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Editorial

TOO MANY IT'S?

It used to be said that if you stood in Piccadilly Circus long enough you would meet everyone you ever knew. It was the centre of the civilized world. You will note the past tense! If you stand there now you will be accosted, importuned, arrested, run-over, choked by vehicle fumes, get involved in a fracas or asked your views on "punk rock" by a reporter from the media! (That dates this Editorial!) From his office window the Editor looks beyond the Gordon Statue, the South Africa Arch, the Kitchener Obelisk, the Crimea Arch, across Brompton Square to the side entrance of REHQ Mess. In time, provided he has nothing else to do, the Editor will see every member of the Corps. This is the centre of our world of Military Engineering. One senses the excitement. One feels one belongs. It is small wonder that despair is almost unknown in this office. Frustration and irritation—yes!; despair—never!!

In contrast Gus Cannon (or was it Sam Chatmon?), one of the early negro blues singers at the beginning of the century (before the blues became Chicago based), was a "share cropper" in the Deep South. He said to his land owner that there were "too many it's" in share cropping. Having been allocated the ground he had to clear it, plough it, sow it, weed it, water it, harvest it, give the land owner half of it, his family starved because of it and it wasn't worth it! His despair was real enough.

Most of us despair at times because we can see no alternatives and no way out of the predicament we happen to be in. The luxury of alternatives should be a blessing. However, a number of military engineers despair because of the alternatives—a paradox indeed.

The military appreciation system should eliminate the alternatives, it will certainly reduce them. Even if one starts with the plan and makes the "factors" and "options open" fit the plan (a not unknown procedure!), the alternatives are still reduced even if the technique leaves much to be desired.

One of the real joys of military engineering is that there are so many alternatives. There is seldom a single correct solution to a given problem. To most of us this is the excitement of our chosen profession. This is why it is said that if you put four Sappers in a syndicate you guarantee at *least* four workable but different solutions. This may drive others to despair but not the vast majority of military engineers.

Having been given a task the good military engineer looks at it, considers it, sees a number of answers to it, checks the resources for it, decides how to do it, plans it, organizes it, gets on with it, completes it and finds it was worth it!!

The Centenary Meeting Institution of Royal Engineers

The Proceedings of the Centenary Meeting of the Institution of Royal Engineers were published a year ago (*RE Journal* March 1976). Since then the pages of the Journal have been open to those who wished to join in the discussion. A number of contributions have been received, it may be that there are more to come. As announced in the *Journal* of March 1976, one hundred Commemorative copies of the complete proceedings, including the written discussion, will be prepared and will be available to Members on a "first come first served" basis. It has been decided to make the June 1977 issue of the *Journal* the deadline for contributions to be included in the Commemorative copies. The discussion will of course continue but will not be included in the bound copies.

Each bound copy will be accompanied by one of the Royal Engineers Special Commemorative Covers, "Centenary of the Institution of Royal Engineers", carrying the British Forces Postal Services Handstamp No 1487 dated 22 May 1975, the actual Centenary Day.

Visit of Her Majesty the Queen to the Corps of Royal Engineers Minley, 29 October 1976

On 29 October Her Majesty the Queen, accompanied by His Royal Highness the Duke of Edinburgh, visited Minley to spend the day with the Corps. The Queen, Colonel-in-Chief of the Corps of Royal Engineers, had previously visited the Corps on two occasions: in 1956 at Chatham on the centenary of the amalgamation of the Corps of Royal Engineers with the Royal Sappers and Miners and in 1968 when the modernization of the Royal School of Military Engineering was complete. The Duke of Edinburgh laid the foundation stone of Chattenden Barracks in 1962.

Minley, an important centre of Corps activities, provides a splendid background for such an occasion and is considered by many to be our second home. Our aim was to show Her Majesty as many aspects of the Corps of Royal Engineers as possible and for her to meet the widest possible cross-section of the Corps, the whole to be done in an enjoyable way. Although the number of visitors had to be limited, a truly representative selection, with their wives, was achieved including regulars and volunteers, all ranks and branches, the Commonwealth, Gurkhas, REA and others who have close connection with the Corps.

29 October was a dull, damp and overcast day, always threatening to rain. At 11 o'clock exactly the two royal cars arrived at the top of Minley Road where they were met by an RMP Landrover and escorted to Hawley Hard, where the Chatham and Aldershot Corps Bands were on parade, flanking the Pipes and Drums of the Gurkha Engineers. The 300 specially invited spectators were in stands looking across the Hard and Hawley Lake. At 1103 hrs the royal cars stopped in front of the Royal Box.

The Queen was received by the Vice Lord Lieutenant of Hampshire, Sir Hugh

Photo 1. The Queen, the Chief Royal Engineer, Prince Philip and the Quartermaster General on arrival at Hawley.

Visit of HM the Queen to the Corps of Royal Engineers (1)

Smiley and was welcomed on behalf of the Corps by the Chief Royal Engineer, General Sir Charles L Richardson GCB CBE DSO. The Chief Royal Engineer then presented the Quartermaster General, General Sir William Jackson GBE KCB MC, the GOC South East District, Lieut-General Sir James Wilson KBE MC, the Engineer-in-Chief, Major-General J H Foster and the Commander 11 Engineer Brigade, Brigadier S M J Withall and their ladies. Accompanying the Queen and the Duke of Edinburgh were Her Majesty's Lady-in-Waiting, the Countess of Airlie, Her Majesty's Private Secretary, Lieut-Colonel the Rt Hon Sir Martin Charteris, and two Equerries, Lieut-Colonel Blair Stewart-Wilson and Major Robin Broke.

The Queen was wearing an emerald green coat, a matching velvet beret, black accessories and the RE Brooch given to her by the Corps in 1955. The programme, coordinated by Headquarters 11 Engineer Brigade, started with a demonstration at Hawley intended to display the versatility of the Corps in a brisk, and lighthearted way. The demonstration lasted for forty minutes and was staged by 3 Training Regiment RE commanded by Lieut-Colonel A Mornement RE, supported by 8 Field Squadron RE and detachments from 59 Independent Commando Squadron RE, 24 Field Squadron RE, 29 Engineer Brigade (V), RE Diving School, RE Wing of the RAC Centre, 39 Engineer Regiment (Airfields) and the Junior Leaders Regiment from Dover.

The demonstration started with a not-too-serious look at recruiting, making the point that we only recruit the best, and showing the means by which a soldier is trained to take his place in the field troop. Sappers under training had been temporarily converted to "layabouts" by the issue of a few wigs. A troop from 8 Field Squadron then motored on to the Hard and briefly illustrated its composition; the carrier pigeon held by the troop signaller was unimpressed with the weather and was most reluctant to fly while the painter and decorator's brush was almost as large as he was. A Scout helicopter, flown by an ex-sapper officer, then dropped a frogman into the lake; this was the signal for a troop of frogmen to surface and march off in impeccable style led by Major P O M Chitty MBE RE to the music of "A Teddy Bears' Picnic".

A waterborne assault was then mounted by assault boats manned by men from

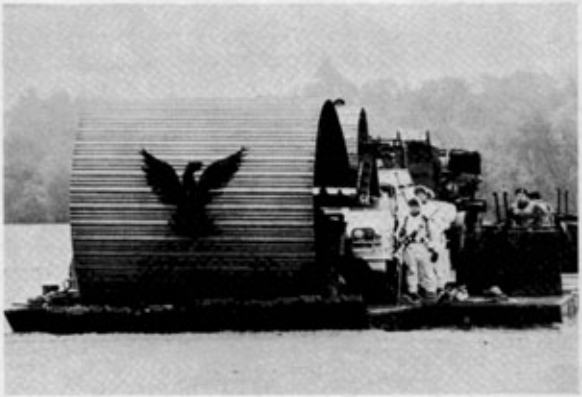


Photo 2. The Heavy Ferry about to land the Class 30 trackway, part of the AMF(L) Troop and two wheeled tractors.

Visit of HM the Queen to the Corps of Royal Engineers (2)

Photo 3. "Steam Sapper" negotiating around block set up by troops from 59 Indep Cdo Sqn.

59 Independent Commando Squadron and Volunteer sappers. The assault was led by Sergeant K Day dressed as a water-skiing Brigadier; he gave an immaculate salute as he sank beneath the waves. This "turn" delighted the Queen. Action then moved onto the Hard with diverse and concurrent displays. In the centre a heavy ferry unloaded a roll of Class 30 trackway, the AMF(L) Troop equipped for arctic warfare and finally two wheeled tractors. On the left of the Hard a section under Staff Sergeant G F Batty built a 10m MGB in 9 minutes 50 seconds, another section under Corporal M W A Coles moved 15 tons of concrete by hand as they built a sangar in under 20 minutes, and a third section under Corporal J Robinson built a "cover from

Photo 4. The MWT "Jaws" removes a suspect car.

Visit of HM the Queen to the
Corps of Royal Engineers (3 & 4)

Photo 5. Prince Philip, accompanied by E-in-C and Major R I Reive talking to men of the AMF(L) Troop.

view" screen. On the right of the Hard an AVRE laid a roll of Class 60 trackway and an AVLB was laid on to a pontoon. On the far shore of the lake a Puma helicopter laid a Class 16 airportable bridge.

The bar minelayer and ranger anti-personnel mine were demonstrated; Captain C J Hall RE (V), a clay pigeon enthusiast, claims to have hit at least four mines in flight with his shotgun but refuses to speculate on the outcome had the mines been

Photo 6. The Queen, accompanied by Lieut-Colonel A Mornement talking to divers.

Visit of HM the Queen to the
Corps of Royal Engineers (5 & 6)

live! The final scene was the establishment by the detachment under Sergeant Jones from 59 Independent Commando Squadron of a road block, which was promptly negotiated by "Steam Sapper" driven by its owner Mr D P Trice, from which a medium wheeled tractor, disguised as "Jaws", bodily removed an abandoned car. In the best Corps tradition the demonstration ended with a bang as a bridge demolition was fired. A "racy" commentary was given by Lieut-Colonel J N Blashford-Snell MBE RE. At the end of the demonstration the Queen and the Duke of Edinburgh talked to all the soldiers who had taken part.

The Queen then drove to the new barracks being constructed for 1 and 3 Training Regiments on a site opposite the entrance to Minley Manor. Here she was greeted by Sir Robert Cox, Chief Executive PSA and the Director of Quartering, Major-General D B Wood. After meeting members of the PSA involved with the project the Queen was invited by the Chairman of the contractors, Higgs and Hill (Construction) Ltd to lay the foundation stone. As she laid the stone the RE Band (Chatham) played a fanfare. The Queen used two mauls to lay the stone; one which had been used by Queen Victoria and her successors and another specially commissioned to commemorate the occasion and subsequently presented to the Corps by Higgs and Hill. When the barracks are completed a pediment from Beaumont Barracks will be used as a capping for the foundation stone. Beaumont Barracks was constructed in Aldershot in 1856 under the supervision of officers of the Royal Engineers including one Captain H D Laffan RE.

Photo 7. The eventual setting for the foundation stone is shown in this drawing.

Visit of HM the Queen to the Corps of Royal Engineers (7)

Photo 8. The Queen talks with Captain Stewart RNZE, an exchange officer serving with 22 Engr Regt.

At 1230 hrs the Queen arrived at Minley Manor for a reception in the Sunken Garden. Brigadier G A Hardy and Brigadier C A Landale, Corps ADCs to the Queen, were presented. The Queen and Duke of Edinburgh then talked to the 300 spectators who had moved from Hawley to the Sunken Garden during the foundation stone ceremony. The Queen and the Duke of Edinburgh spent half an hour at the reception and were able to talk with most of the guests. The Queen then went into Minley Manor, while the guests in the Sunken Garden prepared to take their seats in the tents for lunch.

In Minley Manor the Queen met the guests who were lunching with her at an informal reception lasting twenty minutes. As well as the VIP guests, representatives from the Corps had been chosen by ballot from every rank down to WO1 and including the TAVR. A fanfare announced that lunch was ready and the Queen and the Duke of Edinburgh were escorted into lunch by the Chief Royal Engineer to the tune "Roast Beef of Old England".

Menu
Salmon Mousse
Veal with mushrooms, broccoli
and croquette potatoes
Lemon Souffle
Coffee

Pouilly Blanc Fume 1975 and Chateau Bourgneuf 1967 were served with the meal, and the Loyal Toast was drunk in Sandeman 1945 from the Corps cellars. The Loyal Toast was proposed by the Chief Royal Engineer, and responded to by Mr Vice, Lieutenant R C J Woollven RE who is completing a degree course at Shrivenham. Both the Grace and Loyal Toast were relayed to the guests lunching in the tents by closed circuit television.

After lunch the Queen and the Duke of Edinburgh signed the Visitors' Book and then moved to the Sunken Garden where the Corps gifts to the Queen were presented by the Chief Royal Engineer. The first gift was a copy of "The Royal Engineers" specially bound in royal blue leather with gilt tooling. The end papers, of silk,

Visit of HM the Queen to the Corps of Royal Engineers (8)

Photo 9. The Queen talking to a group from 12 Engr Bde including Staff Sergeant and Mrs Stamford and Sergeant and Mrs Walker from 38 Engr Regt.

carried the inscription "Presented to their Colonel-in-Chief by the Officers, Royal Engineers, 29th October 1976". The author, Lieut-Colonel Derek Boyd, was presented to the Queen. The second gift was a set of fire irons, fire screen, fire basket and log basket made at the Central Engineer Park for the Queen's Finnish Hut on

Photo 10. The Queen talking to a group of Commonwealth Engineers including Lieutenant (QGO) J Bhujel and Captain and Mrs Fafard

Visit of HM the Queen to the
Corps of Royal Engineers (9 & 10)

Photo 11. The Queen and the Chief Royal Engineer with a group from the Royal Engineers Association.

the Balmoral Estate. Corporal R J Knight and Lance Corporal D W G Burton, representatives of those who had made the gifts, were presented to the Queen.

On her way out of the Sunken Garden the Queen talked to Miss Currie, aged 84, whose family used to own Minley Manor and who had lived there when a child.

The Queen then visited a display in the Wellingtonia Avenue that had been co-ordinated by 1 Training Regiment RE commanded by Lieut-Colonel J K Chater RE. There were four main divisions to the display: The Sapper as a combat soldier; Assistance to Communities worldwide; Youth; and Sport and Adventure.

Photo 12. Presentation of gifts ceremony. From left: Chief Royal Engineer, E-in-C, the Queen, Prince Philip, Commander 11 Engr Bde, Corporal Knight, Lance Corporal Burton.

Visit of HM the Queen to the
Corps of Royal Engineers (11 & 12)

Photo 13. Major P Rose RAE explaining a model to the Queen, watched by Lieut-Colonel J K Chater

The first stand visited by the Queen was a display of bridge demolition by sappers from 30 Engineer Brigade (V) which formed part of a combat engineer display coordinated by Major P R Rose RAE from the Field Engineer School. Also in this display was a model demolition which the Queen "blew" by pressing a switch. A field postal detachment from Germany under Captain A F Morris was on display. The field survey stand included the moving map display developed for Harrier and was shown alongside an aircraft in a hide. To forestall queries the Harrier arrived by road and was assembled on site! A detachment from 873 Movement Light Squadron RE (V) was shown to the Queen, as were Northern Ireland search techniques and EOD under Major R I M MacArthur RE. The Duke of Edinburgh put "wheel-barrow" through its paces and discovered that the suspect package contained a jack-in-the-box!

12 Engineer Brigade produced a large stand on Assistance to Communities, and illustrated it by concentrating on a recent project, the "Roll-on Roll-off" jetty at Akrotiri. A stand produced jointly by the RSME and AAC Chepstow showed trade training and at a TAVR stand three volunteer soldiers showed their civilian trades of stone mason, fishmonger and surgical boot repairer! Youth was represented by Sapper cap-badged ACF units and two Sapper Army Youth teams. Sport and adventure covered a wide range, from Everest climbers to Olympic skiers, cycling to hang gliding, shooting enthusiasts, golfers, sailors and explorers from the Zaire River Expedition.

The Quartermaster General, Colonel of the Gurkha Engineers, conducted the Queen around the Gurkha Engineer stand and presented their pipes and drums. The display finished with the postal stand where a special commemorative cover was on sale.

It says much for the interest shown by the Queen that she spent twenty-five minutes longer looking at it than had been planned, and remarked at one point "You know, you Sappers are really very good at everything!"

Before the Royal Party finally departed the Queen was presented with a bouquet by seven-year-old Sharon Lee. Sharon's father Corporal B Lee, though serving in

Visit of HM the Queen to the Corps of Royal Engineers (13)

Photo 14. Major R I M MacArthur explaining "wheelbarrow" to the Queen as the E-in-C looks on.

Northern Ireland with 9 Independent Parachute Squadron RE, was able to take leave in order to see his daughter present the flowers.

At 4.25 pm the Queen and the Duke of Edinburgh said farewell to their hosts and departed to the accompaniment of three cheers from the spectators. It had been a day that will long be remembered by all who took part and our feelings can best be summed up in the words of the Chief Royal Engineer which were clearly rebroadcast by the television microphones as he drank the Loyal Toast:

"The Queen, God bless Her."

At the end of the day, the Chief Royal Engineer sent the following letter to the Palace:—

"Would you kindly convey to the Queen our great appreciation of the honour paid to us by her visit today to Minley in her capacity as Colonel-in-Chief of the Corps.

"I know that all those present were very encouraged and inspired by the great interest which the Queen and Prince Philip showed throughout a long programme carried out in weather conditions which were far from ideal.

"All those in the Corps who have been concerned with preparations for the visit have shown immense enthusiasm, and I am sure the news of its successful and happy outcome will be received with great pleasure and satisfaction by Sappers serving throughout the world.

"The whole Corps is deeply grateful to the Queen their Colonel-in-Chief that, despite the pressing demands of her many commitments, she was able to spend the day with her Corps."

Later that evening a telegram was received by the Chief Royal Engineer from Windsor Castle:

I greatly enjoyed my visit to the Corps of Royal Engineers at Minley Manor today. I was much impressed by the skill and efficiency shown by all ranks at the demonstration and displays. Please convey my warm congratulations to all concerned and my best wishes to all Royal Engineers. Elizabeth R Colonel-in-Chief

This was repeated immediately to all Royal Engineers units serving worldwide.

Visit of HM the Queen to the Corps of Royal Engineers (14)

On 2 November the following letter was received from the Queen's Private Secretary:

BUCKINGHAM PALACE

1st November, 1976

"I hope you received the message which The Queen told me to send to you as soon as we got back to Windsor from Minley on Friday.

"Her Majesty also told me to write to you to say how greatly she and the Duke of Edinburgh had enjoyed the day and how grateful they were for the generous hospitality extended to them at luncheon in the Mess. It was a most agreeable occasion.

Photo 15. The Queen and the Chief Royal Engineer after the bouquet had been presented.

Visit of HM the Queen to the Corps of Royal Engineers (15)

"Her Majesty is also very grateful for the splendid set of fire irons, fire screen, fire basket and log basket given to her. These excellent articles, constructed at the Central Engineer Park, Long Marston, by craftsmen of the Corps, are going to be extremely useful in the Finnish Hut at Balmoral and will always remind Her Majesty and His Royal Highness of their visit to the Corps of Royal Engineers at Minley Manor.

"It was really a marvellously arranged day and I think everyone who was there was impressed by the demonstration which never flagged, was never tedious, which showed off the efficiency of the Sappers, and was also extremely funny! The static displays were also absolutely first class and, as it were, had something for everyone. Those like me who were bemused by the electronics could enjoy the skiing and the rock climbing.

"The other members of the Household who were in attendance join me in sending our sincere thanks to our many hosts for the hospitality shown to us."

Presentation to the Corps of Royal Engineers

On Friday 26 November 1976 Mr Brian Hill, the Chairman and Managing Director of Messrs Higgs and Hill Ltd presented to the Corps of Royal Engineers the ceremonial maul used by Her Majesty The Queen on the occasion of her laying the

Presentation To The Corps of RE.

foundation stone of Gibraltar Barracks during her visit to the Corps at Minley on Friday 29 October 1976. The Chief Royal Engineer, General Sir Charles Richardson GCB CBE DSO, accepted the maul on behalf of the Corps.

The presentation was made in the Officers Mess, Minley, in the presence of the Quartermaster General—General Sir William Jackson GBE KCB MC, the Engineer-in-Chief—Major General J H Foster, Commander 11 Engineer Brigade—Brigadier W N J Withall, Mr R J Morgan—a Director and Mr A E Somers—the Site Engineer, both of Higgs and Hills Ltd. The presentation was followed by an informal lunch in the Mess.

Centenary Meeting of the Institution of Royal Engineers

CORRESPONDENCE INSPIRED BY THE MEETING

Major-General R L Bond CB CBE DSO MC
The Dykeries
Compton
Guildford GU3 1EE

MECHANIZATION

Sir,—In the correspondence on page 144 of the September 1976 *Journal*, Brigadier Jarrett-Kerr quotes Liddel Hart in the latter's condemnation of the War Office hierarchy in "resisting mechanization". Liddel Hart of course never made any allowance for the difficulties facing mechanization of the Army in the 30's. First of all the country was in the grip of a severe economic crisis and, as to-day, the Defence Budget was an easy target. Secondly, the Foreign Office date line, "there would be no major war for ten years", the time base being carried forward year by year, had a devastating effect on mechanization. The tank experts could never agree amongst themselves as to the sort of tank to be built. In any case, had the design been agreed and a wholesale mechanization of the Army taken place (in the economic climate very unlikely) that design would have been out-of-date in two years and the whole process begun again. Thirdly, the continuing burden of the Cardwell system, half our infantry battalions overseas and half at home. Our overseas battalions were all committed to tasks for which an infantry role was essential; Gibraltar, Malta, Egypt, Aden, Hong Kong, Jamaica etc; all peace keeping. India with its eyes fixed on the NW Frontier, a very restricted role for tank units. To have added a really formidable mechanized force to the establishment at home would have cost an enormous sum which no Chancellor in the 30's would have approved especially in view of the ten-year rule. However, it may be of interest to know that before leaving my post as GSO2 MO 1(a) at the War Office in 1931 I wrote a paper in which I gave my views on the future organization of the BEF. In this I said that our small regular BEF ought never again to be used encadrée in the line between large French formations. In view of the excellence of our manufacturing capacity the BEF should be organized, when the time was ripe, as a powerful force of six mechanized divisions, either to act as the spearhead of a sudden advance to the Rhine or, in the event of a German break through in France for a powerful counter attack. Had we had such a reserve in May 1940 the picture might well have been different! I doubt if my paper got very far!

