from the Corps and the Institution this amounts to some £30-£35,000 a year. This is in line with the proposals of the Feasibility Study but the consultants proposed that this could be covered by setting up an organization which they called the Friends of the RE Museum but for which, to avoid confusion with our existing Friends organization, I prefer to use the term Membership Scheme. A membership scheme is a transatlantic idea under which charitable foundations persuade individuals and corporate organizations to pay subscriptions on a graduated scale in exchange for a related status and the provision of certain privileges. Under the recommendations we were to have launched such a scheme by the end of this year.

However the Trustees Steering Committee has decided not to accept this proposal and to rely for future income on the establishment of an endowment fund. As you know, the Chief Royal Engineer took an initiative on just this early last

year. It has made a modest start and has now reached over £14,000 and much gratitude is due to those, mostly retired members of the Institution, who have become subscribers.

(At the time of the report the fund had reached £14,000. It was estimated that it would build up to some £70-80,000 over the next four years allowing for continuation of current subscriptions and new subscribers. The Trustees are addressing the question of reaching a target of some £750,000 in the Endowment Fund at today's prices.)

Friends

Before moving on to outline the plans for the years after 1990, I need to make a brief mention of our Friends organization. Under the leadership of Colonel John Kitching they have made a most encouraging and welcome start. The Friends of the RE Museum is a support organization providing a backup for the Museum staff in a number of areas, most notably research, marketing and expert advice. They have formed a very effective committee and can already record two successes. First, the local Medway group under the chairmanship of Mrs Sandy Douglas have organized a series of evening lectures in the Museum to encourage more interest from within the garrison and the local population. The programme has been published in the *Supplement* and elsewhere. Second, the Friends have managed to acquire a stand for the Museum at the British Army Equipment Exhibition from 3-7 June 1990 which they will help to man.

The point which I want to lodge now is that the Friends present constitution was written before the committee had been formed up and before it was known what interest it would generate. Its funds are held in the Museum accounts and to keep records simple, it was agreed that members of the Institution would automatically be regarded as Friends. It was really the only practicable way of tiding over after the demise of the old RE Historical Society.

However it is now possible to unmesh the Friends from the Institution to some extent and a new constitution is in preparation which will be put forward for your consideration during the course of this year. Amongst other proposals, Institution members will not automatically become Friends.

Membership will be by subscription. However Institution members will, of course, continue to be able to use the Museum free of charge under a voucher scheme which we are considering in line with certain proposals in the Feasibility Study.

1991 and beyond

You will know the main elements of the development plan. We now call these the Eight Point Plan and in summary the points are:

1. The courtyard roof and display.
2. Improved public facilities including the cafeteria.
3. Enhancement of the existing galleries.
4. A special exhibition gallery.
5. An Education Centre.
6. Improved Museum facilities for research, conservation and storage.
7. A rooftop display area and restaurant.
8. Audio-visual programmes throughout the Museum.

Planning will continue in the confidence that the funds will be forthcoming to bring all to fruition by 1994. I would like to make the point that the bricks and mortar aspect really only tell half the story. In parallel with that will be the ongoing activities programme, Serials 11 and 14, the temporary exhibition gallery and the education wing are essential to that; and the marketing programme to ensure that the Museum gets known about both locally and wider.

Conclusion

Concluding this report I would say that my aim has been to present to you the facts as plainly as I can so that you might judge how the challenge you accepted last year is progressing. I believe there is one principal nettle to be grasped now, the boosting of the endowment fund to give the Museum a sound basis for the future.

What I have not said anything about yet and I believe it to be an appropriate note on which to end, is the regard which our Museum is beginning to achieve in the local community and in the museums world at large. It is worth remembering that the local community has a

very considerable stake in the Museum, some £252,000 worth so far. We are the jewel in the crown of Gillingham's visitor attractions. In Medway we compete, of course, with the Historic Dockyard but we are seen to be level in every way with them on quality if not in size. Nationally our name now appears in all the principal museum literature. We are known to the directors of the national museums because of our collection and we are gaining status. My hope and plea is that even more of our own Corps members than now will give us the same recognition as we are earning outside and appreciate the extent to which the Corps itself is gaining from that recognition.

We are lucky to have a splendid staff, highly motivated and enthusiastic. They enjoy being part of an exciting project like this and so long as we can go on giving them the necessary backing, they can be relied on to produce a thoroughly professional finish. Please call on them and make yourself known to them when you come and visit. You will always be welcome.

Early Days

MLC

"ANY officer who has not already subscribed to the RE Gordon Memorials should forward his subscription without delay to Messrs Cox and Kings ..." is a notice which appeared several times in the RE *Journals* (issued monthly in those days) during 1890. Whether its frequency and peremptory tone encouraged late subscribers is not known (its frequency of publication makes one presume response was not too satisfactory!) but all subsequent sapper generations have much to be grateful for. The main memorial — the Brompton statue of Gordon seated on a camel — was unveiled by the Prince of Wales on 19 May 1890. A large number of troops, including a Royal Naval contingent, filled the Brompton Square, and stands for over a thousand seated spectators were grouped around the memorial. It must have been a memorable gathering, with brilliant weather and many speeches, including those delivered in the Mess at luncheon. Sycophancy tended to rule the day: it was the Prince of Wales' first and only visit to Chatham!

"Honour our Prince that honours Gordon" — a motto displayed amongst many others on the route between the station and the barracks — rather sums up the many high-flown phrases issuing from various sources on that propitious occasion! The statue itself, in bronze, was much praised. A plaster cast was exhibited at that year's Royal Academy and the sculptor, Mr Onslow Ford, was nationally acclaimed.

How much was spent on this and other Corps memorials to Gordon is not revealed in the *Journals* of 1890, but the sum subscribed must have been considerable. If a similar opportunity should arise, let us be sure that the Corps would again rise to the occasion! We would all agree that the Gordon memorial in Brompton adds considerably to the atmosphere imbibed by all those thousands of sappers of all ranks who have passed through the barracks.

In a recent number of the *Journal* [1] the Corps is chided for no longer being in the forefront of military engineering, as it allegedly was when the RE *Institute* was founded. It is argued that we are now too readily content to leave such advances as are made, to others. It is true that the Professional Papers (in those days published annually and which contained ten or so papers on all manner of subjects) certainly dealt with more technical subjects, and in greater depth, than is ever normally published in the *Journal* today. It is perhaps of interest to note the chapter headings in the 1890 edition of the Papers: "Cyclist Infantry; Mounted Infantry and its action in modern warfare; The Treatment of Sewage; Road Making; Mobilization of the Forces; Power of Guns and Armoured Defences, and Ships v Forts; Hydrographic Surveying; Military Posts in Burma; Electric Motors and their Application to Electric Traction; Bridges in the Bengal Presidency; Petroleum as a Producer of Energy." All worthy enough and, if taken as a typical example, indicative of the breadth of interest within the Corps in technical subjects.

What cannot fail to impress today's reader of the Professional Papers were the quite frequent accounts of vast civil engineering work in the Colonial Empire, particularly in India, carried out under the auspices of Sapper officers. Vast in scope and vast in technical difficulty. Whether it was irrigation work, railway bridges over endless patterns of complicated gorge, road bridges, flood control and navigational schemes, the success of the whole scheme from planning to execution often seems to have depended on Sapper officers. In the 1890 *Journals* an article on the achievements of General Sir A T Cotton, particularly regarding large irrigation and water transport projects in Madras, is an excellent example. In a further comment on Sir Arthur Cotton's life and work in the November 1890 *Journal* [2], the following remark is perhaps of special significance: "And, let it be added, that not the least of their value consisted in the training of his subordinate officers." Indeed the ability of many RE officers to achieve such remarkable worldwide civil engineering results, seems to have

[1] *The Core Business* by Lieut Colonel L J Ayling. RE *Journal* April 1990.

[2] See also the long memoir on Sir A T Cotton in the April 1988 *Journal*.

been largely due to good initial selection, a sound training in first principles at the RMA or Addiscombe and the SME, and then practical experience and dedication in places like India under personalities like Sir Arthur. The system produced individuals of the highest calibre and achievement. But in India, for example, it seems that it was the civil engineering frontiers that Sapper officers did so much to expand, rather than the boundaries of military engineering, simple though these latter boundaries may now appear.

There were two other aspects of civil works with which RE officers were concerned, and which received prominence in the 1890 *Journals* and which have also been topical in 1990. The Forth Bridge was completed in 1890. Many readers will know that, in this its centenary year, the Bridge has been the subject of much comment in the technical press. Throughout its complicated construction (certainly at the frontiers of civil engineering) the Board of Trade had required regular quarterly reports from its Railway Department. These reports were compiled by two retired Sapper officers, Major General C S Hutchinson RE and Major F A Marindin RE, (both used the *RE* notation though both were retired!) and their final and glowing report was published in the April 1890 *Journal*.

The May 1890 *Journal* contained another account on a topical, 1990, subject. This was on prison construction and design; in this case it was Wormwood Scrubs. This account was by Major General Sir E F Du Cane, who was the Inspector General of Military Prisons, Chairman of the Prison Board and Surveyor General of Prisons. Readers may also remember that during this period, Major General Sir C Warren was the Commissioner of the Metropolitan Police.

At this time another prison was being built at Borstal, near Rochester, from which the future inmates were to be employed on fortification works under the War Department. For Wormwood Scrubs, temporary wooden hutting was prefabricated in the prisons at Millbank and Pentonville. This was erected by *free* labour at the Wormwood Scrubs site and subsequently occupied by convicts from Millbank, who then built the permanent quarters. The *very valuable* site at Millbank was subsequently sold, and it seems that not only was a *comfortable* profit made but Millbank was replaced by, if not a comfortable, at least a prison of *modern* design. For instance, the cell blocks did not radiate from a common centre but were arranged parallel to one another. The Inspector noted with satisfaction that there was "no combined insubordination" during the course of construction. It may be reasonably surmised from Sir E F Du Cane's many titles, that the Sapper influence on prison design and conduct etc was considerable. Another example of such influence was in Scotland where Lieutenant Colonel Sir A B McHardy was Chairman of the Scottish Prison Commission.

As far as the frontiers of Military Engineering were concerned, a possible example is the defence of ports through submarine mining, which was very active during this period. However, a spirited and somewhat acrimonious exchange in the 1890 *Journals* indicated that all was not well on this frontier. A submariner wrote: "Indeed it is commonplace with the average RE that submarine mining is an inglorious pursuit, fit only for the inferior order of officers, whose legs are too short to straddle horses or who, either in body or mind, are in some way unfitted for pontooning, ballooning and the higher walks of war. Submining is dirty, tedious, unmilitary and non-medalliferous. All this we knew. But now comes Major Clarke and says it is useless."! (Major G S Clarke RE had shortly before published an article on submarine mining in the Royal Artillery Institution Journal.) Subsequent correspondence does not exactly fly to the defence of the *submariners*, but does seem to indicate that such units were not among the most popular of postings! At the time there was the RE Submarine Mining Battalion at Chatham with 11 companies scattered around the Home ports, with one company in Halifax, Nova Scotia.

There was an interesting review of *The Influence of Sea Power upon History 1660-1783* by Captain A T Mahan USN, published in the November 1890 *Journal* and written by Colonel G E Grover RE, who recommended with much fervour that the book should find its way into "all the RE Libraries". The reviewer was right in supposing the book would be required reading for many generations to come. He obviously had difficulty in choosing which of the many quotable extracts he should publish. "A Nation, as we have already shown,

cannot live indefinitely off itself, and the easiest way by which it can communicate with other peoples and renew its own strength is the Sea" wrote Mahan. Grover further quotes "Since 1815, and especially in our own day, the Government of England has passed very much into the hands of the people at large. Whether her sea power will suffer therefrom remains to be seen. Popular Governments are not generally favourable to military expenditure, however necessary, and there are signs that England tends to drop behind". Writing in 1890, almost at the height of Empire and during a century which had "witnessed the main struggles and successes of Great Britain for the maritime supremacy of the world", Colonel Grover points out how England's might is commerce, based upon the influence of sea power, and how, in maintaining such naval superiority, the army with "its arsenals, coast batteries, guns and submarine mines, plays no unimportant part". Grover also reminds us that Mahan quotes Macaulay's well-known saying: "There were seamen and there were gentlemen in the Navy of Charles II, but the seamen were not gentlemen and the gentlemen were not seamen." A somewhat vivid statement that class played an important part in the emerging Navy. To be a soldier and to fight and to win battles was the ambition of a gentleman. Even at sea the tactical battle decisions were thus left to soldiers, such as Major General Monk, while the actual process of sailing and manoeuvring the ship was in the hands of more lowly people, the mariners!

But times and opinions change. Perhaps it is not inappropriate here to quote a modern political journalist — Peter Jenkins in the *Independent* — who wrote in May 1990, "history should have taught us that our Island interests have been best served through continental involvement, not by taking to the open seas".

An interesting correspondence developed in the *Journal* during 1890 on the subject of football. It seems that at this time the Corps association football team had not done particularly well. And why? Because, so the Secretary of the REFC alleged, of the introduction of a game, "played with little sticks called hockey, which had attracted about a dozen of the best players away from football". It seems that Rugby Union had also attracted many players. A correspondent suggested that the obvious course was to drop association football and only to play Rugby as "I cannot help thinking it a mistake to attempt both". Another suggestion was that the Corps should drop other games altogether and encourage everyone to play golf! The correspondence was, as to be expected, inconclusive! It seems that most readers had come to the conclusion that the Corps management should organize such games as people wished to play, and this should certainly include hockey if not golf!

A ticket for the annual Corps dinner in 1890 cost quite a lot. "Two guineas is too much to pay for one's food for one evening", wrote Captain S L Norris in the July 1890 *Journal*. He suggested that officers should be able to join a Dinner Club with a small annual subscription, such as 7s 6d or 5s per year. Norris reckoned that he and many others would like to pay this small annual sum, and then be entitled to dine free on the few occasions they could probably attend the actual dinner. Since inflation during the last hundred years is likely to have raised prices at least, say, thirty or forty times, the dinner at two guineas would have been quite a severe burden!

Fifty Years Ago

LIEUT COLONEL D R STENHOUSE MBE MA FCIT

CORRECTION

PLEASE note that on page 109 of the August 1990 *Journal*, the penultimate line of the CV should have read "17 Port Training Regiment RE" not "17 Post" which was an error and we apologise for this.

Best Practice in Training

BRIGADIER K J DREWIENKIEWICZ MA

Brigadier John Drewienkiewicz was commissioned in 1966 and graduated from Cambridge in 1970. He spent 15 years in the UK and BAOR before two idyllic (for him) years commanding 22 Engineer Regiment within the UK Mobile Force. He then served two years on the MOD 6th Floor as Secretary to the Chiefs of Staff. His debt to society paid, he was allowed to return to the Corps as Commander 11 Engineer Group at Minley in December 1989.

Introduction

No-one ever deliberately set out to teach me how to train. It was assumed that regimental and squadron commanders with wide combat experience were able to use training events to pass on their experience, albeit in a diluted form. This approach was successful in teaching the generation after the Second World War. But we have now reached the point where today's commanding officers arrived in units as young officers after the last 'old hands' had ceased to be commanding officers. So the process of dilution has now gone a long way. Then there is the view that simply by being involved in an activity, you become good at it. It is certainly the principle behind much adolescent fumbling behind the bicycle sheds, but it is not necessarily cost-effective. Third, there is the cynical view that the best way to train successfully is to reproduce last year's instruction, with this year's date on it.

A combination of these three approaches served us well throughout the 70s and early 80s. But over the past few years there has been a growing feeling that training has lost some of its purpose. The aim of major training events and exercises has become more political and less testing. Major exercises, while still useful for training staffs and commanders, have become less worthwhile for most participants. The First Law of Exercise has evolved into:

> 'The higher level the exercise, and the more troops participating, the lower the challenge and value to each participant.'

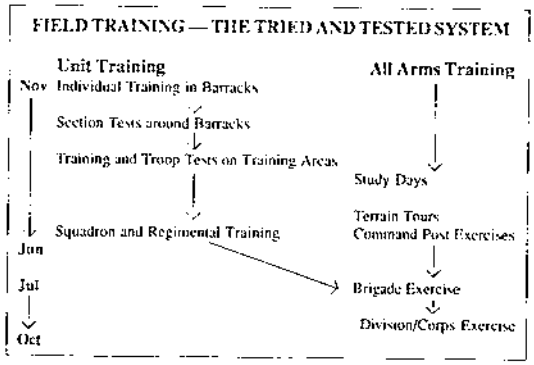
Constraints have always been present in training, and have imposed a degree of unreality on events. But they have been useful to a degree, in providing alternatives to the 'friction of war'.

Restrictions on cross-country manoeuvres to avoid the expensive crops, such as beet, or to ensure that the 'battle' flows past the VIP Stand at a given moment, go some way towards approaching the problem caused by uncleared minefields and other obstacles. Likewise moving by night is more difficult and requires alert vehicle commanders, even if it stems from the need to avoid civilian traffic, rather than from an adverse air situation. Over the years the constraints got tighter quite gradually, and it was generally possible to adapt to changed circumstances. Throughout the 70s and 80s an established pattern of individual and unit training, leading to formation training, was set.

Who gives way to whom?

(This photograph is reproduced with the kind permission of the Editor, *British Army Review*)

Brigadier KJ Drewienkiewicz MA
Best Pratice In Training



It was a stately progression, but there were still sufficient imponderables, created by weather, tiredness and unreliable equipment and individuals to produce unexpected situations. The real value of the training lay largely in reacting to and coping with the unexpected.

THE UNEXPECTED

- Rain caused roads to collapse under armoured vehicles.
- Dense fog delayed the 'break-in' attack by six hours (despite the presence of the Prime Minister).
- Two railway trains of supplies for two divisions were transposed so that each received the other's (different) supplies at railheads 40km apart.
- Extraction of key personnel designated as casualties took them away for up to four days instead of the one day planned.
- Mud on the roads caused whole columns of vehicles to slide into ditches, blocking all access to bridges for up to six hours.

Thus it was still possible, in September 1980, for there to be no bridges or bridgeheads established at first light, across the Corps frontage, when eight crossings had been ordered. So whoever else was suffering from a dearth of realistic training in the early 1980s, it was not us!

> 'The commander ... is more interested in how quickly a bridge can be completed and opened to traffic, than in how it is built. It is very difficult for the engineer officer to give a reasonably accurate forecast of how long a particular bridge will take to erect ... . The responsible engineer officers are therefore very loath to give any estimate of time for completion, and, although anxious to give helpful advice, even after reconnoitring the actual site can only give a very approximate figure.' (*Mil Engr (Field)* 1952.)

However as the decade wore on, the need to avoid unscripted incidents in set-piece exercises took hold. The Master Event List changed from being the skeleton, around which the directing staff would develop the exercise, to become the sole authority for action. This was brought home most forcibly when an infantry commanding officer demanded of the exercise control staff to have an enemy position removed, since it 'was not on the Master Event List'. This gave rise to the Second Law of Exercises:

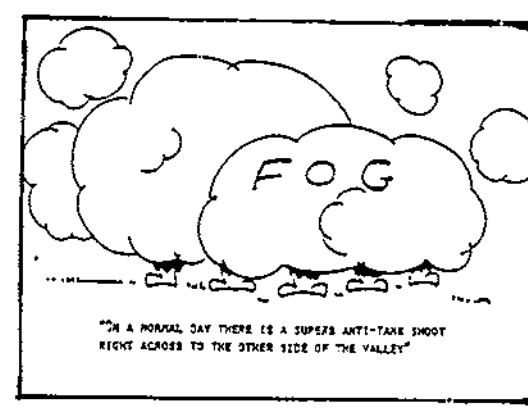
> 'Sapper play slows down the exercise so is only allowed if it is off to one side where it can be by-passed.'

The factors which were beginning to dominate our lives by 1989 were:

- Environmental Pressures, especially in BAOR.
- Lack of money in the Defence Vote.

These might have been managed if we had had two or three years to develop new ways of operating. SACEUR had appreciated the need for a changed approach in his 'Right Mix' study. This study challenged the requirement for each unit on exercise to be represented, in full, and at every level, on the ground. It was a bold attempt to manage change. In normal circumstances it deserved to succeed.

However, the nature and extent of change was accelerated. An evolutionary approach to new constraints will no longer work. The apparent collapse of the time-honoured Threat to NATO



and the move towards reunification of Germany have all happened too quickly for us.

Specifically, the Short Warning Scenario is no longer credible to the taxpayer. However it is not really possible to revert to how things were before the Short Warning Scenario became the focus for training. There is no-one currently serving who can recall the 'Long Warning Scenario', or any scenario when the major threat was not specifically against NATO in Central Europe. Those searching for sets of exercise papers to change the dates will have to look back a long way. Perhaps the last 'Long Warning Scenario' was in 1939/40.

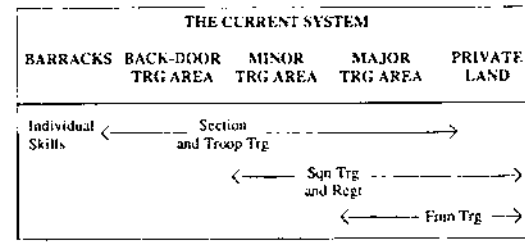
Moreover, there are many aspects of the Short Warning Scenario which are an inefficient and expensive way of doing business if we are not at such short notice. We all know how difficult it is to train in December/January in BAOR, when as many people as were permitted were away on trickle leave. But we have, consciously or unconsciously, got used to operating in a certain way.

One of the few clear facts for the future at this stage is that units and formations will go on exercise in the field less. Most exercises will be on military land, and it will be much easier to get to military land near at hand than distant. There will certainly be fewer formation exercises, and the 80s spectaculars, the *Spearpoints* and *Lionhearts*, will be scaled down: perhaps to *Needlepoint* or *Kittenheart*! Thus, when a unit is at last allowed on a formation exercise, the overall level of experience will be that much lower. Many members of a unit will be on their first such exercise. The back of an APC, which typically used to have four 'old hands' and one 'new boy' in it, will have only one or two 'old hands'. So we ought to look at how best to prepare ourselves for such events. Particularly because with fewer exercises allowed, each one will be much more of a demonstration of capability.

There is thus a need 'to train to train'. Units will have to train in-house, in barracks and on local, small training areas, in order to take their place competently on formation training. With less experience gained at first-hand, we must be prepared to study how others approached similar problems.

As ever, the problem is not new. It was faced in training the Kitchener Army in 1915, and again (more successfully) in training Allied Forces for *Overlord* between 1941-44. In both cases experienced commanders and soldiers were scarce, and there were many constraints to be overcome.

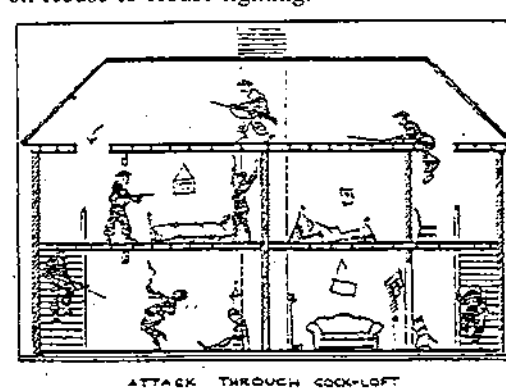
In essence, these stages of training a unit, and the sort of areas used, are:



Individual Skills

The training of individual skills is already well developed. The least efficient individual skill to test and improve is individual marksmanship, and improvements using laser technology which reduce the need for ranges are in the pipeline. Moreover the problems of improving the basic soldierly skills apply to the whole Army, and so we can to some extent sit back and allow others to solve them. Our ingenuity is better used on those special-to-arm skills which no-one will help us to improve if we do not tackle them ourselves.

Nonetheless there are ways in which we could teach individual skills better. We have become very committed to teaching lessons, rather than allowing individuals to learn from manuals at their own pace. We appear to have lost the knack of producing information in an easily digestible form, such as in the 1940s manuals such as this one on House-to-House fighting.



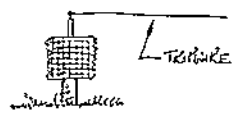
This illustration appears with the kind permission of the publishers of *House to House Fighting*

It certainly is possible to make 'Basic Battle Skills' more digestible than at present. A booklet

has been produced privately by a serving junior officer, on the lines of an adventure game booklet, where the reader is given a choice of two or more paths at the end of each situation, and moves on to success — or not. Such an approach has much to offer, but at present it remains a private venture.

PARAS 38-41

PARA 38
You carefully push your way through the grass, keeping under cover. Suddenly you see, inches in front of your nose, a mine. Now you know what the Russian word for "mine" is. Add one Hero point to your total for being cautious. Here is a sketch of the mine:



a. If you think it is a POM 2-2, keep a note of this PARA number. Turn to PARA 42.

b. If you think it is an OZM-3, keep a note of this PARA number. Turn to PARA 22.

c. If you don't have a clue what sort of mine it is, or don't care and just want to get the hell out of there, or have returned here after PARAs 42/32. Turn to PARA 36.

PARA 39
You now move off down a forest trail heading in roughly the right direction. After about one hour you notice that the birds have stopped singing. You can:

a. Press on. After all, there is a war on and they are probably shell shocked. Turn to PARA 44.

b. Hide in the undergrowth and wait to see what happens. Turn to PARA 29.

c. Go back the way you came from. Turn to PARA 36.

PARA 40
As you move forward, there is a loud bang as your leg is shattered by a mine. Now you know what the Russian word for "mine" looks like.

You dimly hear yourself screaming, as you pass out. Turn to PARA 10.

PARA 41
About ten minutes later you find yourself lying on the ground, choking on your own vomit. You knew there was something you forgot! Your cannister does not work after being immersed in water. Changing it will not help if the replacement is wet as well...

Lose 3 hero points. You die (and the game ends) here.

This illustration appears with kind permission of the author Capt T Mouatt, RAOC

Most basic combat engineering skills would benefit from such treatment, and the format would be familiar to today's recruits — even if not to their commanders. The best booklet we have at present is the well illustrated and popular 1981 Basic Combat Engineering Skills (Part One), but it is now almost a decade old and there are no signs of Part Two, or any subsequent parts.

Section and Crew Skills

Turning from individual skills to the next level, that of section and vehicle crew skills and drills, we have made a lot of progress in the last ten years. Existing backdoor training areas are being improved. However the pace of these developments will now have to increase, as larger groups of people will need to be trained on increasingly smaller amounts of real estate.

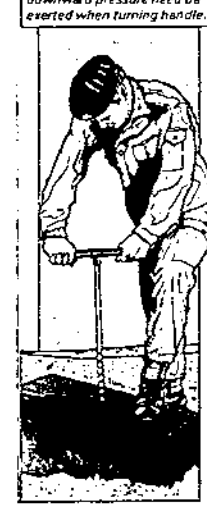
ONE FUTURE SYSTEM

BARRACKS	BACK-DOOR TRG AREA	MINOR TRG AREA	MAJOR TRG AREA	PRIVATE LAND
Individual	Section and Troop Trg			
	<—	Sqn and Regt Trg —>		
		<—	Fmn Trg ——	>

The current MOD policy of disposing of all available land needs not just to be stopped, but to be reversed if the limited available areas are not turned into deserts by over use. Moreover if training areas are not developed imaginatively, the training available on them will become predictable and stilted. We are fortunate that the last 12 years has seen a continuous flow of improvements to the combat engineer training ground at Minley, but the facilities need to be advertised widely and used to the full.

