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Editorial

"UNDER PRESSURE"

THROUGH the printed word, television and radio we read, see and hear of individuals and organisations being "under pressure". The footballer who punches another player is said to be under pressure; the pop star who takes drugs is excused as he was under pressure (his jeans were too tight no doubt!); the managing director/manager of a business seems to be under constant pressure; the executive who diverts the money of others to his personal advantage pleads he was under pressure; the factory worker doing a repetitive job is under pressure; the shoplifter is under pressure—it seems to be fashionable!

Life used to be relatively simple. One took the known facts, studied them, made a decision and then took action or caused action to be taken. What then has changed?

Could it be that we are confusing facts with assumptions, opinions and media speculation presented as facts (Falklands!)?

Could it be that the general level of comprehension has failed to keep up with the erudite presentation of information? It is noteworthy that a recent education report stated, of the adult population, that 30% could not do simple arithmetic, read a graph or cope with simple percentages; that 45% could not read a railway time-table; that 60% could not understand rate of inflation. (If the rate of inflation drops from 20% to 15% does this mean (a) that prices will fall? (b) that prices will stay the same? or (c) that prices will rise but at a slower rate than at present?) These figures were deduced from a "representative sample" of over 3000.

The vast quantity of available "information" seems to generate Committees, Sub Committees and Working Party studies. Committees seldom make decisions, they make recommendations to someone else. These recommendations are then passed to a higher Committee who then consult with all those likely to be affected and those who want to get "in on the act". They seldom agree, so the matter is referred back to the original Committee with the request for more information! Nothing is accomplished but everyone is working hard getting nowhere!!

An exaggerated account?—Probably—but there is enough truth in it to make the point that pressure stems largely from the systems we use. Overwork should not be confused with pressure. Overwork is an individual "tangible" and can be reduced. Pressure seems to be out of the control of the individual as it is normally initiated by others and then feeds on itself.

To one on the fringe there seems to be much overwork though little pressure in the Services. Why is this? Is it because our systems are better? Is it because decisions are taken at the appropriate levels? Is it because the Committee chain is not allowed to develop into a self perpetuating circle? Is it because we believe in strong decisive people on the spot, people who believe in themselves more than they believe in systems except the system which singles them out and their own system for maintaining control? Is it because we do not accept the concept of pressure and just get on with our jobs?

Or is it that "pressure" has become the "in word" to cover inadequacy?

1982 Corps Annual General Meeting

ADDRESS BY ENGINEER-IN-CHIEF

At the Annual General Meeting of the Corps, held on 30 June 1982, the Engineerin-Chief, Major General G B Sinclair CBE FIHE, spoke on Corps Affairs.

INTRODUCTION

So much has happened since I last reported to the AGM in June last year, that I feel I must depart from the traditional form of address. It would be clearly impossible for me not to cover the recent action in the South Atlantic, the part the Corps has played, and is still playing there.

As I forecast last year considerable changes are taking place in the organisation of the Army both in Germany and in the United Kingdom. We are primarily a Support Arm so we have to change our shape, and sometimes our size, to fit the Forces we are supporting; and we must never forget that our support is required by the Navy and Air Force, to an extent which others often underestimate.

The complexity of our reorganisation and the importance of the Campaign in the South Atlantic, determine that I should concentrate on these issues at the expense of the customary resumé of the worldwide activities of the Corps. Reluctantly I must abandon the magic lantern.

SOUTH ATLANTIC

I believe no one would deny that the first common reaction to the invasion of the Falkland Islands was one of shock. However as far as the Corps is concerned the shock was not accompanied by paralysis. In the first three days, with the support of Engineer Resources, a "package" was selected and assembled for 59 Commando Squadron, which included a limited amount of Harrier Support equipment, Emergency Fuel Handling Equipment including the Ship to Shore element, Combat Engineer Tractors, Bomb Disposal Kit, and General Engineer Stores. This equipment was supplemented on later sailings. The proof of success was demonstrated by the Sappers ability, very soon after landing, to construct Harrier sites which were intensively used, and to bring fuel ashore. On one particular day they landed 40,000 gallons.

In the early stages HQ E-in-C devoted tremendous effort to building up information on Ascension Island, the Faiklands and South Georgia. The task started on the first day, and I think it is fair to say that the Corps started with more information than any other part of MOD, as Sapper recce and construction teams had been in the Falklands and South Georgia in the last year or so. Their reports and photographs proved invaluable, but we did not rest content with these.