I also strongly recommended that the IDC should study a combined exercise for a war on the north coast of Africa in place of the ludicrously academic exercise on which so much time was spent. This was firmly rejected by the IDC. Rather a pity!—Yours faithfully, R L Bond.

Captain S G Mawhinney
325 Anzac Avenue
Kippa Ring
Redcliffe
Queensland 4020
Australia

CENTENARY MEETING—ARE YOU A ROYAL ENGINEER?

Sir,—I refer to Mr C A Stephenson's letter published in the *Royal Engineers Journal*, December 1976, in which he infers that the Sapper (Civil) Engineer lacks three qualities when he is compared with the Civilian (Civil) Engineer, namely:—

(a) The Sapper is not cost conscious.
(b) The Sapper does not have to look at the numerous methods open when approaching an engineering project.
(c) The Sapper lacks initiative or inventiveness on site.

Firstly let me say that I write as a wholly Sapper trained engineer having joined the Corps as a boy of fifteen when in 1936 I joined the School of Military Engineering as an Apprentice Tradesman and served through nineteen years until resigning my Regular Engineer Commission as Captain in 1954.

My experience is based on nineteen years' association with Sapper methods and training and not the four year apprenticeship Mr Stephenson "enjoyed".

With regard to qualifications let me say that I do not have a single "civil" qualification, all I had was a Mechanical Draughtsman's certificate, First Class, an Architectural Draughtsman's Certificate, Third Class, and the Army First Class Certificate of Education (hons maths) together with the post war training as a member of No 8 Supplementary Engineering Course.

During my Sapper service I was not engaged in Works Services so I did not gain any site experience apart from one task in Egypt when I built the Kabrit Leave Centre. All my training was, therefore, "Text Book" plus a certain amount of common sense application to projects using the Corps methods.

Despite my lack of civilian qualifications I applied for, and was successful in obtaining, a position as a civil engineer with an oil company in the Middle East and took up the appointment in August 1954. I must admit that as I flew out to start work, at what was to be my very first civilian job at the age of 34, I felt somewhat apprehensive. I felt that civilian engineers would be right up to date and really "on the ball" in their works approach and I wondered how I would fit into things or whether I would be able to fit in at all!

However I need not have had any misgivings because I soon discovered that Sapper engineers were well up to date and the civilian engineers with whom I was to work were still far behind. (A discovery that enabled me to appear that much brighter and so obtain rapid promotion as the oil company promoted on ability and not on service or seniority.)

My first project was the construction of a major transport complex budgeted at several million pounds sterling and forecast as a two year construction task. I had never handled a project of this magnitude nor had I had any real site experience. Despite this, I applied the Text Book methods and was able to complete the job in eighteen months, instead of two years, and also with a considerable cash saving on the budgeted figure. During the work it was necessary to erect a 120 × 6ft lattice truss and we did not have the necessary cranes to handle it but, using Sapper initiative, I was able to "spring" it into position much to the amazement of the Redpath Brown representative (a civilian engineer). Numerous other little things were initiated during the eighteen months and all contributed to early completion and a reduction in overall costs. That all work was carried out by Lebanese and Indian tradesmen with Arab labour and only one European on site, a Sapper Engineer, would hardly seem to infer that the Sapper was not up to the standards of the Civilian Engineer!!!

Concurrent with the work on this project I was given the task of "doping" some thirty miles of pipe in readiness for a new pipeline project and, on taking over the preparation site, I was amazed to find that the civilian engineer was using the old wire brush/hand method to clean the pipes, hand painting them with primer and similarly hand pouring the enamel. A very slow and costly method of application. However the Sapper Engineer stopped the work and re-organized the system so that the pipes were fed past two sand blasters for cleaning; then past a spray painter for the priming and finally dipped into enamel baths. This simple approach enabled the task to be completed in one fifth the usual time and at one third the usual cost on work of this nature. The Text Book training had paid off again!

As a result of this and other efforts during my first two years I was transferred to the exploration side as Chief Civil Engineer with the overall responsibility for all engineering works associated with the exploration and drilling programme on the isolated Trucial Coast. Exploration was costing ten thousand pounds sterling a day with two drilling rigs leap-frogging and a third rig drilling twenty-four hours a day. Any reduction in time on various works would show a real saving.

The first drilling site I took over had a rig on a levelled-off sand dune with eighteen-inch concrete blocks as the mud pump foundations. I promptly warned that spillage from the pumps would undermine the foundation blocks and so throw the pumps out of alignment. This was scoffed at but, forty-eight hours after the commencement of drilling, the warning was heeded when the pumps slewed off the blocks . . . now the problem was to re-align the pumps with a minimum of delay as ten thousand pounds per day was the cost of ignoring the Sapper's warning. A number of "experienced civilian engineers" made their comments as to how the task should be done but the Sapper ignored these and approached the problem with Text Book know-how . . . the pumps were jacked up; blocks pulled out and a cement fondu slab poured in one day. Several people were seen to snigger at the approach as we now had to remove the steel beams on which the pumps were being supported and these people were interested to see how this would be done. The Sapper merely jacked the pumps up a little and packed below them with blocks of ice and then lowered the pumps onto the ice and slid out the steel beams. The ambient temperature of 130°F soon lowered the pumps onto the slab and the alignment was made and drilling re-commenced. This simple ability to look at the numerous methods open and make the required rapid decision enabled the work to be completed in the minimum time and so avoided a costly stand-down period.

On another occasion I received a radio telephone call to build a jetty at Zubayiah to take LCT's and barges. I had to give an on-the-spot cash estimate for this task. Quick mental arithmetic and a rapid decision gave the answer and the task was completed for the requested amount in fourteen days. Facilities were not easily come by on the Coast at that time but a sand coffer dam was constructed and maintained for the period while the oil company's fire pumps were used to keep the site dry. Working three shifts a day the jetty was completed, the tides then cleared the coffer dam, enabling the LCT's and barges to come in on schedule. Another example of Sapper initiative and inventiveness.

At that time we had two distillation plants working but had to move these four hundred miles to Tarif, the new base area. The civilian engineer had tried to dismantle one of the two chimney stacks (90 feet high in steel) and "dropped" it thereby reducing us to one available distillation plant. The Sapper took over himself and, using an oil pipe gyn pole with four trucks as stay anchorages, was able to lower the remaining stack safely. He also re-erected it at the new site while we waited six months for a new stack to arrive.

Many other examples could be given of Sapper initiative and inventiveness. The old, expensive and time absorbing method of stabilizing around the rig site was by hauling selected fill from miles away and then spreading, the use of old oil well cement for soil stabilization reduced the time and cost for this work. Sapper method.

On returning to the more civilized oil company area in Qatar the first task facing

the Sapper was the dismantling of a deep test rig, 180 feet tall, which had been the cause of four deaths during its erection by a civilian engineer. The dismantling was held back till the Sapper was available and he took it down without any further loss of life or accidents . . . in passing let me just say that site controls were such that in eight years I never had one serious site accident despite the fact that I worked with indigenous labour.

Finally, with the oil company, the explosives store was found to hold two tons of gelignite which had crystalized due to heat and overlong storage. This had to be removed and eventually disposed of. None of the civilian engineers would touch the job so the Sapper had to take it in hand and he personally handled every box to the disposal site and destroyed it. Sapper initiative and ability surely showed itself in this instance when no one else would handle the touchy explosives but again decisions had to be made on the spot and the work completed as soon as possible to avoid further danger.

On leaving the oil company, after some eight years in the Middle East, I went to Australia and became involved, on a share holding basis, with a swimming pool company building pools in the accepted concrete media but this very soon proved to be a most competitive business and not worth the return financially.

I joined the State Water and Sewage Department as a civil engineer and my first task was to convert a country township of some 27,000 people from septic tank to water borne sewage. The plans were all drawn up but the ejector stations were of varying capacities and the pumps for these were of four types: hardly an economical proposition for the future; the Sapper had this amended to one pump unit throughout using single, double and treble pump ejector stations and so avoided the need for numerous spares holdings with only one unit as a replacement standby. The plan was to start on the perimeter and work in to the centre . . . a loss of revenue . . . the Sapper changed this and started from the lowest point so that as soon as lines were laid and available revenue could be collected for the project from the local populace. Cost consciousness from a Text Book Sapper engineer?

As a Civil Servant I found time on my hands so I looked at the swimming pool industry in my spare time and came up with the Fibreglass Reinforced Plastic pool system. Admittedly this was not original as FRP pools were already being made in UK and USA. On closer examination and trials I found that all pools were made in sections and subsequently bonded together as it was impossible to get a 34 × 14 × 6ft deep pool unit off a mould in one piece due to contraction as the resin cured. Several types of pool were made by this method and it took five days to make one pool with six staff . . . a viable proposition but not really competitive with accepted concrete pool construction. Again the Sapper looked at the methods and the courses open, all courses open. Approaches to resin manufacturers in an attempt to evolve a method to release the one-piece moulding proved useless so the Sapper had to fall back on his own initiative and inventiveness to find an answer to the problem. A system was developed. Using simple tyre valves set into the mould and injecting air the pool unit was released in one piece. Now production was one pool per day using the same six staff . . . a five hundred per cent increase in production without a penny increase in costs. Sapper cost consciousness and inventiveness? Within four years the Sapper had two production plants in operation making some eighty pools per month and taking over thirty per cent of the pool market throughout five states.

Later he sold the business and went to South Africa for a holiday and there he saw the opening and immediately started the same pool business. Within two years he had two factories producing pools and two others operating under licence. While the companies were producing pools he also looked at pool filtration and designed and developed his own pool filters for production in Glass Reinforced Plastic. The factories were also used to produce acid tanks, septic tanks, furniture etc,, every item produced was the result of the Sapper's designs and approach.

One outstanding item was developed as a result of an alternative tender submitted when steel "stilling" boxes were called for by the local Council Sewage Department

in Johannesburg. We offered these in acid resistant FRP with five year guarantee as opposed to two years in steel, (effluent acids play havoc with the steel), and six weeks delivery as opposed to six months. (Cost? Well we were lowest but we could have been a lot lower if competition had made this necessary.) Subsequently other councils took this media up and we were inundated with orders for the same stilling boxes and later we went on to supply skimmers and weirs, etc for the sewage department.

I could go on demonstrating the inventiveness of the Sapper trained engineer, the cost consciousness as well as the ability to look at all aspects and options in an approach to a project, but I feel that I have shown sufficient to, at least, invite Mr Stephenson to review his thinking of who is the better trained engineer.

As a sidelight to the engineering may I mention that at one very early stage of my army career I was a company pay NCO and as a result became familiar with the double entry accounting system as used throughout the services. This came in very useful when I started operating my own companies as I was able to insist that my accountants operated the same system . . . foolproof and fiddleproof . . . much to the satisfaction of our annual taxation auditors.

I feel that the Sapper training has proved itself for service application and for civilian application, it cannot be judged on a short four year association.—Yours faithfully, S G Mawhinney

PS It may interest Mr Stephenson to know that whilst working in the oil company in the Middle East we found that if an employee had had previous service experience he was able to fit into the show whereas those arriving with no previous service experience soon fell by the wayside and returned to the UK.

Ice Bridges Move Equipment Across Rivers

An extract from "Oil and Gas Journal", Tulsa, USA, reproduced by permission

In Alaska and other cold regions where equipment must move across rivers, one of the cheapest and most environmentally safe solutions may be ice, one of nature's strongest load-bearing materials. Such ice bridges are designed for short-term use. No spans, piles, or complex materials are required, although logs and wood debris are sometimes used to strengthen the ice.

Two floating ice bridges were recently designed to cross the Susitna and Yukon rivers in Alaska by Dames & Moore, an environmental and earth-sciences consulting firm. The Susitna bridge spanned 1,200ft, but the Yukon bridge spanned almost 2,000ft and had to bear static loads up to thirty tons. Less than a 2ft ice thickness was needed to support the load. Construction took only three days.

Floating ice bridges are simple to construct. But design requires information on the water composition below the existing river ice, water temperature and flow rate, ice temperature, expected bridge loading, general weather conditions, channel configuration, variations in existing ice sheet, and other factors, according to Dick Ragle, Arctic engineering specialist with Dames & Moore.

During construction, hoses spray water over the frozen river, and ice layers are built one upon the other. At the Yukon River site, Dame & Moore concluded that a 6in buildup over the existing 16in of river ice would be strong enough to support the equipment.

Two inches of ice was laid on three successive days. Each layer was allowed to harden completely before the next was applied. Within days a twenty-five ton drilling rig made its way across the Yukon.

The bridge was used for two weeks and then deserted. In the spring it will thaw, break up, and return to nature, leaving no trace behind.

Three Weeks to La Panne
A Diary of 1940 (Part I)

LIEUT-COLONEL R L CLARKE, MA, C Eng, FI Mech E, FIEE,
FI Prod E, MIWM, M Inst MC

THE Godsell Diary dealing with a part of World War I proved very popular. Extracts from a World War II diary should be equally successful. This very personal account is "officially" covered in History of the Royal Engineers, Volume 8, pages 22 to 42.

Lieutenant (as he was then) Clarke was the Engineer Intelligence Officer of 4 Division when he kept this diary. The diary has been divided into parts for convenience.

The "cast" who appear in the diary are:

Engineers:-	II Corps	Brigadier C C Phipps, Chief Engineer
		Major W W Boggs
		Major G G S Clarke
	3 Division	Lieut-Colonel D Harrison, CRE
		Captain R H Walker, Adj
		Lieutenant P H Ronaldson, IO
		Captain R de V Winkfield, OC Fd Park Coy
	4 Division	Lieut-Colonel N A Coxwell-Rogers, CRE
		Captain P Hodgson, Adj
		Lieutenat G D H Pawle, Field Engr
		Lieutenant Lipscomb, MO
		Lieutenant Sauervein, French LO
		Foster, Leeming, Bourner, Graham, Despatch Riders
		Sedgewick, Garland, Mess Staff
		Hewitt, Turner, Smith, Staff Drivers
		Gregory, Gregory, Hodder, Goddard, Truck Drivers
		Corporal Wilkinson, MT Corporal
	5 Division	Lieut-Colonel J H R Le Sueur, CRE
	2 Gen Constr Bn RE	Lieut-Colonel C P Worsfold, CO
	7 Fd Coy	Major R R Gillespie, OC
		Captain Vaughan-Williams, 2IC
		Lieutenant A D E Curtis
	59 Fd Coy	Major A J Macdonald, OC
		Captain A Gesty, 2IC
		Lieutenant G Galloway
		Lieutenant J Calvert
		Lieutenant S N White
		Lieutenant J G Hanson
	225 Fd Coy	Major J B Windle, OC
		Captain W Hedley
		Lieutenant J Osborne
	18 Fd Park Coy	Captain A Nixon, OC
		Lieutenant P Bradfer-Lawrence
Staff Officers	II Corps	Lieut-General A F Brooke, GOC
		Brigadier Pepper, BGS
	3 Division	Major-General B L Montgomery, GOC
	4 Division	Major-General D G Johnson VC, GOC
		Captain H Straubenzee, G Staff
		Captain J Stevens, Intelligence

	Captain Sir Basil Bartlett, Security
	Captain Hill, Camp Comdt
8 Brigade	Brigadier C G Woolner, Commander
11 Brigade	Brigadier K A N Anderson, Commander
	Captain Lyon, 10 Northants
12 Brigade	Brigadier J L I Hawksworth, Commander

Thursday 9th May

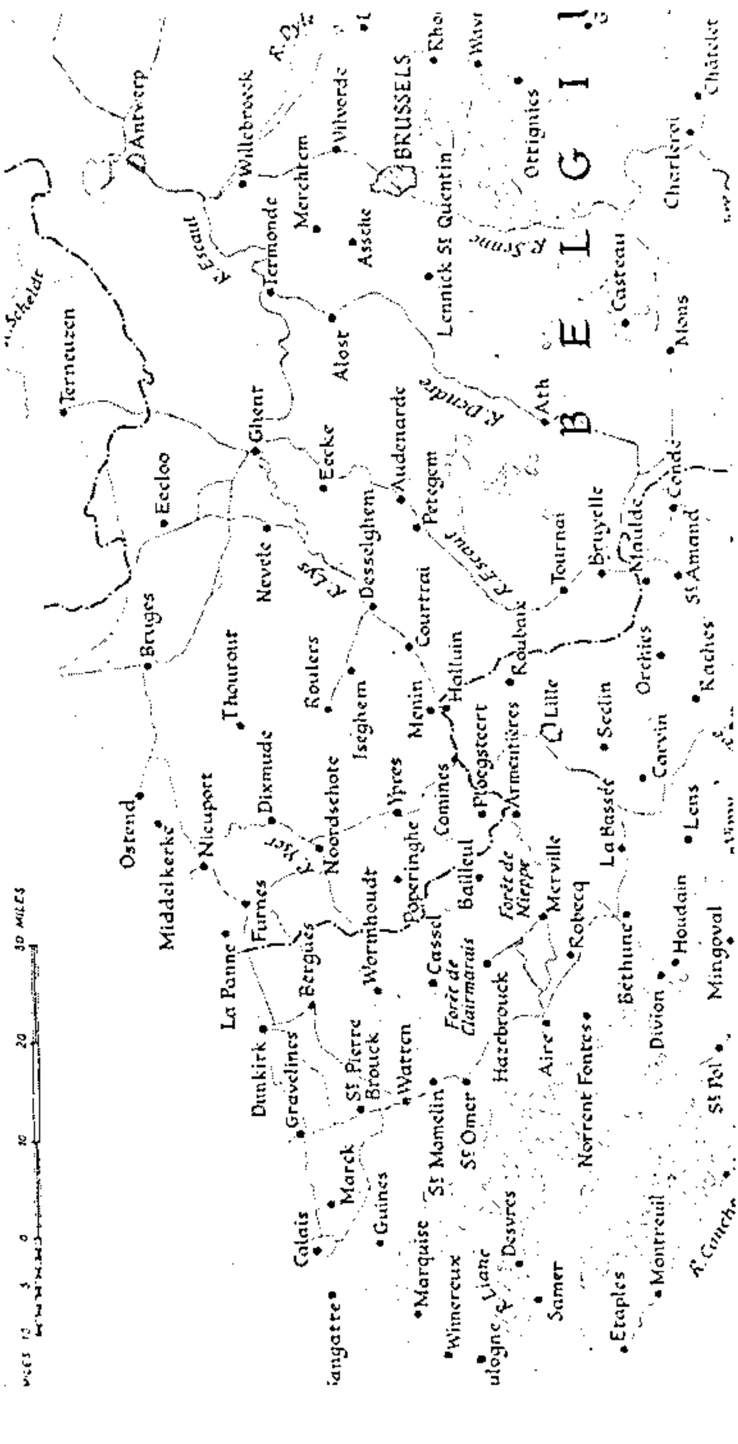
Wakened early by the crash of gunfire from the frontier. Another sunny day bringing out the reconnaissance aircraft. As I come downstairs Madame Rouzet is polishing the tiles and she greets me cheerfully. She is a Flamande from Blankenberge and calls me her "autre enfant". I get on famously with her grandchildren Jean and Denise who come most weekends from Lille where their father is a timber merchant. But generally the British are not popular. When I ask Denise why she replies, "On dit que vous vous faites toujours chez vous". I am certainly made very much at home in the Rouzet household.

It is two hundred yards from my billet to Croise Laroche, where the roads to Tourcoing, Roubaix and Comines meet. The HQRE 4 Div Mess is in an empty house near the crossroads. It has been furnished nicely; the curtains have been sewn by the daughters of the house at the Doctor's billet. Breakfast is a hurried meal because I aim to be away before the CRE, Lieut-Colonel Coxwell-Rogers, comes downstairs. I can hear him above in his bedroom as soon as he gets his riding boots on. Being caged up with a tiger is inspiring. "What does he know about building pillboxes?" a sapper has been overheard to say, "He hasn't been off a horse for the last ten years". But we seem to get them up quicker than the Construction Companies.

The Adjutant, Paul Hodgson, tells me to hold the fort in the morning because he has to go and check on the aggregate barges; delivery is a bit slow. Our office is a first floor flat a few yards down the Comines road. Round the walls I have stuck charts with coloured pins showing the progress of pillbox construction, Bren, Machine-gun, or Anti-tank gun. I have given them names beginning with B, M or T respectively. The map references never seem to be quite right, My draughtsman has just finished a tracing showing them all as yellow spots ringed with black so there will be no more argument. Devote the day to checking my monthly report to my namesake at II Corps HQ hoping that it will not come back this time corrected in red ink. Am too hungry after midday to concentrate. An excellent French cook comes in to deal with our lunch and dinner, a cottage loaf of a woman who only demands unlimited beer and permission to bring her little boy along with her. Our former French Liaison Officer, Henri Hauck, particularly appreciated her rare roasts after the burnt offerings of the sapper cook.