Miscellaneous tools

Wood Auger.
Used for boring holes in timber. May be obtained in different sizes. Handle fits through hole in top of auger. Once the auger has obtained a grip in the wood, only slight downward pressure need be exerted when turning handle.



Earth Auger.
Used for boring holes in the ground. In normal ground it will make a hole 200mm in diameter. A greater depth can be achieved by using the 0.9 metre extension rod. It should not be used if there are large stones in the earth.
It is operated by twisting it to fill the body with earth and repeatedly withdrawing it with the earth it contains.

NOTE: The earth auger has a suction effect, and it is better to take a number of small 'bites', rather than one large one.

This illustration appears with kind permission of the publishers of *Basic Combat Engineering Skills*

Training bridges at Minley

As backdoor training areas are developed to their full potential we will need to determine the aim of each facility, and to decide which skills we are seeking to improve. Some actions are always difficult and need special control, however many times they are repeated. It is not necessary to produce areas to repeat these actions. But other actions do get easier with repetition, so by building repetition into the facility the action can be done better.

Simulators

One other way of avoiding over use of available areas, and indeed over use of equipment, is by the use of simulators. These already exist, both the microchip based ones, such as the tank driving simulator, and the scale model versions. While the microchip simulator is expensive, and is probably not capable of being manufactured locally, models are cheap and capable of being 'invented'.

MGB Model

The model MGB is an excellent example of a scale model, and enables small groups of students to be taught both basic and intricate skills without needing to touch the actual bridge. Improvised bridging has been treated similarly in Minley. There is much that can be done using our own tradesmen and the materials available from the trade-training vote. It might also be a more rewarding activity for the tradesmen than the constant refurbishment of the GOC's greenhouse.

Editor's Note: is the promotion of those so involved another indication of the Greenhouse Effect?

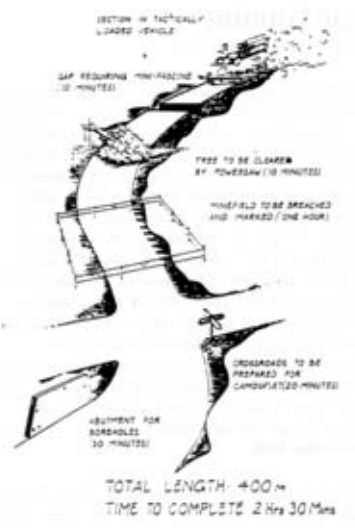
But the next level, that of section or troop 'battle runs', is almost a blank page. Such battle runs could be the combat engineer equivalent of an assault course, where teamwork and combination of individual skills are required to overcome a series of problems. Much needs to be done here, but we have the opportunity as undermanning bites, to form up additional training teams from underemployed troop and squadron management.

Tactical Trainer

The danger with all this is that it produces troops who are skilled in their area of expertise, but who

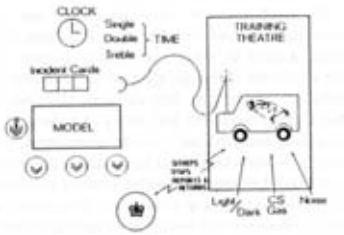
Improvised Bridge Model

Best Pratice In Training.



Camouflet

lose touch with the way their actions mesh into the All-Army Battle. This is already a problem, and is a hardy perennial in such documents as the BATUS Annual Report. Indeed it could be said that even without current changes some new impetus is required, since we have been unable to solve the problem in the last ten years with all the formation exercises. One possibility is to develop the principle of the Battlegroup Tactical Trainer, where a Battlegroup Headquarters is provided with the stimuli it would expect to meet from lower and higher controllers playing out the plan on a model.



This was attempted within 22 Engineer Regiment, with a minefield tactical trainer. The aim was to bring the troop commander, who had just spent a year abroad on projects, up to speed on barriers quickly, without excessive exercising, and without prodigious stores usage. Once he had done his reconnaissance, and given his orders, he settled down in his vehicle in the Training Theatre. He received the sitreps from his subordinates who were seated around the ground model, and could be subjected to other stimuli, such as darkness,

Ground Model

gas, irate civilians or irrelevant information as necessary. If he was not well organised he would not cope with the volume of information rushing at him from a variety of sources. There is clearly a long way to go to develop this, but commanders at all levels can produce the incentive by working such requirements into the objectives they set their subordinates.

Conclusion

To conclude, much has been done to date to improve training at low level, and this article has sought to show our current position. But the pace of change is such that we must now take positive steps to improve the way we train, and to be prepared to adopt the best practice of others. This article will only have succeeded if it generates a healthy debate at every level.

Best Pratice In Training. (2)

Paint Gun War Gaming

LIEUTENANT COLONEL D R SUMMERS BSc(ENG)

Lieutenant Colonel David Summers has spent his entire military career enjoying himself. He was commissioned in 1967 and then went to Gibraltar for seven months to help with the construction of Victoria Stadium. This was followed by three months in British Columbia before going to Shrivenham for three years. He was posted to BAOR, where he did two emergency tours in Northern Ireland in the Infantry role before returning to the UK, only to be sent straight back to Northern Ireland in the Sapper mode. His SO3 job was in HQ Task Force Delta/HQ 12 Armoured Brigade during the fascinating era of Ex Crusader 80. *He then commanded 131 Independent Commando Squadron RE (V) for what was up to then the best years of his life. He was rewarded with a tour as the SO2 Engineer with the Battle Group Trainer at Sennelager, and then became the 2IC of 38 Engineer Regiment, where he spent three very happy years. He went to JSDC at Greenwich before assuming his present appointment as CO 1 Training Regiment in October 1989.*

TRAINING must be realistic if it is to be effective. If it can get the adrenaline flowing and also be cheap, and fun, then so much the better. The main problem of using blank ammunition (if you can get it) for section battle drill training is that the individual does not get that unique sensation of being shot at, because he, or she, is not actually hit if engaged by the enemy.

In an attempt to meet some of the shortcomings of peacetime training, and to improve it, the Army is introducing the Small Arms Weapons Effects System (SAWES). The major drawback of SAWES is its high cost, and limited availability, particularly for the Sappers. Whilst the introduction of SAWES represents a quantum leap forward in realism of training, soldiers still do not experience a physical blow. All they sense is an electronic noise, which hardly simulates the effect of being shot. And as Sappers, we are unlikely to receive the equipment this century.

For low-level, close-quarter field craft and battle training, one answer is the paint gun. The use of paint guns generates intense excitement and unleashes the competitive spirit. Everyone experiences the competitive instinct that makes them want to win. Participants are forced to use their initiative and cunning to the full. If they do nothing else they learn to keep their backsides down.

Many civilian organizations run games on a commercial basis and typically charge around £20 per head, not including the cost of the bulk of the ammo and gas. The civilian game can easily be adapted for military purposes. In its basic form, two or more teams each defend a base, which is marked with tape and contains a flag. The aim is to locate and capture your opponents' flag, and recover it to your own base. Initially bases are about 100m apart in close country so that the game lasts about 40 minutes.

The short range of the pellet means that the equipment is most useful in close situations, it is ideal at night, in woods and in built-up areas. To be successful, each team must use the principles of defence, camouflage, concealment, C3I, recce, field craft, patrolling and attack. Leadership is essential, and first aid, casualty evacuation, fire control, section tactics and battle skills can also be practised. Umpires are needed in order to ensure fair play and to keep everyone's enthusiasm in check. Recruits who have had no tactical training take readily to the paint gun war game. They

quickly realize that fire and manoeuvre, use of cover and keeping one's profile as low as possible are vital skills if one is to survive. Trained soldiers can be practiced in NBC protective clothing. In all cases, paint guns produce the realism necessary for good training and the incentive for the soldier to try his best.

It is obviously cheaper and more convenient to own one's own equipment and utilise military safety items, such as helmets, visors, goggles and respirators. A gun costs from £25 up to £360, a round is 6p and a gas canister is 45p. There are a variety of weapons on the market, from a simple pistol to a semi-automatic pump action rifle. For military purposes the cheapest, single shot pistol is relatively soldier proof and perfectly adequate at about £25. Automatic weapons are inadvisable as they are difficult to handle and encourage the waste of ammunition. The need for complicated handling drills with the automatic weapons can teach false lessons.

The ammunition is a soft plastic ball the size of a 'Malteser' filled with water soluble paint which can easily be removed from clothing with a wet sponge. The ammunition is propelled by CO2 contained in 'Sparklets Bulb' style of canister. Each canister will fire 20-30 rounds over a range of 20-100m, depending on the cost of the equipment. At short range, a hit is painful, like a close-quarter hit with a fast squash ball, but with a minimum of protection to the head there is no danger of serious injury. A full set of 40 paint guns together with ancillaries will cost £1900 approximately, but this can be funded from official sources, and even if not the initial outlay can be quickly recovered by charging for expendables and hiring equipment out for leisure purposes.

Paint gunning has its limitations, but has the scope to make low-level tactical training exciting and realistic. The very fact that it is tremendous fun, and the participants want to go back for more, means that it is worth investigating.

Paint Gun War Gaming

Citizen Soldiers

COLONEL J B TIMMINS OBE KSTJ TD JP MSc DSc MCIOB

John Timmins joined the Corps as National Serviceman in 1954. After commissioning at Chatham he served in 6 TRRE at Worcester as MTO. On demobilization he joined 42 (East Lancs) Divisional Engineers (TA) as a troop commander, being Regimental 2IC at the time of the reorganization of the TA in 1967.

On the formation of TAVR he transferred to 75 Engineer Regiment(V) as 2IC becoming CO in 1971. From 1973-75 he was Deputy Commander 30 Engineer Brigade(V) a nd from 75-78 TA Colonel at HQ NW District.

He served as Honorary Colonel of 75 Engineer Regiment(V) from 1980 – 90 and is currently Honorary Colonel of Manchester and Salford UOTC. He was a member of the GP&F Committee of TAVRA for NW England from 1971-1987 and an Association Vice-Chairman from 1983-87. He has been Lord Lieutenant of the County of Greater Manchester since 1987.

THE August 1989 *Journal* contained the paper *Today's Territorial Army* by Lieut Colonel J C H Moorhouse. In that paper he looked at the TA, and particularly the TA(RE), from a purely military point of view, the contribution and the need, – the need in support of current commitment of the Regular Army.

The purpose of this paper is to suggest a complementary view, which can be considered against the changing situation of East/West relations. I am aware that an MOD study called *TA 2000* is underway as I write. I have no knowledge of the content of this, although it may well be published by the time this article is read. It will be an interesting comparison of thought process.

HISTORICAL BACKGROUND

LOOKING back 100 years or even 50 years, every County Town had its *Barracks*, the Depot of the County Regiment. Many other towns also boasted Military Depots. In all these towns the Barracks were a major contributor to the life of the community. Taking part in every Civic occasion and celebration, they identified with and were identified by the community as an integral part of itself.

After the formation of the TA in 1907 almost every town and village of any size had its *Drill Hall*. In the case of the County Regiments the TA Act had established the TA battalions as part of their parent Regiments, and the high level of recruitment gave a direct identification between the citizenry and the Army.

World War One during which almost every able-bodied man of the right age was involved, cemented relationships between the Army and the people which were to continue through the Second World War until the ending of Conscription.

From this time onwards there has been a progressive withdrawal of the military from the consciousness of the civilian community. It is a withdrawal made more evident by the amalgamation of Regiments, the concentration of the UK Army into a few main Garrison areas and by the slow but progressive decline in strength and establishment. Add to these factors the virtual ban on the wearing of uniform outside of barracks, the *Monday to Friday* working week in UK Depots and training establishments and it is not difficult to see that the average citizen is very rarely aware of the Armed Forces, and has little sense of identity with them.

Colonel JB Timmins OBE KS MSc DSc MCIOB
Citizen Soldiers

For the TA, 1967 brought the much-publicized disbandment. The concurrent but much less publicized establishment of the TAVR, considerably smaller and concentrated into many fewer units, went almost un-noticed. Until recent publicity campaigns, many otherwise well-informed people express surprise that it still exists when they occasionally meet someone who serves in the TA.

Throughout the 23 years since its formation, the TAVR (now renamed TA) has had an almost impossible training commitment to meet the requirement of immediate deployment to war on mobilization. All other aspects of *Regimental* life have been subservient to this including civic participation.

The lack of participation by the military in the life of the civilian population, particularly civic and corporate social life, has not always been accompanied by a lessening of demand, but the inability to respond has now I suggest, become counter-productive to the commitment of the people to its armed forces.

One Army?

The *One-Army* concept has passed out of fashion as the difference of level of training between the full-time career professional and the part-timer to whom soldiering is a secondary activity, has been sensibly recognized. It is equally recognized by every Field Commander who has experienced TA working in his area, that the difference is narrowed considerably in a very short time by the enthusiasm of the TA volunteer.

I would suggest that the time is now ripe for an honest recognition by everyone of the inability of the TA to acquit itself properly and effectively without a minimum post-mobilization period of work-up training. For the first time in almost 45 years we can acknowledge this, and to do otherwise would merely mirror the attitude of *The Generals* in 1914!

Once this truth is accepted by everyone, the role of the TA becomes capable of much greater flexibility, a flexibility which can be used to enhance its attraction as a secondary activity for our citizen soldiers, and therefore its recruiting and retention capabilities.

Efficiency and Flexibility

Since the 1907 Act which formed the TA with its divisional structure, it has been under direct command of the Regular Army. Perceived military requirements have been translated into training commitments for the TA. These commitments have become the directives of district and formation commanders who have ordered and monitored their implementation as a first priority of activity. Clearly the chain of command must remain but it requires recognition of the changed circumstances and modification of the requirement of immediate commitment to battle, to allow commanders to adopt more flexible demands to be effected through the setting of *Achievement Objectives*.

I have specifically used that phrase because the setting of objectives rather than the issue of orders allows the selection and priority of activity to be determined by the regimental and unit commanders, enabling those commanders to take greater recognition of the community within which they live and recruit, and to which they belong. In fact, the decentralized control which I suggest, mirrors current civilian management thinking and has proved so effective in increasing performance, efficiency and individual commitment in our most successful companies.

In the preceding paragraphs I have pointed the direction that I believe we should take; a move back to become again an integral part of our local civilian community and no longer a part which is taken from it but never seen. A positive commitment to the civil community should be part of the *Achievement Objectives*. This would enable unit commanders to prepare properly to achieve a standard in those activities of which we can be proud.

Flexibility of Commitment

Over the past 20 years there have been a number of major studies and innumerable local ones into recruitment, retention and losses, in an endeavour to reduce perceived unacceptably high turnover levels. I sometimes feel that we fail to appreciate the obvious.

Our targeted recruit is a young man or woman coming to the end of a period of full-time or part-time vocational training and is therefore in the most volatile period of his/her life. At this time

circumstances of employment and family commitment change rapidly, and an acceptable commitment to TA one year or even one month can become an unacceptable level the next, despite the most generous financial incentives which have been introduced. We have to acknowledge this by a much more flexible attitude to rigid attendance levels if we are to retain that young person at this stage in their development.

Subject to achievement of individual minimum training objectives we should accept a commitment appropriate to the appointment being undertaken at a particular time in a TA career. I believe most responsible soldiers will respond to this positively, and will acknowledge that financial reward will vary accordingly. To accept this flexibility might require the introduction of a *State of Tension* during which commitment levels would be enforceable. To accept this principle would also obviate the need for *term* engagements, except perhaps a contractual one in return for expensive specialist training. (A common civilian practice).

Unit Identification

I identified earlier the loss of *association* by the civilian population. Throughout the whole of the Second World War shoulder flashes were worn together with divisional or formation signs. Today's soldiers by contrast are almost entirely anonymous in their dress, apart from a cap badge (if worn) even in peace locations. The re-introduction of unit identification in a form which can be recognized by the general public would enhance its acknowledgement of the military.

Equally a greater willingness to identify with a community by adoption of its name in a unit title would improve the bonds between that unit and the community. This requirement for identification is true for both regular and TA units. Any loss of security would be outweighed by the benefits of recognition.

The second element which requires specific acknowledgement and personal identification is the present *anonymous* Reserve. At the end of a period of active commitment the soldier (and officer) may be transferred to the Reserve with no identification to a particular unit. Modern computerized records are perfectly capable of very rapid amendment and it should be feasible for every reservist to be identified with a unit, either the one he has served with or one more appropriate to his present circumstances. He must know of that attachment and must be encouraged to identify with the unit, even if only on a social basis. He can thus maintain the sense of belonging and is much more likely to come back to the active list if his circumstances change.

I suggest that as an extension of this, it might be possible at officer level to introduce *Honorary Membership* of a Corps or Regiment. It would require that the person had completed training, such as a UOTC commissioning course, or achieved appropriate civilian professional status. It would however foster a valuable link within the civilian community, and provide a Regimental or Corps identification for the person concerned.

At a time when we are using every endeavour to foster links with employers the concept of *Honorary Membership* might be an appropriate link with managers/directors of companies of suitable standing. Something along the lines of the Supernumerary List of the Engineer and Transport Staff Corps (TA) could be explored.

A Territorial Army?

The suggestions which I have made of *Achievement Objectives*, of flexible commitment and of much closer unit identification with the civilian community, clearly point to the TA being more akin to the original Territorial Army with an acknowledged sense of belonging to a particular town, city or county.

The role of the *Post Cold-War* Regular and Territorial Armies has yet to be defined. I would suggest however, that the TA will move away from immediate reinforcement of the regular military in its overseas commitment. In this circumstance *All-Arms* and formation training are likely to be inter-TA rather than Regular/TA as is the current practice. Conversely it will be easier for the TA Infantry Battalions to work with and support their own Regular Battalions without prior commitment to specific tasks. Perhaps in a Corps such as our own, it is time to look at Regular/TA unit ties, particularly if formation HQs justified on a BAOR requirement are disbanded. The Regular unit would then provide the first level of specialist-to-arm support to its TA counterpart, and in so doing

202 Field Squadron(V) provide a guard at Manchester Crown Courts — "High Sherriffs Day" — 1986

would enhance its own territorial identification.

If one is able to see a scenario in which the Regular Army increasingly becomes part of a *World Police Force* and that the TA will move away from an immediate overseas (BAOR) reinforcement role, then a probable conclusion is that the TA will resume a greater role in Home Defence as its priority commitment.

It is tempting to suggest that I have completed the circle — back to 1907. That would be a wrong conclusion and a false basis for the future, but I hope that I have shown that a major review is necessary and that within it we have for the first time in half a century the opportunity of considering medium/long-term principles rather than short-term expediency.

General Sir Arthur Thomas Cotton KCSI

THE 188th birthday celebrations of General Sir Arthur Cotton were marked at the A P State Centre of the Institution of Engineers (India) on Tuesday 15 May 1990. A full report on the lecture given by the principal guest Shri D S R Sharma FIE, Chief Technical Examiner, Irrigation and Department and Director General, Walamtari, has been received and is lodged in the Corps Library.

The lecture by Shri D S R Sharma covers some of Cotton's early life and entry into the Royal Engineers. It details the work on, and effects of, the upper anicut on the Cauvery river and the Godavary anicut. Cotton's great adminstrative and man-management capabilities are also stressed.

The Royal Engineers in the British Forces Arabian Peninsula and the Middle East Command 1958 – 1967 – Part I

BRIGADIER (RETD) H W BALDWIN OBE CEng FICE FIStructE

The author was in the Officer Cadet Reserve RE on the outbreak of war and, after commissioning, was posted to a West African field company. In 1942 he became DCRE Takoradi. He commanded a works section through the British Liberation Army(BLA) campaign and returned to the Gold Coast as OCRE District in 1945. This was followed by tours as SORE II at West Africa Command HQ and OC 35 Field Squadron West African Engineers. After appointments as DADFW in the War Office and Chief Instructor of a training regiment, he held three CRE Works appointments including building the Dharan and Malacca cantonments. After spells as CI PRA School and Colonel E in the War Office, he was the last Chief Engineer Middle East. On return to the UK he was seconded to the Ministry of Transport where he continued to serve after retirement in 1971.

Foreword

The purpose of this article is to record the activities of all the Sapper units that served in South Arabia between 1958 and 1967. It is therefore lengthy and rather longwinded.

I hope its publication will serve as a basis of accurate facts against which the official *Corps History*, now being drafted, can be checked to ensure that no important events are omitted.

I would welcome comments on where the article is inaccurate or where important events or activities have been omitted. I will then produce an amended article which would be deposited in the Corps Library.

Fuller military and political backgrounds to the Sapper activities can be found in Julian Paget's *Last Post: Aden 1964-67* and Humphrey Trevelyan's *The Middle East in Revolution*.

Headquarters, British Forces Arabian Peninsula was established in Aden on 1 April 1958. On 1 March 1961 the Headquarters was redesignated Middle East Command, the name having been transferred from the integrated Service HQ in Cyprus.

In November 1967, after 128 years of British rule, Aden became independent.

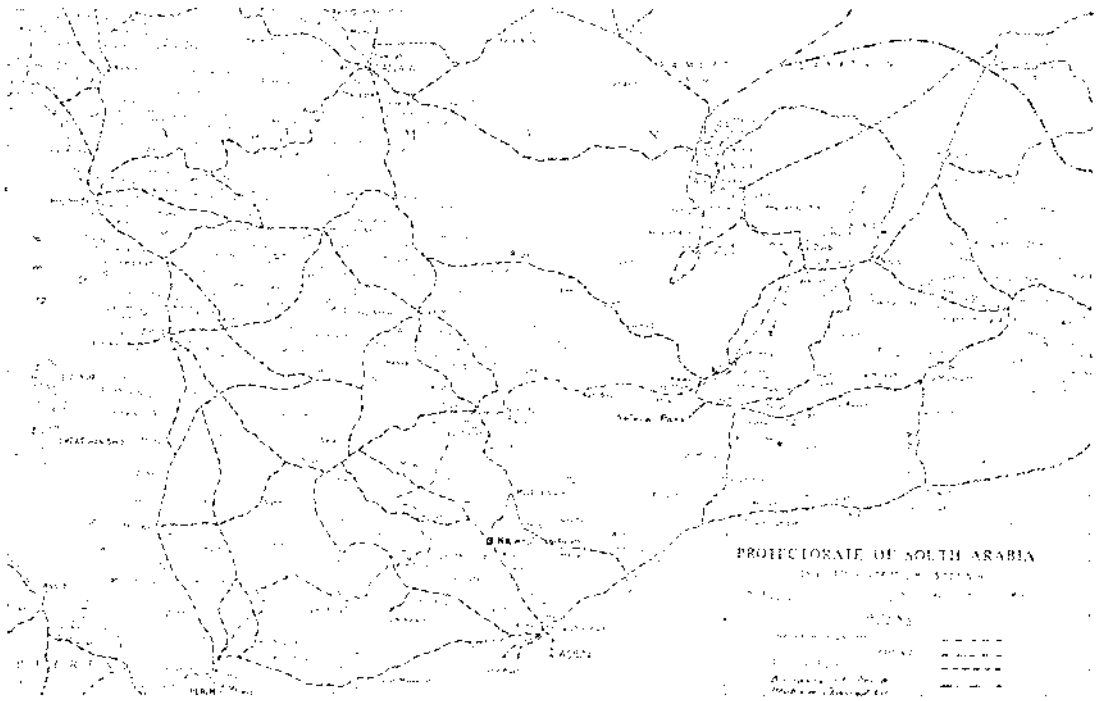
Political background in Aden and the Federation

Aden was a small British Colony covering only 75 square miles. Behind it, stretching for about 112,000 square miles, lay the Aden Protectorate, — a barren, mountainous and inhospitable land comprising twenty autonomous States with which Britain had treaty agreements to deal with their external affairs in exchange for British protection.

In 1959 a Federation of the States of the Protectorate was formed which, in due course, seventeen of the States and Aden joined. The embryo capital of the Federation was at Al Ittihad, a small Arab village halfway between Aden and Little Aden on the Colony's border.

To provide military forces for the Federal Government the Aden Protectorate Levies were reorganized into four battalions to form the Federal Regular Army (FRA), and the Government Guards and Tribal Guards were reformed into the Federal National Guard.

Brigadier H W Baldwin OBE CEng FICE



The Governor of Aden became also the High Commissioner to the Federation.

By 1962 it was clear that Kenya was no longer suitable as the main base for the Middle East and it was decided to transfer the 'rapid deployment' or 'reserve' Brigade and other facilities from Nairobi to Aden where the Joint Service Commander in Chief, Middle East, was already established and where there was an important RAF base.

The 1962 Defence White Paper confirmed that British Forces would be stationed permanently in Aden and that the base would be expanded. A new Cantonment was to be built in Little Aden, near the BP refinery, to be ready to receive the Brigade in 1964.

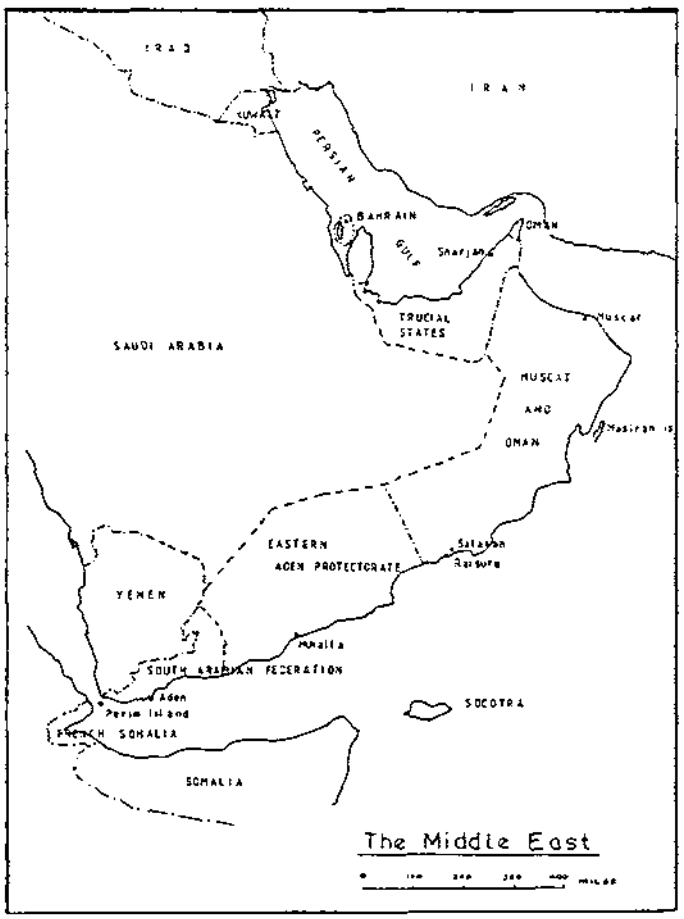
The formation of the Federation was virulently opposed by President Nasser and the ruler of Yemen. It was a severe blow to the fragile and struggling Federation, therefore, when, in September 1962, following the Imam of Yemen's death, a military coup, backed by the Egyptians, succeeded in establishing a Republican government committed to liberating 'Occupied South Yemen'.

However, at the coup, the new Imam escaped and within a few weeks the new Yemen Republic had to be supported by an Egyptian Expeditionary Force of some 40,000 troops against the Royalists. A bloody civil war continued for a decade and the presence of the Egyptian troops on the borders of the Federation enabled the Egyptians to organize and direct dissident operations against the Federation and the British.