Over forty Falkland Islanders including local Pilots were traced and interviewed by Colonel Tony Mornement and his team. Amongst those consulted were the Governor, the Head of the Public Works Department and Members of the Legislature. Lord Shackleton and members of his Study Team were also interviewed. Much useful information was given to us by Major Cocks, an RE TA Geologist who had recently worked on the geological survey of the Falklands, and an Agronomist of the Department of Overseas Development who had been conducting grass trials on the Islands until ejected.

A team of three Survey NCO's were attached to my HQ to assist in the interrogation of these people with first-hand knowledge of the Falklands from which terrain information was gathered and later produced as an overprint to a composite sheet covering the whole of the islands. The response of Military Survey was magnificent. At four o'clock one afternoon they were handed the traced overlays, and at eight o'clock the next morning the first twenty copies of the coloured overprinted map were available in HQE-in-C. I think it no exaggeration to say that the rapid availability of this going map affected the operational planning to quite a degree.

The crisis posed a considerable challenge to the Military Survey Branch of the Corps. Because resources have been reduced over the years, and access to overseas territories more and more restricted, the gathering of survey information has become increasingly difficult and effort has had to be concentrated in priority areas. It is almost axiomatic that operations occur in areas where contingency planning is of low priority, on the junction of at least two map sheets and at the junction of two grid zones! This was the case in the Falklands.

Demands for maps, in substantial quantities, began to arrive in the Directorate of Military Survey on 1 April and increased rapidly in the succeeding days. The immediate requirement was for maps of the Falklands and South Georgia, 32 sheets in all, with print runs increasing to 10,000 of each. The requirements of Special Forces and the Royal Air Force added substantially to the area to be covered and the amount of detail to be shown, with scales varying from 1:500,000 down to large scale plans of selected areas at scales as large as 1:2,500.

Within the first four weeks there was no part of the Military Survey organisation which had not become involved, including library facilities, computer production of gazetteers, field survey, air survey, photography, printing, digital terrain data, computer-drawn perspective views, moving map displays, and last but by no means least, storage and distribution. To date maps have been produced in over 350 formats in quantities totalling just under ¾ million. Well over 16,000 hours of overtime have been worked by the civilian staff of the Mapping and Charting Establishment, and the resources of 42 Survey Engineer Regiment, the School of Military Survey and 8 Map and Air Chart Depot have been fully stretched since 1 April with the pressure only just beginning to ease. Many contacts here and overseas have been exploited for information and a number of civilian, public and private sector agencies in the UK used to assist production, particularly in some specialised techniques.

Much valuable experience has been gained confirming thoughts on the reorganisation of Military Survey which have been formed during the past two years, much of which is already on the way towards implementation. A detailed analysis of the whole operation, every move of which has been carefully recorded, will assist in tightening all Military Survey procedures for emergencies and war.

Meanwhile in HQ E-in-C, dossiers were produced on each Settlement on the Islands, giving details of facilities, resources and buildings. The only complete aerial photograph of the Falkland Islands available to the task force came through Engineer channels. Contact with the Intelligence Staffs in MOD was naturally close and almost continuous. Sapper advice being offered and taken to assess the capability of the Argentines to operate aircraft, repair runways and to move vehicles by land. To help in our assessment of the one major airfield, at Stanley, a member of the Engineer and Railway Staff Corps was able to provide original drawings and construction details. The Corps was able to provide much useful information on possible landing sites for the Task Force.

As a consequence of this accumulation of fact and analysis, members of my HQ were called to brief the Commander-in-Chief Fleet, the Major General Royal Marines, the Chief of the Air Staff and the Director General of Intelligence. Engineer briefs have been produced for the Chiefs of Staff Committee. Two Officers were flown out to the Task Force and took part in C-in-C Fleet's Planning Conference. They also briefed the Commander and Staff of 3 Commando Brigade. This visit also enabled 59 Commando Squadron to continue to develop the intelligence assessments with the help of material delivered to them. The briefings given to Headquarters and individuals about to be involved in the operations are too numerous to list.

At the same time as this information was being collected, Commander Military Works Force visited Ascension Island and within three days produced reports which resulted in the quick development by a small force of Sappers of additional aviation fuel installations, accommodation and a water desalination plant without which the support given to the Task Force would have been much diminished.

Throughout all this time the Directorate of Engineer Services were involved in planning and design, usually under great pressure, of many Engineer logistic requirements. The rapid restoration and extension of Port Stanley airfield for use by fast jets, fully loaded C130 Hercules and other aircraft, is probably the most challenging operational airfield task we have undertaken since the last war. Providing full airfield facilities using an expedient airfield system has required much detailed planning and liaison. 6000 tons of stores have been assembled and shipped and the work will involve 172 items of plant with a Sapper force of nearly 1000.