Telephone active with the usual trivialities; winding the handle is good indoor exercise. 18 Field Park Company have lost the bulldozer again. 30 Field Regiment RA have indented for yet more sandbags; are they to be supplied? A battalion in 10 Brigade has cut up the local dance floor for revetting material and are faced with a bill for £50. The infantry working party for offloading stores has failed to arrive at the goods yard. Corps want our return of outsize boots by tonights DRLS (Despatch Rider Liaison Service) and 225 Field Company have forgotten that "Nil Returns" are required. A French civilian arrives from the Mairie with a pot of blue paint to say that he has instructions to black out the windows.

This evening the CRE, Adjutant and Geoffrey Pawle, the Field Engineer, have gone to Lille for an evening conference with the contractor for mechanical equipment, so Lipscomb and I are alone for dinner. He is our doctor, a stout Australian with popping eyes, fond of good living and his fellow men. We do not linger because he has promised his host a game of chess, and I have to make a final check on my pillbox report in the office; find two map references still wrong. About ten o'clock a single aircraft flies over making a peculiar throbbing noise. Footsteps clatter along



30 MILES
Antwerp
Willebroeck
R. Dyle
Vilvorde
BRUSSELS
Merchtem
Asselle
Termonde
R. Escaut
Terneuzen
Lennick St Quentin
R. Senne
Ottignies
B E L G I
Charleroi
Châtelet
Alost
Ghent
Eecloo
Eecke
Audenarde
Petegem
R. Dendre
Ath
Casteau
Mons
Condé
Maulde
Bruyelle
Tournai
St Amand
Bruges
Nevele
R. Lys
Desselghem
Courtrai
R. Escaut
Roubaix
Halluin
Menin
Roulers
Thourout
Iseghem
Orchies
Raches
Lille
Seclin
Carvin
Ostend
Middelkerke
Nieuport
Dixmude
Noordschote
Ypres
Comines
Ploegsteert
Armentières
R. Yser
La Bassée
Lens
La Panne
Furnes
Bergues
Wormhoudt
Poperinghe
Bailleul
Forêt de Nieppe
Merville
Robecq
Bethune
Houdain
Mingoval
Dunkirk
Gravelines
St Pierre Brouck
Watten
Cassel
Forêt de Clairmarais
Hazebrouck
Aire
Norrent Fontes
Divion
St Pol
Calais
Marck
Guines
St Momelin
St Omer
Marquise
Wimereux
R. Liane
Desvres
Samer
Etaples
Montreuil
R. Canche

the street and a whistle blows. I walk back to my billet past a line of cars with blazing headlights and blaring horns held up by a policeman at the crossroads. French air raid precautions....

Friday 10th May

Gunfire rattles the windows at first light. An hour later I wake with a start to the sound of a Bren gun. Spring to the window and see a small high-winged aircraft against a pale blue sky. As I watch it drops a red flare. Towards the frontier red dots curl slowly upwards. Excited talk from below. "Comment, tous les deux!" When my batman Sedgewick, an efficient but incomprehensible Geordie, brings me my morning cup of café cognac (by courtesy of Madame Rouzet) he says that the Germans have invaded both Holland and Belgium.

Confirmed at breakfast that 4 Division will be moving into Belgium under Plan D, making first a short disengaging move to Roubaix. This means a mass of office work, preparing handover documents and bringing files up to date. All files relating to local activities to be handed over. Personnel files to be put in order and delivered to Records. Pillbox construction to be carried on by 2 General Construction Battalion. Stores, surplus to the active service scale G 1098, to be dumped under the care of the Barrack Officer on the racecourse (no receipts given). Maps to be sorted through and a selection packed; we have them up to Brussels but what shall we need to the west? Better take two each of Armentieres and Poperinghe to be on the safe side.

At Division HQ down the road all are in ripe good humour. General Johnson looks twenty years younger having successfully warded off General Eastwood who was about to succeed him. The Duke of Gloucester has had to leave though he wants to stay. Henry Straubenzee and John Stevens in Intelligence have little news but have set up their battle map with blue marks (for the enemy); parachutists at Assche and Alost, Belgians fighting in the Ardennes, a few towns bombed. Armbands are to be worn, and I proudly put on my green band with a black E for Engineer Intelligence Officer. As I come out there is a roar of motor cycles and the Corps Commander, General Brooke, sweeps up the Roubaix road, his fish flag fluttering from his car.

Company commanders arrive after lunch for a conference, Gillespie of 7 Fd Coy who has taken over from Le Sueur (now CRE 5 Div), Macdonald of 59 Fd Coy, Windle of 225 Fd Coy and Arthur Nixon of 18 Fd Park Coy. 3 Div are already crossing the frontier for Louvain, and 4 Div is to move in reserve to Brussels where we are to prepare the bridges for demolition.

Saturday 11th May

Paul Hodgson takes the new French Liaison Officer, Sauervein, resplendant in his uniform of the Chasseurs d'Afrique, to Roubaix with the Divisional Advanced Party. We are allotted two big empty houses in the Rue Gay Lussac but the keys cannot be found. This will be a change for the section from their comfortable billet next to the office, four flats with parquet flooring.

The telephone rings; parachutists reported above the open country east of La Madeleine. Pass the warning on to companies and set off with my pillbox files to see Lieut-Colonel Worsfold, 2 Gen Constr Bn RE. On my way back remember the parachutists and think this may be an intelligence matter so head for the area. There are fields of roots and occasional dark woods, and I stand up in my 8cwt truck carrying Driver Hewitt's rifle ready loaded. Wonder whether I ought to explore the woods. Suddenly I come upon a line of men advancing towards me with fixed bayonets led by a desperado waving a revolver. In time I recognise Rollo Gillespie who is disappointed to find the parachutes to be no more than anti-aircraft puffs.

Sunday 12th May

An early breakfast to get the mess packed up. The main Div convoy leaves on the five mile trip to Roubaix at 1000 hrs. I lead the HQRE Section of thirty men, four despatch riders and Wilkinson the MT corporal on motor cycles (four 350cc

BSA and one 500cc Norton) and the rest in Morris trucks, two 8cwt, four 15cwt and one office truck which got through the garage entrance under the flats with an inch to spare. The CRE and Adjutant have got the two Humber cars on their own affairs. At Roubaix we stop near the old exhibition ground and the Camp Commandant "Monkey" Hill directs us to park the vehicles fully loaded under trees in the square. Transport is not allowed near offices or billets. I put the two Gregory's on guard, and the rest lug the kit with a lot of grumbling up the slope to our houses which are at least open though without light, heat or blackout. Locate Div HQ and "A" Mess where the CRE will be feeding ready to move forward with the General in the morning. Set up the office and notify companies by DR. Wish we had wireless.

Supper at the Rue Gay Lussac is a melancholy affair in the twilight. My room at the top of an echoing staircase faces south. As darkness falls there is a distant rumbling of aircraft and the sky is white with searchlights making it light enough to write.

Monday 13th May

Sauervein and Geoffrey Pawle set off first thing in the Humber shooting brake driven by Turner, leaving me in charge. Will see them in Brussels. A quiet morning preparing all the information I have about Belgium and fitting out my "Intelligence Box" with coloured pins etc. Have a large-scale map of Brussels and its environs, so make a chart of the crossings over the canal with serial numbers to make sure none are left out. We have little information because the Belgians have remained unassailably neutral.

Visit Div HQ to bring my mapboard up to date with Straubenzee's. The possible defence lines ahead of us are, in succession, the Escaut, the Dendre, the Senne (and Willebroek Canal) through Brussels, the Dyle through Louvain, and the Meuse (and Albert Canal). The Boche have already crossed the Albert Canal and the bridge at Maastricht has fallen intact into their hands. Horsed reconnaissance units are moving west towards Louvain where 3 Div is already in position. Contact has been made with the French in the Ardennes. No indication where the main attack is coming.

Set off for La Madeleine to visit companies, but meet 59 Fd Coy strung out along the main road and stop to talk to the OC, John Macdonald, a charming man. He has sent a subaltern forward and is moving into Belgium this afternoon in support of 11 Brigade. At Croise Laroche I call in and say goodbye to the Rouzets. Madame kisses me and weeps. She says that the Belgians will fight like tigers. I warn her to get packed up ready to join her relations in Aix-en-Provence.

Back at Roubaix I find that orders have been issued for a move forward tomorrow. We are a late serial, but the Doctor has to leave early as advance party taking one depatch rider (Leeming) and the cooks truck.

Tuesday 14th May

Another perfect day with no sign of enemy aircraft. We take the southern route for Brussels. The frontier poles are raised as we leave the dusty French pave for the Belgian concrete roads, a neatly ordered line of vehicles, at eighty yards spacing precisely, patrolled by motorcycles. The spacing does not last; just across the Escaut I have a row with a gunner who tries to cut in with his Scammell tractors. My drivers have no maps, only route cards, and if they lose the convoy they may miss the rendezvous.

Clean-looking people stand beside the road waving and throwing flowers. But at Ninove there is a change—they are huddled in groups. There is a smoking crater near the road junction with bits of blue-painted board lying on the lip. A long straight road with Belgian troops on bicycles riding two and two. Suddenly they fling them down and run into the field, pointing upwards. High in the clear blue a silver Heinkel 111 Recce Bomber is droning to the west ignoring the anti-aircraft puffs miles behind.

The western outskirts of Brussels are indicated by new concrete roads for unbuilt housing estates, not shown on the map. A cluster of motorcyclists is waiting at

the rendezvous. As I come up, Leeming swings out ahead of me. Half a mile on he guides me to the right up a cobbled street to a village square full of apple trees. We park the vehicles underneath them, breaking a few boughs in the process. The advanced party has a meal ready in the billet alongside. The doctor has chosen a house in the street as a mess; the lady of the house is flattered and charming. The office is another house a few doors down marked by our sign, white 18 on a blue ground. Report safe arrival to Geoffrey Pawle who is upstairs sorting out messages. Unpack my things, get the company locations and set off on foot for Div HQ because no vehicles are allowed near. The street leads over the hill and I have to pick my way through piles of bicycles. The cafés are full of Belgian soldiers, drinking and singing. One shouts "Good mornink" at me and tries to look at my mapboard. I shake him off.

Div HQ is established in an imposing glass fronted building on the forward slope, probably a school. Children are playing round the feet of the Military Police. Back to the mess for tea where the cook, Garland, has settled down well in the kitchen and is talking fluently to Madame. Go to the office to see if Geoffrey wants relieving, but he is deep in conversation on the telephone about explosives lorries and does not want any tea. Warn Hewitt, my driver, to be ready with my 8cwt truck in half an hour, and try out the piano while the kettle boils.

The centre of Brussels is full of shoppers in cotton frocks and trams are crossing the great bridge in the middle of the town. The only sign of war is a Belgian bridge guard. The map does not show all the bridges; there seems to be one every 200 yards. There is a large park of vehicles and a petrol depot on the wrong side. North of the town the canal is wider but narrows to about sixty feet at the bridges, the principal crossings being the two low-level steel lifting bridges at Vilvorde. I cross here and drive on to the end of our sector marked by a railway bridge which is the responsibility of the Belgian Corps on our left. I list every crossing by description, sketch, map reference and estimate of guncotton and ammonal required. Back in the office the CRE has arrived and reports from company reconnaissances are beginning to come in. I am up till 2 am summarizing, checking and identifying.

Clear moonlit night with continual red flickering to the east. The section is snoring peacefully. Nice bed with clean sheets.

Wednesday 15th May

Wakened by gunfire; a Heinkel 111 flying high probably taking photographs. Brussels is beginning to look more seemly. The trams are still running but our sappers are pickaxing at the road surface. Drive in my truck along the canal to Vilvorde and then up the towpath on the east bank. Something has happened to a group of houses whose rafters are showing. Then I see that the railway bridge has been demolished. II Corps have a report centre at Laeken and I call in on my way back to tell my namesake that the Belgians are beginning to blow their bridges. He expresses surprise.

Geoffrey is in a raging temper having been visited in the office by Brig Anderson of 11 Bde who does not mince words. He wants sandbags. Take over while he goes forward to reconnoitre a line of anti-tank obstacles covering the Louvain road in case of a Belgian withdrawal. Soon a message comes through that all bridges are to be prepared for demolition by 0800 hrs tomorrow. I send on to companies by their despatch riders of whom we have one from each company standing by at HQRE.

To Brussels after lunch to see how work is proceeding. Columns of Belgian troops looking clean and cheerful are marching back. All the bridges seem to be covered. Tubby White has his section at work on the great bridge. John Osborne of 225 Coy worried by what he thinks is a spy at the next bridge. The corporal in charge points out to me an elegant officer in Belgian uniform who has been there a long time and has been asking questions. He is now running up and down patting the marching soldiers on the back and shaking their hands. I walk across the bridge and accost him. He turns with a charming smile and says "How do you do. Do you wish

to see my identity card?". I examine it critically as if I knew all about Belgian identity cards. At that moment Lyon, the Intelligence Officer of the Northants appears and walks away with him for questioning.

The office is in a flap; the explosive lorries are an hour overdue. Geoffrey leaps on a motor cycle. He has scarcely gone when a message arrives to say that demolition is postponed for twenty-four hours. Alan Gesty, the second-in-command of 59 Coy arrives with his CSM who he has placed under open arrest for being found in a state of inebriation. Pity because he is an excellent chap and a fine looking soldier. He is to be in my care for the rest of the campaign. At midnight a message arrives, the explosives lorries have been found. I sleep well.

Thursday 16th May

Straubenzee's map shows an ominous blue bulge to the south lined with question marks. 3 Division and our own covering troops are to fall back to avoid being cut off and need two more crossings north of Brussels. To provide these we have to use our equipment bridges, preparing them for demolition as we put them up. One bridge will be made from our folding boat equipment, the other from our small box girder resting on two barges.

I am sent off with the Camp Commandant to help recce a new site for Div HQ in a village six miles to the west. Am given an unpromising lane of barns and pig-styes for HQRE. The only house is locked, the owner having gone to Tournai. Find a barn for the section and a tiled room for officers at the back of a house in the next street, with a feather bed and access through a ground floor window.

Coming back to Brussels on my motor cycle the sound of gunfire is persistent. Down on the canal Gus Galloway, a little dark haired Canadian in 59 Coy, is building folding boat rafts under the trees. He is going to run them across the road and into the water after nightfall. Further down two barges lie alongside the farther bank being filled with gravel by a scoop under the supervision of John Macdonald to bring the decking down to the right level. At Vilvorde a trickle of civilians cross the bridge pushing handcarts watched by the Royal Fusiliers who are providing protection parties. Back to the office along now-deserted roads to write my evening report. Brussels, a city of the dead, streets empty and echoing. Round the corner come troops trudging in single file along both gutters wearing the red-and-black triangles of 3 Div. A lorry without lights nearly runs me down. At the great bridge there is glass all over the road—they must have blown the camouflets.

The news at the office is that Alan Gesty has fallen off his motorcycle and been sent to the rear, so HQ 59 Coy must be shorthanded. When the CRE dismissed me I thankfully set off for our new billet, arriving about midnight. Sedgewick has laid out my kit on the feather bed, but choose the floor as looking cleaner.

Friday 17th May

Wakened by bright sunshine at 6 am—two hours to go. Wash under the pump and leave a canvas bucket of water for Geoffrey and the doctor who are still snoring. Go down the road to Div HQ.

In the orchard outside the Field Security Office a truck is standing with a group of Military Police looking in the back. One says "Look Out! He's got a knife!" and there is a scuffle. On the floor of the truck somebody is squirming around wrapped in white silk. I see a bald purplish head with a gash across it. An NCO tells me it is a parachutist and curses. From the direction of Brussels comes a distant thud followed by two more, windows rattle. The bridges have been blown.

Back at the billet my good deed has not been appreciated because the bucket has leaked. Sedgewick is frying bacon in an outhouse. Should I go back to Brussels after breakfast or await orders? At that moment Paul Hodgson arrives in the Humber brake with Turner, tired and hungry. He says that the CRE is remaining with the Divisional Commander and Geoffrey is to report to him. I am to take an urgent message to 12 Brigade while he gets some sleep. Set off with Hewitt in my 8cwt; find the village, but no sign of the Brigade Headquarters. Could they have pulled back? There is a signaller winding up wire. As I stop to ask him, a car draws up beside me

with a pink Brigadier Hawkesworth leaning out. "Ah, here's a sapper!" "Sir?" "The bridge at Vilvorde has not been properly blown and I want it done at once. Get in touch with the Royal Fusiliers to provide a covering party". "Right away Sir". No time for me to get hold of the CRE even if I knew where he was. The Vilvorde job belongs to 7 Fd Coy who are in support of 12 Brigade, and their headquarters is only a mile or two away. When I arrive the second-in-command, Vaughan Williams, and Derek Curtis are having breakfast. Gillespie is out at the bridging site. I deliver my message. "Afraid that was coming", said Vaughan Williams, "How much sleep have your section had Derek?" "About three hours." "Go yourself now and contact the Commanding Officer of the Royal Fusiliers. I'll send them along in about half an hour."

I drive off to find Gillespie, making slow progress because the road is now full of refugees observing no traffic rules and abandoning their gear whenever an aircraft appears. Gillespie's truck is standing by the roadside at the folding boat bridge. Everything is quiet. On the far side is a Tetrarch (light tank) of the Inniskillings who are holding the bridgehead for the benefit of stragglers. Smoke from a burning house lies low over the water. Gillespie stands by the waters edge watching two sappers in a dinghy. I report my mission for Hawksworth and he turns on me. "How dare you order my company out! Don't you know there's nothing between Vilvorde and the enemy? The CRE has sorted all this out already." "Shall I stop them?" "Yes, and I will go and see Hawkesworth."

The only way to get to Vilvorde quickly is along the canal bank, Germans or no Germans. I tell Hewitt to go flat out and wish my tyres did not scream so loudly. It takes me half an hour to get to Vilvorde where the road bends round away from the canal. We turn right, up the main street and stop where the 7 Fd Coy working party are having a smoke, their vehicles tucked into the side of the road. I walk towards the canal. At the last bend in the street a Bren carrier is parked at the ready, and opposite is the sign 67 Tac HQ on a brown ground. Stumbling down steps into a cellar I find the CO of the Royal Fusiliers and Derek looking at a map. I report that the bridge was not to be blown again after all. "Well that's that," says Derek "but we think we ought to have a shot at that last girder anyway". The CO is not too keen. He has withdrawn his covering party and re-establishing it might cost casualties. Nobody knew what there was across there now. "I'll check with Brigade," he says. Meanwhile I walk down to inspect the bridges. The main girder on one has not been properly cut but it is impassable to vehicles. There is a rifle shot and a bullet whines overhead. I jump into a slit trench. Nothing to be seen. Return to meet Derek coming up the steps. "All off?" "Yes, back we go!" The sappers stamp out their cigarettes. I follow the convoy back so I can report they are safe, and branch off to Laeken to get some information from the II Corps Report Centre. Nothing there; they have pulled out. Drive on to the former Div HQ office and find nothing but a rear party of CMP who say that everybody has gone back to rear HQ. Something is going on and I had better get back. I postpone my tour of the blown bridges in Brussels.

In the orchard there is another victim. John Stevens, a cold light in his green eyes, is shooting questions at a dejected figure in shoes and ill-fitting battle dress who sits on a chair facing the sun with his eyes bandaged. In the background two CMP lurk hungrily. To their disappointment it turns out that he is a member of the British Embassy trying to get away; he thought he would have a better chance dressed up as a soldier! The news is that we are to fall back behind the line of the Dendre now held by 3 Div.

* * *

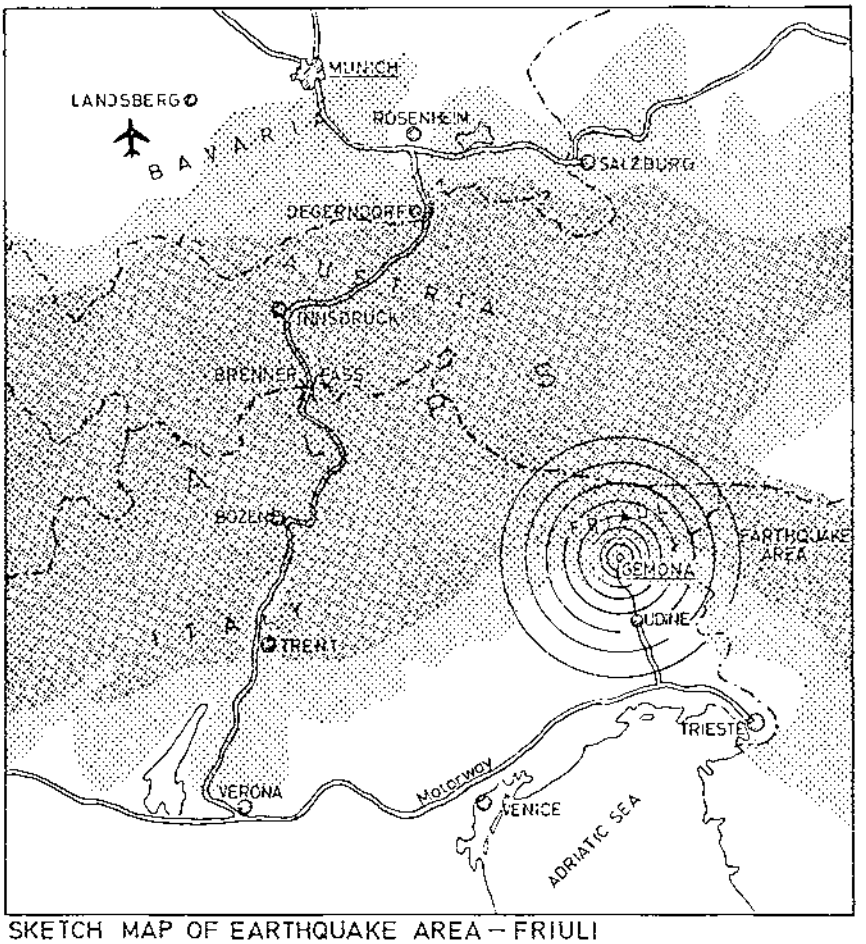
Earthquake Relief in Italy

THE FEDERAL GERMAN ARMY ENGINEERS HELP THEIR NATO PARTNERS

MAJOR CVE GORDON, MC*, RE
British Exchange Officer, Pionierschule, Munich

1976 will go down in history as a year notable for earthquakes—amongst other troublesome events. The loss of life and suffering caused make a sad story but there is at least one bright side which Royal Engineers will be glad to read about, namely, the valuable and successful help given to some of the victims by units of the Federal German Army Engineers.