In 1963, encouraged by Yemeni and Egyptian agents with arms, cash and promises, the hostile tribesmen of the Radfan, numbering some 6000 armed men, became increasingly aggressive and they closed the main road from Aden to Dhala, an important frontier town.

The Federal Government decided to launch an operation against them and, in December 1963, declared a state of emergency. The British Government gave their support to the occupation of the Radfan and, at the request of the Federal Government, provided Tank, Gunner, Sapper and Air support to the three battalions of the FRA to be employed in the operation. The remaining FRA battalion was left to garrison the rest of the Federation.

The force, under the Commander of the FRA, began operations in January 1964 and by the end of the month the heights dominating the Wadis



and became the responsibility of 24 Brigade when it came from Kenya in October 1964.

To win the support of the local people the High Commissioner implemented a 'hearts and minds' programme of development which required continuous protection.

In July 1964 the British Government announced that Britain would grant independence to South Arabia not later than 1968, but intended to retain a military base in Aden.

Following a serious deterioration of the situation in Aden and obstruction by the Chief Minister of Aden to the Governor's policies to contain terrorism, the Governor, in September 1965, suspended the Aden Government and assumed direct rule.

In February 1966, in a new Defence White Paper, the British Government announced that it no longer proposed to maintain defence facilities in South Arabia after granting independence in 1968. It also announced that additional defence forces and facilities would be deployed to the Gulf.

Rabwa and Taym had been successfully occupied. However, by March, the FRA battalion garrisoning the rest of the Federation had become overstretched in maintaining the peace and it was found necessary to withdraw the force from the Radfan. Cairo Radio publicized this as a humiliating defeat and, egged on by Egypt and Yemen, the tribesmen resumed their offensive with greater vigour than before. The Federal Government requested military aid from Britain under the Treaty obligations and the British Government had no option but to comply.

An *ad hoc* Brigade was formed under the Aden Garrison Commander and operations were mounted in April. By June the Radfan was once again occupied but it was a war that could not be ended by the capture of objectives. A large area had been occupied and had to be kept under control. This commitment had to continue until final withdrawal

The formation of British Forces Arabian Peninsula and renaming as Middle East Command

The first integrated all Service HQ was established in Aden on 1 April 1958 and was designated British Forces Arabian Peninsula (BFAP).

The Headquarters included a SORE 2, a DADPCC and DAD Survey. To these was added, in 1959, a SORE Tn. The Field Post Offices were run by 261 Postal Unit and these included Bahrain and Sharjah.

During the two years up to 1958, 1 Radar Air Survey Liaison Section had employed detachments at various times to provide control for aerial photography for mapping. In 1959, 19 Topographical Squadron moved to Aden to carry out mapping in the Protectorate as well as in Muscat and Oman at 1:250,000 and 1:100,000 scales.

Field engineering support in 1958 was provided by a troop from 34 Independent Field Squadron in Kenya. However, in 1959, this was relieved by a troop from 38 Corps Engineer Regiment in the UK Strategic Reserve. At the end of 1959 the troop became the Independent (Arabian Peninsula) Troop RE. The main task of the troop was assisting the PWD in a programme of work developing roads in the Federation in the mountainous area south and west of Mukeiras. At first the tribesmen showed hostility to the work and in October 1959 a Sapper was killed and another was wounded. However, the project gained increasing favour and there were no more ambushes[1].

At the time of the formation of HQ British Forces Arabian Peninsula, GHQ Middle East Land Forces (MELF) was in Cyprus. By 1961 a ban on airspace over Israel and Arab countries reduced the strategic value of Cyprus as a base and the Middle East was virtually split into two. On 1 March, therefore, Middle East Command, by then an integrated Headquarters, was divided. The name was transferred to the Headquarters at Aden and the territory left under control at Cyprus was renamed Near East Command.

The Commander in Chief in Aden became responsible for an operational area that stretched from the Persian Gulf to Swaziland.

The efficiency of the newly organized Middle East Command was soon to be demonstrated. In June 1961 President Kassem of Iraq claimed that Kuwait was part of his country and announced that he was going to annex it. The Amir of Kuwait appealed to both Britain and Saudi Arabia for aid and the Commander in Chief mobilized a force under the Commander of 24th Infantry Brigade Group, — the reserve Brigade in Nairobi. Sapper support comprised 34 Independent Squadron from Kenya (Major F W E Fursdon), one troop of 9 Independent Parachute Squadron from the UK, one troop of 10 Port Squadron from FARELF and a Works Detachment RE.

The rapid deployment of this force to Kuwait was sufficient to deter President Kassem and no active operations took place. One of the main Sapper tasks was to provide hot weather amenities for the force.

[1]The work of the Troop is described in Colonel R L Clutterbuck's articles *Strategic Reserve Regiment* and *Military Engineering as a weapon in the Cold War* in the March 1961 and September 1964 issues of the Royal Engineers *Journal*.

The Deployment Camps in Little Aden and Aden

Works Services in Aden were the responsibility of the Air Ministry Works Directorate (AMWD), — to be absorbed into the Ministry of Public Buildings and Works in April 1963.

By 1962 their organization was heavily committed to the construction of a permanent cantonment at Little Aden to accommodate the Brigade to be transferred from Kenya to Aden. This was a major project estimated to cost £7m and included accommodation, facilities and married quarters for three major units.

However, by early 1962, it was clear that the Command had to be reinforced and considerably more accommodation was required. The requirement was defined as:-

(a) A transit camp to accommodate two battalions to be sited near RAF Khormaksar. The scale of provision to be tentage on concrete bases with kitchens and ablutions in semi-permanent construction and some Twynham huts for the permanent staff.

(b) Two camps in Little Aden to accommodate an Infantry Battalion and an Artillery Regiment. The scale to be Twynham hut living accommodation and camp structures for kitchens, latrines etc. Messes, Junior Ranks Club etc to be in local semi-permanent construction.

(c) A camp sited between Aden and Khormaksar to accommodate two GT Companies RASC (later RCT), a Pioneer Corps Company, and a Field Survey Squadron RE. The scale of provision to be as (b) but including a High Marston for a map store for a Field Survey Depot.

Subsequently, the brief was extended to include accommodation at Little Aden for a Brigade Headquarters and a Field Squadron RE requiring 48 Twynham huts.

The planning and supervisory capacity of the AMWD was already fully stretched and it was considered impracticable for their organization to complete this additional commitment by the target dates of 'get you in' by December 1963 and completion by December 1964. It was agreed, therefore, that the work would be carried out by

the Royal Engineers working under the technical and financial control of the AMWD.

Accordingly, in April 1962, 513 Specialist Team RE arrived in Aden to assist the AMWD in planning. It was under the command of Lieut Colonel E E Peel who was to be, in due course, the CRE of the project with a specially designed and comprehensive Works staff.

It was decided that the construction of the Twynham huts, concrete tent bases, roads and other external work would be carried out by RE units, Pioneers and local labour and that the permanent buildings would be built by local contractors, — all under the supervision of the CRE and his staff [2].

In October work started on the transit camp using the Aden Independent Troop RE. This Troop was expanded rapidly to become 32 Field Squadron RE (Major S McCloghry). Two troops were then employed on the project and one troop was employed in the Federation.

In addition to the CRE (Works) for the Deployment Camps it was found that there was a need for a CRE Middle East Command and in May 1963 Lieut Colonel W D C Holmes assumed this appointment.

In mid 1963 circumstances necessitated the replanning of the execution of the Deployment Camps to meet target dates. This increased the Royal Engineer commitment and it was necessary to request an additional squadron for a limited period. 32 Field Squadron's tour of duty ended in October and it was replaced by 12 Field Squadron (Major J L Jealous). In addition, 48 Field Squadron (Major R W Bird) also arrived from 38 Corps Engineer Regiment, with an element of Regimental HQ, for a six months tour. The Squadrons were supported by a composite Workshop and Plant Troop from 15 Corps Field Park Squadron.

The project was progressively completed and 48 Field Squadron with the element of Regimental HQ left in April 1964 without relief. However, when 12 Field Squadron completed its tour in October it was replaced by 24 Field Squadron (Major M W Jenkins).

In April 1964 Lieut Colonel Peel, after a two-year tour, handed over to Lieut Colonel D F Densham-Booth.

[2]The Detailed story of the construction of the Deploymant Camps is given in Lt Col D N LeGassick's article in the June 1967 issue of the Royal Engineers *Journal*.

By November work on the Deployment Camps was nearing completion and CRE (Works) ceased to function as a military unit. Lieut Colonel Densham-Booth and most of his staff remained with the MPBW and on 1 April 1965 he and 24 of his staff formally filled individual MES integrated appointments. 24 Field Squadron continued to provide some assistance to MPBW in Little Aden.

The establishment of Survey Units

To deal with the increasing 'Survey' commitment in the Command, 2 Field Survey Depot was established in 1963 and 13 Field Survey Squadron (Major D P S Wilson) arrived at the beginning of 1964.

Transportation and Movement Control

Following the 1962 Defence White Paper it was decided that the Army should take a greater share of certain supporting functions. Prior to this the RAF was responsible for Transportation and Movement services for the RAF and the Army. It was determined that these should become Joint Service functions with the Army taking the major part.

Early in 1963 a Transportation Troop, comprising stevedore, lighterage and plant operator tradesmen, and a Movement Control Troop were formed. Their activities were coordinated by Major P S Nott, the SORE2 (Tn) at Command Headquarters. The RAF continued to provide a surface movement unit, — 50 Movement Unit RAF, — commanded by a Squadron Leader.

Shortly after its formation the Transportation Troop was given an unusual assignment. In 1960 the Somali Republic, comprising the former Italian Trust Territory and the former British Protectorate, gained independence. Ever since formation its main concern was to incorporate into it French Somaliland and those adjacent areas of Ethiopia and Kenya mainly occupied by Somalis. Despite the wishes of the indigenous Somalis, the Government of Kenya opposed the transfer of the relevant part of its country and the British Government supported the Kenyan Government. Accordingly, the Somali Republic broke off relations with the British Government in March 1963.

The Transportation Troop was required to send a Z craft to the former British Somalia to covertly

evacuate key personnel and equipment of the Foreign Office Diplomatic Wireless Service. The mission involved a round trip of some 350 miles across open sea in a flat bottomed powered lighter, with some excitement in the darkness during the evacuation. For his part in the task Sergeant Wood RE, the Z craft skipper, was awarded the BEM.

The rather *ad hoc* arrangement of the two RE Troops and the RAF Movement Unit was an interim measure only and the two Troops were incorporated in a Middle East Port Squadron RE. The OC, Major A C James, arrived in September 1963 with further reinforcements from Marchwood.

In addition to commanding the Squadron, Major James took over the 50 Movement Unit RAF for which he was responsible through RAF channels. This Unit comprised two Flight Lieutenants, a Warrant Officer, 21 Airmen and 25 civilian labourers. The two officers and the Warrant Officer were ammunition and explosives specialists.

The joint organization was responsible for the Army, RAF and MPBW port operations at Aden, Little Aden, Bahrain, Perim Island and the RAF route stations at Mukalla, Salalah and Masirah.

In general, the Arabian ports serving the British Forces were anchorages where ships lay in the tide-way, discharging their cargo to lighters which would then ferry the freight ashore. Even in Aden the water alongside the wharves was not deep enough for commercial shipping from the UK. Exceptions were Perim Island, where the Diplomatic Wireless Service had been installed, which was suitable for coasters and LST's, Little Aden, where there was a LST hard for bows on discharge and loading, and Bahrain, where a new jetty had been built to take ocean shipping. This meant that most of the freight sent out from UK for Aden and the route stations had to be double handled via lighterage. The RAF route stations at Mukalla, Salalah and Masirah could only receive sea freight out of the monsoon season (September to March) and since Salalah and Masirah had scant facilities these had been provided on an *ad hoc* basis from a variety of sources. As an initial step in the provision of Port Operating assistance it was arranged that a stevedore/lighterage section of ten men under a senior NCO should be detached from 17 Port Regiment, Marchwood to Salalah for the shipping season.

Although some shipping delivered direct to Masirah and more did to Bahrain, Aden generally served as an *entrepôt* trans-shipping freight into the LST's and, later, LSL's supplying the route stations.

The tonnages handled increased rapidly with the opening of operations in the Radfan and the import of stores for the construction of the Deployment Camps. The reception of the seaborne elements of 24 Brigade and the stores from Kenya produced another major commitment. An interesting task was the successful salvage of a ditched Argosy aircraft from Aden Harbour.

On 15 July 1965 the Royal Corps of Transport was created and the Middle East Port Squadron RE became 57 Port Squadron RCT. The combination of the Squadron and 50 Movement Unit RAF became the Joint Service Port Unit, Middle East.

The Radfan Operations 1964

In the Federation, throughout 1963, trouble had been brewing in the border areas with the Yemen and also on the ancient caravan route from Aden to Dhala, a frontier town. In the area astride this route known as the Radfan, the Quteibi tribe encouraged by Egypt and Yemen had become increasingly aggressive, not only by their traditional levying of protection money from passing traffic but by laying mines in the road and in tracks used by Federal forces for routine reliefs. The Federal Rulers demanded action and the Federal Government declared a state of emergency.

The British Government gave their support to the occupation of the Radfan.

Operation Nutcracker began on the 4 January 1964 and the Force included 2 Troop of 12 Field Squadron. The aim of the operation was "to carry out a demonstration in force in the area of Radfan to convince the tribesmen that the Government had the ability and the will to enter Radfan as and when it felt inclined".

A secondary aim was to convert the existing track in the Wadi Rabwa into one usable by jeeps so that re-entry could be made whenever necessary in the future. With the help of local labour the Troop successfully completed this task. The road

was opened on 31 January and the Force then extended its military control into the Dhanabah Basin and Wadi Taym.

However, by March the commitment of occupying the Radfan was seriously affecting the ability of the Federal Regular Army to carry out effectively their normal task of patrolling the frontier. The Force was, therefore, withdrawn.

No sooner had it left than the Quteibi tribesmen reoccupied their old positions and destroyed the road. Egyptian propaganda hailed the withdrawal as a defeat and Yemeni aircraft attacked a village in the state of Beihan. On the 19 March the Federal Government invoked their Treaty and asked officially for British retaliation.

The renewal of operations in April 1964 meant not only the formation of an *ad hoc* British Brigade but also an *ad hoc* Sapper force to support it. This comprised a troop of 12 Field Squadron from Little Aden, a troop of 9 Parachute Field Squadron from Bahrain and a troop of 34 Independent Field Squadron from Kenya. To coordinate their efforts the CRE appointed his GS02RE, Major C R Grey, to command them.

An early casualty in the renewed campaign was Sapper John Warburton, a radio operator with the SAS. On 29 April a troop of the SAS set out to mark a Dropping Zone for a parachute drop by 3rd Battalion Parachute Regiment the next night. They were heavily attacked and forced to withdraw during the night of the 30th. Two of the patrol were killed, one of whom was Sapper Warburton.

In May, 3 Independent Field Squadron from 3rd Divisional Engineers arrived with its three field troops and park troop. Its OC, Major J P Groom, then took over command of all RE units. By the end of May he had received the additional support of a RE Stores Section from the Command Ordnance Depot in Aden, a Topo Troop from 13 Field Survey Squadron and 521 Specialist Team (Well Boring) (Captain R R Theobald)[3].

In July the troop from 9 Parachute Field Squadron returned to Bahrain but additional plant assistance was received from 6 Field Park Squadron (Major R Anderson) which had just arrived from the UK.

The Dhala Road 1964

To impede the operations in the Radfan the rebels carried out indiscriminate mining of the main supply route from Aden and many vehicles, both military and civilian, were being damaged or destroyed. It was considered that the best way of dealing with this was to convert the main supply route to a bituminous surfaced road in which it would be difficult to lay mines in conditions that were not easily recognizable.

The construction of roads in the Federation was, of course, the responsibility of the Federal PWD but it was impracticable for their organization to complete the whole of this work in the time required.

The Aden-Habilayn road was already surfaced as far as Lahej and it was agreed that the PWD would undertake the next six miles from Lahej to the crossing of the Wadi Saghir. The Royal Engineers would be responsible for the remaining 34 miles[4].

The specification for the section to be constructed by the Royal Engineers was unsophisticated but adequate to meet the military requirements. The road was to be gravel based with a 15 feet wide surface dressed carriageway. Culverts would be Armco or concrete and Irish bridges would be constructed at Wadi crossings.

The task was divided into three sections:-

(a) Wadi Saghir crossing to Nawbat Dukayn (Nubait Dukayn) — the junction with the road to Taiz. This was 13 miles in length.
(b) The Wadi Matlah stretching for seven miles.
(c) From the north end of the Wadi Matlah to Habilayn, — a distance of 14 miles.

Resources allowed only one section to be started at first and the order of priority was (a), (c) and then (b).

6 Field Park Squadron arrived from 3rd Divisional Engineers in July 1964 and started work on the Southern Section.

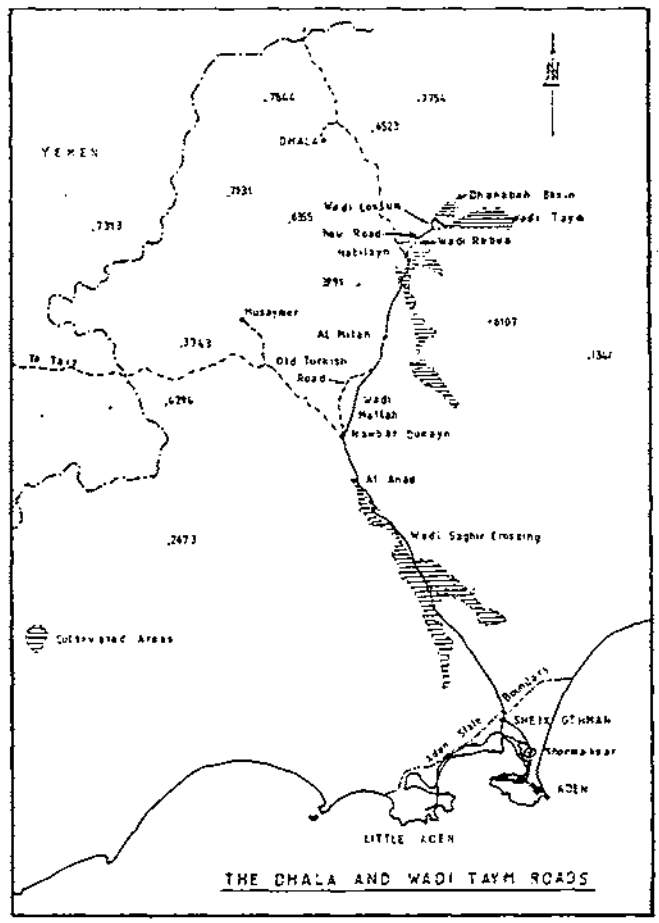
The appointment of a Chief Engineer

It was clear at this time that the deteriorating situation in Aden and the Federation would

[3]Major J P Groom, in his article *The Radfan* in the September 1965 issue of the Royal Engineers *Journal*, describes the tasks which were undertaken by the Sappers.

[4]The execution of the project, with its many vicissitudes, is described in Brigadier P C Shapland's article *The Dhala Road* in the June 1969 issue of the Royal Engineers *Journal*.

considerably increase the Engineer commitment and that there was a need for a Chief Engineer and staff at Command HQ. Accordingly, Colonel P Drake-Wilkes assumed the appointment on 1 September 1964. On the same day Lieut Colonel W D C Holmes, CRE MEC, became CRE (Operations) and was thereby able to exercise closer command over the Field Units and more effective supervision over the Dhala Road project and the detachments engaged on 'hearts and minds' schemes.



The withdrawal of MPBW expatriate staff from the Federation

At this time the MPBW were responsible for the provision of Works support to the British Forces in the Federation and, on behalf of the PWD, for the Federal Forces in the Federation.

The increasing dissident activity throughout the Federation in 1964 brought with it increasing danger to the MPBW expatriate staff and, in December, they were withdrawn completely from all up-country stations. The situation was resolved, on a short-term basis, by withdrawing a Garrison Engineer (Lieut I B Stevenson), four Clerks of Works and some Sapper tradesmen from the MES Staff in Little Aden and forming a small unit, — Garrison Engineer (Western Aden Protectorate), — under command of the Chief Engineer, with technical and financial control exercised by MPBW.

Operational airfield construction becomes a RE responsibility

In November 1964 the Defence Council decided that operational airfield construction and maintenance should be transferred from the Airfield Construction Branch RAF to the EinC and that four Field Squadrons should be formed to take over progressively the commitment of the Airfield Construction Squadrons RAF. The new Squadrons would come under the operational control of the RAF but would be under the technical direction of the Chief Engineer of the Command concerned.

In December 1964, 60 Field Squadron (Major P G Rosser) moved to Aden to take over from 5004 Squadron RAF pending the formation of 10 Field Squadron (Airfields) in the United Kingdom. This Airfields Squadron arrived in Aden in August 1965 under the command of Major R Wheatley.

The formation of the MELF Field Park Squadron and Well Drilling Troop

The Chief Engineer had no Command Engineer Stores Depot to hold the ever-growing stores and plant held in the Command and, in November 1964, 63 (MELF) Park Squadron (Major G D S Northcott) was established at Little Aden under the command of CRE (Operations).

521 Specialist Team RE (Well Drilling) was due to complete its tour in the Federation in mid-1965 and opportunity was taken in early 1965 to form a

Well Drilling Troop in the Park Squadron to ensure continuity of well drilling.

The Specialist Team had been most successful in its drilling at both Dhala and for the large camp at Habilayn. During its tour it was fortunate in having the advice of Major F Moseley of the AER Pool of Geologists[5].

Postal

The arrival of 24 Infantry Brigade in Aden in October 1964 with the immediate dispersal of elements into the Radfan greatly increased the problems of the DADPCC (Major J F Ashworth). By close liaison with the Transport Wing of RAF Khormaksar, the Army Air Corps and road convoys, 24 Brigade Postal and Courier Communications Unit provided a very efficient service. This was made even more effective in 1965 by the introduction of a 'Flying Postman' who provided a 'counter' service dispensing stamps, postal orders, registered letters etc to remote detachments. 261 Postal and Courier Communications Unit continued to provide the static service throughout the Command.

Survey

To meet the increasing Survey commitment in the Command a DD Survey MEC was established in 1963. The first DD was Colonel E P J Williams, succeeded in 1965 by Colonel W N Morris.

In 1965 progress was being made towards producing a military medium scale series of maps of South Arabia. Twenty two sheets were needed to cover the area and the deadline for completion was 31 July 1967. In October 1965 the first pilot sheet was produced, printed in various styles, and these were sent to Aden for short trials. It was interesting that this series was to be the first military medium scale series to have fully modelled hill shading, — an addition which helped all users and, in particular, the pilots of light and strike aircraft.

With the specification decided, work proceeded on the other sheets. The bulk of the printing was carried out by 13 Field Survey Squadron (Major E W Barton) in Aden after each final proof had been produced by 42 Survey Regiment. It was much to the credit of the Regiment as a whole that the last sheet was cleared three days before the deadline.

[5]Major F Moseley paid a further visit in April 1967 and the reports of his two visits are recorded in articles in the Jun 66 and Sep 67 issues of the RE *Journal*.

The formation of 523 Specialist Team RE (Construction)

During 1965 the small Works Unit in the Federation, despite increased support by tradesmen from Field Squadrons, became increasingly unequal to the task of dealing with the expanding requirements. At the beginning of 1966 it was, therefore, replaced by the newly formed 523 STRE (Construction) (Major D I Knight) which was to operate under the title of a 'Military Works Area' although it was more correctly a 'Military Agency Works Area'. (The terms were not officially introduced and defined until February 1967 in DCI 2/67.)

The STRE was under the command of the Chief Engineer but was financially responsible to the Regional Director MPBW for the work funded by him. The MPBW made the OC Area Officer for the Federation with financial powers equating to the old CRE (Works)[6].

The establishment of the Specialist Team gave the Chief Engineer greater flexibility in dealing with the Royal Engineer tasks in the Federation. He was able to support the Team as necessary with tradesmen and other help from the Squadrons and the Team held and operated the Command Construction Laboratory.

The Dhala Road 1965-6

Meanwhile, on the Dhala Road, 6 Field Park Squadron had progressed on the construction of the Southern Section. In April 1965 it was relieved by Squadron Headquarters and the Park Troop of 9 Independent Parachute Squadron (Major M Matthews) and they completed the Southern Section in July 1965.

For the Northern Section a new task force was established in February 1965 at Al Milah, some eight miles south of Habilayn. The basic unit for this force was 24 Field Squadron which had been employed on the Redeployment Camps in Little Aden. One of its field troops had to remain in Little Aden to finish this work so the CRE gave it a troop of 50 Field Squadron (Major J S Fowles), which had replaced 3 Independent Field Squadron. In addition 24 Field Squadron was supported by a section of Pioneers and an RASC platoon operating the 10 ton tippers.

[6]Major D I Knight has described the operation of the Specialist Team in his article in the Sep 67 issue of the RE *Journal*.

As part of its 'Ever ready' training a detachment of 300 Field Squadron of 131 Parachute Engineer Regiment TA arrived at Al Milah in April to assist in the work. Unfortunately on 12 April the camp was attacked. The Territorials joined in the battle with great courage and enthusiasm suffering severe casualties. WO2 J F Lonegan RE (TA) and a RAPC Sergeant were killed and an officer and sergeant of 300 Field Squadron and an officer and two NCOs of 50 Field Squadron were wounded.

In May Lieut Colonel Holmes completed his two year tour and was succeeded as CRE (Operations) by Lieut Colonel P C Shapland who, together with his other duties, then inherited the construction of the Dhala Road.

Work on the Northern Section progressed steadily and, in July 1965, 24 Field Squadron was relieved by 73 Field Squadron (Major W N J Withall) which completed the section in February 1966.

The Squadron then started work on the Wadi Matlah section — the most challenging length of the whole project.

The Wadi was steep sided and liable to severe flooding during heavy rains. A variable track existed along the Wadi bed and was erased and subsequently re-established at each flood. The Turks had earlier avoided flood damage to the southern four miles of the Wadi by constructing a track along the top of an escarpment 30 to 40 feet above the Wadi bed. The adoption and reconstruction of this route was precluded both on cost and time limitations. The Federal PWD was prepared to provide only £20,000 for this section of the road. To keep within this sum the specification was reduced to an 18 feet formation and a 12 feet wide surface dressed carriageway. To minimize flood damage the road was located on the flood banks on either side of the Wadi whenever possible and where the road crossed the Wadi the bed was to be stabilized only and surfaced.

It was accepted that the crossings and some lengths of the road were vulnerable to flooding but it was considered that the aim of producing a 'mine-proof' road would be met.

73 Field Squadron's tour ended in April and it was relieved by 48 Field Squadron (Major A A Fitzherbert) from 38 Engineer Regiment. This was the Squadron's second tour in the Command.

Its main task was, of course, the completion of the road in the Wadi Matlah. It suffered the same difficulties and harassment that 73 Field Squadron encountered. Mine laying was a continuing hazard and the mine sweeping every morning of the road between the construction camp at Al Milah and the Wadi Matlah often took two hours. This meant long working hours on the site to achieve targets. Several members of the unit were wounded in dissident attacks but fortunately no-one was killed.