For the first time since Aden in 1967 a Military Works Area exists, this time in the Falklands. The CRE (Works) who is established on the Islands has been charged with supporting all three Services and, besides the airfield tasks I have just mentioned, his immediate priorities are the restoration of essential services in Port Stanley and planning and supervising the construction of hutted accommodation for several thousand men to allow our troops some comfort in the particularly harsh winter climate there.

The planning and procurement of these huts has required a prodigious amount of work from the Staff, the MWF and Engineer Resources as almost all the hutting had to be located, assessed, integrated into a design, justified financially and bought off the shelf from industry in a very short time because of the long delay imposed by transporting stores by ship to the Falklands.

This brings me to the vital part played by PM GEE, RE LE(A) and Engineer Resources. Since the crisis began we have been authorised to spend some £M44. Accepting that £M30 of this was for the airfield system, it is still a great deal of money to spend quickly. A wide range of items are involved all of which have to be identified, costed, procured or manufactured and then moved. Material has come from pools and stocks, where available, but for a long time now it has been the policy to buy in engineer material from the trade when it is required. To give you some idea of scale, Long Marston had to obtain 1000 tons of Ordinary Portland Cement and 400 tons of specially packed High Alumina Cement. A complete quarry system with drills, explosives, compressors, crushers and screens was purchased at a cost of some £K600 for the Falklands within the space of three weeks. The airfield stores have sailed completely filling two large ships and the initial instalment of hutting filled another ship. Further shiploads are due to follow. It is worth emphasising that, from an Engineer point of view, the Falklands are as much a desert island as Christmas Island and we are involved in works on a similar scale but the urgency is greater.

We should remember too that this has been possible only because of the unstinting help of many, including civilians, who work either with or for us. I would particularly mention those at Long Marston. Their unselfish devotion has been a marvellous example.

The unique problems posed by an operation of this kind could not be overcome without many trials and much special training. The trials have ranged from the carriage of our recently bought hutting stores as underslung loads on helicopters to the effect of different aircraft on the expedient airfield surfacing. The special training has involved Sappers in quarrying operations, erection of proprietary hutting and, of course, putting together the expedient airfield system which includes aircraft arrestor gear and airfield lighting as well as the more obvious surfacing.

It must be apparent to you all that although the fighting now appears over our work is only just beginning and I believe you will continue to see Sappers in the Falklands for a long time to come.

Much essential work has been done by Engineer Units still in UK. For example the installation of improvised water storage and the assistance with the construction of helicopter platforms on requisitioned merchant ships. We also carried out feasibility trials on the use of an Air Portable Bridge as a ramp on a Roll on-Roll off Ferry.

On the Falklands the Commander Engineers is Lieut Colonel Geoff Field, the Commanding Officer of 36 Engineer Regiment from Maidstone. 59 Commando Squadron with a Troop of 9 Parachute Squadron provided intimate support to the Commando Brigade throughout the operation, and 9 Parachute Squadron with a Troop of 20 Field Squadron under command did the same for 5 Brigade. The troop of 20 Field Squadron from Maidstone were on *Sir Galahad* and had two men killed and eight wounded and lost all their equipment. 11 Field Squadron from Ripon went through the worst of the bombing in San Carlos water, lost all their equipment on the *Atlantic Conveyor* and spent three weeks in slit trenches at Port San Carlos building and rebuilding the Harrier forward operating bases and are now doing the same at Port Stanley. In the words of Geoff Field in a letter he wrote last Thursday, "RHQ of 36 Regiment and 61 Field Support Squadron, the CRE Works and the Postal and Courier unit have had it easier, but it has been no picnic for them." The CRE Works is Lieut Colonel Leslie Kennedy who in normal times is the CRE (Airfields) and he has three Specialist Teams Royal Engineers with him.

I will not go into any detail about what they have all been doing. That I believe has been obvious to any Sapper who has watched the television reports or read the despatches in the newspapers. The other branch of the Corps I have not yet mentioned has also done a magnificent job.

The Postal and Courier Service is responsible for moving classified, official and private mail to and from the Task Force and the Falkland Islands. The Postal and Courier operation was rapidly but carefully planned and implemented and has proved, yet again, that this Branch of the Royal Engineers is more than "equal to the task" for which it was established one hundred years ago. The Directorate has been congratulated by QMG and the Captain of HMS *Hermes*. The first detachment (1 + 3) was flown to Ascension Island. The numbers were soon increased to 1 + 5. A second detachment (1 + 3) sailed from the UK and eventually landed on Ajax Beachhead at San Carlos. The third detachment (1 Major, a S/Sgt + 3) sailed in the Queen Elizabeth 2 and are now operating from Headquarters Land Forces, and HMS Fearless.