Royal Engineer units in Germany and elsewhere have doubtless wondered how their National Service German counterparts would respond in an unexpected diaster deployment situation abroad. German units have in the past given a good account of themselves on relief operations on floods, forest fires, etc at home, but it was not until May 1976, and the earthquake in Northern Italy, that engineer units were actually employed outside German frontiers. Though the scale of the operation was not unduly great nor the distance from home very far the German Engineers have shown that they are well able to cope with an operation of this nature.



SKETCH MAP OF EARTHQUAKE AREA — FRIULI

Photo 1. Gemona, Northern Italy. Centre of earthquakes of May and September 1976.

It was at 9 pm on Sunday, 9 May 1976, that the main severe shock occurred, centred on the historic town of Gemona some 30km north of Udine (see sketch map). Widespread destruction, dislocation of communications, 1000 deaths and many casualties resulted. At mid-day on Tuesday, 11 May, the 8th Mountain Division Engineer Battalion stationed close to the northern slopes of the Alps at Degerndorf, Bavaria, received a warning order to deploy to Udine within eight hours. A battalion "O" Group was immediately called and the advance party left for Udine via the airfield at Landsberg at 2 pm that afternoon.

The move of the main body, reinforced with extra plant and operators, took

Photo 2 (left). Typical blocked streets in Gemona.
Photo 3 (right). Bundeswehr Engineers search rubble in Gemona.

Earthquake Relief in Italy 1,2,3

Photo 4. Mobile crane adapted for use as battering ram.

place on 12 May—416 men and 137 vehicles travelling the 620km via the Brenner motorway in eighteen hours without serious vehicle casualties. A further 109 men and 45 vehicles were flown from Landsberg, including the FAG medium wheeled tractors whose low road speed would have unnecessarily held up the main party. On arrival at Udine bivouacs were put up within Cormon barracks 2km south-west of the city.

Meanwhile Italian army, fire brigade, Red Cross and other relief forces had started work in the disaster area. German engineers were allocated their own area of operations within the town and were given the following priorities:

(1) Demolition of dangerous buildings without use of explosive
(2) Road clearance
(3) Preservation of cultural buildings
(4) Assistance to the local population—recovery and removal of personal effects etc.

A summary of the tasks achieved in the three weeks the battalion spent in the area is as follows:

26 road blockages cleared
159 dangerous buildings demolished, including a school
180 rubble clearance tasks
118 shorings-up of buildings
2 reinstatements of collapsed road embankments
22 roof removals
1000 metres of new road construction
9 tent and vehicle parking areas
9 improvised hutting tasks
567 miscellaneous tasks including:
Recovery and removal of furniture, private possessions, machinery, vehicles, antiques, choir stalls, stained glass windows, organ, church bells using CH53 helicopter (plus remounting bells); securing of valuables; clearance of public buildings, two factories and thirty shops.

Arising from these tasks the following points will be of interest:

(a) The restriction on the use of explosives for civilian psychological reasons

Photo 5. Typical shoring-up task.

involved improvisation with ropes, cranes and winches. Crane jibs were adapted by welding on metal plates to enable the jib head to be used as a form of battering ram. Cranes were also used to hoist skilled personnel to retrieve valuables from upper floors.

(b) Whereas the high road speed of the 60 hp dozers carried on tipper/transporters was of value for initial deployment it was found that a more powerful dozer was needed on site.

(c) Teeth fitted to the front edge of the Medium Wheeled Tractor buckets greatly increased the output of these machines.

Photo 6. FAG Medium Wheeled Tractor clearing rubble in Gemona.

Earthquake Relief in Italy 5 & 6

(d) Battalions returned home with 80% of their equipment still fully operable.

(e) Water and electricity supply tasks were executed by the Italians, as well as casualty clearance (disinfectation and removal of corpses, etc). No local sources of drinking water could be used. There was no need for wet or dry bridging equipment.

(f) Four days of rain made sleeping in the mud in sleeping bags uncomfortable. Lilos and camp beds were sought. A 100% waterproof outer garment, like the British poncho, would have been a great help. Tentage scales were inadequate for prolonged operations in bad weather.

(g) Seventeen German-speaking Italian soldiers from South Tirol were attached as interpreters.

(h) Italian engineers operated in a capable manner and carried out a very efficient demolition of part of the new Gemona hospital (sadly damaged in the earthquake) using explosives. Italian staff "O" groups tended to be somewhat lengthy.

(j) Working strain on troops was high due to fifteen hours uninterrupted daily shifts and the danger from continuous minor earthquake tremors combined with the psychological strain of seeing so much human suffering. Withdrawal of the first battalion after three weeks was timely. Some carelessness over safety became noticeable at the end of the period. Troop casualties were narrowly avoided when a cinema roof collapsed. There was only one disciplinary case—a driver decided to set off in his vehicle for Rome but was apprehended in Florence.

Amongst factors favouring the operation one might mention:

(a) Gemona is only 3½ hrs helicopter flying time from Rosenheim. In bad weather the Brenner Pass was used with a refuelling stop at Trento.

(b) Radio communication to base in Germany worked well.

(c) Local purchase was easy to arrange. However there were some snags—eg, lack of German type black bread until an Italian baker in Udine was taught how to bake it.

(d) Good logistic support was available from the Italian Army. However special lubricants had to be supplied from Germany due to trouble over codification.

The 8th Mountain Engineer Battalion (Gebirgspionier Bataillon) was relieved on 31 May by 240 Light Engineer Battalion, from Passau/Bavaria, who remained until all Bundeswehr units were withdrawn on 30 June.

Photo 7 (left). Recovery of church bell in Osoppo.
Photo 8 (right). Road embankment repair on main access route to Gemona.

Earthquake Relief in Italy 7 & 8

Photo 9. Farewell Mass in Gemona Cathedral which was later totally destroyed in the September earthquake.

In conclusion it can be said that although relief operations were well within the capacity of Italian civil and military forces the employment of Bundeswehr engineers provided a valuable demonstration of NATO partnership and solidarity. The Italian authorities have been profuse in their expressions of gratitude for the timely and efficient help rendered by the Bundeswehr.

Sappers in Cyprus 1974–1976

LIEUT-COLONEL F M K TUCK, RE, MA

INTRODUCTION

ANOTHER page of history turns, the defence forces contract a little more and the Sapper presence in Cyprus reduces by another step. Where once there sat a Major-General Chief Engineer now, from 1 April 1976, the senior Sapper is the Major Commanding 62 Cyprus Support Squadron Royal Engineers (with a "by your leave" to the AD Survey who remains with his small directorate). Lest the page should turn unrecorded I feel I should make some attempt to describe the change which has overtaken Cyprus in the last two years and the major differences in the British military presence there.

Cyprus must conjure up many contrasting memories in the minds of my readers —a wartime base, a postwar backwater of the British Empire, the base for the Suez Operations, the scene of a long and vicious terrorist campaign, or the holiday island to which I came with my family at the end of May 1974. What is it like now?—bitter, sad, divided, assets wasted, somehow hopeless, a pawn in the international game and yet in many ways the same. The Greek Cypriots are friendly, not very efficient or punctual; (the Turkish Cypriots are separated from us so difficult to assess); the sun shines; the sea is warm; there are always prospects of a political settlement; Archbishop Makarios is still there; the shops and hotels are mostly open but short of

customers; the Sovereign Base Areas remain and the Army and Royal Air Force stay though sadly reduced in numbers.

THE "PRE-WAR" SITUATION

It is already an effort almost of historical research to recall the picture that was painted for me when I arrived in May 1974. It had been a particularly dry winter after a succession of relatively dry years so that everything looked brown and arid as the last of the wheat was harvested. Meanwhile an aggressive fruit and vegetable farming policy throughout the island had increased the irrigated area enormously over the years and with it, of course, the consumption of pumped water from the aquifers. At the same time the tourist "industry" was just beginning to take off and huge holiday hotels, flowing with water from every faucet, and swimming pools were opening almost weekly. A few years behind was a water catchment scheme with a series of dams completed or planned round the South and West foothills of the Troodos Mountains. This was to be followed by a grid water distribution system.

At Akrotiri was one of the busiest RAF stations in the world with stationed bomber, air defence and transport units with a very large through traffic to the Near and Far East and the administrative support for all these. At Episkopi was the large Near East Headquarters of the Joint Commander and his Army and RAF commands and the associated civilian agencies. While at Dhekelia and Ayios Nikolaos were the Army Garrison Headquarters and the main Army administrative base. The main units were a battalion and a half of infantry, a squadron of armoured cars, a Royal Engineer squadron, the large and important 9 Signal Regiment and administrative units. The total strength was about 10,000 men with 15,000 dependants the majority of whom lived in rented accommodation in Limassol, Larnaca and Famagusta.

The resident Sappers consisted of a CRE with a small Headquarters of nine; an AD Survey with his staff, one Air Survey Liaison Section and a Map Depot; an ADPCC with his staff and a Postal unit (275 PCCU) with its Forces Post Office detachments; and 62 (Near East) Support Squadron RE at Dhekelia which included an Engineer Park and a REME Workshop and had an establishment of 6 officers, 125 soldiers and 137 civilians. There was also an MES staff of one officer and twelve men who held various appointments with the PSA/DOE including a proportion of the staff of the Dhekelia Distillation Plant and Power Station. There was usually one major project in progress involving a special tasking of Sappers from outside Cyprus. In addition we expected two or three field squadron training exercises in Cyprus (from the UK) each year together with several TAVR Specialist Teams and a number of smaller detachments.

Two major projects had just been completed—the construction of a mole and wharf at Akrotiri to replace the one destroyed by a storm a few years before and the building of a twenty-five metre swimming pool at Dhekelia. One other was in progress, a Part II Works Service to construct an electric target range at Akrotiri. (Although delayed by the "emergency" this range was also successfully completed.) There seemed to be no shortage of smaller engineer tasks for works services, for service clubs and for the civil community. There is no doubt that at that time the facilities in Cyprus for resident and visiting engineer units were outstanding whether for project work, trade employment, combat engineer or military training. There was the added advantage of splendid adventurous training and recreational facilities and, of course, the sun and the sea.

THE CYPRUS EMERGENCY—JULY 1974

It is not my intention here to catalogue the events of the Cyprus "emergency". The attempted coup, the Turkish invasion, the cease-fire during the first Vienna talks followed by the further Turkish advance to Famagusta, and then the protracted attempts to achieve a settlement are well enough known. Readers will also recall the anxious periods of uncertainty; the reinforcement of the British Garrison; the part played by the United Nations Force in Cyprus (UNFICYP): the evacuation of

tourists, non-Cypriot residents and of service families; and the sometimes harrowing scenes of Turkish and Greek refugees.

The resulting calls on Sapper assistance were, of course, legion. In addition we shared with other resident units the problems of greatly enhanced guard and administrative duties including looking after our own families and separated personnel. There was never really an IS problem as such so that combat engineer support was limited to the relatively peaceful occupations of constructing OPs, sangars, VCPs, barricades, barbed wire fencing and camp improvement for our own resident and reinforcement units. Most of the work resulting from the "emergency" was carried out in support of and in co-operation with the PSA. Although we expected problems with essential services through the withdrawal of local labour and/or disruption, the fifty-eight individual RE tradesmen who joined us for varying periods between 23 July and 3 September were only occasionally required for electrical and plumbing work. However they and reinforcing troops from 8 Field Squadron, 24 Field Squadron, 59 Independent Commando Squadron and 60 Field Squadron, together with the resident 62 (Near East) Support Squadron, were more than fully occupied with temporary camp construction for refugees.

This was often a thankless task and the Sappers deserve high praise. We could see that the need was great and we have a reputation for uncomplaining hard physical work for long hours in hot, dirty conditions, but our sympathy was stretched when those for whom we laboured refused point blank to help in any way; complained interminably and were never grateful for what was done for them; and showed a primitive and wilful inability to make proper use of the facilities provided (to put the matter as delicately as possible). The task of constructing and improving camps dragged on in what might appear a haphazard way, but unlike disaster relief the matter was highly charged politically and estimates of numbers and length of stay depended on imponderables. We built facilities of varying degrees of permanence for five temporary camps of which two at Episkopi for Turkish refugees (at one time numbering in excess of 10,000) and one near Dhekelia for Greek refugees (at one time about 24,000 were in the base) continued into the rainy season and required a winterization programme. In most cases standard camp-structure packs were adapted for use as toilets, showers, wash benches and cookhouses, while timber and CGI ration stores and slaughter houses were custom built. Electric power from the mains or field generators was distributed by overhead cable, water was piped variously from Braithwaite tanks supplied either from bore holes or existing reservoirs, surface water drainage was dug, while sewage and foul water was disposed of (with some difficulty in the rocky soil) in cess pits and soak aways. The lessons we learnt were not new—for the commanders a good example of co-operation with the PSA/DOE and the frustration and waste of not knowing what was required; for the soldiers long hard hours of dirty work often with poor quality materials and a difficulty in maintaining good standards.

I record a credit here to the Engineer Parks and the transport organizations both within Cyprus and in UK. All our needs of stores and equipment were quickly met and transported, sometimes in unconventional ways. For several months while bases in Cyprus were cut off from each other by road, stores from the Engineer Park at Dhekelia came to Episkopi by Hercules aircraft from the Sapper constructed Kingsfield Airfield, or by Royal Fleet Auxiliary, or by Ramp Powered Lighter. Some were even beach landed at Episkopi.

THE "POST WAR" PERIOD

The majority of the RE work on the refugee camps was completed by the end of November 1974 and the last reinforcement troop departed then, although the Turkish Cypriots remained in the Western SBA camps until early 1975 and some of the Greek Cypriot refugees remain in camps to this day, but mainly under Cyprus Government administration.

Meanwhile limited use began to be made of the remaining training facilities, and

Royal Engineer units being useful visitors were among the first to come. Particularly pleasing were successful visits over the two years by five TAVR Specialist Teams and the TAVR Well Drilling detachment which overcame both administrative and other difficulties in carrying out a large number of small projects and designs in the construction, bulk petroleum and public utilities fields.

During my tour five squadron-sized regular units carried out one-month exercises. In the main they undertook troop construction tasks and plant work either as works services or as amenity tasks for the military or civil communities. Very successful most of these were. I trust I am preaching to the converted in highly recommending this type of training which practises the tradesmen; exercises troop commanders and staff sergeants in planning and executing a complete task; and tests the squadron management in planning, supervision, movement, administration and provision of resources. To list all the tasks would be tedious to the reader if gratifying to the units concerned, however those old soldiers who constructed the water pipeline in the Troodos foothills from Kissoussa to Episkopi will be interested to hear that many of the valley crossings have now been repaired and that water continues to run through it. One squadron task was tackled which proved too much for the exercise timetable. This was the construction of a slipway at Akrotiri to allow the periodic "slipping" of the ramp powered lighters. A combination of bad weather, inadequately supported underwater shuttering, and an over-ambitious time-table resulted in failure. The job was picked up again in April 1976 by an *ad hoc* RE work force and is now complete.

Plenty of good publicity resulted from these various tasks, but I sometimes felt that the old work horse—the resident 62 (Near East) Support Squadron—did not get the credit for the many jobs which it carried out. The sudden reduction in married accommodation when we lost the hirings in Cypriot towns resulted in a large proportion of the unit becoming unaccompanied. To avoid turbulence an ingenious scheme was devised by HQ in E-in-C which linked the squadron with 24 Field Squadron at the RSME. The manpower of a field troop was transferred to the latter who then

Photo 1. Nicosia Airport, showing repairs to the SE end of the main runway.

Sappers in Cyprus 1974-1976 1

Photo 2. Troodos, size II dozer at work in the Paphos Forest.

provided a roulement troop on six months unaccompanied tours to Cyprus. A mixed accompanied and unaccompanied unit is a far from satisfactory arrangement, but the output and morale of "62" remained excellent and they received well deserved praise from all the local Army and RAF Commanders.

Two particular tasks carried out principally by this squadron are noteworthy. The first was the repair of the pavements at Nicosia International Airport during a five week operation in June 1975 after extensive damage to the runways and taxiways had been caused by the Turkish Air Force bomb, rocket and strafing attacks in July 1974. The reinstatement of the pavements to full international standards was a professionally challenging task successfully completed by a reinforced 62 (Near East) Support Squadron as contractors for PSA/DOE. Major John Farmbrough's article on this project "Operation Annabelle" appeared in the June 1976 edition of the *RE Journal*.

The second was carried out as a MACC task for the Cyprus Government. A major forest fire in the NW part of the Troodos Mountains had killed forty square miles of pine forest. Some £6m worth of timber could be salvaged if access through the remote and mountainous area could be quickly constructed. A small team of plant operators with two or three Size II Dozers toiled for some six months in cutting a side hill track through this precipitous country. They lived in a pub in an isolated village and worked with a drilling and blasting team of Cypriots to force the 4km track through the rocky area. It was excellent plant training and a gratefully received hearts and minds exercise at a time of difficult Cypriot/British relations.

PRESENT AND FUTURE SITUATION

Hanging over our heads all the time was an MOD axe wielded with all the vigour of financial cuts in Defence costs world wide, but reinforced by the politically uncertain future of the base in Cyprus and the immediate need to reduce the accompanied strength to match the availability of quarters. This sort of exercise is always a bitter and depressing business with the frustration of writing establishments not to meet the tasks and role of the unit, but to conform to an arbitrary manpower ceiling. The

solution is unsatisfactory but will be made to work somehow. Our loyal Cypriot friends and employees have seen it happen so often before and battle gamely on in our ever smaller Engineer Stores and Parks. In short Cyprus Land Forces commanded by a Brigadier has no HQRE, the future of the Survey Directorate is uncertain, the PCCU is emaciated and able to offer only a limited service, and our field presence is 62 Cyprus Support Squadron RE at the sadly reduced strength of three officers and forty-eight soldiers with eighty-one civilians commanded by a Major who also acts as the Brigadier's Sapper adviser. The MES complement also took a heavy cut to one officer and eight soldiers. The effect of this has been to reduce the Sapper effort to a pitifully low level, but there is still the ability to provide the plant and stores for training, project or operational reinforcement squadrons.

It is planned that two or three RE Field Squadrons will carry out one month exercises in Cyprus each year. It is hoped that the RAF Transport lift will still allow this and in spite of works service economies there is little doubt that worthwhile tasks will still be available. After all, Sapper built means cheaper and better built. At the time the CRE was disestablished on 1 April 1976 a project unit (60 Field Squadron) was arriving in Cyprus to construct a roll on–roll off jetty as an extension to the RE built mole at Akrotiri. (After note: this has now been completed.)

CONCLUSION

The Royal Engineers have had a long and successful association with Cyprus and have left a number of permanent and less permanent marks on the Island. In spite of difficult times resulting both from the intercommunal conflict and our own precarious economic situation the future for the Corps is not entirely bleak. There are good prospects of many further good works projects and successful exercises for both resident and visiting squadrons. Long may this happy association continue!

Everest—Spring 1976

THE JOINT BRITISH ARMY ROYAL NEPALESE ARMY EXPEDITION

MAJOR M W H DAY, RE, MA, CEng, MICE

Sapper dramatis personae: *Major M W Henry Day*
Major Peter B Page
Captain Meryon G Le G Bridges
Lance Corporal Steve Johnson
Lance Corporal Gamalsingh (Support Party)
Major E M Warrick (UK Base)

THE Army Mountaineering Association (AMA) had been waiting for five years to have a go at Everest. An application was made to the Government of Nepal soon after our ascent of Annapurna I in 1970 and was originally understood to have been granted for an attempt in the spring of 1975. Somehow the Japanese ladies got that slot and even the British SW Face Expedition found a vacancy which they wonderfully exploited.

The members had a lot of Himalayan Peaks behind them, and in particular our leader's form was unsurpassed. Lieut-Colonel Tony Streather's ascent of Tirich Mir (1950), Kangchenjunga (1955) and the legendary parts he had played on K2 and Haramosh were known to all of us. Major Jon Fleming had led AMA expeditions to Tirich Mir (1969), Lahaul (1973) and Nuptse (1975). If my great friends Major Gerry Owens and Captain Richard Summerton had survived last year there could have been one man with a grand slam of all the AMA's Himalayan Expeditions. As it was Captain Dougie Keelan and I were the only representatives of the Annapurna I team. Our Medical Officer Lieut-Colonel Dick Hardie and Captain Pat Gunson had climbed the difficult East Ridge of Indrasan in 1973. Corporal "Bronco" Lane, who was to play a key part this year, had also been on that trip together with two more

members of the team. The Nuptse party was of course very strongly represented. Two very strong newcomers were Captain Philip Neame (youngest twin son of Lieut-General Sir Philip Neame, VC, KBE, CB, DSO, late RE) and Lieutenant John Scott who had climbed Lamjung Himal in 1974. Flying Officer Geordie Armstrong and Captain Meryon Bridges had been on the ill-fated RAFMA expedition to Dhaulagiri 4 during the same season. Our team altogether numbered thirty-five climbers.