To meet other commitments in the Command it was necessary for the Squadron to provide individual tradesmen and detachments. Electricians, engine fitters, bricklayers and other tradesmen assisted the Specialist Team in Dhala, Mukeiras, Musaymer and, on one occasion, Ethiopia.

In addition, detachments from the Squadron blasted overhanging rocks where the access road to Mukeiras cut through the Thirra Pass and carried out construction work in Aden in support of the battalions engaged on internal security duties.

20 Field Squadron RE

Meanwhile, in Little Aden, in Oct 65, 20 Field Sqn (Major H JKissack) from 36 Engineer Regiment had replaced 50 Field Squadron as the Squadron supporting 24 Infantry Brigade and Aden Brigade.

Apart from its day-to-day work in supporting the two Brigades, detachments of the Squadron were widely used throughout the Command. A section of the Squadron was attached to 2nd Battalion the Parachute Regiment in the Persian Gulf. Other detachments were employed on Perim Island in support of the Diplomatic Wireless Service, at Ayn controlling civil labour building a camp, on Yas Island in the Persian Gulf constructing an airstrip and on engineer work in Zambia in support of the RAF at the start of airlift operations occasioned by the Rhodesian Unilateral Declaration of Independence.

Well borers from the Squadron were employed with the well boring team working at Dhala and Habilayn and the Squadron was made responsible for the maintenance of the Dhala Road from Wadi Saghir to Nubait Dukaym until 20 July 1966 when it was formally handed over to the Federal PWD.

The Squadron also provided a detachment of plant operators to assist in the work on the Wadi Matlah section of the Dhala Road.

(Part II to be published in the next issue of the *Journal*)

The French Engin Blindé Du Génie

MAJOR P F SCARLETT BSc(ENG)

The author was commissioned in 1961. After his degree course at Shrivenham, he spent a year with 1 Fortress Squadron in Gibraltar before going to 3 Division Engineers in Tidworth. There followed a three year tour as Carrier Borne Ground Liaison Officer on board HMS Hermes *and HMS* Eagle. *Following Staff College he did a tour in the MOD, and then commanded 38 (Berlin) Field Squadron. He then did an exchange appointment in Canada, followed by tours in 1 Training Regiment and D&W Team, Chatham. He has been the British Liaison Officer at the École d'Application du Génie at Angers, France since 1987.*

INTRODUCTION

A RECENT article in the *Journal* described some of the new German Army engineer equipment and posed the question: "Have the Germans got it right?" This prompted me to ask the same question, posed slightly differently, of the French Engineers. In this article I will attempt to analyse the strengths and weaknesses of the French armoured engineer vehicle, the Engin Blindé du Génie (EBG). I am limiting myself to this one particular item of equipment because I feel it may contribute to the current debate and studies of the replacement of our own Combat Engineer Tractor (CET). The EBG can be considered to be the equivalent of CET, although I hope to show that it is really a cross between the Armoured Vehicle Royal Engineers (AVRE) and the CET.

DISTRIBUTION

THE EBG is only just coming into service. It will eventually be issued to each of the French armoured division engineer regiments. The 1st French Army comprises three corps in each of which are two armoured divisions. Each armoured division has its dedicated engineer regiment. There are thus six of these regiments. Each regiment has a headquarters and command company, a support company, two mechanized engineer companies, and two armoured engineer companies. This organization is remarkably similar to our proposed close support regiment in BAOR. The armoured engineer companies have four combat platoons of two sections, and each section has one EBG. There are thus 20 EBG in each armoured division engineer regiment. The mechanized companies have a similar organization but, instead of the EBG, are equipped with a wheeled bucket loader similar in size to our Medium Wheeled Tractor. In passing I should mention that the French Ministry of Defence announced in the summer of 1989 that there was to be a major reorganization of the French Armed Forces called *Armées 2000* which would be implemented between 1990 and 1992. Under this plan one of the corps headquarters will be eliminated and subordinate units will be re-distributed amongst the remaining two corps and the Rapid Action Force (FAR). However, the number of armoured divisions will not change and therefore, allowing for reserves and training, the total production run for EBG will amount to about 140 vehicles.

DESCRIPTION

THE EBG uses the chassis of the present French Main Battle Tank, the AMX 30 B2. It thus has the mobility, armour, and NBC protection required to keep up with the forward battlefield elements of the French Army. It weighs about 38 tons and has a top speed of 65 km/hour. It has a crew of three: the commander, a sapper, and the driver. It is capable of fording water obstacles up to 2.5m in

Major PF Scarlett BSc
The French Engin Blinde Du Gene

View of right hand side of EBG showing dozer blade and working arm stowed for travel.

depth without any preparation, and can schnorkel in up to 4m of water. It carries a variety of equipments which help it to do its job. It has a dozer blade with a thrust of about 30 tons enabling it to push and fill at the rate of 250 cubic metres per hour and to excavate at 120 cubic metres per hour. Retractable scarifying teeth can scarify roads up to a depth of 20cm. There is a working arm with a lifting torque of 15 tons/m. Fully extended, it is 7.5m long and can rotate through 360 degrees. At the end of the working arm can be either a grab or an earth auger. It takes some 20 minutes to change from one to the other. The grab can lift up to five tons, and the auger will bore a hole of 220mm diameter down to 3m in depth. There is a 20 ton winch with 80m of cable which can be operated when the vehicle is submerged. It is armed with a 7.62mm machine gun and carries 4000 rounds of ammunition. In addition it has a demolition round launcher with five rounds available, and four mine launcher tubes. Each tube has five scatterable anti-tank mines in it, and one re-load of 20 mines is carried internally. Unfortunately, to re-load both the demolition round launcher and the mine launcher tubes, one of the crew has to exit the vehicle. There is a 50kw hydraulic power take-off point so that hand tools can be used by the dismounted crew.

Operations

The EBG is designed to provide both mobility and counter-mobility support. For mobility support the dozer blade, which cannot be angled, is used to improve exits and entrances to wet and dry gaps. It can also be used to push aside obstacles. The working arm can be used to lift obstacles such as abatis out of the way, or the demolition round launcher may be used to remove them explosively. The demolition round is 142mm calibre with a range of between 30m to 300m. The complete round weight is 17kg and its effect is equivalent to a static charge of similar mass. The demolition round may also be used against enemy strong points such as bunkers, or in urban warfare. The other mobility support equipment is the winch which may be used either to self-winch the EBG, or to winch other vehicles through difficult terrain. Its use, of course, necessitates one of the crew members dismounting from the EBG to fix the shackles.

Counter-mobility support is also provided by the dozer blade to form obstacles and to dig tank slots and other field fortifications. The working arm with the grab attachment can build up obstacles, and the auger can be used in conjunction with camouflet charges to produce craters. Obstacles may also be produced using the demolition round, particularly in urban areas.

All obstacles can be sown with up to the 40 anti-tank mines carried in the EBG. Each mine has a diameter of 139mm, an overall weight of 2.34kg, and has an explosive charge of 0,7kg. The fuse gives the mine a full-width attack capability and an anti-disturbance device is contained within it. The mine will sever a track or penetrate up to 50mm or armour plate at 50cm stand-off and 60 degree incidence angle. The range of the launcher tubes is between 60m and 250m.

Front view of EBG showing working arm deployed with grab attachment. Scarifying teeth can be seen on underside of dozer blade.

EBG exiting water obstacle with schnorkling tube deployed.

Discussion

It can be seen from the above that the EBG fulfils the roles of both the AVRE and the CET. With its schnorkling ability, dozer blade, and working arm it can be used as a pathfinder vehicle and performs all the tasks required of the CET. Its armoured protection, demolition round launcher, and scatterable mine capabilities enable it to give the close support to forward armoured formations which is provided by the AVRE in our own Army. To be capable of performing such a wide variety of tasks there have inevitably had to be compromises in its design and in the equipment it carries. By using the chassis of the current main battle tank as the basis of the vehicle, and thus giving a certain amount of commonality in terms of maintenance and spare parts, space for all extra equipment has been limited. Thus the very useful demolition capability has had to be kept to five rounds and the launcher has to be re-loaded from outside the vehicle. Similarly, the number of scatterable mines carried will not allow the vehicle to actually produce a minefield, but rather gives it the ability to effect nuisance mining instantly and to enhance the effectiveness of other obstacles. It should be noted that this is the only anti-tank scatterable mine capability within the French Army at present, although, like us, they are procuring the Multiple Launch Rocket System (MLRS) and are planning to use the same mine in that system as the EBG carries.

Tank scrapes and other digging tasks are undertaken using the dozer blade. With the power pack of the AMX 30 behind it, it has a very impressive performance. A useful modification might be to give it an angled blade capability and this could be easily accomplished. It would over-complicate the vehicle to fit a bucket loader to the front end, even though it would have obvious advantages. The blade is also used as an aid to gap crossing by quickly filling in ditches. It is not as quick as a fascine, but again because it is so powerful very few passes are required to fill in the gap. In addition, the top of the vehicle remains relatively uncluttered by not having to carry a fascine on it.

Like us, the French have decided that for larger gaps a specialist vehicle is required and they are designing an AVLB equivalent. Interestingly, they have discarded the idea of a scissors bridge because of its visual signature when launching and are pursuing a horizontally launched solution in common with the German Army.

In terms of mobility support, there remains the problem of minefield breaching. Whereas we use a combination of Giant Viper and mine plough, the French remain unconvinced of the effectiveness of explosive hoses to clear mines. Tests have shown that their own HPD anti-tank mines are relatively unaffected by the over-pressure of an explosion unless the hose falls directly on top of the mine. Their argument is that if it does not work against their own mines, there is reason to doubt that it will work against enemy mines. They have been studying for some time various systems to breach either buried or surface-laid minefields but have yet to arrive at a satisfactory solution to the problem. In the meanwhile they rely on the ever useful dozer blade of the EBG, which they know is far more likely to succeed against surface-laid mines than buried mines.

The working arm and demolition round launcher provide advantages in countermobility support which our own armoured engineers do not possess. These advantages are particularly apparent when considering urban warfare. One might argue that AVRE and CET have been designed chiefly for mobility support, and that countermobility support is more the province of the field engineers. The French have adopted a slightly different approach and would seem to have arrived at a solution which, for all its compromises, provides the answers to most of their problems.

The French Engin Blinde Du Gene (2)

Conclusions

The EBG is a well-protected, mobile, armoured vehicle which can perform a variety of engineer tasks. It is able to keep up with forward armoured elements in a battlefield environment and provides a measure of engineer support not previously available to French armoured divisions. As with all multi-role equipments, there have had to be trade-offs in certain of its capabilities in order to accommodate others. Nevertheless, the result is a capable, well-rounded vehicle. Its demolition round launcher and the range of its scatterable anti-tank mine launchers are factors that we should seriously consider when planning and developing the replacement of our own CET.

Close-up of armament. Central tube is demolition round launcher with two mine launcher tubes on each side. On turret is a 7.62mm machine gun.

Artificial Catchments for Military Water Supplies

CAPTAIN K D NELSON ED (RL)

Captain Nelson graduated from the University of Wales where he gained the Colonel Page Prize in Engineering. He initially served with the Royal Air Force and was later commissioned in the British Army. He joined the Reserve of Officers (RAE) in 1952 and returned to the Active List in 1953 with 22 Construction Regiment RAE (SR). Captain Nelson saw active service in Burma during World War Two and was at the siege of Imphal.

The following article first appeared in the *Australian Army Journal* in February 1972, and is reproduced here with the kind permission of the Editor.

WATER supplies to isolated garrisons have proved to be a continual embarrassment to field commanders since the earliest days of warfare. Field Marshal Viscount Montgomery of Alamein cited the siege of Megiddo (1468 BC) as an early instance of this problem. Eventually, the defenders overcame their water shortage by constructing a vertical shaft 60ft deep within their fort and then drove a horizontal tunnel 140ft long to an existing water supply, well outside their defensive position.[1] The weakness of this solution was that the source of supply still remained in enemy territory and the opportunity was ever present to poison or pollute the water.

The need for adequate water supplies has become critical in modern warfare due to higher standards of hygiene and increased demands for better quality water for supporting plant and equipment. Singapore in World War Two failed to live up to the concept of an imperial bastion because instead of being an impregnable fortress it was, as Churchill proclaimed, "a hideous spectacle of an almost naked island". The truth was that, apart from other defence considerations, the water supply came from the Malayan mainland by pipeline to reservoirs in Singapore Island and once this pipeline was cut by the enemy, the fall of the city was purely a matter of time. On 31 January 1942, the British forces retreated from the mainland to Singapore Island, blowing up the northern end of the causeway joining the island and the mainland. By 14 February, the military situation had deteriorated to an extent that the Governor in Singapore, Sir Shenton Thomas, sent the following cable to the UK:

> General Officer Commanding informs me that Singapore City now closely invested. There are now one million people within radius of three miles. Water supplies very badly damaged and unlikely to last more than twenty-four hours.
>
> Many dead lying in the streets and burial impossible. We are faced with total deprivation of water, which must result in pestilence. I have felt that it is my duty to bring this to notice of General Officer Commanding.[2]

The next day — the 15th — Singapore surrendered.

Yet, Gibraltar, in spite of years of blockading by Franco's Spain, had no such water supply problem. Fortunately, elaborate artificial catchments had been constructed to forestall such a contingency. Artificial catchments are natural catchments which have been treated to reduce or eliminate the infiltration of rainfall into the surface. Gibraltar has approximately 100 acres of metal roofing, concrete paving and treated rock surface on the eastern slopes of its peninsular. This runoff is collected by gutters and passed to reservoirs with a total capacity of about 16,000,000 gallons.

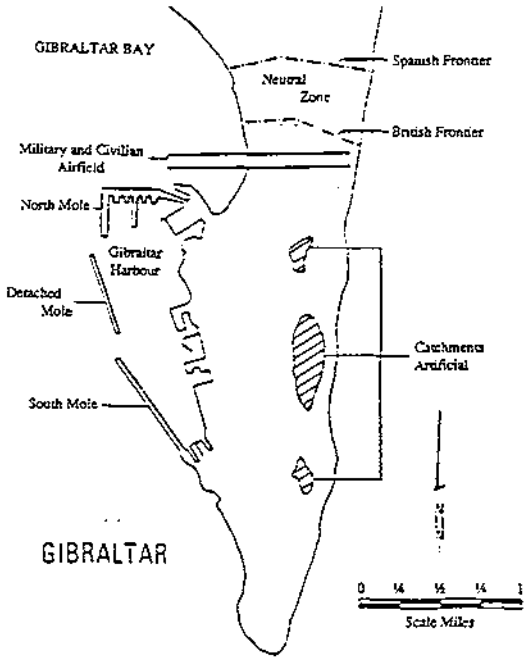
The practice of developing artificial catchments dates back to the early days of civilization. Around 2000 BC inhabitants of the Negev Desert in Israel cleared rocks and gravel from the hillsides in order to smooth the surface and so increase the runoff. Contour channels were then constructed to collect and convey this water to irrigation areas. This system may have been crude but it enabled these people to survive in a region with an average rainfall of four inches.[3]

To help those involved with military water supplies, it is proposed to review current research on new

[1] Montgomery of Alamein. *A History of Warfare*

[2] Moore, D & J. *The First 150 Years of Singapore*

[3] Evenari, Shanan, Tadmore & Aharoni. *Ancient Agriculture in Negev*

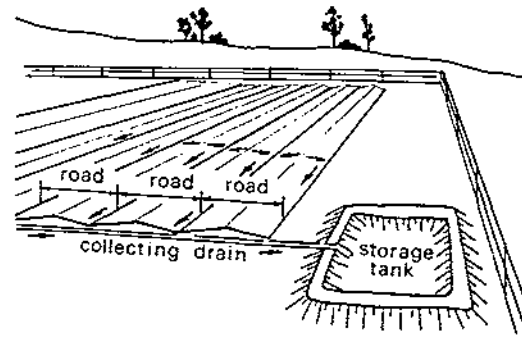


techniques and materials for artificial catchments.

Probably the simplest and cheapest artificial catchment is the cleared, smoothed soil surface. First, the vegetation is removed by a soil sterilant that is non-toxic to humans and animals. Then the soil is smoothed and compacted. The resulting runoff may be collected either by taking advantage of any local watercourses or by constructing channels.

Hillel, an Israeli researcher, reports that by using this treatment he was able to increase the runoff from five per cent to 21 per cent.[4] Per cent runoff is that component of the rainfall which will flow off the surface of the soil and can be collected and stored for future use. Myers carrying out studies near Phoenix, Arizona, also showed that it was possible with this simple treatment to increase the runoff from 20 per cent to 35 per cent.[5] This type of catchment has an annual cost of one cent per square yard.

An interesting modification of this treatment was developed by the Department of Public Works in Western Australia. This technique has been called 'roaded catchments' because the catchment area



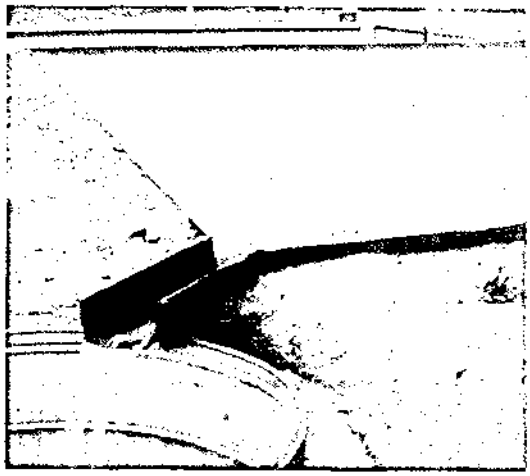
Roaded Catchments

is graded and compacted into a series of parallel roads each 24 to 30 feet wide with side slopes of 1-in-20 to 1-in-10. The drains between the roads have a grade of about 1-in-200 which collects the runoff and passes it on to a larger channel with a grade of approximately 1-in-400 leading to the storage. The cost of six acres of roaded catchment shown in the diagram above was £100 in 1955.[6]

Another method of increasing runoff from many clayey soils is the introduction of sodium salts. These salts have the effect of causing clay to swell and so seal the soil pores. Hillel and Myers in Israel and Arizona respectively have recorded 70 per cent runoff by using 400 pounds of sodium carbonate per acre.[7] Salt treatment is very attractive because of its low cost. However, it has two disadvantages, first the effectiveness of the treatment deteriorates after the first year and second there is a definite soil erosion hazard involved.

The permeability of soil can also be reduced by adding water repellent chemicals so creating hydrophobic soils. The chemicals used include sodium rosinate, quaternary ammonium chloride, calcium salts and silicone compounds. Myers found that 46 pounds of quaternary ammonium chloride per acre could completely prevent infiltration into sandy soil.[8] Unfortunately this treatment also makes soil very susceptible to erosion and appropriate precautions must be taken. The cost of this treatment is five cents per square yard and lasts about three years.

[4] Hillel, D & Associates. *Runoff Induction in Arid Lands*
[5] Myers, Lloyd E. *New Water Supplies from Precipitation Harvesting*
[6] Public Works Department of Western Australia. *Roaded Catchments for Farm Water Supplies*
[7] Myers, Lloyd E. *Precipitation Runoff Induction*
[8] Myers, Lloyd E. *Recent Advances in Water Harvesting*



(US Water Conservation Laboratory, Phoenix, Arizona)
Water running off a plot of sandy loam. This soil was sprayed with a water-repellent chemical

Bitumen is a material which has been used successfully to create an artificial catchment. However, before treating any area it would be prudent to explore the possibility of using existing pavements such as roads, parade grounds and parking areas. Myers and co-workers have developed low cost bitumen, adding a non-penetrating bitumen emulsion to seal the surface.[9] Such catchments record 100 per cent runoff but unfortunately it is frequently discoloured by bitumen oxidation. Research is now being undertaken to prevent this oxidation which is tasteless, odourless and believed to be harmless to humans. The on-site cost of sprayed bitumen is about 75 cents per square yard.

Other successful materials are plastic and metal films, provided that they can be securely anchored to prevent damage by wind, runoff and other forces. Anchoring devices include steel spikes, smoothed boulders, car tyres or similar weights. Researchers in the USA have developed new techniques of bonding plastic or metal films to the soil using low-cost bitumen.[10] Black polyethylene film of 1.5mm thickness and also 1mm aluminium foil have been satisfactorily bonded this way. A bitumen-fibreglass catchment near Kukaiau, Hawaii, was installed for 85 cents per square yard and will last at least ten years with minimal maintenance.

Butyl rubber sheeting has been used and proved highly resistant to both weathering and mechanical damage.[11] In Hawaii, about 30 small artificial catchments have been constructed with reinforced butyl sheeting over difficult ground consisting of small, sharp cinders. The main problem encountered was uplift of the sheeting by wind but this was solved by weighing down the sheeting and by avoiding sharp changes in slope. The cost of butyl rubber is about $2.00 per square yard.

Standard construction materials such as sheet metal and concrete have been used for several years for collecting rainfall. Pioneer work was carried out by a Victorian engineer, A S Kenyon, who built galvanised sheet iron catchments called 'iron-clad catchments' in the Mallee district of Victoria.[12] These catchments have operated very successfully over many years. An iron-clad catchment built at Nowingi, Victoria, consisting of 6400 square feet of sheeting and a storage of 20,000 gallons cost £245 in 1927. Whilst technically sound, these standard materials are expensive, so the search for lower cost materials and techniques continues.

The installation costs are given as a guide, but in common with most construction costs the unit cost of a catchment will decrease as the area of the catchment increases.

Now what are the military applications of artificial catchments? One is water supply in desert operations. Up-to-date, the main military sources have been wells and bore holes; however, as ME Vol VI states:

> Much of the underground desert water is highly saline. The only practicable method of removing the salinity of water is by distillation; but its potability may be improved by blending a high salinity water with water of a low salinity or with distilled water.
>
> Distillation is a very unsatisfactory way of providing drinking water on any but a comparatively small scale.
>
> The plant able to produce even 1000 gallons per hour is so large and complicated that it is immobile, vulnerable to enemy action, difficult to maintain in the field and requires considerable quantities of fuel.[13]

[9] Myers, Frasier & Griggs, *Sprayed Asphalt Pavements for Water Harvesting*
[10] Myers, Lloyd E. *Water Harvesting with Plastic Films*
[11] Lauritzen, C W. *Collecting Desert Rainfall*
[12] Kenyon, A S. *The Ironclad or Artificial Catchment*
[13] ME Volume VI, *Water Supply & Petroleum Installation (1956)*

(US Water Conservation Laboratory, Pheonix, Arizona)
A bitumen-fibreglass catchment near Kukaiau, Hawaii, in a 100-inch rainfall zone

Bearing in mind this problem the capability of artificial catchments to produce pure, salt-free water cannot be ignored, particularly since this source depends on rainfall and not stream flow and it is well known that in desert regions the rainfall is many times greater than stream flow.

The advantages of artificial catchments as a means of supply during protracted defence has already been discussed in the introduction and requires no further comment.

Another possible use for these catchments would be as a supply for garrisons stationed overseas in highly populated districts with low hygiene standards and a high disease incidence. By siting an artificial catchment within or adjacent to the perimeter of the camp, a properly protected supply of pure water could be ensured.

Whilst it is not claimed that these catchments are a panacea, it is considered that under certain circumstances they could prove to be an important source of pure water for military installations.

(Rural Water Commission of Victoria)
Iron-clad catchment at Nowingi, Victoria, as it appeared in 1957, 30 years after construction.
Re-growth can be seen between the cast-iron sheets

Artifical Catchments For Military Water Supplies

A Watercolour From Abyssinia 1868

STEPHEN BELL ESQ BA

Mr Stephen Bell spent four years of his upbringing in Ethiopia and his interest in that beguiling country has continued ever since. He has returned as an adult several times, travelling widely through the highland regions, often on foot. His last visit was in 1984, when he presented a paper to the 8th International Conference of Ethiopian Studies in Addis Ababa. He will be returning next year to accompany a tour commemorating the 50th anniversary of the country's liberation in the 1939-45 War. Until recently he worked for the Commonwealth War Graves Commission. He is now training to become a teacher.

On a casual stroll through a London street market one day in June 1980, my eye fell upon a watercolour, a landscape precisely etched on a sheet of stiff art paper that had clearly never been framed or displayed. It was the only picture on a stall, half-hidden behind brass pots, old bedside lampstands, zinc pewters, and other assorted bric-a-brac; and it was of a location I recognized immediately.

I saw Senafe, in northern Ethiopia (a country once more generally known as Abyssinia). Of especial interest was an encampment of white bell-tents in the valley below to associate the painting with General Sir Robert Napier's expeditionary force of 1867-68, a distant and obscure episode of British military history that I happened to know something of. Indeed, on the back of the painting was the terse explanation, in a sloping hand: "Senafe, 10th May 1868".

Napier's expedition, ordered reluctantly by the Earl of Derby's government after the failure of attempts at diplomacy, was mounted from India and brought about the release of 65 foreign captives incarcerated upon Emperor Theodore's mountain fortress of Magdala. The expedition's success, albeit at a cost of £7 million on top of £2.5 million originally voted by Parliament, derived in large part from the excesses of recent years of Theodore's rule, and from the shrewd co-operation of local rulers along the line of march who were themselves engaged in struggle against Theodore. Between the embarkation point at Zulla on the Red Sea and Magdala, 380 miles inland, was some of the most rugged terrain anywhere on earth, the ramparts of a proud and fiercely independent highland people and of an outpost of Christianity that had survived in isolation since the 4th century. The only fighting, against Theodore's brave but dwindled forces, occurred at the objective itself. This was a campaign against the geography of a country rather than its people, a triumph of logistics rather than a feat of arms, more an engineer's than a soldier's war; and it was commanded by one of the most distinguished Royal Engineers of his day. On the barren and sweltering shore of Annesley Bay his sappers constructed an entire port, complete with piers, prefabricated warehouses and water-condensing facilities, a broad-gauge railway across eleven miles of coastal plain and a graded road up the Kumaile Pass to enable wheeled artillery and bullock carts to reach the plateau at Senafe, 7000ft above sea level.

My knowledge of both the painting's view and its military context was a consequence of a journey to Ethiopia back in 1967, retracing as much as I could of Napier's route while also searching for physical traces and for any impact still discernible, after exactly a century, upon the folk memories of the communities along the line of march. Now the

Stephen Bell ESQ BA.
A Watercolour From Abyssinia 1868

Senafe, 10 May 1868

owner of an interesting and attractive item of Victorian militaria, I resolved upon an exercise in analysis and detection. How much of the story behind the painting was it possible to unravel? And was there evidence extant of the events at Senafe on one particular day, 112 years before, to point to an identification of the artist? The vendor herself knew nothing of the painting, which had reached her in a job-lot of indeterminate provenance.

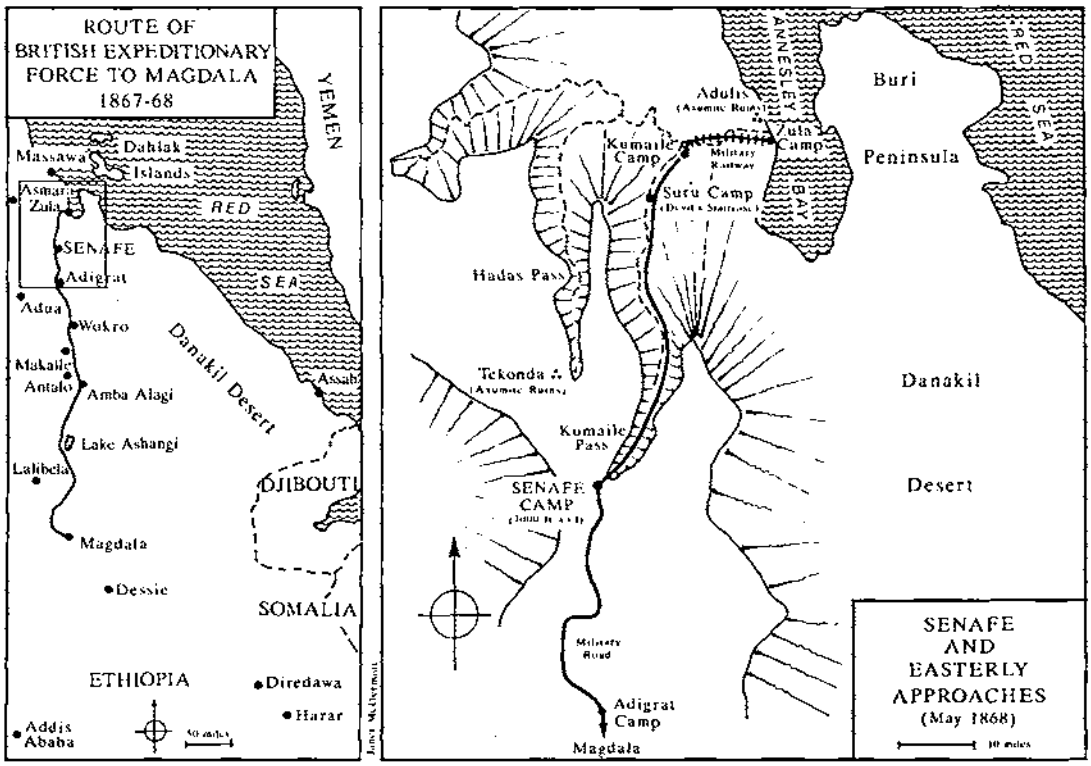
An absorbing challenge occupied much spare time over ensuing years. At first glance, eligible participants in the expedition seemed to run into many hundreds of names, among them war artists, war correspondents, and specialists in various fields attached to the force, not to omit the many serving soldiers who also could have possessed artistic gifts and could have deployed these whilst in the country. First, I consulted the published material in the British Library: general accounts of the expedition, the memoirs of its members, regimental histories and, most usefully, the two-volumed and massively detailed War Office report (published 1870). Then I examined the documentary sources: files and boxes in the Public Records Office containing communications between the War Office and Napier's headquarters staff, and more files and boxes among the records of the India Office Library with papers from Abyssinia happily surviving to give some insight into the operational minutiae of an army in the field.

Early on one simple fact became apparent, and greatly eased the task. For sound geographical reasons, any of Napier's force with an established presence at the events surrounding the capitulation of Magdala over the Easter weekend of 10-13 April could not subsequently have been at Senafe, 315 miles away, four weeks later. A short list emerged of 55 possible names, men whose duties, for one reason or another, confined them well to the rear of the advance force and, more particularly, in or near Senafe: members of the Senafe garrison, for example, and officers of the mule transport train, medical officers, veterinary surgeons, telegraph engineers, and engineers maintaining and improving the military road up to Senafe and beyond.

In the best detective fiction, the clue that unlocks the solution to a case is one that is apparent, yet overlooked, at the outset; and a clue of a kind existed within the painting. The artist had reproduced the view before him with a trained and professional concern for the utmost precision (perhaps as if his primary purpose was one of record).

The view looks south. The military road enters the painting from the Kumaile Pass (off the painting

A Watercolour From Abyssinia 1868



to the left) and passes through the encampment before trailing away into the middle distance. The sun is in the west and the work was therefore executed in the afternoon, probably over the course of some four hours (on a day that, perhaps not significantly, was a Sunday). Two particular features of the painting merit some attention:

- The flora: I showed the painting to an arboriculturist at the Royal Botanic Gardens at Kew. The prominent tree to the left is, unmistakably, a *Juniperus procera*. This, the largest of the Juniper genus, is an evergreen forest tree indigenous to the drier highland regions of eastern Africa. Hanging from its branches is the lichen *Usnea*, a species thriving on the dense seasonal mists that rise up from the hot coastal lowlands and lap the fringes of this part of the Ethiopian plateau between November and March. The *Usnea* hangs to a length of around three feet, and makes it possible to estimate the height of the tree at 25ft. It is a battered specimen. Its lower branches, within reach of the ground, have been attacked for firewood.

- The encampment: Lieutenant T H Holdich RE, one of the three military surveyors attached to the expedition, was assigned to the sector of the line north of Lake Ashangi, while his two colleagues accompanied the advance force to Magdala. His plan of the encampment, later to be published in an attached map volume of the 1870 War Office report, accords in close detail with its depiction in the painting.

The date of 10 May offers a further clue. On that day the first units of the advance force, now retiring northwards with the released captives, reached Antalo, 120 miles south of Senafe. Ahead of them, meanwhile, a carefully phased withdrawal of all the highland staging posts was underway — a rolling up of the entire force which, on this very day, had the Cameronians, a part of the Senafe garrison, beginning its march down the pass to the railhead at Kumaile. The tranquillity of the view gives no hint of the febrile activity in the valley below while the artist was peacefully at work with his brushes. Nevertheless, there was a palpable air of urgency at Senafe on 10 May, as elsewhere

along the rapidly contracting line, the imperative being to complete the evacuation of Abyssinia before the onset of the highland rains, normally due at any time from early June, and before the dry river bed in the Kumaile Pass became a torrent in full spate. A hint of what lay in store was to come at the end of the month, when a brief but heavy fall of rain in the mountains above the Pass resulted in a sudden rush of water, demolishing the section of road through the defile known to the force as the Devil's Staircase.

Who, known to have been at or near Senafe in mid-May, could pass a whole afternoon pleasantly and undisturbed on a nearby hillside? Who, indeed, but the aforementioned Lieutenant T H Holdich RE? Almost a semi-detached member of the force, his assignment bestowed an independence denied to others, taking him away from the line of march, often into difficult country for days at a time. His small party, comprising, Indian assistant, Indian surveyors, an armed escort and mules carefully loaded to carry a theodolite and other delicate instruments, as well as provisions and camping equipment, methodically plane tabled the country on either side of the northern part of the route for a depth of up to 25 miles.

Records in the public domain and additional material shown to me by the descendants of Holdich (then aged 25) allowed me to establish much of his movements during his seven months in Abyssinia. For example, on Easter Sunday, the day before Magdala was stormed and taken, he records that he was entertained by Walde Iyasus, a minor warlord whose base was the imposing natural fortress of Amba Alagi at roughly the mid-point between Zulla and Magdala (and later to become famous in the East African Campaign of 1940-41). Early next month Holdich was well to the north, and under instructions from Napier to report on the feasibility of the Hadas Pass as an alternative line of withdrawal to the coast, should the Kumaile Pass become impassable. Over a millennium before, the Hadas Pass had served as a major trade route between the Axumite settlements on the highlands, via Tokonda at its head, and the port of Adulis whose ruins were just to the north of the expedition's own base at Zulla. Holdich descended the Pass, following a route in disuse since the decline of the Axumite Empire in the seventh century, and he records that he lost all his mules on the way. We may assume that his report (which I could not find) on the prospects of an alternative to the Kumaile Pass was couched in a tone of some vehemence.

A reinforcement of the evidence, as yet circumstantial, to link the painting to Holdich appeared in a file in the Public Records Office, where I found a detailed hand-drawn map of the expedition's route (and much of the country of either side) between Adigrat and Antalo. It was under cover of a letter from Napier to HRH The Duke of Cambridge (Field Marshal commander-in-chief) in London, and was almost certainly prepared and drawn by Holdich himself. A graphologist in the British Museum acknowledged a likely affinity between the handwriting on the map and that on the reverse of the painting.

After Abyssinia, Holdich went on to render distinguished and adventurous service as a military surveyor, mostly in the wild border regions of the Indian subcontinent, for which he was appointed KCIE. His entry in the Dictionary of National

Colonel Sir Thomas Hungerford Holdich KCMG KCIE CB

A Watercolour From Abyssinia 1868 (2).

Biography records that: "one of Holdich's hobbies was painting in watercolours. A sketch-book and a battered paint-box were always in his haversack. Wandering as he did in wild places, often amidst the most impressive scenery, he had unique opportunities for this pursuit, long before the days of the kodak".

In 1902, shortly after retirement from the army, Holdich travelled to South America to demarcate the disputed Patagonian section of the Chile-Argentina frontier in response to an appeal for British arbitration from the governments of both countries. For this service he was appointed KCMG, and a town in southern Argentina was, and still is, named in his honour. In 1916-18 he served as President of the Royal Geographical Society, which institute possesses 16 of his later paintings. He died in 1929, at the age of 86.

Other paintings by Holdich from the time of his service in Abyssinia, if any survive, have yet to surface. None in the possession of his family, other than from his days as a pupil at Addiscombe College, predate his marriage in 1873. Questions remain. What befell this painting between 1868 and 1980, and how and from where did it emerge to see the light of day? And why was it in such perfect condition when it came into my hands (at a modest cost) ten years ago?

Postal and Courier History 1882 – 1982
The Roodeval Incident 1900

The following is an extract from the PCS Association Newsletter '*Cleft Stick*' and is reprinted here with the Editor's kind permission.

This little incident is set during the Boer War when an APO detachment was over-run by the enemy on 7 June 1900.

Lieutenant Pearce was OIC Railhead Detachment with some 17 APO staff looking after 2000 bags of mail which had been off-loaded from the supply trains. The mail was awaiting onward movement to the forward divisions. It was after the overwhelming of the 4th Derbyshire Regiment that the Boers were able to bring cross-fire to bear on the station defences. After some six hours resistance, the position was surrendered, Privates Tuffin and Gobel having been killed and Privates Rutherford and Taylor seriously injured. In addition to the mail, there were four APO stocks in the charge of the senior NCOs of the APO. All were taken by the Boers.

Later, the Director in South Africa, Lieut Colonel Green, wrote to GPO London, to explain the losses and requesting "write-off" of some £5009-0-4.5 the amount of stock lost, the figure being a reconstruction of those stocks.

On 29 July 1900 the APO men were released and one Lieut Moffatt who was OC APOs wrote to each SNCO: "Let me have a full account of the cash and stocks you lost at Roodeval. The following questions to be replied to in detail:

How much was the total loss?

How much lost was cash and how much stock?

List all denominations in detail including serial numbers of all postal orders.

What happened to your Date Stamp and type?"

The subsequent reports from the SNCOs showed that most tried to destroy the stocks but had not been successful in all cases. One Sgt Julyan managed "to salve £9-10-0 in cash, of which £5 was stolen *en route*, and he spent the remainder on food (mealie and dubbin) for his men during their forced march as prisoners".

Lieut Colonel Treble requested the authority of GPO London to accept this loss of £9-10-0 in cash and not hold Sgt Julyan to make good. This was eventually agreed.

Later, in 1904 to 1906, postal orders listed as lost at Roodeval started coming to hand at Post Offices in the UK.

- PRI of 4th Derbys tried to encash £3-15-0 of penny stamps, allegedly given to a Sgt Weeks by a Free State Burgher.
- From GPO Kilkenny — by a Mrs J — a postal order given to her by a gentleman from SA.
- From GPO Birmingham — by a Mrs S — a postal order sent by her son from SA.
- From GPO Dundee — by a Mrs S — a postal order found in the effects of her son.
- From GPO Worcester — by a Mr C — a postal order found in the wallet of his son.

All such items were impounded and payment refused; non-involved APO men or their families.

The most interesting discovery was some 15 years later, when the Department of Posts in Pretoria informed GPO London that: During the course of a police search of the residence of ex-Boer General Christian de Wett during the rebellion of 1916, a large quantity of postage stamps of VR reign had been found:

1d	2045
2d	325
2.5d	353
6d	94

As all VR stamps had been demonetized the SA Postal Department requested disposal instructions.

The Secretary of the Post Office London replied: "I require and request that all stocks be destroyed and for a Certificate of Destruction to be furnished showing full particulars and denominations of all items".

Postal and Courier – North Russia With Love

(Prepared by Jack Russell from extracts of a letter to St Martins le Grand from Major J Smith RE DADPS Archangel)

We arrived in Archangel in October 1918 — one officer and six to service a contingent of British, Canadian, American, French, Italian and Serbian troops, plus all the embassies ousted from Petrograd. There was considerable room for improvement, for mail arrivals were irregular and then only after lengthy transit. On arrival they were deposited in the Base Commandant's office. There owing to the absence of records and lack of staff, the mails were delayed in processing.

So with our team plus another six pre-war posties winkled out of units, APOs were set up at Bakharita, Obozerskaya and Beresnik and the mails sorted from nominal rolls. The need was to establish a standard service between the Base APO and the fronts which ran in an arc — Onega, Shenkhurst, Pinega and Mezen. By November, the APO had absorbed the DRLS due to the fact that the Russian civil PO had been placed under orders of the DADPS, so the fronts had a service three times a week, whilst the trip to Dyina and Vaga fronts, of more than 200 miles were accomplished in three and a half days. During summer, communications were mainly by river using decent sized river craft. With the onset of winter, ice was forming on the rivers, there were no real roads, and only one railway which had a poor track, still poorer rolling stock, and used wood fuel which caused a fire hazard. Only once was the mail lost through fire en route. To other fronts in winter the only way was by ship. The trails wandered over land, marsh and river so it was very difficult to tell the type of terrain over which one was travelling. The sleighs travelled all day and night changing horses and sleighs at each Zemstvo (or post house) set at intervals of 16 miles. The condition of the horses was poor owing to lack of fodder, but they trotted the whole distance without a touch of a whip, an instrument rarely carried. Ordinary shipping ceased in the White Sea owing to ice, so we were dependent on the sleigh service between Archangel and Soroka, on the SW shore of the White Sea. The distance was 300 miles, with 24 relays and took about four days. One of these runs was within a mile of capture but the Russian mail guard put discretion before valour, and reached safety.

The scenery here differs from light pine forest to bleak open marsh. The country is flat. The dark green pines with a coating of snow, also blue in its coldness, is pretty, but one soon tires of it travelling eight days at a stretch. All the villages and houses are the same, built of logs. Those in the town are ornate with a dressing of wood. Game and animal life is very scarce with the exception of Rabschik, a species of small woodcock, which has been the staple diet of the allied troops, so is near extinct. I travelled over 300 miles and only saw three birds, similar to blackbirds.

There are two seasons, Autumn and spring. In November the snow begins, the rivers freeze up but until sufficient snow has fallen and the ice is sufficiently strong to carry traffic there is nothing one can do. Spring (or the thaw) starts in April, the packed snow on the trails gives way, the ice on the rivers and seas becomes waterlogged, making movement impossible. Both these periods last about six weeks. Even when it breaks, several days elapse before a boat can move without fear of being crumpled up. We tried the use of aeroplanes but the difficulties of landing in mud and slush, or seaplanes landing on rivers of broken ice, presented difficulties.

The winter is past ... we are doing our best to get through during the thaw. The Bolsheviks have not done the things that were threatened, the Russians are mobilizing fast, trained by British NCOs, but as they have no postal system, the work has fallen to the APO.

Our band of RE(PS) work hard, our thoughts turn to home, the winter we enjoyed, but held out no hope for the summer when we will be eaten, inch by inch by the mosquito swarms. But send us the mail — the panacea for all ills — we will gladly pass it on to those depending upon us ...

Sleigh Post
The painting by Terence Cameo is held in the Officers' Mess at Millhill. The painting illustrates the various methods of transport used in Russia to move the mails, so vividly described by Major Smith in the article. The picture is reproduced by , kind permission of the Commandant, the Postal Depot.

August 1990 Journal Awards

THE Publications Committee announces the following awards for articles of special merit published in the August 1990 *Journal*:

TRAINING FOR BETTER ENGINEER SUPPORT, A PERSONAL VIEW FROM BATUS
Captain S P W Boyd — **£50**
BACK TO DUNKIRK
Major General A E Younger — **£30**
PRE-WAR SERVICE IN PEKING
Lieut Colonel F N Croft — **£20**
MILITARY WORKS FORCE AND THE PROJECT
Major R W Dixon — **£20**
RECOLLECTIONS OF AN AMATEUR SAPPER, TWO TEN AT WAR — FIREWORKS GALORE!
Colonel F H Foster — **£20**

THE Editor of the *Journal* would be pleased to receive further articles from anyone who took part in World War Two, with a view to their publication on or near to the 50th Anniversary of the events described. We are now considering, in particular, the events of 1941 but accounts of later events are always welcome as they can be kept for publication in the appropriate issue.

Postal And Courier North Russia With Love

Recollections of an Amateur Sapper Preparing UK for Invasion

COLONEL F H FOSTER DSO OBE TD DL RIBA

This article is another extract from Colonel Foster's book (see August Journal *page 112) recounting his experiences throughout his peace and wartime service. The extract is published with the author's kind permission.*

AFTER their exploits with the British Expeditionary Force, the 44th Division (all Territorial soldiers recruited from the Home Counties), crossed over from Dunkirk to Dover much split up as were most formations and then boarded special trains to barracks and camps in various parts of the country. As OC 210 Field Company, I went with a few others to Warminster where we were very well looked after — good food, hot baths and beds. 210 (Sussex) Field Company were all from the towns of Seaford, Newhaven and Lewes. I had been OC from 1936 and we were like one big family!

After a couple of days we entrained for Cowley, Oxford, where quite a number of 210 chaps had arrived and was I glad to see them! I managed to make a hasty trip to Moss Bros to get some decent kit as I was still existing in a filthy battle dress, an ORs great coat and a tin hat! Then we were off again to Tetbury in Gloucestershire. Here were more 210 arrivals and we began to look more like a field company but alas, we then realized the number of chaps who had been killed or were prisoners-of-war.

Soon we were off again to Yorkshire where our 44th Division was reforming. We arrived at about 1800hrs at Castleford and by then the company was some 160-170 strong.

We stayed in billets for about a week and then moved to be under canvas in Cowick Park a few miles west of Goole. Bell tents and ablution benches! Rather a nasty shock after our very good billets and home cooked meals in Castleford!

The German invasion of England was expected at almost any time. The 1st and 2nd Divisions were responsible for the defence of the east coast north of the Thames and we of the 44th were responsible to back them up. As Sappers we had two major tasks. One was the construction of very many pillboxes at strategic points. These were rather hasty affairs of concrete blocks and sandbags filled with concrete. The other was a formidable one — the preparation for demolition of three major bridges over the wide River Ouse.

At Boothferry, the bridge was a very long steel girder bridge on many concrete piers. The preparation of placing charges and drilling piers etc did not present much difficulty after our experiences with the BEF.

At Drax there was a railway bridge over the Ouse carrying main line traffic from London to Scotland. The bridge could be opened, pivoted on a centre pier to allow river traffic to pass. There were long and high embankments to the bridge approaches. The method of denying the use of this bridge was: first to swing the bridge open and insert large steel pins in the opening gear so that the bridge could not be swung back again, and second to build demolition chambers into the sides of the embankments so that charges could be inserted to blow large craters on each side of the bridge.

Selected Sappers were sent to York to learn to control locomotives. On receipt of orders from the CRE the London and North Eastern Railway Company would drive railway engines to the north and south approaches and hand them over to our Sapper drivers. The craters would then be blown and our drivers would take the engines forward at slow speed, jumping out just before the craters so that engines would topple in, — hopefully their noses would be well in and their rear well out at a high angle.

The bridge at Selby on the main road north to York was of very old timber and steel construction. It did not present any difficulties.

Detonators would not be inserted in any charges until orders were received from the CRE. The code word for the whole of the UK that invasion was about to take place was *Cromwell.*

There were many other jobs to keep us busy. I would like to put on record here that our 211 Field

Park Company had the task of manufacturing anti-tank mines in large quantities. The cases were made with large diameter asbestos piping and filled with explosive with a natty little mechanism to set them off. The mines were christened 'The 44 Anti-Tank Mine' and had a booklet complete.

When the CRE, Godfrey-Faussett went on leave, as senior company commander I went to Divisional HQ to act for him. As soon as I got there, I was summoned by our GOC Major General Percival and his GSO1 and informed that the code word *Cromwell* had been received. "Put your Sapper plans into operation." I immediately 'phoned LNER at York for the engines to stand by with steam up and gave orders to the field and field park companies.

The 'flap' only lasted a few hours as *Cromwell* proved to be a false alarm.

Soon after, I went on a bridging course at SME Chatham. The course was the last one to be held at Chatham before the SME moved to Ripon. I was awoken one night in my quarter, which was one of the houses about three doors from the HQ Mess, by a huge explosion and my plaster ceiling dropping over me. I put on my greatcoat and on arriving on the Square found that *Jerry* had dropped a stick of bombs that had fallen close to the Commandant's house, hit the guard room and the house two doors away from the one I was quartered in. There were several nasty casualties and great damage to buildings.

At the end of the course, the CRE rang me up at Chatham and told me the 44th Division was moving from north to southeast to take over the commitments of the 43rd Division. I was to go to Battle, Sussex to my opposite number OC 206 Field Company and find out what he had been doing. He was Major L E Gwynne and on my arrival he put me up in his Mess and gave me a 'Cook's Tour' of his responsibilities.

My area was the coast line from Camber Sands to exclusive Eastbourne and to about 15 miles inland. Already laid were miles of Naval Beach Mines and there were newly constructed concrete pill-boxes, concrete cylinders and buoys for anti-tank defence and large quantities of Molotov cocktails. There were also bridges prepared for demolition.

210 was quartered in the requisitioned houses, some parts of the hotels and a large school that had been evacuated. Our parade ground was the Cattle Market and the TA drill hall our dining room and cookhouse. It was a popular area for 210 as chaps naturally wanted to nip home. We were only 20/25 miles from our drill hall at Seaford.

About mid-December the CRE was promoted to Colonel and went off to be 2IC of an armoured brigade. I went immediately to Divisional HQ as acting CRE. Major General Percival was a grand man to have as my boss. On asking my advice on Sapper matters, he would always listen carefully, seldom criticize and then give his instructions.

I went back to 210 and after a few days we moved from Battle to Aylesford in Kent. We were quartered in the Friary (which ranks as the oldest Carmelite priory in England) and in parts of the village.

After about three weeks a posting order arrived appointing me CRE 4 Corps Troops with HQ at Snegs Hill near East Grinstead. (This formation was composed of Territorial soldiers recruited from Hampshire.)

I was to get many interesting Sapper tasks for my formation during the year I spent with them and I will relate the principal ones. It was realized that if Hitler invaded, our troops could not counter attack with 40 ton Churchill tanks over the River Ouse except over the bridges at Newhaven and Lewes. We were therefore to build class 40 bridges at Southease and Barcombe.

At this time, the Bailey Bridge had not yet come into use. The site chosen for the bridge at Southease was immediately to the north of the existing three ton limit swing bridge. The only prefabricated Class 40 bridge at that time was the *Hamilton*, which consisted of many steel trusses and fittings that had to be bolted together as the bridge was built and gradually rolled over the river gap. It was a slow process as an important factor, much affecting the speed of construction, was that the River Ouse had tidal banks or *bunds* which could not be cut into without flooding the countryside. We had to transport a great deal of excavated earth or spoil from a mile distant or from South Heighton to construct the launching plane and the two ramped approaches to the bridge. The whole project took about three weeks. The Gunners sited an anti-aircraft gun on the hill on each side of the valley during the final stages of launching. (Note: No photos were taken but I am

Hamilton bridge over River Medway built by 221 Field Company RE (Major K J Heaney) in 1940

indebted to Major Heaney for the illustration of a similarHamilton.)

. When the bridge was ready for traffic I asked the commander of a Churchill tank squadron to test out the bridge and the next day we went together to see 20 tanks (each 40 tons) make a successful crossing. Shortly after, I received an irate 'phone call from an official of the Ouse River Board that a tank had broken the timber ribbons of their three ton-limit swing bridge. It later transpired that we only saw 19 Churchill tanks cross the Hamilton Bridge. Tank No 20 had broken down some miles back and had to leave the column. When the crew completed their repairs the tank carried on and in spite of the new direction boards, crossed the three-ton limit swing bridge instead of the Hamilton. The crew were certainly lucky!

We constructed another bridge at Barcombe Mills, this being for same purpose of making a Class 40 crossing place. This was a simple affair, a task much practised in peacetime viz a Large Box Girder Bridge. The major task here was to re-route the very narrow roads so as to cut out the three very old, narrow brick bridges and to widen and resurface over a mile of road. Materials for this project were sent from demolished buildings from London bombed sites. A long goods train pulled into Barcombe Mills station every night.

At the same time as the two Class 40 bridges were being built, I was made responsible for the construction of a new underground HQ at South Heighton, near Newhaven. Fortunately I was given a Canadian Tunnelling Company, under command. They certainly knew their job. The entrance was made from the main road into the side of the hill and a long tunnel leading to four large chambers was excavated, for the Naval Officer in charge (NOIC) and staff, for a big signal operations room, for the Headquarters of the Infantry Battalion occupying the area and the Home Guard. A shaft with steps gave an exit and access to the Guinness Holiday Home, which the Navy had requisitioned as their main HQ.

Although all excavation was in hard solid chalk, all tunnels and chambers were reinforced with steel frames and the offices were lined in plywood. The whole place was electrically lit and air-conditioned with its own plant. One of the problems was the disposal of hundreds of cubic yards of the chalk spoil much of which was transported away to assist in forming the embankment approaches at the new bridge at Southease. Much care had to be taken to avoid drops of chalk on to the tarmac roads as this would show up badly on German aircraft recce photos, thus giving away the position of the Headquarters (I am told the entrance to the tunnel was filled in long ago but the remainder is still intact).

Another task for which my formation was responsible was the destruction of the huge petrol tanks on the Isle of Grain to prevent their contents falling into German hands if invasion took place. As we were quartered in mid-Sussex it would entail a long run across Sussex and Kent, placing demolition charges and firing. If ever we had had to undertake this enormous, this terrible task, God knows what the result would have been but full recces were made, schemes worked out and arrangements made for explosives to be available.

My 576 Corps Field Park Company had the job of making thousands of 'Handworth Torpedoes'. These gadgets were real Heath Robinson affairs. A gun barrel was made with a length of water pipe. It had a piston and rod inside which were connected to a little trolley on which was secured an anti-tank mine. The gun was fired by gunpowder. The use of this gun was to fire the torpedo out from a concealed position across a road into the path of an approaching German tank! It was to be a Home Guard (HG) weapon and we had to give many demonstrations to local HG detachments on Sunday afternoons.

As part of the 'anti-invasion scheme' certain towns and villages were termed 'Nodal Points'. This meant that they were areas considered to be

vital to be held at all costs. One of these was Horsham. Here, I was made responsible for a deep anti-tank ditch to surround the town and had authority to employ civilian contractors. It didn't mean that the ditch had to be continuous. We considered houses as anti-tank obstacles or constructed concrete block obstacles between them. It meant a lot of recce and organizing.

I was glad to hand this job over when I had the wonderful news that I was posted to 1st (Infantry) Division as CRE. I had no more responsibilities for the defence of UK but strict training for overseas, culminating in the advance to, and capture of, Tunis.