This was of course a large party but there was a big difference in approach to that of any previous Everest team. Instead of using hired hands to do most of the carrying on the mountain we did that ourselves. We hired only ten high-altitude Sherpas to work above Advance Base in the Western Cwm and a further fifteen icefall porters, only eight of whom actually carried above the lip of the icefall. Our support party of eleven included mail runners and signallers whose high point was Base Camp. Including the Liaison Officer and the Sirdar, Sonan Girmi, (from our Annapurna and Nuptse expeditions), the expedition numbered a total of seventy-three.

The highlight of our preparation was undoubtedly meeting our patron HRH The Prince of Wales. One foggy lunchtime we gathered in a wardroom at Portsmouth where he talked to us—between lectures on how to sweep mines with a ship. Another was a visit to Jungfraujoch to test equipment in obligingly foul weather that buried us in our tents. Then a five-day "non-stop" flight in an RAF VC10 beating the bounds round the United States. The aim of the one and only passenger was to visit Robertshaw Controls in California to learn rather more about their diluter-demand oxygen apparatus. The trip paid off because the sets worked for us though the SW Face party had felt let down by them.

At last to Nepal but via Hong Kong this time where all but a few stragglers were assembled by the end of February. We walked-in in three main parties almost at once and took three weeks to Pheriche which was the acclimatisation base for some fine Alpine style climbing. By 6 April the whole team had reached Base Camp.

The Icefall party of eight strong climbers including Lance Corporal Steve

EXPEDITION MARCH-IN ROUTE

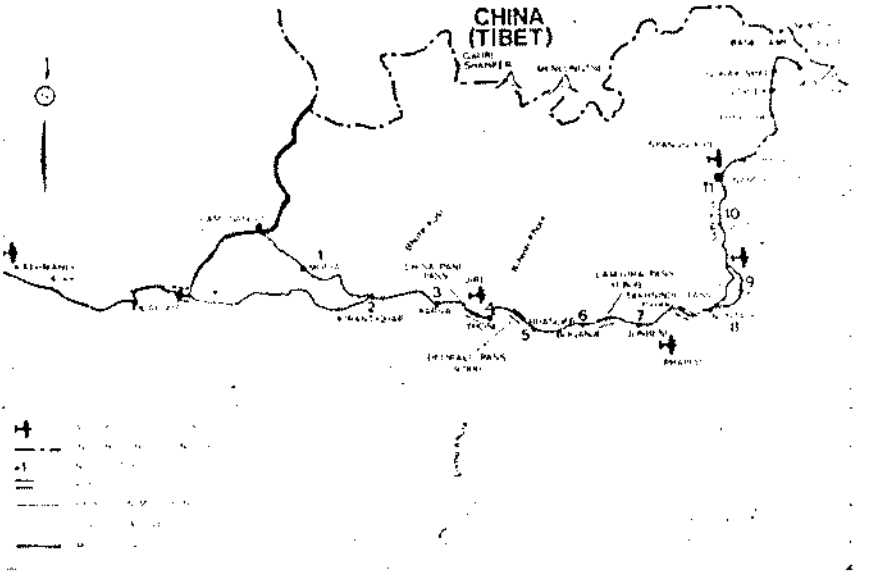


Photo 1. Major Peter Page at ease on the walk in.

Photo 2. Heavy transport on the main supply route. Khumbu Glacier below Base Camp. April 1976.

Everest-Spring 1976 (1 & 2)

Johnson had occupied Base Camp on 24 March and on 3 April placed a camp on the block of ice that had been the British SW Face team's Camp 1 only a few months before. However it soon became clear that the icefall was by no means over. Comparing our photographs with those taken in the winter showed that the camp site had descended at least seventy metres. It took another four days work to make a route through to the Western Cwm. On 6 April my party moved up and sited our Camp 1 reaching Advance Base Camp, Camp 2, in six hours next day. There was a raised track of ice marked by flags still standing from the previous winter expedition. The SW Face was black rock blown quite clean of any snow. There were none of the heavy avalanches into the Cwm from Nuptse and the West Flank of Everest that had been reported earlier, either.

The crevasses were thinly covered as a consequence of so little snow, making the Cwm a deceptively dangerous place. On 10 April Captain Terry Thompson RM inadvertently strayed onto a concealed crevasse dividing Advance Base and fell to his death. This was a great shock to us all and set us back both mentally and

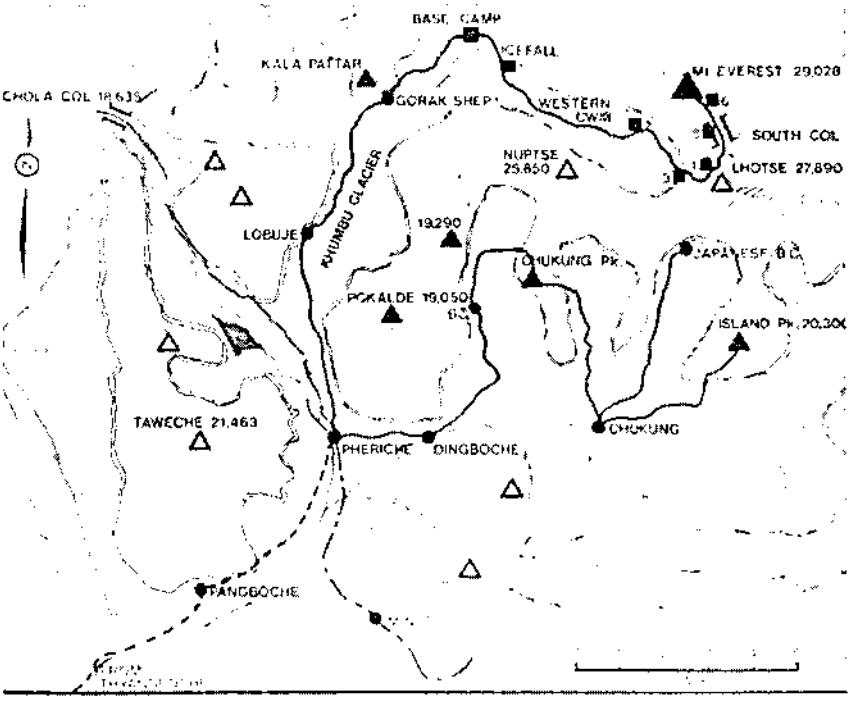


Photo 3. Everest (8848m) in April 1976. The surface still bare of snow. Nuptse, scene of the AMA's tragic expedition in 1975, on right.

materially. In spite of some fine helicopter flying by Commandant Pierre Le Floch we were unable to recover the body to Kathmandu. Terry was buried near the lip of the icefall.

The lowest section of the Lhotse Face proved steep and was well led by Geordie Armstrong. By now we were down to eight Sherpas and about twenty climbing members. It is pleasant to be able to record that no less than seventeen members and six Sherpas carried loads to the South Col. Some oxygen practise was made on this

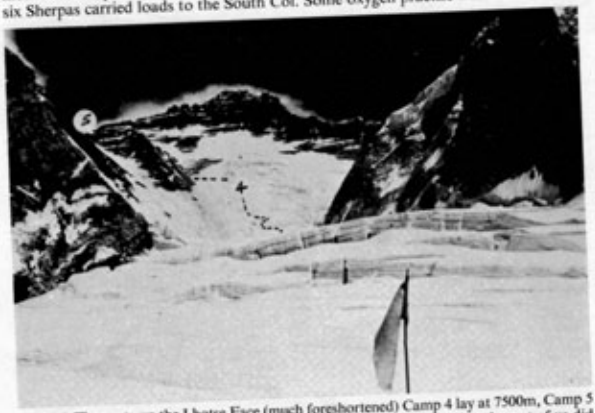


Photo 4. The route up the Lhotse Face (much foreshortened) Camp 4 lay at 7500m, Camp 5 on the South Col at 8000m. No Sherpas used oxygen on this section but the rest of us did (17 members in all).

Everest-Spring 1976 (3 & 4)

lowest section as very few members of the team had used the apparatus in anger. Altogether we had mustered fourteen sets of the sophisticated diluter-demand type and ten sets of the well proven constant flow sets made by L'Appareil Médical de Precision (AMP) in Paris. Oxygen was used at night at Camp 4 at the rate of 0·5 litre/minute and proved most beneficial. Camp 4 was beneath an ice cliff to which clung the tattered remains of the Japanese Ladies' tents pitched the previous spring at a height of 7500 metres.

Progress slowed down about this time. Camp 3 had not been occupied until 24 April although an easy 1½ hours walk to the head of the Cwm from Advanced Base. Camp 4 was not occupied for another five days. There was discussion with the Sherpas about this time as to whether it was on to carry straight through from Advance Base to Camp 4 and back in a day. A number of us did this journey on more than one occasion but it is probably fair to say that it would be too hard to repeat frequently. It is good to be able to report that at least one of the Sherpas, Lakpa Gyaltu, showed a commendable attitude throughout the dispute. He showed all the splendid personal qualities that the Sherpas are famed for.

The great couloir separating the icefall from the Geneva Spur was now traversed and the yellow band attacked at its leftward, and lowest, extremity. It was not clear then how this route compared with that of previous parties. In fact Hunt's party in 1953 had continued up the Lhotse Icefall and traversed in above the yellow band. The line of fixed rope left by the Japanese Ladies' party was later found to run absolutely straight from the place where the Sherpa Traverse ended at the crestline of the

Photo 5. Cold hard graft carrying up the Lhotse Face to 7500m, the limit for Europeans without oxygen. May 1976.

Everest-Spring 1976 (5)

Photo 6. Major Henry Day checking abandoned oxygen tanks on the South Col in beautiful weather 13 May 1976. We found 20 part filled tanks equivalent to 6 of our own full cylinders.

Geneva Spur to Camp 4. There was no rope left showing over the band. Presumably it had been worn through chafing against the rock.

Four days work that involved fixing rope across the couloir and through the band was done by Hardie, Scott, Chris Johnson and Gunson. Then Geordie Armstrong and I took over with Phil Neame and Steve Johnson. It was cold and windy on the face but Geordie bombed up from Advance Base in 3½ hours with a full load of kit. Next day we picked up the line of Japanese ropes just as our own supply ran out and this pointed the way to the end of the Sherpa Traverse. Unless he had been there before there was no way that the particular point on the crest could be found with any accuracy by an ascending climber. It was quite clear that the Sherpa Traverse was discovered in descent. It was also clear that the Japanese Ladies had some good route finders with them!

Having excavated the Japanese rope to within 20 metres of the crest on 4 May, we returned to Camp 4 overnight, leaving next day at 7.30 am and this time were

Everest-Spring 1976 (6)

all on the South Col by 12.30. We found hundreds of cylinders, all that we tested empty of oxygen. Later on I was to find quite a number that were useable and was particularly pleased that the adaptors purchased from AMP enabled us to use them all. Geordie and I arrived back in Advance Base in time for supper at 17.30.

A stout hearted team now took over Camp 4 numbering Meryon Bridges amongst them. They had all achieved personal "bests" by reaching a height of 7500 metres and were to be amongst the vital members of the expedition who carried loads to the South Col. Meryon also undertook the taxing task of camp logistician, ferretting around in the snow to find which oxygen cylinders were full, arranging loads for the following day and then co-ordinating the whole thing over the radio. No mean achievement when your brain is slowly dying off from lack of oxygen and it takes the greatest strength of will to even get out of your sleeping bag. I particularly remember a remarkable "handover" of the camp when I next returned. His tent was laid out as for a kit check with food, stove, radios, oxygen kit in neat rows. The radios in particular were a huge success due entirely to his thorough procurement and expertise.

A week later we were back on the Col as part of Tony Streather's summit plan. There were to be four "official" summitters (Bronco Lane and Brummy Stokes; John Scott and Pat Gunson); Camp 6 would be carried up by four climbers (Armstrong, Fleming, Hardie and myself) and the second pair would be supported by Steve Johnson and Philip Neame. The support climbers could then have a go for the top themselves as circumstances permitted. The logistics were finely calculated and there was enough of everything with a small reserve.

Just then we heard that the Icefall had once again collapsed and we were entirely cut off from Base Camp. Mercifully no-one had been injured but once again the small team who lived at Camp 1, which included Peter Page, were left to sort out the chaos. It took them several days during which the rest of us lived off our "fat".

Photo 7. Captain Meryon Bridges, Royal Engineers.

Everest-Spring 1976 (7)

Photo 8. Corporal Bronco Lane (*left*) and Sergeant Brummy Stokes. Base Camp. April 1976.

It was a thankless task and one fraught with danger. The passage through the Ice-fall has caused more deaths on Everest than all other accidents put together. That Peter and others put up with that strain for over a month without cracking up was a tribute to a very brave and dedicated band. They exemplified the message that came through so strongly on the expedition that a group of mountaineers of modest standing, pulling together, could achieve more than any number of prima donnas squabbling over who should have the glamorous roles.

Of course the thought that all would have a chance to go for the top was wishful thinking. Everest does not lower her guard for four days on end just when you want it. Camp 6 went in at 8400 metres on top of the tent left by the Americans in 1963.

Photo 9. Lance Corporal Steve Johnson, Royal Engineers.

Everest-Spring 1976 (8 & 9)

Bronco and Brummy made the route being comparatively lightly laden. The top section of the couloir leading to the SE Ridge was hard consisting of steep, deep, insecure snow crusted over by the wind. The exit onto the rotten rocks was nasty as was the next twenty metres or so. It was a good lead to have made.

Geordie and I caught up with the leading pair on the main ridge where the first Swiss expeditions had placed a camp in 1952. The going by now was definitely unpleasant. Unconsolidated powder snow lay over rubble and no footstep was firm. Brummy and Bronco both seemed to move in a daze—making separate tracks although roped together. Visibility by now was very poor; no longer could we see the beautiful pyramid of Makalu nor Lhotse behind us. Lhotse had beckoned us for some time and I remembered that Lord Hunt had recommended that we should "have a look at it" if we got the chance. The style of the Swiss ascent of Lhotse in 1956 had been years ahead of its time. Just two men on their own climbing the great cleft on first sight, 800 metres straight to the summit from their tent—a great achievement yet to be fully appreciated. In fact Eggler's book about that climb was for me the text book for planning our ascent of Everest by the South Col route.

The ridge line by now was corniced and conditions made it difficult to tell where snow ended and cloud began—one of us could easily have dropped into Tibet while digging out a platform for the tent. I had found the edge of a blue tent showing through an otherwise uniform slope of snow angled at about 40°. There was no obvious place to head for though there was some discussion that the slope to our left seemed easier. Bronco and Brummy had hoped we would carry up to the top of the South Shoulder at 8500 metres but I pointed out that the third rope was going very slowly, it was already 1400 hrs and we had to dig their tent platform and get ourselves down before dark in obviously worsening weather. I started excavating the snow from above the blue tent and began uncovering yellow oxygen cylinders of familiar pattern—wire wound Gerzat 920 litre cylinders sold by AMP. They were date-stamped 1962 so this must have been the Americans top camp in 1963. My altimeter indicated that we were 400 metres above the South Col which was almost half-way (8848m–8000m) to the top so it would have to do. As it was the second support pair were not back on the Col till about 1700 hrs, not long before dark. The doctor had been concerned about his companion, Fleming, and had closely to supervise the descent especially down the nasty broken rocks leading to the top of the couloir.

The loads had been planned in great detail. Brummy and Bronco had packed and were carrying their own rations and personal equipment including the cylinder of oxygen to be consumed en route. Each of us needed an oxygen cylinder (5kg), oxygen apparatus (1½kg) and the pack and frame to carry everything (2kg). In addition each member of the support party carried a payload of 10kg. In my diary I record that my payload was the assault tent (4½kg) and a cylinder of oxygen (5kg). So none of our packs weighed less than 19kg or 42 pounds. One cylinder was substituted by a sphere at extra high pressure (4500psi compared with 3300psi in the cylinders) which saved 1kg. Bronco chose to use this overnight rather than take it on the summit bid as he had not used a sphere before and did not want to risk being let down. There was an extra rope for the Hillary Step and our lightest radio (0·8kg). We left them with six full tanks of oxygen. In theory they needed 1½ tanks each for the summit and one between them for the night. This left two spare which would be in reserve at Camp 6 for subsequent parties. They also had twenty-four hours reserve of rations and fuel.

I don't remember when the storm began but it was still blowing gale force the following morning. On the Col it was exhilarating knowing the tunnel tents were soundly pitched exactly head to wind, being snug in warm bag, sleeping oxygen working well. Breakfast was by now a well practised routine—Geordie lay still while I promised not to blow myself up again (I had foolishly overheated a butane cylinder to vaporize the gas three weeks before and it had exploded cutting my hands badly). Then the realization. Camp 6 lay exposed on the ridge, a metre from Tibet. The first

radio call was depressing. The assault tent, fine at Advance Base, was not shaping up well. Spindrift had filled it through an air vent now clamped shut with a clip from the oxygen set. They had had a poor night's sleep and morale was low. I relayed this to Tony at Advance Base using another radio (that weighed 1·6kg—hence not taken to Camp 6). He had already appreciated the significance of the delay and wanted the first support party down (leaving the second group on the Col—John Scott and Pat Gunson supported by Steve Johnson and Phil Neame). I remember the disappointment—producing objections (there would be no radio link since the South Col would be unmanned during "summit day" while the second party was en route to Camp 6). But as the morning wore on the radio messages from Brummy and Bronco cheered up, they had dug themselves out, the wind was dropping, they hoped to make it next day. So eventually we four left the Col at 1445 hrs arriving at Advanced Base Camp at 1800 hrs in time for supper. Jon Fleming stayed the night at Camp 4. He had worn himself out with many unselfish carries on the Lhotse Face and was now in need of a good rest.

Throughout the following day, Sunday 16 May, tension mounted. After an early morning radio schedule with Philip Neame on the South Col had established that the summit pair had set off at 0630, no further news was reported until the second

Photo 10. The summit at about 1400 hrs 16 May 1976. The climber is Bronco Lane, photo by Brummy Stokes.

support pair returned to the South Col having carried loads for the second ascent pair to Camp 6. No part of the route above the South Col could be seen from Advance Base in the Western Cwm. The weather was indifferent all day with heavy snow falling in the Western Cwm.

Brummy and Bronco made good progress up wind-hardened névé to the South Shoulder where they once again met unconsolidated snow. Their account from now on became a little hazy. Several hours later they rounded the rock pinnacle on the South Summit. I had passed on Doug Scott's briefing on his bivouac site—ten paces towards Everest from the South Summit, slightly right. They found a cylinder (there should have been two—both empty). If Mick Burke had made it back to that site on 26 September 1975 there was no sign of him now. Photographs they took looking upwards show the whole route to the main summit—the Hillary Step having undergone yet another metamorphosis being part rock and part snow, no sign of a chimney as when first ascended in 1953. At its foot lay an 8 metre length of rope, attached to a deadman belay. Pete Boardman had warned me not to rely on this line as it was poorly anchored. So to the summit where they must have showed great strength of will. For not only did Bronco take photographs with the mandatory pennants but also Brummy read my altimeter and took his heartbeat. The altimeter indicated an increment of 915 metres above the South Col (conventional survey computations indicate 848 metres). Brummy's heartbeat was 98 which seems impressively low.

The descent must have been a nightmare. At dusk they found the part-filled oxygen cylinders dumped on the South Shoulder that morning and scraped a little shelter in the lee of the ridge—only for the direction of the wind to change onto their faces. Changing cylinders proved too great an effort so they shared the last one between them, a few breaths each, alternately. Somehow they survived the night.

Meanwhile all camps were again manned and all communications open. John Scott and Pat Gunson radioed to Phil Neame and Steve Johnson on the Col that there was no sign of the summit pair and this was passed down to us at Advance Base. Regular schedules next morning contained the same depressing news and by 0900 hrs I, and I suspect many others, feared the worst. The second pair set off

Photo 11. The MO, Lieut-Colonel Dick Hardie treats Sergeant Brummy Stokes' frost-bitten nose back at Advanced Base 19/20 May 1976.

prepared for the summit but if necessary to act as a rescue party. At 1000 hrs we heard on the radio that John Scott and Pat had found them frostbitten and half dead struggling out of their bivouac site. Dosing them with oxygen they began their laboured descent that was to last five days for one of them. We were overjoyed. Tony had tears in his eyes and I think most of us had a lump in our throats. "That which was lost is found."

It took the full team to get them down but we were by no means spent. All those who had worked above the Col needed a rest probably down at Base Camp. It would have taken almost two weeks to mount another assault. Many of the members had exhausted themselves carrying on the Lhotse face, a debilitating activity and perhaps they could not be expected to repeat the feat. No one was surprised when Tony announced the inevitable, that the mountain was to be evacuated.

So it was over. The eleventh ascent, the fifty-second and fifty-third climbers to reach the summit. Already two men have repeated the achievement and many more are preparing to try. What had we achieved? As a club we had together done far more of the work of lifting camps up the mountain than has been the case before. Seventeen members carried loads to the South Col as did eight Sherpas. This reversed the traditional proportions. And members carried all the loads to Camp 6. But most of all we have learnt to know ourselves a little better.

An Immortal Name

KONSTANTIN SIMONOV

This short story from the Eastern Front in World War II was translated from the original text by Lieut-Colonel J M Laing MC (RE Rtd) and was first published in "Owl Pie" in 1953. We are indebted to the Editor of "Owl Pie" for permission to republish.

LAST autumn while we were still on the river Desna travelling along its left bank, our "Willis" had a puncture in a most unfortunate place. We were stuck near a temporary bridge which was being built across the river and we had to wait for half an hour practically on the river bank itself while the driver pumped up the tyre.

During the half hour we were sitting there three or four German aeroplanes came over twice and dropped some light bombs around the crossing. The first bombing was quite normal so the sappers who had been working on the crossing dropped down where they were and waited lying on the ground until it was all over. The second time, the last German plane remained alone in the sky and continued circling ceaselessly over the river. After enduring this tiresome buzzing for some time the dark little sapper major in charge of bridge construction jumped up and began to swear violently.

"They'll go on circling like that all day," he screamed, "and you'll just go on lying there, but the bridge will stand still, too. After the war it will be immaterial whether such a bridge gets built or not. After the war we could build a railway here. But now time is important. Get to your jobs!"

One after the other the sappers rose and with a glance up in the sky continued with their work. The German circled round for a little longer, then, realizing that his droning round had ceased to have any effect, dropped his last two light bombs and flew off.

"Now he's disappeared," the major shouted gladly, dancing on the edge of the bridge, so close to the water that it seemed he was just about to fall into it.

I would most likely have forgotten altogether about this small episode but several occurrences later on reminded me of it. Later in the autumn I was once more at the front, still going in the same direction, first of all on the Dnieper and then beyond it. I had to catch up with the army which was far away and still advancing. On the way there was one name which kept hitting me in the eyes and which seemed

an indispensable adjunct to the road. It was sometimes on the wall of a hut, sometimes written on a piece of plywood nailed to a telegraph pole, or sometimes written in chalk on the armour of a destroyed German tank: *Mines cleared—Artemiev*, or: *Bridge repaired—Artemiev*, or *Road reconnoitred—Artemiev*, or: *Diversion to the left—Artemiev*, or finally simply *Artemiev*, with an arrow pointing forwards.

Judging by what was written on the signs, it was not difficult to guess that this was obviously the name of one of the sapper commanders who had gone forward from here with the leading units clearing the way for the army. But this time the inscriptions were particularly frequent, detailed, and, what was most important, always corresponding to the facts.

Having covered a good two hundred kilometres accompanied by these signs, I remembered that small dark major who was in charge of the bridge construction on the Desna while being bombed. And it suddenly struck me that perhaps he was indeed this mysterious Artemiev in the role of a sapper guardian-angel for the advancing troops.

On the banks of the Bug that winter during *Rasputitsa*—the bad season for roads—we spent a night in a tiny village where a field hospital was located. That evening we gathered round the fire with the doctors, sitting about and drinking tea. I cannot remember why, but I started talking about those signs on the road.

"Yes, indeed," said the head of the hospital, "we must have come about five hundred kilometres following those signs. A famous name! In fact so famous that it is sending some women off their heads. Now, now, don't get angry, Vera Nikolaevna, I am just joking." The head of the hospital turned towards a young woman doctor who had made an angry protesting gesture as an answer to his words.

"But please don't joke about it here," she said, then turned to me: "You are going further no doubt?" "Yes." "They laugh here at what they call my superstitious premonition, but you see I am also Artemiev, and I think that these inscriptions along the road have been left by my brother." "Your brother?" "Yes, I lost track of him at the beginning of the war, since we parted right back at Minsk. Before the war he was a road engineer, and that is why it seems to me that it must be him. Apart from that I just believe it is."

"She believes it all right," interrupted the head of the hospital, "and she gets so angry because whoever it was that left the signs never added any initials to his name." "Yes," agreed Vera Nikolaevna simply, "I feel very hurt about it. If only the signature read *A N Artemiev*—Alexander Nikolaevitch—I would be completely convinced."

"Do you know what she did?" the head of the hospital chipped in again. "Once she added underneath one of these inscriptions *Which Artemiev? Not Alexander Nikolaevitch? His sister is seeking him; her address is field post office 0390 B.*"

"Did you really write that?" I asked her. "I certainly did. Only they all laughed at me and assured me that sappers seldom go back along their own tracks. I know that is true, but just the same I wrote on the sign. . . . When are you going forward?" she continued. "Please ask at every opportunity in the divisions and you might suddenly run into him. And now I'll write the number of our field post office for you. If you do recognize him, do me the favour of dropping a line, will you?" "Of course I will."

She tore off a scrap from a newspaper and, having written her address on it, offered it to me. While I was tucking the scrap of paper inside the pocket of my tunic, she followed my movements with a look as though she was trying to see right into the pocket and reassure herself that the address was really there and had not disappeared.

The offensive continued. Beyond the Dnieper and on the Dniester I kept on meeting the name Artemiev: *Road reconnoitred—Artemiev. Crossing repaired—Artemiev. Mines rendered harmless—Artemiev.* And once again simply *Artemiev* with the arrow pointing forward.

In April, in Bessarabia, I was with one of our rifle divisions. There, in answer to my questions about the name which interested me so much, I suddenly heard from the General these unexpected words: "Yes, indeed, Major Artemiev is the commander

of my sapper battalion. A remarkable sapper. Why do you ask? Have you often come across his name?" "Very often." "Yes, and you still will. He carries out reconnaissances not only for the division but for the corps and the army as well. His trail always leads forward. His is a famous name throughout the army, although few have actually set eyes on him because he is always further forward. It is a famous name, one might even say immortal."

Again I recollected the crossing of the Desna and the small dark major, so I told the General that I should like to meet Artemiev. "You will have to wait for that, unless we have some temporary check. At the moment you won't meet him—he is up forward somewhere with the reconnaissance units." "By the way, Comrade General," I said, "what are his other names?" "Alexander Nikolaevitch. Why do you want to know?"

I told the General all about the meeting in the hospital. "Yes," he affirmed. "I think he must have come from the reserve, although today he is such a warrior that he might have served a hundred years in the army. I'm sure it's the same one."

That night I dug in the pocket of my tunic and found the fragment of newspaper with the field post office address of the hospital. I wrote Dr Artemieva a few words about her premonition and how it had been confirmed. I also said that soon she would have covered one thousand kilometres on the trail of her brother.

A week later I had cause to regret that letter.

It was on the far bank of the river Prut. A bridge had not yet been built, but two rafts working like fine clockwork mechanisms were being ferried across from one bank to the other regularly and continuously. Coming up to the left bank of the river I noticed an inscription on the shield of a knocked-out German self-propelled gun: *Cross here—Artemiev.*

I crossed the Prut on the slow ferry and landing on the bank looked around, involuntarily trying to find the same familiar sign. Twenty paces away, on the slope of the bank itself, I saw a freshly built mound with a carefully made wooden pyramid on it. Nailed to the top of this and underneath a tin star was a small square board. On it was inscribed: *Here is buried Major A N Artemiev, who died the glorious death of a sapper during the crossing of the river Prut.* Under this was written in firm red letters: *Forwards, to the West!* A photograph was stuck to the pyramid under a square of glass. I glanced at it. The photo was old, with worn edges, probably having been for a long time in a tunic pocket, but still possible to recognize: it was that same small dark major whom I had seen more than six months ago on the crossing over the Desna.

I stood for a long time at the grave. Many varied thoughts surged inside me. I was sorry for his sister who had lost a brother, perhaps without having even received my letter saying she had found him. Then some sort of feeling of solitude captured me, too. It seemed that there would be something missing on the roads without the familiar sign *Artemiev*, and that my noble travelling companion, who had guarded me all the way so far, had disappeared. But what was there to do? In war one must willy-nilly accustom oneself to death.

We waited until our car was unloaded from the ferry, then drove on further. After fifteen kilometres, at a place where deep ravines ran down from both sides of the road, we noticed a whole pile of German anti-tank mines heaped up on each other like enormous lozenges. On a solitary telegraph pole was a small plywood notice with the inscription: *Road reconnoitred—Artemiev.*

Of course, there was no miracle about this. As in many units where the commander had not changed for some time, the sapper battalion had grown used to calling itself Artemiev's battalion. The men in it honoured the name of their fallen commander by continuing to open roads for the army and write down his name wherever they had passed. When I kept on meeting the same immortal name on signs ten, thirty, even fifty kilometres after that, it seemed to me that at some time in the not too distant future on the crossings over the Niemen, the Oder and the Spree I should still be meeting little plywood notices saying: *Road reconnoitred—Artemiev.*

Sappers and the Soviets

LIEUT-COLONEL D R WHITAKER RE, MA, FINuc E

IT goes without saying how important to soldiers the study of intelligence, both long and short term, always has been. Sometimes in peacetime, however, the advantages which can be gained from a deep study of a potential enemy tend to become overlooked and my aim in this short article is to highlight some of the facets of peacetime intelligence about the Soviet Union and the Warsaw Pact armies which will help us to defend ourselves against them should that unfortunately become necessary.

As Sappers trying to stop an enemy moving and fighting we must first of all study their main arm tactics, doctrine and weapons. For example, we have got to know in some detail how easily their main battle tank can get across obstacles and also what an armoured unit looks like in the attack. An extension of this is to know what their next generation of armoured vehicles is going to be like and if they intend to stick to their present day tactics. Then we need to know something about the general environment in which they fight, for instance their use of electronic warfare, so that we are not caught by surprise in, say, a bridging operation because we suddenly discover that our radios are jammed. Finally, we should study Soviet engineer equipment in order that we can learn from it. They have had some quite exceptionally good items for many years now and seem likely to retain their substantial lead over us in this field.

First then what is their overall doctrine? Well, of course, it is based on the massive use of armour, supported on the ground by mechanized infantry and large amounts of artillery and in the air by large numbers of modern aircraft. The air defence is such that it is wise to assume that for a lot of the time they need not fear attack from the air. They will also be thoroughly supported by excellent communications, engineer troops, and specialists engaged in such things as electronic warfare. The weapons and equipment they use are now technologically very advanced and the lower formations are not too bothered about logistic considerations, because the doctrine is to bring fresh formations into the battle to replace those which have fought themselves out. Most of the soldiers fighting this battle will be conscripts or reservists with a maximum of two years' soldiering behind them but they will be led by very professional officers and senior NCOs, they will be thoroughly trained and will have exercised realistically very often for the limited tasks they have to perform as individuals. Such a terse statement of the facts is, of course, an over-simplification and for anyone who wants to look at this side of the Warsaw Pact armies more deeply there are plenty of publications which deal with it, but it should be enough to set the scene for this article. The main point to grasp is their dependence on large numbers of AFVs of all kinds, which will have to be stopped somehow.

The chief character on this stage at the moment is the Soviet medium tank T-62, although T-72 is already appearing and, having better mobility, requires watching.

Photo 1. ". . . how easily their main battle tank can get across obstacles . . ."

Sappers and the Soviets 1

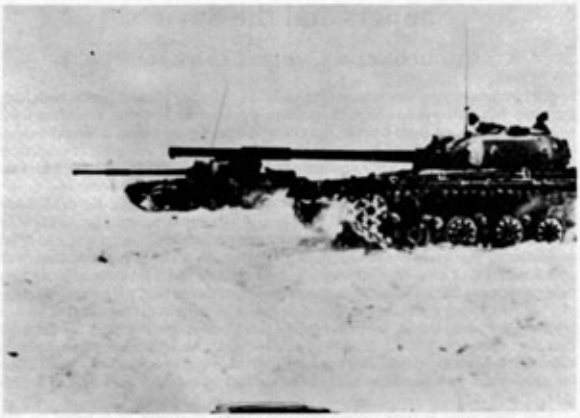


Photo 2. ". . . although T-72 is already appearing . . ."

The selected troops who come at us first will all be equipped with this, although there are many lower category formations, particularly in the junior partners of the Warsaw Pact, who still have the older T-54/55 tanks, though the mobility characteristics of the two are not very different. T-62 is not a tank which would suit our own concept of operations. The Soviet tactical doctrine which emphasizes speed, manoeuvre and massed fire power has called for a tank with greater emphasis on mobility than on the protection to which we give first priority, and it is this which concerns us most as Sappers. It has a ground pressure of 11·4lbs/sq in, using old units, which is rather better than Chieftain and only slightly worse (0·3lbs/sq in) than our AFV 432 APC. It has a high speed across country, limited probably only by what the crew can take in the way of bumping, but officers who have driven both say that it is not as agile a tank as Chieftain because the manual gear change is hard work. Because it is comparatively light, bridges and ferries can be of a lower load classification than we require, though this is of less importance than it would be to us because all Soviet MBT can, and do, deep wade using a schnorkel. It will negotiate a step of 0·8 metres, a gradient of 32°, a trench of 2·7 metres and has a ground clearance of 0·43 metres which, ignoring mine warfare, is all the information a military engineer should need in order to work out how to stop it, and where it can or cannot go.

BMP, which is a true MICV and not just an APC, is the other important vehicle which we will have to stop. Although it has already been in units for eight years and will therefore have beaten our own MICV into service by a generation of soldiers, it is really still a remarkably advanced vehicle. The weapons it has been given to fight with have been well described in many a publication and, with its mobility, make it much more of a light tank than an APC, though its armour is not much better than AFV 432. The facts we want to know about this vehicle are that it swims quite well, though not very fast and without too much freeboard; it has a ground pressure of 7·4lbs/sq in, which is not so good as Scorpion; it will go up a 30° slope and a step of 0·8 metres, and cross a trench 2 metres wide. In addition, it has a very full system for ensuring that the whole of the inside of the hull is kept free from chemical agents and nuclear fallout dust while it is motoring through a contaminated

area, so that the crew can operate their weapons freely.

Of course, there are plenty of other armoured fighting vehicles in the Soviet inventory, some of them a lot older and not so good as the two I have described, but these will be replaced all too soon by more up-to-date vehicles with performances comparable to BMP. Amongst these are specialist reconnaissance vehicles, self-propelled field artillery pieces, self-propelled SAMs and AAA and so on.

In common with all armies, Warsaw Pact formations will become very vulnerable every time they come up against a water obstacle. The Soviets have recognized assault river crossings as routine operations of war for many, many years and practice them on most of their peacetime exercises. Their doctrine is that such a crossing should be carried out from the line of march, without pausing either before the obstacle or in the bridgehead and with little slackening of offensive impetus. They will first carry out extensive active reconnaissance of the obstacle on the full front of the formation involved although, of course, it is probable that a lot of this work has already been done in peacetime, since they are the ones who will choose the battlefield. A division will select up to half-a-dozen crossing points for amphibious vehicles, the same number for tank deep wading, perhaps half the number for ferry sites and one or two for bridge sites, and these will be well spread out to make

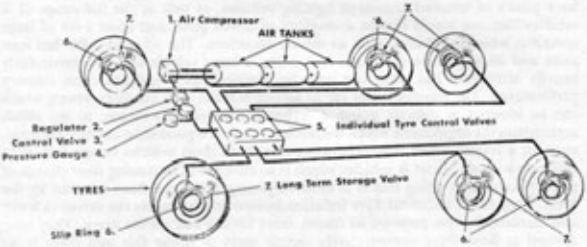


Photo 3. ". . . they call it a Central Tyre Inflation System . . ."

detection and attack of them more difficult. The characteristics they will look for at these sites are easily forecast, based on the limitations of their equipment, and anything we can do to disrupt the more obvious sites will naturally slow down their operation. Wading and swimming vehicles will have all the well-known difficulties of getting out of the water and they have not so far developed a specialized vehicle for helping them out. Tall, thin and rather delicate schnorkel tubes are vulnerable and the crew is at risk for the 15-20 minutes for which they have to dismount to make the preparation for an underwater crossing. Nevertheless, there will be so many places where these techniques are used that we are unlikely to be able to close them all. Ferry sites will be difficult to inhibit but their floating bridge, PMP, although it makes stringent demands on launching sites and ramp conditions, is so flexible and fast to build and move that it will be a real problem to stop them operating it.

Tank traps as such have been out of fashion for many years but in the early stages of the Syrian advance in the Golan in 1973 a trench dug by the Israelis was very effective in slowing down their advance. Whilst it would be absurd to consider any kind of Maginot Line type of obstacle, the experience did prove that carefully designed and sited physical obstacles may still have a limited part to play in armoured warfare.

Tracked vehicles are not the only things that have to be stopped and the Soviets have plenty of wheeled armoured fighting vehicles, as well as the full range of B vehicles that one would expect, a majority of towed guns, and quite a lot of large specialist wheeled vehicles, such as missile launchers. The wheeled APC has four axles and an engine on each side and, being a large vehicle and not particularly heavily armoured, has what can only be described as a brilliant cross country performance. The wheeled scout car in service is fitted with auxiliary wheels which can be lowered in difficult going, a technical complication which, to my mind, accentuates the importance which the Soviets place on a good cross country performance for a vehicle which they believe needs it. Both these vehicles have a feature in common with all Soviet B vehicles which is so effective in increasing their chance of getting across soft going that it is most surprising it has not been adopted by the West. They call it a Central Tyre Inflation System and it enables the driver to lower and increase the tyre pressure all round, from his cab and on the move. They have devised at least three comparatively simple ways of doing this and there is no particularly high bill to pay for the system in terms of maintenance or cost. Combined with the large balloon tyres which they very often fit and the locking differentials which their B vehicles also have they get draw-bar pulls out of their vehicles of perhaps twice what we would expect to get out of an equivalent Western vehicle. Any plan of ours, therefore, to get their wheels off hard surfaces would have to judge the going that we are trying to force them on to by totally different standards to those we would apply when thinking of our own wheeled vehicles.

I suppose the field in which Sapper pits his wits against the opposition Sapper most directly is that of mine warfare. The advantage ebbs and flows from layer to breacher with each succeeding generation of equipment. The advantage at the moment appears to be with the breacher, largely because he has plenty of time to design his equipment against mines which, not being expendable in training like artillery ammunition, tend to remain in service for a great number of years. The Warsaw Pact are, for obvious reasons, much more interested in breaching mine fields than in laying them, though with their usual thoroughness they pay plenty of attention to both sides of the game. Their mines do not appear to be particularly advanced technically although they write quite openly about their development of, for instance, blast proof mines. They have laid mines mechanically, using trailers, for many years and now have an armoured tracked mechanical mine layer in divisional engineer battalions. They are particularly good at laying very rapidly small minefields in the likely paths of counter-attacks, using standard densities and spacings. I do not believe there is much we can learn from them about mine-laying, but what is surprising, in view of the tremendous importance of this subject to us, is that there is

Photo 4. ". . . the field in which Sapper pits his wits against the opposition Sapper most directly is that of mine warfare."

not much we could teach them about it either. It is on mine breaching that the Russian has concentrated his efforts for many years. He decided long ago that if he was to keep up his rate of advance when hampered by mine-fields, the only way to deal with them would be with a heavy mechanical or explosive fist. They have delegated the breaching of fields largely to the tanks themselves and their aim is that one tank per platoon should use its mine plough, or perhaps "comb" is a better description, to lift and throw to one side all the mines designed to go under its tracks. Of course they realize that such a simple device, effective though they have clearly found both generations they have used of it, cannot be the full answer. A plough in the raised position makes little difference to the mobility of a tank but it is clearly

Photo 5. ". . . and now have an armoured tracked mechanical minelayer . . ."

Sappers and the Soviets 4 & 5

undesirable to have tanks ploughing for long distances before they even reach a mine-field. Except on the occasions when a plough fails dramatically enough for a mine to be detonated, it gives no indication that mines are in fact being cleared, since you cannot see them from a closed down tank, so that some form of reconnaissance has been found to be necessary. It is to do this job that they appear to have relegated the mine rollers, which preceded the plough as a method of clearance. A mine roller clears by detonating a mine so it is obvious when you have arrived in a field and some such signal like "ploughs down" can be given. The roller tank itself can lower its plough and I imagine that even in a mine-field of advanced fuses the plough and roller together should successfully make a breach. Breaches are widened by towing Bangalore Torpedo type linear charges through after the initial lane has been made, and detonating them. In addition to this, however, the Warsaw Pact countries have developed several Viper type explosive hose clearing methods which will be of use in particular situations, such as river crossing operations, but which presumably could be used, should reconnaissance discover a mine-field full of very advanced mine fuses, to proceed a roller plough tank. It would have to be a very clever mine which survived an explosive hose, a mine roller and a plough and yet detonate under a tank! I can thankfully leave the defeat of such aggressive clearing methods to those whose job it is to think about such things, but I would remind them that Soviet tank crews are as human as any other; they will presumably still do their utmost to avoid entering anti-tank mine-fields, particularly since they must know that a little subtlety and thought in the exact positions in which individual mines are laid can help to frustrate these mechanical clearing methods.

Four last points about Warsaw Pact mine warfare. First, it looks as if RDMs will cause them few headaches to clear; second, they must be well aware of even more advanced methods of breaching, such as fuel/air explosive techniques; third, if mines are going to have to be virtually hand laid in selected positions in order to be effective, it will take longer to lay them; and last they have surely already won a part of the cold war by making us use mine fuses of exceptionally high cost.

As Sappers, there are not many things we can do to counter the use of bridging equipment by an enemy, but we can study his bridges to see what we can learn from them. Warsaw Pact support bridging, both floating and dry span, relies on a totally different design concept to any of our own, largely because they can afford a full range of specialized bridges, and need not compromise therefore over their characteristics. Their floating bridges are of the ribbon type, that is to say they consist of a

Photo 6. ". . . with the first span built out as a sort of jetty . . ."