The BAOR Close Support Engineer Trial

COLONEL P J RUSSELL-JONES OBE

Colonel John Russell-Jones was educated at Wellington College, RMA Sandhurst and RMCS Shrivenham. He has been a troop commander in BAOR, UK and Ulster, was Adjutant at JLRRE and, prior to going to Staff College, was DAAG (2) in PB7. He commanded 26 Armoured Engineer Squadron, as his father had before him, and was DCOS of 11 Armoured Brigade in Minden. More recently he has been MA to MGO, serving both General Sir Richard Vincent and General Sir John Stibbon, and has just completed a very happy tour commanding 23 Engineer Regiment in Osnabrück. He is currently Assistant Director Defence Policy in London. To date duty has taken him to Italy, Turkey, Thailand, Korea, Malaysia, USA, Pakistan, Ulster, Germany, Sardinia, Hong Kong, Oman, Mexico, Singapore and St Kilda. He was made an OBE in 1988. He is married with two children.

INTRODUCTION BY CCRE

COLONEL Russell-Jones describes the process of evolution of the Close Support regiment from the initial concept, through the trials phase to the day-to-day business of running a regiment with all the training pressures of peacetime. He is well placed to do this as he has commanded 23 Engineer Regiment throughout the practical development of close support engineering within the Corps. His article is a definitive account of how the skills of close support engineers are applied in practice. The article is similar in purpose to one in the RE *Journal* of September 1978 by Lieut Colonel Willmott which described the *modus operandi* of the Armoured Division Engineer Regiment, which was a new and developing organization at that time. Neither author pulls any punches.

There are some in the Corps who would not call the Close Support concept new. Those assault engineers of the 1940s may think that we are reinventing the wheel. Many of the Close Support engineers' skills are not new, but it is the combination of these skills that is. I am sure that those who consider the matter for a moment will agree that the ability to give immediate support to an armoured brigade, with all the offensive and defensive sapper battlefield skills from the resources of one squadron, is not a capability we have had before. However I do know for certain that it is an ability which is welcomed by formation commanders, and is here to stay.

It is because the concept has been so well received by brigade and divisional commanders that it will survive any changes in the structure of the Army in the next few years. Wherever there are armoured formations equipped for high intensity war, there will be Close Support sappers. There will of course be other more traditional sapper units too, but there is no doubt that Close Support squadrons will survive with much the same organization as we see them today.

Experience at British Army Trauma Unit Suffield (BATUS) has shown that the concept works at troop level, and 23 Engineer Regiment has proved that it works on a regimental scale. Colonel Russell-Jones frankly describes some of the difficulties he faces with the organization, training and equipment management of the Close Support regiment. We should not sweep these genuine problems under the carpet, but we must recognise that they may induce changes as Colonel Russell-Jones presages, both to the quality of regimental life, and to such things as the trade structure for our soldiers. Change is inevitable and I welcome this forthright article which reports on how the theory of the close support engineering has been interpreted and is being handled at regimental level.

Colonel PJ Russell Jones OBE

Introduction

In his excellent article *The New Concept of Providing Engineer Support to Armoured Divisions* in the September 1987 *Journal*, Brigadier Sheppard, then CCRE, set out the theory behind the proposed major reorganization of the Sappers in Germany. He explained the need to provide greater mobility support to the armoured brigades and battlegroups caused primarily by changes to the Army Group Concept, which put more dependence on aggressive use of large powerful and highly mobile reserves.

You will recall that he concluded that we needed a Close Support (CS) engineer regiment and a General Support (GS) regiment in each division. The former would command the brigaded squadrons, which would have a radically new equipment intensive organization containing a mixture of armoured and field engineers. The latter would consist of two squadrons of conventional APC mounted engineers; and both regiments would be supported by one field support squadron per division. Brigadier Sheppard concluded by saying his proposals were to be trialled in two phases in late 1987 and 1988 and that an embryo CS regiment would be formed for that purpose, based on 23 Engineer Regiment in Osnabrück.

The trial is now over and many will have read the formal Trial Report and the various concept papers which led the Executive Committee of the Army Board recently to endorse the new Concept and the resulting reorganization, which is (subject to the "Options for Change" study) to begin implementation in 1993/4. But as I have just completed my tour as the Commanding Officer of that embryo Close Support Regiment I thought it might be of interest if I reported to a wider audience how the CCRE's theory has stood up to the practical test. I will concentrate on the Close Support Regiment, even though Phase 2 of the trial involved many more Sappers, not only because I commanded it but also because that was where the major new ground was being broken. Although it would make an article in its own right, I will not cover the conversion of the Regiment by my predecessor to a CS organization because, despite many difficult problems (mainly caused by having to do everything "at no cost"), it all went remarkably well. The lessons learnt have been recorded to help those charged with converting the new regiments.

The Trial

First a brief recap on the Trial itself. In 1986 the Director of Military Operations directed that a Trial be conducted to validate the ideas for future engineer support to armoured divisions. Phase 1, in 1987, examined the ability of a CS squadron to provide intimate Sapper support at brigade level, and culminated in Exercise *Keystone*, a field exercise (FTX) for 12 Armoured Brigade then, coincidentally, commanded by a Sapper, Brigadier Hyde. Phase 2 was conducted by 3 Armoured Division throughout 1988 and examined the overall support needed by an armoured division.

Phase 1, involving 39 Field Squadron, validated the basic concept and won enthusiastic support from 12 Armoured Brigade. Although the Brigade favoured a squadron with six AVREs, six AVLBs, six CETs and a field troop, resource constraints indicated that four AVLBs might have to suffice. It was decided that Phase 2 of the Trial would examine, *inter alia*, whether four were sufficient.

Phase 2 examined whether a CS regiment (formed of squadrons organized as proposed in Phase 1), a GS regiment and a field support squadron, could provide the necessary support to an armoured division. The various command post exercises (CPXs), and exercises at the Brigade and Battlegroup Trainer and at the SOLTAU Training Area throughout the year gave us the chance to experiment with groupings and command and control structures, before the whole concept was trialled on a major divisional FTX, Exercise *Iron Hammer*. Despite an incomplete CS regiment organization, caused by a shortage of engineer tanks, and some unreliable major equipments, this Phase of the Trial also was highly successful.

The 3 Armoured Division Trial Report was enthusiastic and stated that the new organization "demonstrated convincingly that the CS squadrons, being better integrated, can provide engineer support that is more responsive to the plans of brigade and battlegroup commanders". The Trial Report confirmed, further, that four AVLBs could provide adequate integral support to a brigade, provided additional and timely reinforcement (normally from the Corps Armoured Engineer Squadron) was available for a particular operation.

The overall concept was thus overwhelmingly supported by all-arms commanders and there was

Close Support Troop

a genuine belief at all levels that we were moving firmly in the right direction. However, to be frank, the environmental restrictions on FTXs in Germany, even in 1988, meant that the concept at battlegroup level was not often as fully tested practically as we would have liked — what we did was to prove that we could get the right men and the right equipment to the task sites but were not often allowed to carry out the work because of the damage it would cause. Thus it was fortunate that we had the chance the following year (1989) to support no less than six battlegroups on their *Medicine Man* Exercises at BATUS in Canada. Our CS troops were put firmly through their paces on the prairie, coming through with flying colours and winning unanimous endorsement from the battlegroup commanders even if there was some justifiable adverse comment on the reliability of our equipment and the speed of the tanks. The BATUS 1989 Annual Training Report said that "it has been proved that the close support concept works, giving battlegroup commanders powerful mobility and countermobility assets on the battlefield". So much for the all-arms perception. But what Sapper lessons did we learn, and what problems still remain?

Sapper Lessons

The main Sapper lessons have been set out at length in the Engineer Report on Phase 2 of the Trial on Future Engineer Support to Armoured Divisions which was completed in February 1989 and circulated widely, but it might be useful if I highlighted our key conclusions:

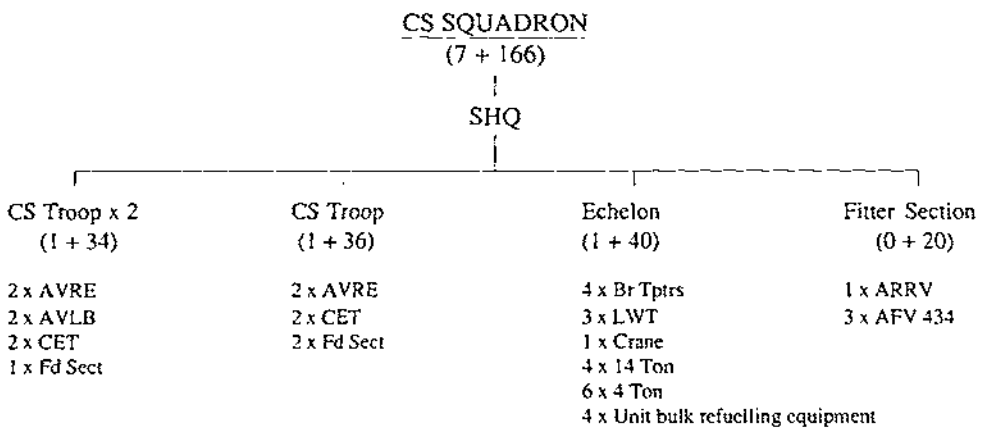
- We showed that an integrated squadron of armoured and field engineers can and does work. Contrary to popular belief armoured and field engineers can exist in harmony and humour! And any initial parochialism disappeared almost overnight once we had fully integrated the CS troops. Indeed the advantages of the significantly increased understanding between the two disciplines and the benefit that in an integrated squadron one goes to war with those whom with one lives and trains in peace — and all under one commander — is inestimable. Whether individual troops should be fully integrated is not so clear

The BAOR Close Support Engineer Trail (2)

cut however. Although the squadrons' CS troops must clearly deploy on operations in their composite grouping (ie two AVREs, two AVLBs, two CETs, one field section) for most of my tour we have been undecided whether the troops should be completely integrated in barracks or split into one field and two armoured troops. The strong arguments for integration at squadron level clearly applied equally at troop level but were offset by two main factors: the need to ensure field engineer standards and morale were not reduced if they were only in section strength; and the need to look after our equipment properly — maintaining tanks is a time consuming and specialist task. We have tried both groupings and the overwhelming view within the Regiment now is that we should organize in barracks as we plan to deploy for war ie in completely integrated troops. The CS squadron organization we recommend is shown below.

- The troop command team (troop commander, SSgt and Recce Sgt) relationship with its affiliated battlegroup is important. These three should not be removed except, occasionally, for major Sapper tasks at squadron or higher level. The assets of the troop, on the other hand, can and should be moved by the SHQ to match specific operations ie one troop commander may well find himself with all the AVLBs if his battlegroup is, say, conducting an assault crossing. We found regrouping of these assets, although always a difficult operation, to be easier under the new organization.
- A field troop of four sections per squadron is just sufficient for most situations, but the tank crews frequently have to assist in field engineer tasks, particularly in defence. They therefore have to be better trained in combat engineering than hitherto. Similarly the field sections have to help maintain the tanks on occasion in barracks. It is worth highlighting here that the AVRE proved excellent at barminefield laying, and can lay a one kilometre light minefield quicker than a field troop because it can carry all the necessary mines in its trailer. Our confidence in the adequacy of only four sections will be increased with the introduction in the 1990s of the new field engineering equipments, such as the Vehicle Launched Scatterable Mine System (VLSMS) and rapid demolition devices, which will reduce both the time tasks take and the manpower bill. Nevertheless brigades may, of course, have to be reinforced by elements of the GS regiment for specific tasks.
- We confirmed that the equipment in the CS squadron, in general, matches its likely tasks. The one glaring omission is the lack of a rapid scatterable anti-tank mine system, and the sooner VLSMS enters service the better.
- We found that the CET/AVRE combination is a powerful one. In an advance, for example, with a battlegroup advancing "two up", a CET/AVRE with each of the leading groups will meet almost all their needs for rapid engineer support. As the CET has comparatively poor armoured protection, however, it needs to be deployed carefully when

OUTLINE CLOSE SUPPORT SQUADRON ORGANISATION (PEACE)



AVLB

Field Section

in contact. In this scenario, incidentally, the AVLBs and, perhaps, the field section used to travel on the centre line just behind the battlegroup headquarters, under command of the troop staff sergeant. It is worth adding that in such an advance we found a clear requirement for two recce sergeants; one is not sufficient and we re-learned a lesson that was learned by the assault engineers in World War Two.

- The final major lesson we learned was how best to command and control events, not only in the CS regiment but across the whole divisional area. During the Trial there was more discussion on this topic than any other because there is more than one way to do it, and most methods have been tried with varying success before. It thus deserves a section in this article to itself.

Command and Control

We experimented with a number of options during the year but concluded that the existing arrangements for the current divisional regiments were best: the CS RHQ runs Engineer Operations in Divisional Headquarters, the CRE's staff run Engineer Plans, and CS SHQs provide the Sapper cell at brigade level. The CO of the CS regiment is not tied to Divisional Headquarters; indeed the excellent secure communications of SCRA (a secure radio telephone linked into the Ptarmigan trunk network) mean he need visit his Headquarters less often than before because he can be kept up-to-date more easily. We found that the CO could command specific operations from a small Tac Headquarters, operating from his hard rover vehicle. We found that with one exception, if two or more Sapper squadrons in the Division were involved in an operation, an RHQ was required to command it. The exception was that the CS squadron commander could control up to one GS squadron for a specific operation bounded in time and space, for example in the preparation of an obstacle plan within his brigade area. Whether the CO of the CS or GS regiment commanded various operations generated considerable discussion (and heat!) during the year. Our firm conclusions were:

- The principle of commanding in war those who one commands in peace was valid. Thus operations should, where possible, be commanded by the CO who had the most sub-units involved. He could then exploit their strengths and support them best. This principle was valid regardless whether the operation was forward in a brigade area or in the rear area of the Division.
- The RHQ of the GS regiment was better equipped to command and control a major operation because its RHQ was complete and uncommitted to Divisional Headquarters. This is an important factor because we found on many operations, particularly those of more than 24 hours duration, that all the assets of the RHQ were needed to command effectively.

The CO of the CS regiment should normally command operations requiring an RHQ in brigade areas, because he knows the brigade staff well and is better acquainted with their Standing Operational Procedures. He is best suited to command operations involving both the CS and GS squadrons, such as assault crossings or the preparation of Divisional obstacle plans. However, operations in the forward area such as an M2 crossing involving amphibious and GS squadron(s), where the CS squadron is untasked, are better commanded by the CO of the

The BAOR Close Support Engineer Trail (3)

GS regiment (and, occasionally, by the CO of the amphibious regiment).

Nevertheless we found that one could not be rigid in the choice of command RHQ. It depended, among other factors, on the situation, other concurrent Sapper commitments, and in our case on the Divisional FTX, the preferences of particular brigade commanders. The important point is that there are now sufficient Headquarters in the Division to provide the necessary flexibility in command and control.

Post Trial Concerns

Once the Trial was completed we had two remaining concerns: could we train the new regiment properly and could we look after all its equipment?

Many, including me, were concerned that the training requirement for the new CS regiments, with the need to train both armoured and field engineers would be too heavy a load, and that standards in both disciplines would inevitably drop. We have put considerable thought into how best to organize our training over the last two years and now believe that we have evolved a system that works. By the time this article is published we will have circulated a paper explaining our views on both collective and individual training. Nevertheless, it would be wrong of me to pretend that despite being better combat engineers, our armoured engineers are as well trained in the more esoteric techniques as before. And we have also had to restrict our combat engineer training slightly to cover those tasks likely to be carried out by our combat engineers in the forward battle areas eg we concentrate on demolitions and mine warfare more than water supply and MGB pier, which are now more likely to fall to the GS squadron. But the benefits of armoured and field engineers training together, with the resulting greater understanding between the two disciplines, in my view greatly outweighs these disadvantages. More refinement is needed over the next few years but I am convinced that training is not going to be an insuperable problem.

I am not so sanguine about the problems of equipment management however. Throughout the Trial virtually every major problem we faced concerned our equipment, particularly the tanks. Although we resolved many, some still remain, and it is worth outlining what the problems were because they are relevant to the views on equipment management which I expound below. They also, I hope, explain why my whole Regiment would put reliability as the single most important requirement in the new generation of Sapper equipment.

The Willich designed Chieftain AVRE (see the article *The Chieftain AVRE Project* by Lieut Colonel J F Johnson, September 1987 *Journal*) was a first rate idea and excellently manufactured but it naturally suffered the normal teething troubles and shortage of spares that affect any prototype. The vital system for loading and launching the top hamper equipments, for example, did not work for the bulk of the Trial period, and it did not help that the Chieftain hulls came from the older tanks in the fleet and were not given a base overhaul before conversion. But thanks to excellent support from Willich and the work of our own REME Workshop, we overcame most of the problems by the FTX and managed to get by in between. Although the reliability of the AVRE has improved it is still poor, caused primarily by the state of the chassis, many of which have motored more than twice the target mileage between base overhauls. We eagerly await the AVRE designed by Vickers, with whom we and 32 Armoured Engineer Regiment have worked closely.

The AVLBs also gave us problems. Most of our bridgelayers are the Mk6 which is basically the reliable Mk5 version uprated with "improved" hydraulics for a speedier launch. These "improvements" unfortunately suffer serious design faults which mean that every third or so launch the crews are showered with up to 40 litres of hot hydraulic oil. Although we reduced the problem (in my, if not the crew's view!) to manageable terms (ie we could repair the fault within about four hours), we could not place any confidence in its reliability throughout the Trial. Consequently we always had to have at least 100 per cent reserves for any task with the obvious ensuing operational penalties. And, lastly, our CETs, although a superb vehicle when going, proved to be consistently unreliable, with a spares support that was, and is, very poor indeed.

I have deliberately not disguised the problems we faced, but things do need to be kept in perspective. By the FTX we had sorted out most major problems

and the serviceability of the key vehicles throughout that exercise was, in the event, remarkably good — even if I was not too disappointed that our CETs were seldom allowed to dig!

These specific problems with our vehicles will no doubt be sorted out permanently in due course. But even when they are, the equipment management problems of a CS regiment should not be underestimated. The problems stem from the sheer number of equipments and vehicles we hold, an inadequate Workshop establishment (although we need to see how the increased establishment proposed for the 1993/4 implementation works; Maintenance branch at HQ 1(BR) Corps believe it will suffice), and the fact that Sapper squadrons being busier than the average find it difficult to make time for enough equipment management. The comparison, below, of our vehicle holdings against some other teeth arm units — although somewhat simplistic as we are not comparing like with like — should help explain our problem. Many will say that I exaggerate the problem because, after all, Sapper BAOR regiments have had similar problems in the past and have coped admirably. That they coped is true but there is one big difference; the bulk of the A vehicle fleet of the old BAOR regiments were AFV 432s, which are inherently reliable and easily maintained whereas CS regiments have tanks. Tanks are not just big APCs: the difference in maintenance effort can be likened to the extra effort required to look after a horse rather than a dog.

The problem undoubtedly can be overcome. But I believe it is important that we recognize two things: we as a Corps will need to place more emphasis on equipment management in our training at all levels in future; and the balance that every CO has to strike between work and play will, I fear, inevitably tip in favour of work.

SUMMARY

THE last three years have been exceptionally busy and rewarding for 23 Engineer Regiment. The Close Support Concept has won wide approval and there is no doubt that we provide better support to all-arms formations than before: the integration between field and armoured engineers is better; the grouping and equipment is more suitable; and all-arms commanders only have to deal with one Sapper commander. That the Trial was such a success was to a large extent a direct result of the immense hard work and enthusiasm of the soldiers in the Regiment, particularly the vehicle crews and our REME Workshop. Anyone who has doubts about the quality of our soldiers nowadays is worrying without cause. Problems do remain, particularly over equipment management, but none is insurmountable and 23 Engineer Regiment will continue to develop the concept over the next few years until the reorganization begins.

My last word must be to thank 32 Armoured Engineer Regiment for all their help and support throughout the whole period of the Trial.

COMPARISON OF VEHICLES AND MANPOWER (PEACE)

	Armoured Infantry Battalion	Armoured Regiment (Type 57)	Current 23 Engr Regt (2 Squadrons)	Future CS Engineer Regiment
Total Strength	39 + 742	43 + 556	25 + 469	33 + 666
LAD/Workshop	1 + 70	2 + 92	1 + 46	2 + 91
A/C Vehicles	110	98	98	118
B Vehicles	47	54	111	134
Total Vehicles	157	152	209	261

Memoirs

BRIGADIER RICHARD GARDINER CB CBE

Born 28 October 1900, died 3 August 1989 aged 88

BRIGADIER RICHARD GARDINER was born at Rawalpindi on 28 October 1900. He was the son and grandson of Sappers both of whom were seconded to the Indian State Railways. He was educated at St Christopher's School, Eastbourne, Uppingham School and the Royal Military Academy, Woolwich.

Gardiner was commissioned into the Royal Artillery on 15 July 1920 but after a spell in India he returned to England and transferred to the Royal Engineers on 19 June 1924. Gardiner went back to India as a Sapper in 1926 to the Madras Sappers and Miners. Following the example of his father and grandfather, he was seconded to the Railways, in this case to the East Indian Railway, as Assistant Executive Engineer. This move was to shape the rest of Gardiner's career, which was principally in the field of railways and transportation.

Shortly after the outbreak of the 1939-45 War, Gardiner returned to military duty with the Madras Sappers and Miners, raising the first Transportation unit of the Indian Army, 101 Railway Construction Company, Madras Sappers and Miners. After service in Eritrea, he was posted to General Headquarters, India, becoming Director of Transportation.

In 1945, Gardiner went to BAOR as Director of Transportation returning to Longmoor in 1946 as Commandant of the Transportation Centre and later Director of Transportation at the War Office. On his service at Longmoor DCM writes: "Brigadier Gardiner was one of the last of a now vanished brand of RE Officers who had had professional railway experience through secondment to the Indian Railways and he knew his job thoroughly. He had a eye for detail but in every way was fair and considerate to subordinates and always approachable. He was a keen communicator and made considerable effort at Longmoor to put its affairs "on the map" and to encourage publicity about the work there, particularly amongst visits by school parties. Another initiative he took early in 1947 was the revival of the RE Rifle Assoc and in the establishment of a Central RE Rifle Meeting held for some years at Longmoor. In all he encouraged a very happy relationship with his staff and it was always a pleasure to work under him."

His last appointment before retirement in 1953 was Director of Engineer Stores. For his military services he was made an OBE, later a CBE and appointed CB in 1954.

On retirement he became Managing Director of the Peruvian Corporation in Lima, Peru. Of his service there and on his retirement to Suffolk TRMS writes: "When I arrived in Lima in 1959 to take up post as Head of Chancery in the British Embassy it was to find Dick Gardiner and his charming wife Catherine the acknowledged leaders of the British community in the Peruvian capital.

It was not just because of the position he occupied — though Managing Director of the Peruvian Corporation was unquestionably head of one of the biggest British enterprises in South America — but also because Dick's personality and experience commanded great respect. Catherine's unfailing sense of humour provided a perfect counterpart.

As one of the leading railway engineers in the British Army, Dick had already risen to the top of his profession during the war, and his second career in charge of the Peruvian railway system presented great responsibilities and possibly an even greater challenge. At that time British influence

Brigadier Richard Gardiner CB CBE

in Peru was second only to that of the United States, and by reason of our historical association with the independence struggles of the 19th Century in some respects the links were closer: the Peruvian Navy looked only to the Royal Navy for inspiration.

The two separate railway systems of Peru — comprising the Central Railway from Lima to Huancayo, rising in a series of hairpins up the almost sheer sides of the Andes to become the highest main-line railway in the world; and the Southern Railway linking Arequipa with Puno and Cuzco — were scenically superb but the very devil to run, with ancient engine and rolling stock which could not be replaced because the Peruvian Government lacked foreign currency to purchase adequate spares, let alone engines and carriages. The Peruvian Corporation was not in consequence a highly profitable enterprise yet Dick kept the lines running with an efficiency which was almost miraculous and as Director General Dick's position called for great diplomatic qualities as well as managerial skills.

After retirement Dick and Catherine fell in love with a small medieval farmhouse on our property in Surrey and to our great joy became our tenants and neighbours for nearly 20 years. Dick's third career as County Councillor was no less typical of him. He took his responsibilities in local Government seriously and never found any difficulty in winning elections: his administrative skills found an outlet in running the Fire Services and representing his constituents on the Planning Committee.

After Catherine's death Dick remarried, his second wife Barbie having long been a friend of the family. They spent a number of happy years together in Norfolk, sharing a love of music, art and travel, and working for charitable foundations."

GWAN DCM TRMS

LIEUTENANT COLONEL J C MACKINDER OBE ERD

Born 12 December 1910, died 4 April 1990 aged 79

LIEUT COLONEL JAMES CHARLES MACKINDER, who has died aged 79 following a long battle against cancer, spent most of his professional career restoring the fabric of society following its destruction by others.

The culmination of a life in public service was his tenure, from 1959 to his early retirement in 1973, as City Engineer in Londonderry. It was typical of him that he ensured his engineers maintained services, throughout the City and despite the troubles, without regard for politics or sectarian bias. He will be forever associated with the city's bridges as he engineered the conversion of the old double deck road/rail bridge to all road use, as part of the Lecky Road improvement scheme. He was the catalyst for the "new" Foyle bridge and, with his team was responsible for its early planning. It was his one regret that, having left the Province in 1973 he was never able to visit to see the completed bridge.

Educated at Worksop College he started his professional career by being articled to the Borough Engineer of Rotherham. A keen sportsman, he played as wing three-quarter for Rotherham and Sheffield Tigers Rugby Union Clubs.

In 1936 he joined the supplementary reserve as a Subaltern in the Royal Engineers. He was one of the few officers commissioned by King Edward VIII to survive the war.

Mobilized on the outbreak of War he joined the 61st Division, RE, commanded by the legendary

Lieut Colonel J C Mackinder OBE ERD

Major General Carton de Wyart VC. In May 1940 he was posted to London District and given responsibility for a number of Heavy Anti Aircraft Batteries. One, on the Isle of Dogs, was destroyed by an early land-mine attack. In typical manner he assisted the RN Lieutenant Bomb Disposal Officer to defuse a second mine, which had failed to explode, and had the site fully operational within two days.

Swiftly promoted to Major he was made responsible for the maintenance of a number of Anti Aircraft Batteries in the North London District.

Mackinder landed in France in August 1944, initially with 12 Corps, subsequently 8 Corps. He moved with the British forces through France into Belgium where, based near Bruges, he was responsible for converting a disused munitions store at Zedleghem into a POW camp for 100,000 German troops.

In this project he showed great initiative in converting the light railway found there into a sewage transportation and disposal system.

From there he moved through Holland arriving in Hamburg shortly before the end of hostilities. On 1 May he was made responsible for restoring all roads, bridges and essential engineering works around Hamburg to good order.

Early in 1946 he joined the Ministry of Works, his first project was as Resident Engineer responsible for the construction of the Radio Chemical Centre in Amersham. Other projects, including the Rocket Research Establishment, followed.

Despite a heavy workload and a commitment to the Regular Reserve in 1950 he met and married Margaret, who with his two daughters, survive him.

In 1945 he was awarded the OBE, Military Division. This was followed in 1953 by the ERD, and in 1958 by a clasp to the award.

Retiring to Worcester he was elected to Hereford and Worcester County Council where he served on numerous committees until ill health forced him to full retirement.

PJJ

LIEUTENANT COLONEL C D JONES TD

Born 31 December 1939, died 26 April 1990 aged 50

CHRIS JONES was the Senior Petroleum Officer in the Royal Engineers Specialist Advisory Team when he died at home from a heart attack. He had returned on leave from America to train with 501, 502 and 503 STRE (Bulk Petroleum) (V) at Waterbeach over the previous weekend 21/22 April.

Having been commissioned into 197 Petroleum Company RAOC on 24 Jun 1966 he transferred to 501 STRE (BP) (V) in 1968 and commanded this team from 1974 until 1983, then served with RESAT for four years and took command of 503 STRE (BP) (V) until 1 Apr 1990 when he was promoted to Senior Petroleum Officer in RESAT.

Chris Jones will be well remembered, not just as a most competent and well qualified Petroleum Officer, but as a Commander with style. In RAF as well as Sapper Messes as far away as Bahrain and Masirah he was known for some years as 'Campari Jones' following his insistence that this commodity was stocked in their bars. Those of 501 STRE who camped with him in Cyprus, near the buffer zone West of Nicosia, will remember the fine figure of Major Jones in his light blue beret, standing on top

Lieutenant Colonel C D Jones TD

of his white land rover, apparently quite unconcerned at the time that live rounds were being discharged in his direction from a zealous Turkish observation post. He had cause to be proud since, only eight weeks after the invasion, he had personally succeeded in negotiating a scope of work for his team, who became the first TA Sappers to work for the United Nations in Cyprus.

He was an achiever who used his training in ESSO and Manchester Business School to excellent effect. He devoted himself to consolidating a UK Company, Kestrel Data Services, in order to open up in the USA in October 1983, from which time onwards he became the Group President and commuted to the United States for seven years burning the candle at both ends but without failing to meet his TA training commitments.

Chris Jones was a fine officer who made many friends and is sadly missed. He is survived by his wife Susan and children Victoria, Alastair and Edward who are living at the family home in Woldingham, Surrey. *LJA*

BRIGADIER STAIR STEWART CBE

Born 23 April 1904, died 1 May 1990 aged 86

BRIGADIER STAIR STEWART, who died on 1 May at the age of 86, was a brilliant innovator, for whom "Engineering is fun" was the basis of his absorbing hobby, and of his career. The Army made good use of his qualities, never more so than when they appointed him as Superintendent (Captain RE) of the Experimental Bridging Establishment, at Christchurch, at a critical period for military bridging (1936-1941). Due to ever increasing weights of armoured fighting vehicles, the Corps of Royal Engineers badly needed new rapidly erected bridges to meet the demands of fast-moving armoured warfare. On his small staff of military and civilian officers was Mr (later Sir Donald) Bailey, whom earlier he had helped interview as a candidate for the Establishment. When tests of a redesigned pre-war bridge at Cambridge proved it to be no longer adequate, Bailey sketched out on the back of an envelope his ideas for a *panel* bridge. This was to consist of welded high strength steel panels, to be carried by no more than six men, to be assembled end to end with pinned joints, to form girders each side of the roadway, carried on steel joists spanning between the girders; the whole assembly to be rolled out across the gap to be bridged. As soon as Stewart saw this sketch, he could see the great advantages in Bailey's idea, in speed and ease of construction, in portability, in adaptability, and in ease of manufacture. It was his task as Superintendent to *sell* the idea to the authorities. But even before it was authorized as an official project, in view of his sense of urgency, Stewart took the responsibility of setting an officer straight on to the design and calculations, under Donald Bailey. It was not long before the resources of the Establishment were put to work. The result was the very speedy development of what later was called the Bailey Bridge, so that the first bridge was manufactured and ready for trials within five months of the inception. The story of the success of this bridge is a matter of history, but it came to be acknowledged as one of the *War winners*.

Stewart's ingenuity was a by-word. He used to amuse his colleagues, when he would come into the office and announce "I've had an idea in my

Brigadier Stair Stewart CBE.

bath", usually brilliant but simple. For example, he had an idea to solve a complicated mechanical problem of how to launch a bridge on the *scissors* principle — a bridge folded in half like closed scissors, to be carried on a tank chassis; it was to open up like inverted scissors, the points of which were to rest on each bank of the gap. The scissors principle was not new, but the problem was to launch the bridge, and then for the tank to disengage, and cross over its own bridge, followed by others. Stewart proved his solution as practical by making a working model in his own private workshop. This model was sufficiently convincing to the authorities so that the *Scissors Assault Bridge* was approved for design and development. The prototype eventually had to be redesigned to fit on a more modern chassis, first the Covenanter, and then the Valentine, as the 34ft Tank Bridge No 1. The principle was later adopted in similar bridges in other armies, such as the United States.

In 1941 Major Stewart (as he then was) was sent to Fort Belvoir, the home of the US Corps of Engineers, where he did much to help them to learn from some of the British developments in bridging, and to develop their *Panel Bridge, Bailey Type*. For this work he was awarded the American Legion of Merit.

After the War, Stewart was Deputy Director of Fortifications and Works at the War Office (1950-1953); then Deputy Director of Works, Middle East Lane Forces (1953-1956). During this period he demonstrated his vision by organizing the installation of solar heating in military quarters being built in Cyprus, and the necessary experimental tests to prove the value of the system.

Later he became Director of Royal Engineer Equipment at the Ministry of Supply (1956-1959), responsible for controlling the developments at Christchurch, and for the ordering of military engineering equipment. By this time the Establishment at Christchurch (now Military Engineering Experimental Establishment) covered a wider range of developments than bridging, and included temporary roads and airfields, and construction plant.

After retirement, Brigadier Stewart became Director of the British Road Tar Association, and was involved in close liaison with the Road Research Laboratory, and the British Road Federation; he was on numerous committees concerned with road-making. However, he was able to keep up his hobby of practical engineering invention. Thus he developed and patented the lawn edge trimmer, which was successfully manufactured by Webbs; and the flickering lights now used as warning of hazards on roads. He also made a variety of toy models, such as an explosive battleship, which disintegrated, harmlessly, when it reached a certain point, or was *torpedoed*.

In his final retirement he took up clock repairing, mainly long case clocks, making new parts himself, if necessary. He kept meticulous records of some 250 clocks he repaired in eight years — free of charge, as his hobby.

Stair Agnew Stewart was the son of a brigadier general, and was educated at Winchester, and at the Royal Military Academy, Woolwich, where he won many prizes.

He was commissioned into the Corps of Royal Engineers in 1924. He was awarded the OBE in 1949, promoted to CBE in 1950. He was ADC to the Queen from 1957-1959.

Stair Stewart was a brilliant mathematician and engineer, extremely modest and quiet, but with a pleasant sense of humour. He was always ready to give credit to others, and to help them with ideas in a tactful manner. He was prepared to get his hands dirty in the workshop he set up, wherever he had a home; despite this he was invariably immaculately dressed. His sporting interests were cricket and tennis, and he was immensely proud of his wife when she was selected to play tennis for Hampshire.

His wife predeceased him, and he is survived by a daughter and two grandchildren.

HATJ-K

COLONEL E E PEEL BSc CEng FICE

Born 15 November 1919, died 6 July 1990 aged 70

EDWARD EMERY PEEL was born in Northumberland and after obtaining an engineering degree from Durham University, was commissioned in the Corps on 13 September 1941.

His first posting was to India, to the Royal Bengal Sappers and Miners at Kirkee, as a Company Officer. Soon afterwards he was given command of a Bomb Disposal Section in 352 Indian Bomb Disposal Company and served with them in Egypt and Palestine, their main task being mine clearance in the Western Desert. He then served in Italy with 510 Indian AW Company, and later commanded an Indian Field Company in Java and Sumatra. In Java he ran the PWD in Batavia, using hundreds of Japanese POWs, and proving very adaptable, as WGHB recalls, when he encountered him personally taking charge of a large rock crushing plant!

In 1946 he took command of 477 Bengal S&MAT Company, and was involved in operations against bandits in Central Burma. After a Long Civil Engineering Course he joined the Directorate of Engineer Services in the War Office, and in 1955 went to Engineer Branch Singapore as Chief Designer FARELF. Later on he returned to Aldershot to become one of the last Garrison Engineers during the take-over of the Works Services by MPBW. In the early 1960s he served in Aden during the operations there as CRE Deployment Camps. He was Chief Instructor Civil Engineering at the RSME from 1964 to 1967, and after two years with MPBW, returned to Chatham to his last appointment as Colonel Engineering, before retiring in 1972 to become Secretary of the Institution of Royal Engineers.

Eddy was a great sportsman, playing rugby for Northumberland and Durham in 1939, and for Kent in 1949. He was a scratch golfer and took part in Army Boxing, and his enthusiasm and example were a strong influence on YOs during his time at the RSME. He had a strong sense of humour which enlivened his instruction, and many will recall his (unprintable) story of the importance of theory and practice being taught together. Eddy was essentially an all-round Sapper, capable of going anywhere, tackling anything, and although most of his service involved civil engineering, he was a competent soldier with great powers of leadership, who could take his place in any sort of unit.

As Secretary of the Institution he sought to emphasize its independence and professional role, and to develop the links with other professional engineering bodies. The 100th anniversary of the Institution took place during his time, which was celebrated by a dinner at Chatham, attended by all surviving Presidents down to General Sir Philip Neame (1954-57) as well as representatives of the Royal Artillery and Royal Signals Institutions, and was a memorable occasion.

He married, in 1945, Brenda Fenwick. In their house at Chatham they were always welcoming and hospitable and her death four years ago was a source of great sadness to him. Their son Fenwick survives them.

JCW WGHB WFC MAN FJO

Colonel E E Peel CEng FICE

PROFESSOR F W SHOTTON MBE FRS

Born 8 October 1906, died 21 July 1990 aged 83

PROFESSOR FREDERICK WILLIAM SHOTTON MBE FRS, a distinguished Geological Adviser to the British Army between 1939 and 1970, died aged 83 on 21 July 1990. He was also an eminent academic geologist and in 1945 became a professor at Sheffield University. Four years later he moved to Birmingham University and became Head of their Geology Department, a position he held until 1974.

Fred Shotton was born at Exhall near Coventry on 8 October 1906, and was educated at Bablake School in Coventry. He was encouraged from an early age to develop his interests in natural history and so it was no surprise that he then went on to read Natural Sciences when he went up to Sidney Sussex College in Cambridge, where he obtained First Class Honours in Geology in 1927. He was a brilliant field geologist, renowned for his ability in geological mapping and elucidation of complex geological structures. Early in his career he became interested in the Pleistocene ("Ice Age") deposits of the Midlands, an interest which would be rewarded in 1956 with election as a Fellow of the Royal Society. He took up his first academic appointment at Birmingham University in 1929. Then in 1936 he moved to Cambridge University. Here he became a colleague and close friend of W B R King who was to become, for the majority of the Second World War, the senior military geologist to the British Army, by then holding the rank of Lieutenant Colonel having started his career as a military geologist with the rank of Lieutenant during the Great War in 1915; indeed he was the very first military geologist appointed as such in any army.

King had always envisaged Shotton as his assistant should war ever come, so in 1938 Fred joined the Army Officers Emergency Reserve to avoid classification in a reserved occupation as a civilian lecturer. Although war broke out in 1939, and Lieutenant Colonel King was immediately involved, it was not until May 1940 that Shotton was called up and commissioned into the Royal Engineers. Even then the War Office were not sure how to make use of this geologist. Basic training was undertaken at Colchester and Clapton. Then for a while he accompanied King for the ground investigation of anti-aircraft gun sites.

Shotton's active war service then entered two phases. First he took responsibility for all geological activities in North Africa and the Middle East, mainly dealing with provision of groundwater supplies and technical command of the sapper well drilling specialist teams. Shotton set sail for the Middle East in the spring of 1941, initially to be used in Middle East forces in Cairo under the Director of Works, Major General Tickell, and was appointed as a Captain (E&M) since there was still no established post for a geologist. The groundwater evaluation was conducted by geological analysis of the regional maps followed by test borings; indeed the success of the advance from El Alamein owed much to Shotton's careful hydrogeological studies which had pinpointed the exact positions for water wells which could yield at least 5000 gallons per hour.

In September 1943, now promoted to Major, Shotton was recalled to Britain as Geological Adviser on the Staff of the Chief Engineer (Major General Sir J D Inglis) at HQ 21 Army Group under the command of Field Marshal Montgomery. Initially he joined a team of three assembled

Professor F W Shotton MBE

specifically to assess the character of the Normandy invasion beaches prior to *Operation Overlord.* This work was largely undertaken from aerial photographs, but Fred told fascinating tales of his experiences undertaking personal recces from the co-pilot's seat of a low-flying plane, and the daring sorties by the Combined Operations Pilotage Parties (COPPs) to sample directly the favoured beaches. Geological advice was also sought concerning cross-country mobility along the line of advance towards the Rhine, locations for water supply, provision of bulk materials, especially stone, and the siting of airfields. For his contribution to this work, Fred was awarded the MBE (military), and three times Mentioned in Dispatches for his earlier service in the Middle East and North Africa.

Incidentally, Shotton's interest in French geology was not restricted to just terrain analysis and producing rock. Why were the Germans digging shafts 20ft wide at an angle of 45 degrees into the chalk quarries of the Pas de Calais and the limestone mines of the Calcaire Grossier near Paris? It turned out that these were V-weapon installations. Indeed, Shotton realised that historically some of the chalk quarries also had extensive underground workings (souterrains), such as at Wizerne near St Omer, and later it was discovered that these provided not only storage for the weapons but also refrigeration chambers for producing and storing the liquid oxygen and other fuel components, shelter for the German garrison, and hospital facilities. The specific question for Shotton now to answer was what was the nature and the thickness of the roof above the chalk workings? This information was then used by the RAF to set the time on the bomb fuses to permit them to penetrate to the depth of the mines and thus enable the weapon stores to be destroyed before launching could take place. The bombing raids were successful, much to Shotton's (and Londoners') satisfaction.

On demobilisation, Shotton took up the Sorby Chair of Geology at Sheffield University, but in 1949 he was appointed once again at Birmingham, this time as Head of the Geology Department where he stayed until retirement. Particularly important was his introduction of geophysics and hydrogeology into the curriculum, following his wartime experiences. In both subjects he instituted MSc courses which have developed a high international reputation.

While following his full professional life as a university academic, Fred Shotton retained his links with the Army and acted as the Geological Adviser to the Chief Scientist (Army) until the post was disbanded in 1970. This role is now fulfilled by the geologists in RESAT administered through CVHQ RE at Minley Manor. His last address to the Army was a talk entitled "Geology in the Second World War" which he delivered at Gibraltar Barracks following the Director of Engineer Services' Annual Geological Meeting of 5 December 1983.

His enthusiasm and widespread experience will be long remembered. *MSR*

COLONEL J F D SAVAGE DSO

Born 17 September 1908, died 16 August 1990 aged 81

JOHN SAVAGE came of a Sapper family, his father Colonel A J Savage DSO served in both the Boer and Great Wars. John was educated at Wellington, commissioned as a Royal Engineer in 1928 from the 'Shop', followed by a YO course at RSME and went up to Jesus College, Cambridge in 1930/31. He subsequently served in India with the Bengal Sappers and Miners. Whilst there he relaxed playing polo and trekking in the Himalayas, there too his wife-to-be first set eyes on him playing the double bass in the band at a Mess dance.

On the outbreak of War in 1939, he went to France with the BEF and was evacuated from Dunkirk. After a period at the War Office in AG7, he was posted to command 222 Field Company in 47 Division. 222 Field Company was transferred to 42 Armoured Division in 1943 when the Divisional Engineers were in the process of converting to 42 Assault Regiment, and shortly afterwards was appointed second-in-command. The newly formed Regiment moved to Suffolk, near the Orford Battle Area to train for its new role, and in the spring of 1944 John took over command, when the CO, Lieut Colonel R L Willott was appointed as CRE of 50 Infantry Division shortly before D-Day.

The 42 (East Lancs) Division was a proud TA Division, with a hard core of TA officers and men who had served together for a long time.

Incoming Regulars were not automatically made welcome, but John's orderly and thorough approach and his care for and interest in people rapidly won the respect and affection of all ranks.

42 Assault Regiment went to France after D-Day, arriving during July and August. John was wounded by a sniper whilst reconnoitring the Seine near Elbeuf, for a tank raft-crossing, and thus missed the Regiment's first battle, the capture of Le Havre. This was a classic Assault Engineer operation, involving the breaching of fixed defences, for which he had trained the Regiment, and his steady presence was sorely missed.

During the autumn and winter of 1944/45 the Squadrons of 42 Assault Regiment operated independently with almost every Division in 21st Army Group during the widening of the Arnhem Corridor and the clearing of the Rhineland. John's administrative skill was fully tested in providing equipment and other back-up for these scattered active operations. In March 1945, 42 Assault Regiment came together again for the Rhine Crossing, constructing Class 50/60 rafts which ferried 250 tanks across before the Class 40 Bridge opened. The Squadrons were then deployed again with individual divisions, leading the advance towards Bremen and Hamburg.

After VE day 42 Assault Regiment reformed under John's command to return to the UK *en route* for the Far East. That morale remained so high when so many others were being demobilised is a very great tribute to John and his leadership of the Regiment. In the event the Regiment returned to Germany where it lives on as 32 Armoured Engineer Regiment. John left in 1947. He was first posted to the SME as an instructor, then took command of the Fortress Engineers in Gibraltar. He was subsequently CRE of the Sussex and Surrey District, and in 1954 commanded the 27 Engineer Group TA from the Duke of York's Headquarters. His final posting in 1955 was to E2

Colonel JFD Savage DSO

at the War Office until his retirement in 1958 after 30 years' service.

He was then appointed personnel manager for Fisons in Suffolk and held the post for 12 years. Here he and his wife Joy, sailed their little boat in the estuaries around the coast for quiet enjoyment. After his final retirement he settled in Waldringfield. An active churchman, when he was no longer able to play the cello, he sang madrigals with the choir and concerned himself effectively with family and local affairs. His packed funeral service in the village church was eloquent testimony to the affection John had earned as family man, soldier and neighbour. There are many old gentlemen once soldiers who have lost a very special friend. Our hearts go out to his widow, children and grandchildren.

EJA JCW and others

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 Sir Edward Caffyn KBE CB TD who died aged 86 on 17 June, was Chairman, and from 1981, President, of Caffyns, the garage and motor dealing firm based in Sussex and Kent. Born on 27 May 1904, he was commissioned into the Royal Engineers (TA) in 1930. He served in 51st Highland Division in France in 1940 and was promoted to Brigadier in 1941. He became a Deputy Director in the War Office in 1942 and was involved in sponsoring the formation of the new Corps of Royal Electrical and Mechanical Engineers, serving subsequently as Director of Mechanical Engineering on Field Marshal Montgomery's staff until 1945, when he returned to the family business. After the war Brigadier Caffyn maintained close links with the Territorial Army and with public life in Sussex.

Brigadier Ralph Bagnold OBE FRS who founded the Long Range Desert Group and commanded it for the first year of its existence died aged 94 on 28 May 1990. Bagnold was born on 3 April 1896 and was commissioned into the Royal Engineers in 1915. He fought at the Somme, Ypres and Passchendaele and after the War transferred to the Royal Signals in 1920. Bagnold retired from the Army in 1935 and initiated scientific research at Imperial College, London into the physics of sand movement. He rejoined the Army in 1939 and served mainly in the Middle East until he was released from the Army in 1944. He was subsequently elected a Fellow of the Royal Society and continued to carry out scientific research, both at Shell and at Imperial College. He was awarded the Telford prize by the Institution of Civil Engineers for his work on shock pressures exerted by sea waves on ships and breakwaters. His wife died last year; he leaves a son and a daughter.

Colonel A H Earley CBE died on 16 July 1990 aged 82. He was commissioned into the Royal Engineers in 1939 and served in the Middle East where from 1941 he held a number of senior movement and transportation staff appointments; he was mentioned in despatches and appointed OBE, Earley then became director of movements Paiforce (Persia and Iraq Command) and was responsible for the successful transportation of military supplies to Russia through Persia for which he was awarded the Order of Kutuzov by the Soviet Government. He was subsequently responsible for the reopening of the ports of Venice and Trieste and was instrumental in the restoration of railway communications to Austria and Yugoslavia.

In December 1961 Earley was given the position in Dar es Salaam of assistant general manager of East African Railways in Tanzania. Whilst holding that post he was appointed CBE.

He is survived by his wife Rosemary and one daughter.

Correspondence

THE INSTITUTION
THE CORE BUSINESS

From Colonel P J Russell-Jones OBE

Sir, – In his educative article on *The Institution* in the December 1989 *Journal*, Colonel Napier reminded us of the excellent photographic collection in the Corps Library, and what a marvellous legacy our forebears had left us. His reminder set me wondering whether we are doing enough for our successors in providing a record using the best technology available to us today. The video camera is our equivalent of their box cameras at the turn of the century, and a well indexed video collection of key Corps events, including operations, projects, exercises and equipments (and even key personalities) would seem likely to be of inestimable interest and value in years to come.

Could I use your columns to propose that such a collection be set up?

Whilst on the subject of articles on the Institution could I just add that although I thoroughly enjoyed the provocative comments of Lieut Colonel Ayling (*The Core Business*, April 1990 *Journal*), I fear he dismisses the problems of overcoming both the lack of funds and the bureaucracy too easily. I have just spent two years fighting hard to get a simple cheap fax machine for my Regiment with a total lack of success! — Yours faithfully, John Russell-Jones, *23 Engineer Regiment, BFPO 36.*

FIFTY YEARS AGO

From D J O FitzGerald

Sir, – I hope John Woollett (whom I last met in August 1940 when I was posted from 23 Field Company to East Africa Force Headquarters) won't mind my adding a tail-piece to his account of that unit's activities in May/June 1940.

I attended the 'O' Group during which our OC Colin Browning fell asleep. So, simultaneously, did another of the 'O' Group, and their heads met with a thump as they slumped across the table round which we were sitting.

In the intervening years, until I myself came to command 4 Field Squadron, 7 Armd Div Engineers (the shiny Fourth) in North Africa, Italy and for the invasion of Europe, I served many masters, including three other field company commanders. None taught me more, nor gave me more memorable experiences than Colin Browning. Not only of the craft of commanding a section. Colin was a french wine 'buff', and knowledgeable about good restaurants in Lille and Douai, and he taught me almost all I know about the appreciation of french wine and food.

Finally, Colin and Sapper Stacey had something in common. They both hailed from Devon. The OC had a very soft spot for the old reprobate. Otherwise why would Stacey have been in that wheelbarrow at all, and not long since posted to 2nd Echelon? – Yours truly, D J O FitzGerald, *Consulting Civil Engineer, P O Box 30181, Nairobi, Kenya.*

CODE OF CONDUCT

From Lieut Colonel G E P Mulhern OBE

Sir, – I have long been impressed by an extract from a letter of John Paul Jones to the Naval Committee of Congress dated 14 September 1776, and which became the preamble for the *Article of War* of the US Navy.

This refers to his code of conduct for Naval Officers which, to my mind, would apply perfectly to officers of all armed services and indeed all those in authority over others, notwithstanding its pre-Victorian flavour.

The following is a copy of this extract, verbatim except that, as it might apply to ourselves, I have substituted "Officer of the Navy should be a capable Mariner" by "Officer of the Royal Engineers should be a capable Sapper" etc.

"SAPPER OFFICERS —
SUGGESTED CODE OF CONDUCT

It is by no means enough that an Officer of the Royal Engineers should be a capable Sapper; he must be that of course, and also a good deal more.

He should be as well, a gentleman of liberal education, refined manners, punctilious courtesy, and nicest sense of personal honour.

Coming now to view the Sapper Officer in operations or training and in relation to those under his Command, he should be the soul of tact, patience, justice, firmness and charity.

No meritorious act of a subordinate should escape his attention or left to pass without its reward, even if the reward be only one of approval. Conversely, he should not be blind to a single fault in any subordinate, though at the same time he should be quick and unfailing to distinguish error from malice, thoughtlessness from incompetency, and well meant shortcomings from heedless or stupid blunder.

As he should be universal and impartial in his rewards and approval or merit, so should he be judicial and unbending in his punishment or reproof of misconduct.

In his intercourse with subordinates he should ever maintain the attitude of the Commander, but that need by no means prevent him from the amenities of cordiality or the cultivation of good cheer within the proper limits. Every Commanding Officer should hold with subordinates

such relations as will make them constantly anxious to sit at his table and his bearing towards them should be such as to encourage them to express their opinions to him with freedom without reserve."

John Paul Jones, who commanded various ships of the Colonists during the American War of Independence, was only 20 years of age at this time. He died in 1792 aged 45.

— Yours faithfully, G Mulhern, *'Daleside', 5 Yew Tree Court, Gresford, Wrexham, LL12 8ET.*

Professional and Vocational Qualifications

From Captain S R Arnold

Sir, — For as long as I can remember, the matter of professional qualifications has featured in the correspondence to the *Journal*. I seem to recall that on one occasion, the President was prompted to write the note "Gentlemen, correspondence on this subject will now cease". One thing is sure, the correspondence indicates that there is dissatisfaction with the current situation amongst members of the Institution. We are not alone in questioning the whole matter of professional and vocational qualifications. In recent years, the government established the National Council for Vocational Qualifications (NCVQ) and they have been active in establishing a national system for the recognition of the competence of people in employment.

In 1989 NCVQ moved into the area of Professional, Technical and Managerial staff. For the Construction Industry, the Construction Industry Standing Conference (CISC) was set up. This body has awarded a contract to Mid Kent College to undertake the task of mapping all occupations in the industry and this will be followed by further work to establish individual competencies required by professional people in their work.

This does not clash with the requirements of the institutions who continue to assess professionalism. Whilst many criteria will overlap, the award of the letters MICE does not necessarily relate to a person's ability to perform the task of being a site manager. Vocational Qualifications will be just that; measures of ability to do a job at the work place.

Every Professional Institution is having to look at its own qualifications in the light of the development of NVQs. Perhaps it is also now appropriate that the Institution of Royal Engineers should look to the system of recognition which has been the cause of so much comment. It can be said that at long last, the civil engineer is going to have to face the same system that the Corps has used for years. Having the qualification psc is nothing to do with being a member of the Institution. It is a vocational qualification which recognizes a person's competence as a soldier.

Having transferred to the reserve some 25 years ago, I have often felt that I would like to have some recognition of being a professional Royal Engineer. I agree with Colonel Whitaker that it would mean a lot to be able to say with pride that I am still albeit retired, a member of the Institution. It could be argued that I am still entitled to make everyday use of my rank of Captain. I regret that this conflicts with the reality of the commercial world which frowns on the use of rank when active service has ended. Whatever the rights and wrongs of that situation, it is the world in which we have to survive in a commercial sense.

I am proud of my 12 years of active service and still being a Royal Engineer, I am proud of being a member of the Institution. Whether one says CRE or MIRE does not matter but some form of acknowledgement would be valued. —Yours sincerely, Stephen R Arnold, *CTA Svcs Ltd, 11/12 Devizes Rd, Swindon, Wilts, SN1 4BH.*

Status of the Corps

From Major D W Taylor

Sir, — As a PQE I naturally take great interest in the discussions concerning the status of the Corps, its role, aims, directions, self-esteem and interest in post-nominal letters, since these are the very essence of the Q in PQE.