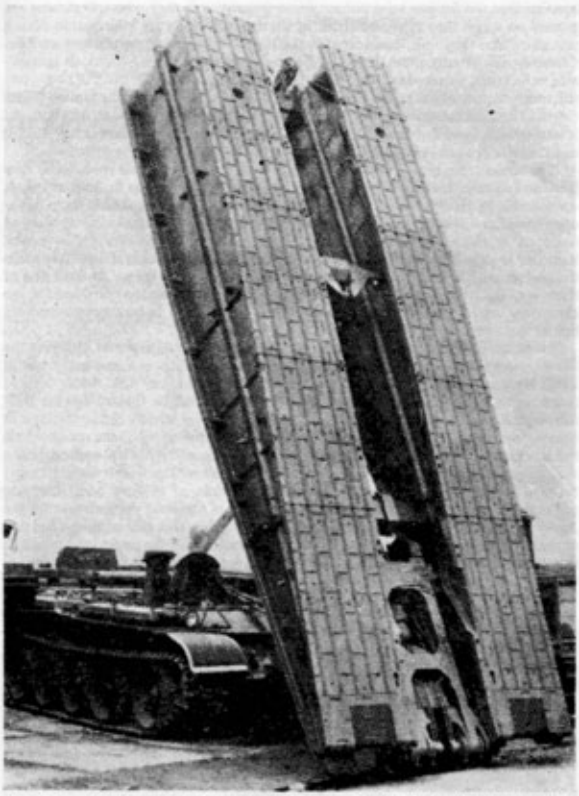


Photo 7. ". . . they have given themselves the choice of both cantilevered and scissors type spans"

very large number of small pontoons side by side across the whole span rather than bigger pontoons with small bridge spans between them. Their dry bridges consist of short, completely prefabricated spans with built-in trestles at one end, with the first span built out as a sort of jetty and subsequent spans launched one after the other until the bridge is right across the gap. Now both types of bridges appear to have obvious and inherent weaknesses; a ribbon bridge allows no water to flow between piers so that a strong current or objects floating down stream will have much more effect on it than on spaced pontoons; a dry span with an integral pier, even though it may be adjustable, relies on the gap not being too deep. Nevertheless, the fact

remains that the Soviets have chosen these systems, it is they who will choose the ground on which they fight and about which they can easily get information during peacetime and they must consider that the limitations are not particularly serious. Certainly the systems allow them to achieve remarkable bridging times, so remarkable in fact that, even today, when there is irrefutable proof of the truth of them, one still meets Sapper officers who do not believe them. Certainly, also, the United States Corps of Engineers has swallowed its pride and, fifteen years after the Soviets brought it into service, have introduced their own version of a floating ribbon bridge, and it must remain one possibility for our own Bridging for the Eighties programme.

The Soviets also have a very full range of L of C bridging. This tends to be very large and to cater for rail as well as road, while still being able to be built at speeds comparable to Heavy Girder Bridge. This type of bridging will enable them to reopen their lines of communication quickly whatever kind of interdiction we attempt to impose on them by destroying even the largest bridges. The Soviets also have tank launched bridges for the intimate support of armoured advances and they have given themselves the choice of both cantilevered and scissors type spans. At least one of these is of light alloy, and very advanced metallurgy has given it a good span at the class they desire. Of course, they have an advantage here in having considerably lighter tanks to cater for.

There are all sorts of other things that as a Corps we can learn by studying the Soviets; it goes without saying that specialist Sappers such as those employed in EOD have to make a detailed study of Soviet ammunition and fuses; airfield constructors need to know the kind of weapons that will be thrown against their runways, as well as, perhaps, learning from the way the Soviets repair damage to theirs; there must be lessons to be learnt both from the design and the use to which the Soviets put their armoured engineer tractor. The possibilities are endless, and a very large amount of the information needed is available. The Corps seems recently to have forgotten its traditions as the great inventors of military hardware, and neglected its responsibilities in the engineering side of weapons procurement for the Army as a whole, but for those who do get involved in this side of things a detail study of the threat to the weapon system being designed, of the target against which it is being designed, and of the equivalent equipment in the Warsaw Pact inventory must be absolutely essential. The West knows much more than is generally supposed by the average regimental or staff officer about Soviet tactics and weaponry, and the

Photo 8. ". . . the use to which the Soviets put their armoured engineer tractor . . ."

information is routinely put in publications which reach all corners of the services, even if they are not necessarily studied as much as they should be. Far too many officers appear to rely on that part of the commercial press which deals with militaria for information about possible enemies, and such information is always incomplete and often inaccurate. Perhaps this article may encourage people to seek out the information which is available within the Services and start the very interesting study of the people who are the *raison d'etre* for our having an army at all.

The Experiences of an "Instant Officer"

SECOND LIEUTENANT G D PHILLIPS RE

TWELVE months ago I was still at school—today I am about to relinquish my commission as a Short Service Limited Commissioned (SSLC) Officer in the Royal Engineers. A lot has happened to me during this last year and I thought that, despite the fact that this *Journal* normally contains learned engineering articles written by senior eminent officers, it might interest some people to hear of my experiences.

I was at school at Brighton College. I sat the entrance examination for Cambridge University last November and was accepted by Magdalene College to read engineering commencing in October 1976. I therefore had nine months to kill. I had been awarded a Army Scholarship in November 1973 and so I thought that it would be a good idea to apply for a SSLC. This commission is designed to give people who are waiting to go to University a "look see" at the Army with the minimum amount of training.

I attended the Regular Commissions Board—three surprisingly enjoyable days in January 1976 and was called forward to Sandhurst at the end of January at only two days notice. This was my first introduction to the Army's demand for quick reaction for I was with my parents in Germany at this time and if I had not anticipated the call forward and already booked a flight to the UK I might well have been late for my very first parade, as it was all was well. Sandhurst was great fun with plenty of activity and many new things to experience. We learnt to drill and march—even to slow march; we learnt to speak over radios; to fire rifles and machine guns although not very well in that short time; we learnt to clean and to polish and we learnt a little about the responsibilities and duties of an Officer, but most of all we learnt how little we knew about the Army, its ways and its traditions. The three short weeks of training were over almost before they had begun, and I found myself reporting to the Royal School of Military Engineering at Chatham along with three others for a Young Officer (YO) course. The course lasted four days and my main memory was of the horror of seeing the fire damage to the main dining room of the HQ Mess. My father had shown me around a year or so earlier and I had been most impressed—I only hope that sufficient funds can be found to restore the mess to its previous glory.

After four days introduction to the Corps we were sent to our respective units. It was with a lot of apprehension that I reported for duty to 39 Engineer Regiment (Airfields) at Waterbeach, but on passing through the gates I had little time to think, let alone worry. A quick tour of the barracks, a visit to the QM, attendance at a Ladies' Dinner night (thank goodness I bought that dinner jacket) and then off with the CO, Lieut-Colonel J N S Drake, and my OC, Major D Verschoyle, to join my Squadron, 51 Field Squadron (Airfields), who were on Bridging Camp at Wyke Regis—all in two days. I was attached to 2 Troop under Lieutenant Chris Slee. I spent the week humping pieces of HGB, MGB and heavy ferries and trying to get to know the troop and how it worked. We also did some shooting and I was thankful for those long cold mornings we had on the ranges at Sandhurst, for here was something that I knew a little about.

Upon our return to Waterbeach everything slowed down and I fought to understand the routine of Regimental life. Like the lull before a storm, the Squadron was

quietly preparing for a three month tour in Gibraltar where we were to carry out concreting and other work to assist the Property Services Agency (PSA). I suddenly found that, understandably in view of my lack of training and experience, I had no specific responsibilities. I spent my days reading files and DCIs and magazines in an attempt to learn more about the Squadron and its tasks, the Royal Engineers and the Army. Time went dreadfully slowly however and after the responsibilities of a Prefect at school and then the frenzied activities of Sandhurst and Bridging Camp I suddenly began to get bored. My OC gave me the job of reorganizing the Squadron library and amending all the pamphlets. This certainly showed me the information that was available and where to find it, but I felt like a overpaid librarian and not an Army Officer. I started to get depressed—39 Regiment was obviously a good unit which was running smoothly—it did not need me and I had nothing in the way of knowledge or experience that could help the Regiment. In spite of everyones' efforts to make me feel "at home" I felt I was an odd man out. I was given jobs which in themselves were interesting, such as accompanying a sapper to court and saying a few words in mitigation of sentence, but I still felt that I did not belong.

I was sent to the RSME at the beginning of April to "sit in" on an NCO's Site Organization and Control Course. This was designed to prepare us for the PSA tasks in Gibraltar and although I could add very little to the discussions, it was my first introduction to "Engineering", albeit very basic engineering. I learnt a lot which was to be of great help when we arrived in Gibraltar.

On my return to the Regiment, I applied for a Free Fall Parachute Course at Netheravon in Wiltshire. I went for three weeks over the Easter break period, but due to bad weather could only make eight jumps and not fifteen which was the normal maximum. This was a very good course and great fun. To my surprise and delight there were several 2nd Lieutenants from Sandhurst whom I had met previously, and also one who had attended with me an adventurous training course in the Rocky Mountains of Canada, the year previously. We all found the parachuting exhilarating and I must admit frightening on occasions. Just after my fourth jump a Sergeant in the Royal Signals had a malfunction on his main chute and failed to open his reserve. He unfortunately died. I think that I grew up a little on my fifth jump.

After the parachuting I was sent to Aldershot to take part in the Royal Engineers Rifle Association (RERA) Annual Competition with the Regimental shooting team, as the non-firing team Captain. I was happy again with a job and responsibility. I studied the rules for the shoot and managed to make two objections, when I thought that our team had been unfairly treated, and got a re-shoot on each occasion. I also actually fired in two details when one of our team was not available.

On our return to Waterbeach after the shoot, all were "at action stations" in the Regiment with final preparations for Gibraltar and also preparations for the annual Fitness For Role (FFR) inspection. Once more I found myself without a specific job and I realized that if I was to enjoy Gibraltar I must persuade my OC to give me a job of my own with some men to do it with.

In Gibraltar 2 Troop were tasked with two jobs. The main one was the renewal and modernization of the valves and piping system in a tank farm, and the secondary one was the construction of reinforced concrete steps. The latter was a job I felt I could handle, but firstly I had to learn how to mix and place concrete—at this stage I had a tendency to call it cement!! I purchased from the Cement and Concrete Association (Wexham Springs, Slough, SL3 6PL) a set of their *Man on the Job* Leaflets and their book *Concrete Practice*. These publications are relatively short, but what is more important, they explain in very basic terms the principle of mixing and laying concrete, the fixing of steel reinforcement and shuttering etc. These books were invaluable and gave me the confidence to ask the OC to let me have a go.

As luck or fate would have it, Lieutenant Chris Slee left the Army shortly after we arrived in Gibraltar, and he was not immediately replaced. I suddenly found myself in command of 2 Troop and the two working sites. At last I was fully em-

ployed. The more so when my Troop Sergeant fell down a five metre hole we had just excavated, putting himself in hospital for the majority of the Gibraltar tour.

On the tank farm site specialized knowledge and experience was required, and I had to rely heavily on my Clerk of Works, who was very dependable. On the other hand I was able to do a lot on the steps with my limited knowledge. Very quickly I came to know the social and marital problems of my sappers, their drinking habits and capacities, and the need to plan ahead, to chase up orders and ensure that they were fully carried out. Also I hope that I learnt a little tact and diplomacy. I spent a whole morning touring the main establishments on the Rock to apologize for the temporary break in the main electricity supply the previous day which was due to the fracture of one main feeder by my Light Wheeled Tractor. (We had not been given the location of this cable which was within 200mm of the surface on our construction site.)

But life on the Rock was not all work. My social life varied from being thrown into the sea at a Troop Party to breakfast at 5 am after the Summer Ball. There was plenty of sailing, canoeing and swimming and I had an enjoyable weekend in Tangiers. I managed to organize a day trip on a minesweeper for some of my troop. Unfortunately her sister ship, HMS *Fittleton*, has since sunk, during a NATO exercise.

It was with great nostalgia when, having completed the tasks (I feel successfully), we had to leave Gibraltar. To those on the Rock these tasks are just two more amongst hundreds of others that have been carried out by the Sappers over the years. To me they are something real that have been carried out by a superb bunch of Sappers in 2 Troop 51 Field Squadron (Airfields) of 39 Engineer Regiment (Airfields) during the very short period when I had the honour of commanding them.

In conclusion I have had an excellent seven months as 2nd Lieutenant (SSLC) in the Corps of Royal Engineers. I have learnt a lot about the Corps, about Sappers and NCOs, and I have learnt a very great deal about myself. Thanks to my CO and OC and the circumstances in 39 Engineer Regiment (Airfields), I thoroughly enjoyed myself and am now completely convinced that my decision to take up a Cadetship whilst in Cambridge and to become, I hope, a Permanent Regular Officer in the Corps in due course is the right one. What is worrying though is, that if circumstances had been different, I could have been very bored and frustrated and felt a bit of an outcast and as a result may not have followed up with a University Cadetship. Of the fifty-five people on SSLC this year, ten of us have taken up University Cadetships, and a few more (perhaps five) have taken up University Bursaries—a new scheme recently introduced. I suggest it would be of value to carry out a survey of the remaining forty recently retired SSLC Officers to ensure that good officers are not being dissuaded from taking up Regular Commissions, because they were bored or frustrated as SSLC Officers.

Horses for Courses

BRITISH ISLES	out of WATER	ridden by D ROWT
LIBRARY	out of BOOKS	ridden by LONG LOWENS
FORD	out of LIMELITE	ridden by J CARTER
FOXBAT	out of RISING SUN	ridden by RUS KIDEFECTOR
BLUE FILM	out of THORSEN	ridden by M WIGHT HOUSE
JIM SLATER	out of FUNDS	ridden by C T FINANCIERS
EDITOR	out of COPY	ridden by A PATHY
TREASURER	out of FUNDS	ridden by R I SING COSTS
BLACK FLY	out of GARDEN	ridden by K EMICALS
HAPPY EVENT	out of BERTHS	ridden by DAY LYTELE GRAF

Correspondence

MEETING WITH MONTY

Major R E Ward
Longmynd
31 Abbot's Road
Tewkesbury
Glos GL20 5TE

Sir,—I venture to submit another little-known story. In November 1944 General Horrocks brought Monty to see 617 Assault Squadron in the small Dutch mining town of Geleen, where we lay resting and re-fitting after the capture of Geilenkirchen and some stubborn fighting in the Siegfried Line in support of 84 US Infantry Division under command XXX Corps.

Monty told our OC, Major Alexander, that his aunt had recently sent him a new pair of gloves and a pullover and as his old ones were still serviceable he would like to give them to one of our soldiers who had done well in the campaign. The OC suggested they be given to L/Sgt Finnan MM*, one of our outstanding AVRE commanders. From that day he was known as L/Sgt Finan, MM and Bar, MP and G, RE, "Monty's Pullover and Gloves!"—Yours faithfully, R E Ward.

BRUNEL

Brigadier Sir Mark Henniker, Bt, CBE, DSO, MC, DL
Pistyll
Began Road
St Mellons
Nr Cardiff CF3 9XJ

Sir,—Your Book Review of *The Works of Isambard Kingdom Brunel* recalled a wise remark made to me by a total stranger.

To work my passage while visiting others, I took a basket of laundry to a laundrette and read a book about Brunel (not the one under review) while watching the process. A woman sitting next me said: "Excuse me interrupting; but is that a good book?" "Yes," I replied. "It suggests to the reader that Brunel looked upon engineering as something above technology. He regarded it as a . . ." and I hesitated, seeking the right word. "As a philosophy," she prompted.

It seems to me that this intelligent stranger hit a nail on the head. One is always reading of engineers who bemoan their *status*. May it not be because they lack philosophy?

Philosophers never complain because they are usually laughed at, often reviled, and occasionally put to death. But some, despite their treatment, become immortal. If engineers sought immortality, rather than status, they might some of them achieve the distinction of Brunel.

It would take an essay, not a letter, to suggest how immortality should be sought; so I will spare you that.—Yours sincerely, Mark Henniker.

THE FAILURE OF THE TETON DAM

Captain G D K Berry RE, B Sc
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Portland District, Corps of Engineers
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Portland, Oregon 97208

Sir,—I was recently lucky enough to attend a geotechnical convention which included a presentation by the US Bureau of Reclamation on the failure of the Teton Dam, and thought I may be able to add a little information to your September Editorial.

The theories you offered have now hardened somewhat but there is still no single stated cause; the fissured condition of the right abutment, however, emerges as a common factor in all cases. During excavation of the abutment key trench some fissures were exposed that were big enough to walk through and many gravel-filled cracks were 5 in or 6 in thick (the canyon

wall continued to "weep" for weeks after the failure). Where possible, the exposed fissures in the trench were backfilled with concrete, and a grout curtain was used in the abutment as described in your editorial. However, this could only serve to lengthen the seepage path and was never expected to cut the flows completely. Peizometers were installed in the abutment downstream of the wall to monitor this seepage (I know of none in the wall itself) and there was neither surprise nor concern on 3 June when a small, clear gravity-flow spring appeared several hundred yards downstream as the dam was filling (for the first time). Another similar spring appeared a day later, closer to the wall, but again no great concern was felt.

Of more significance was the appearance on the fateful morning of a 120gpm dirty, force-fed spring from the canyon wall, right at the toe of the wall. This was followed three hours later by a spring which appeared in the wall itself, about halfway up and 50 ft out from the right abutment. The fill immediately above this spring collapsed progressively into the flow, allowing one to trace the internal leakage path from successive photographs; the eroded trench dog-legged inwards as it worked back up the wall (paralleling the shape of the key-trench in the abutment) but appeared to have a relatively level invert at about mid-height of the wall. Ultimately, of course, the top of the wall collapsed into the trench, allowing the pool water to escape. Five hours later, the dam was empty.

My own conclusions are as follows:

Firstly, because the right abutment was not completely faced with concrete, the water was able too easily to bypass the bulk of the fill and attack directly the very short leakage path at the interface between the impervious core and the grout curtain (which was finished flush with the key-trench surface). The most vulnerable point is at the lowest level where the pressure is greatest and I believe this accounts for the spring at the toe of the dam.

Secondly, the core and fill will have moved as their moisture content increased (earth dams actually move upstream when first filled) and since this must have been relatively rapid near the right abutment (because the water had direct access to the core), this silty core will probably have cracked instead of creeping. The greatest movement typically takes place at about mid-height and its major effect here will have been to shear-crack that part of the core in the key-trench. Saturation effects may have moved the crack-plane as much as 50 ft away from the abutment, or it may have been angled through the core. Either way, the most likely leakage path would have been at mid-height near to the abutment, with the water following the easiest path to the downstream surface of the wall. Hence, I believe, the second, fatal leak.

Some surprise was expressed by the Bureau at the extent of surface fissuring revealed both by scour of the right abutment by the escaping water and by landslides due to the sudden draw-down, so I suspect that, had this been appreciated in advance, the abutment face may well have been shot-creted to protect the fill and core. Regardless, the Bureau now has a new calendar on which dates are either "BT" or "AT"—before Teton or after it!—Yours faithfully, G D K Berry.

Memoirs

PROFESSOR E H THOMPSON, OBE, MA, Sc D, FRICS, FRAS, FRGS

Born 13 January 1910, died 9 April 1976, aged 66

LIEUT-COLONEL EDGAR HYNES THOMPSON probably contributed more than anyone to the development of photogrammetry. He contributed several articles to the *RE Journal*, the last was published about a year ago. Educated at Cheltenham, The "Shop" and Downing College Cambridge, he was commissioned into the Royal Engineers in 1930. He was a brilliant academic and although he was a very successful soldier he will be remembered mainly as a lecturer and instrument designer.

In 1934 he was appointed as a Captain to the Air Survey Committee of the War Office as Research Officer. It was here that his genius as a designer began to blossom. In cooperation with civilian survey instrument makers he developed one of the first stereo-comparators, an instrument for making accurate measurements on aerial photographs. These instruments were widely used during the War and the techniques he developed were used to coordinate accurately the enemy gun positions at El Alamein. He was mentioned in despatches twice (Greece 1941 and Sicily 1944) and

was awarded the OBE in 1944. Having served with Ordnance Survey after the War he retired in 1951 to take up his Professorship of Photogrammetry and Surveying at University College London.

He had always been an innovator and remained at the forefront of his subjects until he died. The Automatic Recording Stereo-comparator, the Thompson Watts Plotter, the Cartographic Plotter CP1 are some of the better known instruments which he helped to design. He was President of the Photogrammetric Society from 1961-63 and was Editor of the *Photogrammetric Record* from 1962. He was a great conversationalist but his ready wit was never allowed to detract from the lucidity of his explanations as his colleagues and students will testify.

LIEUT COLONEL K MASON MC

Born 10 September 1887, died 2 June 1976, aged 88

KENNETH MASON, soldier, surveyor, geographer, explorer, academic and writer was educated at Cheltenham and RMA Woolwich and was commissioned into the Corps in 1906. His passion for India, survey and the Himalayas was aroused when he was at Prep. After a first tour at SME assisting Captain Vivian Thompson with his development of stereoplotting machines he was posted to Survey of India. He learnt to climb with Neve and Corry, taught himself to ski and was in charge of an expedition surveying the Pamirs, "the roof of the world", in 1913.

In WW1 he saw service first in France where he was wounded, in Persia/Iraq where he was involved in the relief of Kut (awarded the MC) and was the first to take cars across the Syrian Desert.

Back to India after the War he probably tackled his most important scientific project, the exploration of the Shaksgam Valley—it was the first real use of stereographic survey for small scales and great distances—the brilliant results he obtained led to the award of the Founder's Medal of the Royal Geographic Society in 1927. He was appointed Assistant Surveyor General in 1928 and Deputy Director in 1929.

In 1932 he was elected to the newly created professorship of Geography in the University of Oxford (this appointment was the culmination of a movement for the recognition of Geography as an independent department of learning), and to a Fellowship at Hertford College. His knowledge of the Himalayas was vast as his work on the "Himalayan Journal", his contribution to the Karakoram Conference and his book *Abode of Snow* (1955) testify.

In WW2 he was involved in the production of geographical handbooks under the Director of Naval Intelligence.

After his retirement from his Chair in 1953 he maintained his wide interests in Hertford, the Drapers' Company (Master 1949) and Cheltenham College. He will be remembered by many, a man of enormous energy with a passion for accuracy but above all a good companion.