The Corps is held in high esteem by the MOD, of that there is little doubt. The concern is really that this could have been questioned. A century ago, the Corps (or rather its members) were leading innovators. In company with the great civilian Engineers they were reshaping the globe, and at the same time they were reshaping battlefields. As a sideline, the Corps also turned out some first class Generals, and more than its fair share of Field Marshals.

What has changed? One must discount the incidentals such as internal combustion engines and nuclear weapons: we ought to seek deeper philosophical changes.

It is insufficient to note that too much has been hived off, either to other hat badges or to civilian agencies and contractors. (And anyway the political climate indicates that rather more of the latter is just over the horizon.) It is untrue to suggest that all would be well if our Voice Procedure was as slick as the Cavalry's.

What has changed is that Britain is now a post-colonial, post-industrialised nation. What has not changed is that Military Engineering (like Civil Engineering) is a relatively low technology discipline.

The Russians have always treated construction battalions as the lowest of the low; only during the Industrial Revolutions of Western Europe and America did the

Engineer tower up from his artisan origins as a demigod. What is surprising is that in Britain, as in America, the two oldest engineering disciplines have yet to fall back to their natural level, as regrettably they have in other parts of Europe. What value the Engineer who "can do for sixpence what any fool can do for a shilling" when the Taiwanese offer a better service for tuppence?

It is a source of sadness to see the well-meaning prostitution of our past, as a sort of knee-jerk rearguard action: the final phase of the retreat from Empire. Endless self-examination will never restore the Corps to its former glory because the rules have been changed: We lost Works over 30 years ago, so have no outlet for the methodical; we lost the Empire a bit earlier (at least on weighted average) so have no outlet for the pioneering; we opted out of new technologies all through the century so have no outlet for the inventive (again the parallel with Civil engineers rejecting novel disciplines is compelling, although their fate as just one of a dozen institutions is worse than ours as just one of half-a-dozen engineering organizations in the Armed Forces).

Should the remaining rump of Army Officers who happen to be Royal Engineers expect any more than a declining status? Is there any value in pursuing an enhanced status for a bunch of chaps who are in any case far more concerned about staff posts and the Pink List? To both the answer must be sadly, No: We have a glorious history, but all that matters now is setting questionable world Records for the bridging of gaps that Stone Age man had conquered.

Now is probably as good a time as any for bringing the Institution into line with the Army of the Twenty-First century, since the post-cold War reduced ORBAT is now being established.

- Concentrate purely on the "Learned Society" role: Meetings and a Journal.
- Make membership voluntary: an adjunct to military engineering not a part of it, and an irrelevance to most aspiring CDSs.
- Draw back the lost talent into the Institution – from REME, Royal Signals, RAF engineers of all sorts, naval minewarfare, engineers and constructors, and (critically) the civilians now engaged in all types of military engineering. This broad kirk of marginally overlapping disciplines just might rekindle some animated and stimulating discussions despite the dead hand of creeping specialisations.
- Keep easy membership rules eg first degree and relevant employment OR proven ability (the Engineering Council for civilian engineers requires both).
- Forget post-nominal letters – leave them to the related civilian organizations – with the exception of MIRE for those who wish to emphasize that they subscribe. – D W Taylor, Major OC.

65 Corps Support Squadron RE, BFPO 31.

To S, or not to S

From Lieut Colonel Edward Wall

Sir, – To S, or not to S: that is the question:
Whether 'tis nobler in the mind to suffer
The slings and arrows of outrageous spelling,
Or to take arms against a sea of ss,
And by opposing end them? To win, to S
No more; and, by no S to say we end
The heart-ache and a thousand natural shocks
That flesh is heir to, 'tis a consummation
Devoutly to be wish'd. No S, to see
No S: perchance to dream: ay, there's the rub
For in that death of S what dreams may come
When we have shuffled off the active list,
Must give us pause. There's the respect
That makes calamity of faulty speech;
For who would bear the whips and scorns of youth
The spelling wrong, the proud man's accuracy,
The pangs of dispriz'd speech, the law's delay,
The insolence of office, and the spurns
That patient merit of correctness earns,
When he himself might his improvement make
With just no S...

With apologies to WS

Royal Engineers in the plural – yes. Royal Engineer's or Royal Engineers' but please not Royal Engineers as an adjective! Those with ambition to be Generals, should note that the paragraph in an operation order which gives them their instructions is headed Engineer or Engr, not Engrs! It may be debatable whether the *Journal* is correctly named, the Museum is certainly not. Nor are many public signboards correct; examples of a redundant S are seen all too often.

Could all Royal Engineer officers and men be encouraged to omit the S themselves and stamp on its misuse by others. – Yours sincerely, Edward Wall, *19 Park Avenue, Camberley, Surrey, GU15 2NG.*

Operation Freshman, The Rjukan Heavy Water Raid 1942 Book Review – September 1986

From Richard Wiggan Esq

Sir, – I wonder if I may call on your readers for help in another "mission". I am the author of *Operation Freshman*, The Rjukan Heavy Water Raid 1942, published in 1986 but now out of print.

Some months ago, I was contacted by a lady anxious to obtain a copy, but was unable to help. I was especially sorry as she was well versed in *Freshman*, and the name

of Lieut A C Allen was mentioned.

Later, I found I could help her, but had not got her address. If she is still seeking, I would be pleased if she would contact me at the address on this letter. Failing that, perhaps any reader who is aware of her quest could put her in touch. I would be most grateful. The book has created a lot of interest and has also been published in Norwegian (Fredhois Forlag). — Richard Wiggan, *14 Sydney Ave, Whalley, Blackburn, Lancs BB6 9TF.*

Presentation of Colours to the Bombay Sappers

From John Gaylor

Sir, — I greatly enjoy reading the *Journal* although I am not a Sapper and I was particularly interested to read in the August copy the report by Major General E M Hall on the presentation of colours to the Bombay Sappers.

However, the pipers and band which augmented the Group Band were not from The Sikh Regiment but from the Sikh Light Infantry. The Sikh Regiment normally enlists Jat Sikhs who wear the scarlet pagri. During the Second World War, when manpower was short, it was decided that we should once again recruit other Sikhs, not acceptable to the then 11th Sikh Regiment. These were known as Mazhbi and Ramdasia Sikhs and that was their first title. Not surprisingly, the Commander-in-Chief, Sir Claude Auchinleck commented adversely on its length. In the nature of armies, priorities were adjusted to find a new name and a committee arrived at The Sikh Light Infantry. This type of Sikh had previously been accepted by the old Sikh Pioneers who were disbanded in 1933 and it was decided that the new regiment should continue the traditions and honours of the Sikh Pioneers.

Looking for a distinctive pagri, they looked at the Sikh Pioneers' colours which were red, blue and old gold. The red had already been appropriated by the 11th Sikhs, the blue did not find much favour which left only the old gold so they chose that. To the untrained, lay eye, it looks remarkably like orange — or saffron — but that is old gold and that's why they wear it. I was at Fatehgarh, their regimental centre a few years ago and they are a very impressive regiment. Although formed only in 1941, they have taken precedence immediately after The Sikh Regiment on the basis of the dates of raising of the Sikh Pioneers. Three battalions were raised during the War but only one of them served in a theatre of war. They were recommended for retention in the post-war Indian Army and currently have some fifteen regular battalions. — Sincerely, John Gaylor, *30 Edgeborough Way, Bromley, Kent BR1 2UA.*

Military Planning for the Defense of the United Kingdom, 1814-1870

From Sir Alan Harris

Sir, — I can add something to WGHB's review of "Military Planning for the Defense of the UK 1814-1870" by Partridge. (Aug 90).

I am a native of Plymouth, a town surrounded to seaward and to landward by a ring of powerful forts, including one on the breakwater in the Sound.

Family gossip has it that a Military Magnate inspected the landward line and asked, "Where is your water supply?" "Burrator" was the answer. "Where's that?" "On Dartmoor, ten miles away." "Then these forts are useless."

Too true. — Yours sincerely, Alan Harris, *128 Ashley Gardens, Thirleby Road, London, SW1P 1HL.*

Reviews

CALLED TO ACCOUNT QUANTITY SURVEYING 1936-1986

James Nisbet

Published by Stoke Publications, c/o 141 Drury Lane, London, WC2B 5UD — Price £5.00
ISBN 0-9514725-0-X

Quantity Surveying has not been well served by the historian. Little has been published about the origins and development of the profession so we must be grateful to James Nisbet for his book which chronicles the period from 1936 to 1986 — years during which quantity surveying developed and expanded to an extent unknown since the early years of the 19th century. It is interesting to reflect that both periods of development came from the need for more effective accountability of public expenditure during and after major wars.

Dr Nisbet who served in the Royal Engineers during World War Two (an instructor at 140 OCTU and at the SME Middle East) is a Past President of the Quantity Surveyors Division of the Royal Institution of Chartered Surveyors and a practitioner of wide experience in both the public and private sectors (he was Chief Quantity Surveyor at the War Office from 1959 to 1962). His enquiring mind and his persistent search for better and more efficient ways of working eventually bore fruit. The quantity surveyor moved from being a measurer and valuer of quantities to today's all-round

consultant in matters of construction, procurement, finance and contract. However, like all innovators Nisbet suffered from the dead hand of those who wished only to maintain the status quo and he had to fight long and hard to achieve results. In his book Dr Nisbet chronicles the development of cost limits, cost research, cost analysis, cost planning and the advances in education and training and sets out clearly why and how the operations and techniques, looked upon today as run-of-the-mill, came about. Interwoven into the narrative are biographical extracts which provide the reader with additional interest.

In the final chapters Dr Nisbet reviews the changing status of the quantity surveyor over the years and looks to the future development of the profession.

Called to Account is an attractively produced soft back publication full of interest and information – and priced attractively too. I can recommend it without hesitation to all those who seek to learn how and why the techniques of today came to be an essential part of the quantity surveyor's armoury. With the disappearance of the QSRE I can recommend it too to those involved in military construction projects for which private consulting quantity surveyors have been appointed or for which design and build contracts are used.

It is to be hoped that Dr Nisbet will now turn his penetrating mind to the 18th and 19th centuries and produce a fuller history of the profession during that period than has been possible before. PDH

COMBAT FROGMEN

MICHAEL WELHAM

Published by Patrick Stephens Ltd, Wellingborough, Northants, NN8 2RQ – Price £16.95 net, hardback
ISBN 1-85260-217-1

Combat Frogman is an illustrated history of military diving from the nineteenth century to the present day. The book is written by Michael G Welham, who served with the Royal Marines and the SBS and has a foreword by Paddy Ashdown MP, a somewhat more famous ex Royal Marine and Swimmer Canoeist.

The book is published in small *coffee table* format and has been well researched. The photographic coverage of the written material is generous, enabling the book to be *browsed* in a short period of time. Given the author's background, *Combat Frogmen* concentrates on the Special Forces side of diving. For the general reader this makes more interesting reading than a detailed history of engineer underwater cutting tools, for example!

The book starts off logically, from the origins of military diving, where the Sappers feature strongly, through to the development of Special Forces diving in World War Two. It then jumps about from topic to topic ending with the use and possible use of mammals and robots. The emphasis is on training, and Royal Engineer divers in particular will doubtless be interested in the descriptions of diver training from many of the world's maritime nations. The descriptive narrative is well-spiced with anecdote and detail from operations throughout the world, although the military historian may find these stories somewhat thin on depth and analysis.

This is an interesting book both for the trained diver and uninitiated alike. An ideal book to dip into and scan and classic material for the waiting room at *HMS Vernon*. RM CM

MEDITERRANEAN SAFARI
MARCH 1943 — OCTOBER 1944
A P DE T (TONY) DANIELL OBE MC TD

Published by Buckland Publications, 125 High Holborn, London WC1V 6QA – Price £9.95
(See special offer August Supplement *page 91)*
ISBN 0 7212 0816 9

THIS book is an account of the exploits of 59 Field Company in the North African and Italian campaigns from their arrival in Algiers on 23 March 1943 until they reached Rimini on the east coast of Italy in October 1944. It is told by Tony Daniell who was their OC throughout this period.

The Company was part of 4th (British) Divisional Engineers and played a prominent part in all the major actions in which their Division was involved. Their baptism of fire was at Hunt's Gap near Beja, and this was followed by the final battle for Tunis and the subsequent mopping up operations. There then followed eight months of arduous training and preparation in North Africa and Egypt after which they moved with the Division to Italy where they arrived on 21 February 1944.

The work of 59 Fd Coy in the ensuing eight months is a microcosm of all that went on in that remarkable Italian campaign in which the sappers played such a dominant role. The terrain, weather and brilliant defensive tactics of the enemy ensured that very little could happen without engineer support: sometimes this support, as in the set piece attack across the Rapido, would involve enormous resources; at other times, such as when mine clearing in advance of a squadron of tanks, it would involve a corporal and a few sappers.

The crossing of the Rapido in the final battle for Cassino was nearly a disaster. None of the three Bailey

bridges planned on the 4th Division front for the first night of the assault succeeded, due to the tenacity of the Germans. Therefore the CRE decided to put all three Field Companies to work in rotation on Amazon bridge to force it through. This was successful by the end of the second night, enabling the tanks to cross into the tiny bridgehead and the Division to move forward. 59 Field Company suffered surprisingly few casualties in this desperate bridging operation but, according to official records, 15 sappers were killed and 57 wounded in the three companies involved.

The subsequent pursuit to Florence and then to the Lombardy Plain is the story of mine clearing, diversions and the bridge building, and is full of interest and action.

Tony Daniell tells his story in a refreshingly clear style with a nice sense of humour, but it is far too modestly understated and therefore few of the emotions he and his men were undoubtedly experiencing are exposed. He had a remarkably strong team by any standards but there must have been more tensions, errors and aggravations than he seems prepared to reveal. Therefore he presents the reader with an almost romantic view of war. There is emphasis, for example, on the movingly beautiful tea party with the English lady on the way to Florence whereas the brutality of the Rapido crossing is glossed over by the matter of fact style; the Cuneo painting, reproduced on the dust jacket, tells us more of the grim reality than the author.

This book will be of particular interest to those who served in Italy; there were 55 divisional field companies and over 100 other sapper units in the order of battle and so there should be plenty of them still around. It will bring back memories of their own exploits. They may also find it amusing to be reminded of, for example, the long forgotten sapper eccentricity of dividing companies into sections and sub-sections, of the dingo and the PU and of the sapper personalities involved.

It should be on the compulsory reading list for all young officers. In spite of its understatement it conveys the feel of a field unit in action – the variety of sapper tasks, the continual need at all levels for improvisation and initiative, the importance of training and fitness. Although the scale of the campaigns is not likely to be met again, the lessons for a smaller Falklands-type war would be entirely relevant.

It should be of interest to historians. They might find it worrying that the author waited over 45 years before going public; not many of us can remember details of what went on even ten years ago. However he has assembled a remarkable collection of reports written at the time and he has used his own notes, letters and diaries; the result should be historically reliable.

There are no photographs but the book is delightfully illustrated by the author and by Peter Boston who was one of his section commanders. The placing of the sketch maps is mildly irritating in that they are sometimes far from the relevant text. CPdeBJ

GUARDIANS OF THE HUMBER

The Humber Defences 1856-1956

JEFFREY E DORMAN

Published by Humberside Leisure Services –Price £6 (£6.65 by post from County Museums Officer, Central Library, Albion Street, Hull, HU1 3TF, cheques to Humberside County Council)
ISBN 0-904451-44-5

THIS is No 16 in the Humberside Heritage Series published by Humberside Leisure Services. Compact (115 pages A5), detailed and comprehensive it should suit the expert and the casual enquirer alike. There is plenty of detail but not to the detriment of readability.

Part I is a general historical review from 1300 which includes some interesting anecdotes, for example recalling the German He.115 floatplanes that landed on the estuary in World War Two to lay mines, with some effect. Part II is a detailed account of each of the battery sites. Some useful appendixes make up Part III.

There is plenty for the Sapper: description of site construction, mention of submarine mining though the detail here is tantalizingly thin, and the part played by searchlights. Anyone who enjoyed the article *How the Humber was Closed* (*Journal* December 1989) will appreciate the context from this book. 38 photos and 20 clear drawings enhance the book which is good value. GWAN

FALKLANDS AFTERMATH

Picking Up The Pieces

MAJOR GENERAL EDWARD FURSDON CB MBE DLITT

Published by Leo Cooper Ltd, Michelin House, 81 Fulham Road, London SW3 6RB – Price £12.95
ISBN 0-85052-205-6

This review was first published in the Royal Marines' January/February 1990 issue of The Globe & Laurel, *and is reprinted here with the Editor's kind permission.*

THE Falklands War will always have a special place in Royal Marines history. Those who took part in that conflict cannot fail to remember the devastation that met them as they entered Stanley. The sight of the defeated Argentine Army struggling with its own destiny

on the ruined airfield; the lack of water, sewerage, electricity or even peat to cut for fuel because of the threat of mines; the joy of the local population at being saved from the Argentine invasion tinged with sorrow at the wreckage that was once their unspoilt island.

The author picks up the story from that moment on, although it was clear that the islands would never be the same again and the Islanders would be living with 'the Aftermath' for many years to come. His subject is the unglamorous but essential task that faced British Forces of returning the Islands to some degree of normality. The author, then Defence Correspondent for the *Daily Telegraph*, was one of the first reporters to arrive at the end of the war. Sir Rex Hunt comments in the book that he was sorry that General Fursdon was not with the Task Force when it sailed – I am sure he was not as sorry as the General. There is no doubt that had he been with the Force he could have added most constructively to the press contribution.

Falklands Aftermath is a personal story of one man's experiences as he moved round the Islands, including a superb description of the activity that took place in the rugged terrain of South Georgia.

The story unfolds, in considerable detail and in travel book style, of the struggle the British Forces had against the weather, lack of equipment and time. The particular problems of the mines and the airfield are given very full coverage and the equipment used and found is catalogued with great precision. The soldiers involved in this chapter of the Falklands Story are given credit as the unsung heroes of the non-combatant part of the campaign; the book is about them, the Islanders and how they reacted to the problems of the time.

I am sure that all who were there during this intense period after the war will be greatly indebted to the author for the effort that has gone into producing such an illustrative account. The detailed nature of his work and the way he intersperses the story with his original dispatches makes it more of a reference book than an easy bedtime read. However I can recommend it for all who are interested in this period, because in many ways, it is the final chapter in a very 'Royal' story. RM

SPLENDOURS OF THE RAJ

PHILIP DAVIES

Published in 1987 by Penguin Books Ltd, 27 Wrights Lane, Harmondsworth, Middlesex, W8 5TZ – Price £8.95
ISBN 0-14-009247-1

PHILIP Davies describes in this well-illustrated book the evolution of "imperial" architecture in the Indian Continent from 1660 to 1947. The story spans three centuries from the era of mud brick and bamboo to the stone and marble masterpieces of Lutyens and Baker: to anyone interested in the history of the British Raj it is an enthralling record. To Sappers it conveys a special message, since of the fifty-six architects noted in the book, twenty-five names are those of Royal Engineers.

There now survives but a dwindling band of Royal Engineer officers who, in their youth, were taught the rudiments of architecture, to fit them for employment in the Works Services. To many, architecture became a fascinating subject, illuminated by vivid pronouncements from the rostrum such as: "I implore you, gentlemen, do not make the soil pipe the most prominent feature of your front elevations."

If later some of these young officers had opportunities to practise their art, their achievements, though satisfying, were minute compared to the architectural gems recorded in this book.

But whence came the young builders of previous centuries who confidently embarked on the construction of cathedrals, palaces for provincial governors, government offices, town halls and countless other buildings?

In the early days, some we must admit, were "gunners" of the East India Company; others were young adventurers claiming some knowledge of the trade, who then were followed by military engineers with minimum qualifications. Then came the young officers well-trained at Addiscombe, and these were followed by Royal Engineers who, in that company, could be rated as experts, until they gave place to the professional architects of the Lutyens era.

The roll call of that talented band of twenty-five Sappers listed in this book includes Captain James Caldwell (St George's Cathedral and St Andrew's Kirk, Madras), Lieutenant Colonel Richard Sankey (Public Offices and Civic buildings, Bangalore), Captain John Hawkins, (the Bombay Mint), Lieutenant Colonel T A Cowper (The Town Hall, Bombay), Captain Charles Wyatt (Government House, Calcutta), Captain W N Forbes (St Paul's Cathedral, Calcutta), and finally Sir Samuel Swinton Jacob of the PWD (Victoria Memorial Hall, Peshawar, St Stephen's College, Delhi, State Bank of Madras, Gorton Castle Simla, Lallgarh Palace, Bikaner, and many buildings in Jaipur). He was a great uncle of Sir Ian Jacob.

Of special interest to those in the Corps who retain happy memories of their years in India, and view the British Raj as a proud achievement, will be Philip Davies' Prologue, entitled "Imperial Myths". In it he searches for links between the architecture about to be described and the ethos of the British Imperialists. It contains some provocative statements about the Raj,

and those of us who enthusiastically served its purposes over many years must choose which of his verdicts to adopt. Was the conclusion of Empire "the logical culmination of generations of effort" or should the event be ascribed to "emasculation and loss of greatness"? And are there indeed those, perhaps among the younger generation, who now regard the British Raj as "some sort of dated music-hall joke"?

If, reading this entertaining book and pondering on these controversies, a Sapper occasionally feels disconcerted, he will be consoled by the paragraph which reads "The work of British Military Engineers is one of the most enduring legacies of Empire".

And so say all of us. CLR

THE POSTIES WENT TO WAR

based on the Journal of
MAJOR IAN WINFIELD RE(PCS)

Published by Square One Publications, Saga House, Sansome Place, Worcester WR1 1UA – Price £5.95
ISBN 1-872017-26-6

THIS is the story of the Postal & Courier Service in the Falklands War, based on the diary kept by Ian Winfield, their OC, surely the oldest person, at age 53, to have participated in that campaign (and he had had a heart operation four years previously). It is a fascinating story, too, of how the mail gets through, and contains such nuggets as how one of the mail-drops to a ship south of Ascension Island went astray and was eventually delivered, late but dry, having been washed up in its container in Brazil some six weeks later!

The Postal & Courier Service is a comparatively little known part of our Corps and Ian Winfield gives us a much needed insight into what they do, though it is a pity he doesn't really tell us more about how they physically move such huge piles of mail, often several tons of letters at a time, with only two or three people in his team. They are obviously very fit! He also gives us some idea of the fog and confusion of war, with plenty of the "Hurry up and wait" routine so often experienced in all wartime zones.

Every Sapper officer should read this slim volume with its humour, its frustration and its professionalism shining through. It is a pity, though, that the publisher has reproduced the photographs so badly – spoiling the ship for a ha'porth of tar. The Posties (as they evidently like being called), are often taken for granted – that is, until the letters are held up for a time and then, after arrival and swift distribution, people, of all three Services, really appreciate their worth.

For their size, the Army's Postal Service must be the most efficient and cost effective part of our Armed Forces: in fact, they are the only part which actually makes money, through the sale of postal orders, First-day Covers and so on. Furthermore, there is no Exercise or Operation throughout the world where the Posties do not deliver the mail. They are truly 'Ubique'. GLC

THE STARS STILL SHINE

EVELYN HART

Published by Random Century Group, 20 Vauxhall Bridge Road, London, SW1V 2SA – Price £13.99
ISBN 0-7126-3666-8

FROM a quick glance at the title and the cover illustration of this book, one might be forgiven for thinking that this was possibly a romantic novel to give one's wife, or sixteen year old daughter, for Christmas. You would be right!

Evelyn Hart is a pseudonym – she is, in fact, the widow of Major General Stu Battye, who spent much of his early service in India with the Bengal Sappers & Miners. She writes with much authority on India but, in this novel, she moves to China and tells a story, set in the early part of this century, based on numerous papers passed on by her pioneering grandparents.

The author has a keen eye for detail and portrays the lifestyle of the Treaty Ports with a sure touch. She does, however, get somewhat carried away with describing every change of dress, or hat, though for the music lover the singing of the heroine is a delight.

This may not be her best book, but do buy it for your family. GLC

MILITARY PLANNING FOR THE DEFENSE OF THE UNITED KINGDOM, 1814-1870

MICHAEL STEPHEN PARTRIDGE

CORRECTION

IN the August 1990 issue of the RE *Journal* the review which appears on Page 183 should have ended with the initials "WGHB" and not "HWB". We apologise for this error.

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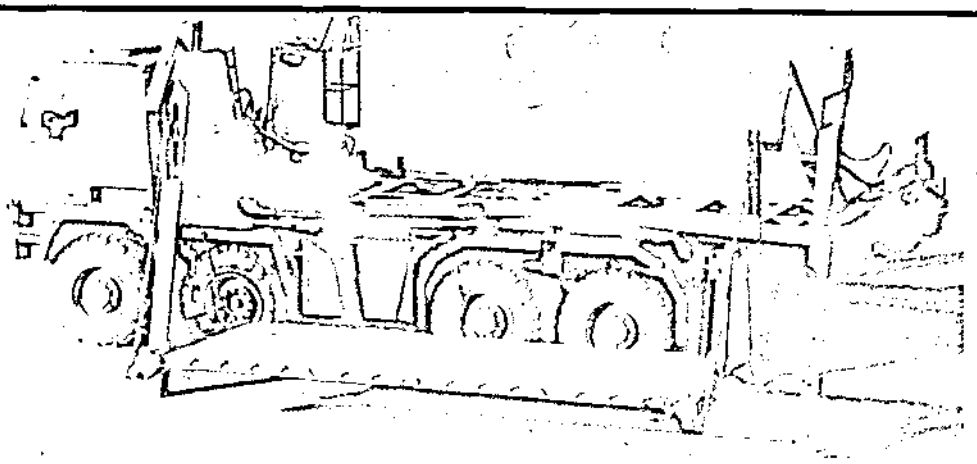
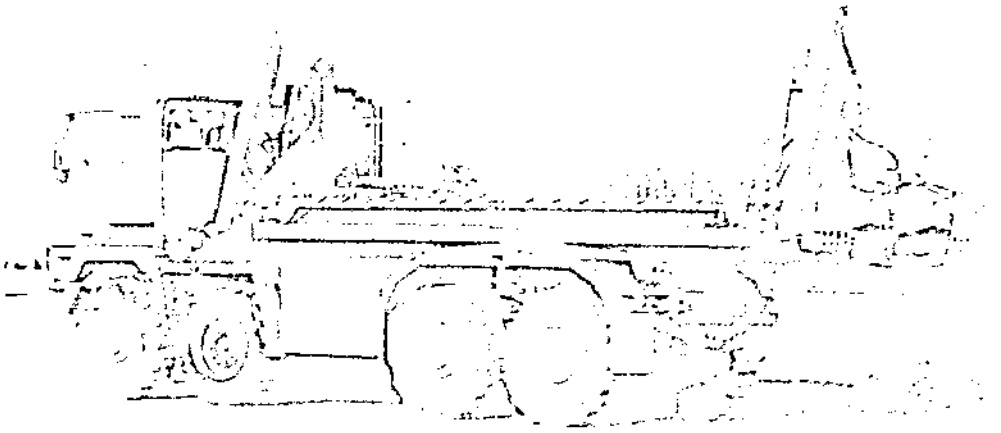


SRTE picking up a flatrack



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