LIEUT-COLONEL G W KIRKLAND MBE, C Eng, FICE, PPI Struct E, MIHE, PPI Arb, M Cons E

Born 1906, died 29 July 1976, aged 69

GEORGE WILLIAM KIRKLAND will be remembered by most people for his design work on the Millbank Tower and the tower building at Guys Hospital. Although trained as a structural steel engineer he was equally at home with reinforced and prestressed concrete and he designed bridges, roads, multi-storey buildings and airfields. In 1967 he became senior partner of R Travers Morgan and Partners, the firm he had joined in 1934.

In World War II he served in the Royal Engineers in BEF, MEF, and PAIFORCE. He was awarded the MBE for his services in connection with Persian "Aid to Russia" roads development.

MAJOR H JOHNSON

Born 24 February 1919, died 19 October 1976, aged 57

HARRY JOHNSON was commissioned in 1942, passing out from OCTU with a rare "A" Grading. After a tour in a Guards Armoured Division he was posted to India, where much of his time was spent as Chief Instructor Workshops, with both the Bengal and Madras Sappers and Miners. On completion of a Long Transportation Course he spent several years as the OC of various Railway Workshops at home and abroad, followed by a tour as DCRE Johore Bahru, Malaya. His last appointment before retiring on redundancy in 1959 was as 2IC 3 Training Regiment.

In 1963 he became SO2RE in the Field Engineering School, RSME and, in 1966, the Manager Corps Publications with the particular task of producing "The Sapper". For some time he was a Borough Councillor and later, Deputy Mayor of Gillingham, his forthright comments enlivening many a meeting.

He had a deep sense of humour and an ability to embellish seemingly insignificant events with such turn of phrase as made listening to him a joy. His true worth was known to but few and I am privileged to have been one of them.

CTD

Like CTD I knew the worth of Harry Johnson. He and I had met many times before I became a semi-permanent "Chatham animal". It was a pleasure to work with him, he had a quick mind and he applied it to everything he tackled. His work behind the scenes for "The Sapper" were not really fully appreciated by the Corps. He was not the "front man", but he was happy working for the Corps doing his very best for the common good. That he will be missed by his friends goes without saying but the Corps will miss him too, though they do not realize it yet.

EEP

COLONEL C A DE LINDE, MA

Born 13 July 1895, died 17 January 1976, aged 80

CRISTEN ALBERT ("BUNNY") DE LINDE was the son of a Danish subject, an engineer of some prominence in North China: and it was here that as a small boy he gained his first experience of "overseas campaigning" when he witnessed the Boxer Rising from a view-point in the Gordon Hall, Tientsin, in which he was incarcerated with his family. The son of a Scottish mother, and educated at Harrow, he elected to become a British subject, and, on the outbreak of World War I, to enlist in the ranks of the London Scottish Regiment. At once embodied for service, he fought in France and Belgium up to June 1916, when he was wounded in the first battle of the Somme. But evidently he had made his mark, for in March 1917 he was selected for entry to the Royal Military Academy, Woolwich, where in early 1918 he won the Sword of Honour and a Regular Commission in the Royal Engineers.

He was posted to "1st KGO Bengal Sappers and Miners", and after a few months in Roorkee he was sent up-country to join 56 Field Company, a year-old unit then mobilizing in Nowshera and soon to move up the Khyber Pass with the 1st Indian Division in what came to be known as the Third Afghan War. However, in August 1919 the peace treaty was signed: and in the following February 56 Company moved to the Middle East to join the EEF in Egypt and Palestine. For de Linde, however, this change of theatre proved little more than a step nearer home; as on 11 October 1920 a bronzed young veteran crossed the threshold of King's College Cambridge, to graduate two years later with an Honours Degree in the Mechanical Sciences Tripos. There followed fifteen months training in No 7 Supplementary Course at Chatham, and three years specialist training at the Railway Training Centre Longmoor where he gained his "R" in Railway techniques and Movement Control. At much the same time he passed the Interpretership in French, a qualification which must at once have secured for him the appointment of English Instructor at the Ecole Militaire du Genie at Versailles, with the rank of local Captain.

From France he was posted to Hong Kong for a three-year tour, 1929 to 1932, to be Staff Officer RE to the Chief Engineer: and on its conclusion, he returned to Home Service for a tour on the staff of the Army Small Arms School, Hythe, as Inspector of Ranges. However, his fluency in French and familiarity with the French Army had clearly marked him for a return to France: and in 1936 he became Assistant Military Attaché in the British Embassy in Paris, with the rank of local Major, for the four years or more ending abruptly on 27 June 1940.

Back in England after the fall of France, he held Lieut-Colonel staff appointments for four years dealing with Troop Movements and Administration, including a period of duty in Washington in 1943, and including "Post-Hostilities Planning". Thereafter he held Colonels' staff appointments in the Control Office for Germany and Austria, and with the Economic Department of the Allied Control Commission for Germany.

He retired in December 1949, to resume his lifelong interest in skiing, and to play a leading part in resuscitating the Journal of the Ski Club of Great Britain, of which he remained Editor over a period of some 17 years. He also started a series of articles recording the comparative values of a large number of skiing centres, leading to the publication in 1965 of an authoritative guide book which is still in many respects the best of its kind today. He himself continued skiing up to the great age of 77.

To his wife Molly (née Thorpe) and to his son and daughter we offer our sympathy in their sad loss.

TB

Book Reviews

AS CHINA FELL

DOROTHY JACOBS-LARKCOM

THIS excellent book was reviewed in the December 1976 *Journal*. Unfortunately due to a misunderstanding the name and address of the publisher was incorrectly given! The book is printed and published by Arthur H Stockwell Ltd, Elms Court, Torrs Park, Ilfracombe, Devon.

THE ART OF WARFARE IN THE AGE OF MARLBOROUGH

DAVID CHANDLER

(Published by B T Batsford Ltd of London. Price £6·95)

THE author of this work sets out in great detail the manner in which wars in Europe were conducted during the late seventeenth and early eighteenth centuries and how the armies of the various warring nations manoeuvred and fought in line of battle and in siege operations.

The title of the work refers to the "Age of Marlborough". Its scope, however, is much wider since it deals, not only with Marlborough's campaigns during the War of the Spanish Succession (1701–14), but spans the years between 1688 and 1748—a period of history during which almost all the countries of Europe were constantly at war one with another.

The Introduction to the book describes how the scope of military operations was limited by the appalling condition of European roads during the winter months when armies were forced to remain immobile and active operations could only be carried out during the months of summer. This encouraged many army commanders, due to the limited campaigning time at their disposal, either to carry out elaborate manoeuvres to dominate selected areas or to lay siege to a strategic frontier fortress rather than to embark upon an attempt to achieve a decisive victory in the field.

Major engagements were difficult to bring about when armies had to operate at a distance from pre-stocked magazines or well-supplied winter quarters. Once brought about a major engagement could be most expensive in casualties, particularly with the increasing lethal power of weaponry, and its result was often far from predictable. Even a major triumph on the battlefield could seldom be fully exploited for logistic reasons and its long-term effect could be relatively small.

On the other hand preparations for mounting a siege could be carried out while armies were still confined to their winter quarters. The length of a siege could vary enormously. However in the case of a siege of a "standard" fortress, without immediate prospect of its being raised by the arrival of a friendly army, a defence lasting seven weeks was considered at that time to be "quite respectable." A besieged garrison could then expect to be allowed to march out of their fortress with full military honours in accordance with the code of conduct then recognized by the armies of the European nations. The outcome of a siege was, therefore, generally predictable and a captured fortress was a valuable prize which could be used as a precious bargaining counter in subsequent peace negotiations. Small wonder then that few periods of military history were more dominated by siege warfare than the age of Marlborough and that military engineers, being both the builders of great fortifications and the brains behind offensive siege operations were so highly valued and why the age gave birth to so many experts skilled in this field.

Following this Introduction the author has divided his book into four Sections dealing with the Horse, the Foot, the Artillery and the Military Engineers of the various European nations. All these Sections make stimulating reading and are most informative. The last Section however will no doubt be of the greatest interest to a Royal Engineer of today. It deals in great detail with the place and organization of the military engineers of that age and their tasks in peace and war. A full account is given of the exploits of famous military engineers of the day who became legends in their own lifetime and whose influence persisted long after their death. Outstanding among them were the Dutchman Baron Menno van Coehoorn (1641–1704), "Chief Engineer" to William III, and, the doyen of them all, the French Marshal Sebastian Vauban (1633–1707), "Chief Engineer" to Louis XIV. These two famous men were not only great defensive engineers and architects of most sophisticated fortifications but they made also a most notable contribution to the techniques of offensive siege warfare.

Military historians have often tended to confine themselves to writing about famous battles and the tactics employed in them while for the most part sieges have been dismissed as minor affairs. This book, however, gives a most erudite account of the moves and countermoves employed in the art of siegecraft. The epic siege of Lille is but one example. The decision to capture the fortress was taken shortly after Marlborough's resounding defeat of Vendôme at Oudenarde on 11 July 1708. The "Twin Generals" Marlborough and Prince Eugene were entrusted with the task. The siege operation was to be undertaken by Eugene's allied army of 35,000 while Marlborough with an army of 75,000 was to cover the operation. The Lille garrison numbered only 16,000 under Marshal Boufflers. It was covered however by a large concentration of French troops under Vendôme in the Scheldt area. For his part Vendôme did not believe that such astute generals as Marlborough and Eugene would be rash enough to embark upon a siege operation so late in the year nor to besiege any fortress so well covered. However, if they did, he did not know which fortress would be attacked: Tournai, Ypres, Mons or Lille were all possibilities, the latter, being the most formidable fortress, was possibly the least likely. Surprise was thus achieved and Vendôme was kept guessing until 10 August only two days before the investment of Lille began.

As soon as the decision to mount the operation had been taken the siege train was mobilized and formed up to move forward in a Great Convoy which occupied some fifteen miles of road space. It took seven days to cover the seventy-five miles from its base at Brussels to Menin where it met up with Marlborough's army *en route* for Lille. During its march from Brussels to Menin some 90,000 men were engaged in ensuring its security from French raiding parties. The convoy reached Lille on 17 August and ten days later eighty-eight heavy cannon and mortars were in action against the fortress.

Eugene undertook the siege of Lille with fifty battalions, of which five were British, while Marlborough with 137 cavalry squadrons and eighty-three infantry battalions took up a covering position in the vicinity of Helchin. The lines of circum and contravallation were completed by 21 August despite a sortie of 1,000 men from the fortress, led by Boufflers, after he had rejected an invitation to parley for surrender terms. For his part Eugene refused to receive a delegation from the citizens of Lille seeking the evacuation of non-combatants as he did not wish to relieve Boufflers of the burden of so many useless mouths to feed.

By late August Marshal Vendôme had collected an army of 110,000 troops for the relief of Lille. Despite his numerical inferiority Marlborough decided to confront Vendôme and force a major battle. However, so high was his military reputation that little determination was shown by the French to accept this challenge and on 11 September they started to march away. A renewed relief attempt was made in early October but once again the French were unwilling to attack Marlborough's covering force.

Direct attempts to raise the siege having failed, the French tried to interrupt the Allies line of communication from Brussels to Lille. A new supply route was however opened from a base built up at Ostend from which convoys of munitions and rations could be sent to Lille via Menin. A French force of 22,000 men set out from Bruges to intercept these crucial convoys but General Webb's escorting force inflicted a sharp defeat on it at Wyendach on 28 September and 250,000lbs of powder and two weeks' supply of shot and shell reached Lille—a welcome replenishment as the progress of the siege had been slowed down by a shortage of ammunition. Later the French attempted to place an impassable inundation across the roads leading south from Ostend by opening the sluices at Furnes and brought up armed galleys from Dunkirk to cover this obstacle by fire. To answer that move Marlborough called upon the Royal Navy to deal with the galleys and had constructed special high-wheel carts capable of moving over the less deeply flooded roads so that the supply route would not be completely closed. Indeed by this means 1,700 barrels of powder arrived at Lille during the first fortnight of October.

A gallant and most spectacular attempt directly to help the besieged garrison was made by the Chevalier de Luxembourg on 28 September. At the head of 2,000 horsemen, each carrying behind his saddle a sack of gunpowder, he attempted to bluff his way through the besieger's lines. He was almost through before the alarm was given. In a wild rush to reach their goal only one half of the horsemen were successful. Most of the others died a grisly death as their bags of powder exploded having been set alight by musket fire or by sparks made by the shoes of their galloping horses. As a last resort, when the plight of the Lille garrison was fast becoming desperate, the French suddenly descended upon Brussels and bombarded the city indiscriminately. It was hoped that this diversion would draw off troops from Eugene's army and reduce the pressure on Boufflers. Their aim was not achieved. Marlborough's covering force on the early morning of 26 November crossed the Scheldt unobserved at five places. The French, taken completely by surprise, fled leaving behind all their guns and 800 wounded. This was the last engagement the covering force had to undertake. The fortress of Lille capitulated two weeks later. Marlborough's task was then ended. In spite of being constantly out-numbered he had successfully held off all attempts either to relieve the beleaguered fortress or cut the lines of communication of the besieging army. He had done this without once becoming involved in a major battle. Such was his mastery of the art of manoeuvre and the awe he engendered.

The major actual fighting, and the heaviest casualties sustained, occurred during the siege itself as the earthworks were inexorably pushed forward and guns and mortars continued ceaselessly to bombard the fortress.

Boufflers made two major sorties. The first, already referred to, took place on 21 August. The second and much more formidable sortie was made on 5 September at a time when Eugene and a considerable part of his army had gone temporarily to reinforce the heavily out-numbered Marlborough at that time confronting Vendôme. The aim of the sortie was to strike at the enemy when below strength and to cause maximum damage thus buying time. The longer the siege lasted the more likely its momentum would be reduced particularly as the approaching winter would restrict the movement of supply convoys and bog down the extension of the trenches before the fortress. As the siege progressed many smaller sorties, or raids, were carried out with limited objectives. To guard against these Eugene kept ten battalions in the approach trenches day and night and dominated the no-man's-land between them by active patrolling.

Eugene, as September arrived, viewed with anxiety the coming of the winter months and tried to speed up his operations. He led an attack early in the month on the counterscarp at the head of 15,000 men but made only minor gains for the loss of 3,000 killed and wounded. Two weeks later he launched another attack which made more progress but at the cost of a further 1,000 casualties, Eugene himself being one of the wounded. The outworks of the fortress were however captured on 21 September. Once this lodgment had been made and exploited the end was merely a matter of time. On 23 October Boufflers sought capitulation terms for the city and for the free evacuation of his wounded. On 26 October the remaining garrison withdrew to the great citadel of the fortress—one of Vauban's masterpieces. They held out there until 8 December when final surrender terms were agreed and on 11 December Boufflers marched out of the fortress at the head of the remaining 9,000 exhausted men of his garrison having been granted free passage to Douai.

The gallant Marshal Louis Francois Duc de Boufflers, one of the first men of all France, richly deserved this magnanimity being shown to himself and to his garrison. They had fought the good fight almost to their last keg of powder and their last kilo-gramme of food. No real hope of outside help had ever been forthcoming yet they had held out for four

months against a most resolute besieging force, much longer than the seven weeks considered "quite respectable" for a garrison in their circumstance. They had suffered 7,000 casualties and inflicted 16,000 on the besiegers. They had even drawn the British Royal Navy into the overall struggle to capture their inland City and Fortress of Lille. JL

MEN OF GALLIPOLI

PETER LIDDLE

(Published by Allen Lane, London. 280 pages price £6·50)

THE Gallipoli Campaign is recent enough to have been well documented and is an excellent subject for analytical study. Peter Liddle, an ex-schoolmaster, who is a lecturer at Sunderland Polytechnic has sought to view the campaign essentially from the point of view of the officers and soldiers who took part in it. He obviously interviewed and corresponded with a large number of individuals to obtain authentic material and made a thorough study of the ground by visiting the peninsula himself. The reader is therefore repeatedly given genuine and graphic descriptions, not only of the series of hard battles which took place but also of the grim conditions under which the troops fought and lived and of the effects on discipline and morale of the administrative shortcomings and the quality of the higher direction of the campaign.

However, with due regard for what might be termed the author's aim, it would be difficult to produce a really effective book on such a politically and militarily controversial subject without beginning with a balanced discussion of the geographical, political and military factors underlying the plan. In the event, the author virtually breaks into the Naval phase of operations after inadequate background discussion and then proceeds to illustrate the land operations in the three main beachheads. One is left with a series of low level battle impressions of the war at sea, Cape Helles, Anzac and Suvla Bay, almost as if they were separate operations with almost no overall plan of operations for the campaign. There is scant reference to the enemy side of the Hill, despite the colourful characters of Limain Von Sanders and Mustapha Kemal who made life so difficult for our forces. Maps are adequate and a well chosen series of photographs do much to produce the atmosphere of the time. The book closes with appendices on the political and military responsibility which, in the absence of preliminary background, are not particularly striking. Military students of the campaign would regard this as an interesting but complementary book to be read after one of the more comprehensive works on the subject. DJNG

HITLERS ATLANTIC WALL

COLIN PARTRIDGE

(Published by D I Publications, Les Goddards, Rue des Goddards, Castel, Guernsey, CI. Price £3·50)

THE research for this book occupied the author for the last fourteen years during which time he travelled the length of the Atlantic Wall, examined the principal documentary sources (including the RE Library) and interviewed some of those responsible for its construction and operation.

The line of coastal fortifications, stretching from Norway to the Spanish border, constructed between 1940–44 as a defensive rampart protecting the western limits of Nazi Germany's European expansion, was so named by Adolf Hitler. It was probably the most impressive building programme since the time of the Romans but it was a military failure.

In his Introduction the author outlines the background, the propaganda, the psychological reasons, the operational responsibilities and confusions, the command chaos and strategic errors. Against this background the author takes the reader through the planning, design and construction phases, he dwells on the organization of the work force, details of the main features, the armament and installed equipment and the "specials".

The Wall existed in one form or another for a distance of 2865 kilometres, very few of the sections were ever tested in battle and like all walls it was only as strong as its weakest link. In its strongest sections it succeeded in deterring the invader from even considering attack but one must pose the question "Did it merit the effort?"

This book is an excellent study, it is well illustrated with photographs, drawings and diagrams, it is, I would suggest, a must for any serious student of World War II and for all concerned with fortifications. EEP

BEFORE ENDEAVOURS FADE
A GUIDE TO THE BATTLEFIELDS OF WWI

ROSE E B COOMBS

(Published by Battle of Britain Prints International Ltd. Price £2·50)

THE author has produced a very thorough and comprehensive guide to the battlefields of the First World War. The book has managed to cover not only the battlefields but also every cemetery and memorial on the Western Front in a surprisingly compact form (136 pages), though this has meant descriptions are at a minimum.

There are over twenty different routes offered in this guide, each one covering a battlefield and the area around it. Each route has comprehensively written directions illustrated by twenty-five "Michelin" maps and over 400 pictures. The author's vast knowledge of the area, Rose Coombs has made over 100 visits to the Western Front, ensures that every significant feature is covered, and it is indeed surprising that so much remains to be seen after nearly sixty years.

It would be unfair to say, however, that this is merely a guide. With such a compilation of knowledge it has made interesting reading with many fascinating facts and pictures. But it is as a guide that this book was written and it is hard to believe that anyone could produce a more thorough, compact, or clearer one. To anybody wishing to visit this historic part of Europe this will be a most valuable book to take with them.

SJH

WELLINGTON'S MEN—SOME SOLDIER AUTOBIOGRAPHIES

EDITED BY W H FITCHETT

(Published by E P Publishing Limited. Price £5·50)

WILLIAM FITCHETT wanted to save four soldier autobiographies from obscurity and at the same time to present a soldiers view of battle. The result was this book, originally published in 1900. Time has shown that three of the biographies did not need his assistance since they were subsequently reprinted, which in itself is confirmation of his judgement.

The autobiographies are—Lieutenant Kincaid's *Adventures in the Rifle Brigade; Recollections of Rifleman Harris*: Anton's *Retrospect of a Military Life* and Captain Mercer's *Journal of the Waterloo Campaign.* Due to the reprints, all except Anton are available in most military and many public libraries. Fitchett's selected extracts were chosen to illustrate a soldiers life in the period 1808 to 1815. He brings to life the dry facts of history and covers almost every possible aspect of an army at war—the confusion and bravery in battle; soldiers views of their seniors and their attitudes to discipline; family life in the field; an infantry opinion of tedious but essential siege work—these are but a few examples. Linked by his clear narrative, these extracts from the four memoirs become an exciting story which has been of interest to the general reader for the past seventy-six years.

The autobiographies were well chosen to give a wide range of experiences and styles. A Private and Subaltern of the Rifle Brigade, a Private of the 42nd Foot (Royal Highland) and a Captain of the Royal Artillery. Harris was an illiterate soldier who dictated his memories to a half pay officer; Anton a dour Scot with an unusually high standard of education for a soldier of those days; Kincaid an excitable, humorous, young Subaltern who lived and fought with almost careless abandon; Mercer the amateur artist with an eye and mind for detail and a flair for putting his observations into words.

Where the original material is still available, the necessity for an edited version must be questioned. In this case each original work has its disadvantages for the general reader. Harris's memory was somewhat hazy and he is far from accurate in his sequence of events. Kincaid seems to have written as the mood took him and makes little or no attempt to follow a logical sequence (his second book *Random Shots of a Rifleman* was aptly titled). Anton has a tendency to write long, wordy descriptions and discourses which are of little value or interest. Mercer covers his subjects in such detail that the original version, of two volumes, is mainly for the keen historian.

A fascinating book which achieves its object of breathing life into history.

JTH