The increased workload at the Depot at Mill Hill has required it to be reinforced from BAOR, and for RN Reservists and RE TA postal workers to do their annual training in the main sorting office.

It is of course inevitable that we should suffer casualties in the type of operations you have heard and seen described. The Sappers took a leading part in every stage of the fighting, and have been uniquely involved in the dangerous task of EOD and mine clearance since the landings at San Carlos and it is still going on. Nine members of the Corps have been Killed in Action, and eighteen seriously wounded. Since the Armistice six more of our soldiers have been injured, some losing limbs. Given the intensity of the operations, we could have had greater casualties, but that in no way diminishes our sorrow and sense of loss of these gallant men. I know you would wish me to pass on our feelings of sorrow to the families of those lost, and our admiration and good wishes for recovery to the wounded.

REORGANISATION

Now, if I may turn to reorganisation. As I said in my introduction we are a Support Arm and must fit our organisation to the overall organisation of the Defence Forces. The three principal factors to which we now have to react are:

(1) The coming reorganisation of 1st British Corps, with the return of HQ Second Division and 24 Infantry Brigade (which was 5 Field Force) to the UK.

(2) The measures to save manpower in Headquarters in the UK.

(3) The recognition of the need to have an Airfield Damage Repair capability against the now acknowledged threat to the airfields in the UK.

I would like to start with the effects on the Sappers in BAOR of the decision to reorganise 1st British Corps. It also affects our organisation in UK, but I will come

back to this. Before the Army Restructuring Plan (ARP) of 1976 there were three in-theatre Divisions in BAOR. To support them there were six Engineer Regiments each of two Field Squadrons. The Regiments were affiliated to Brigades, and each Divison had a Field Support Squadron.

ARP reorganised 1st British Corps into four Divisions and initially no Brigade Headquarters. This led to the Engineers being recast with four Regiments, each of three Field Squadrons and one Field Support Squadron. Each Regiment supported one Division. Genuine savings were made in Headquarters and Headquarters personnel by that reorganisation but on the other hand the large Regiments were difficult to control over a wide area of operations, and there were still no "field" Engineers at Corps level with which the Corps Commander could influence the preparations for battle or the battle itself.

It has now been decided that there are to be three in-theatre Divisions and that they should be so organised that the forward formations, which would meet an enemy thrust in a short warning attack, should be able to conduct the battle before the arrival of the TA. The principle makes sense, regular forces in BAOR at the front, then regular reinforcements from UK and then TA formations behind them. This clearly forces some reorganisation on us and in doing so we must try to correct any weaknesses apparent in the previous organisation, within the constraints of manpower ceilings.

The new organisation we are proposing is to provide a Field Squadron for every Brigade in a Division, grouped under a Regimental Headquarters and with a Field Support Squadron in each Division directly under the Commander Engineers (the new title for the CRE) at Division. The Squadrons not allocated to the Brigades will be grouped together as Corps Troops under one or two Regimental Headquarters. We believe that this will allow considerably more flexibility in reinforcing Engineer support to Brigades and Division as the need arises.

May I just reiterate that this organisation is still a proposal.

When Headquarters Second Division comes home it will move to York where it will combine with HQ North East District. It will have under command a Regular Brigade, 24 Infantry Brigade based on Catterick, and a TA Brigade, 15 Infantry Brigade at Topcliffe, both in North East District and a second TA Infantry Brigade, No 49, centred at Chilwell in the north of Eastern District.

Those of you familiar with our existing TA organisation will realise that this General Staff reorganisation runs directly counter to the existing RE organisation and, together with the re-roling of two TA Regiments cause by the new BAOR philosophy, made necessary another look at our TA structure. After consultation with the Territorial Army and the Regulars concerned I have proposed that with effect from 1 January 1983 Commander 29 Engineer Brigade, who has his Head-quarters in Newcastle-upon-Tyne in North East District and is the Engineer adviser to the GOC in York in peace, should be the Commander Engineers 2 Division in war. This means that Headquarters 29 Engineer Brigade and Headquarters 30 Engineer Brigade are to exchange their roles.

This plan has not yet been endorsed by the Army Board, but is being circulated in the MOD now. The new grouping proposed is that:

71 Regiment is to stay under command 29 Brigade.

72 Regiment which now has two Field Squadrons will require a third Squadron. 106 Field Squadron is the logical choice as it is located in North East District.

73 Regiment will regroup with 29 Brigade in the same role as it has today. 873 Movement Light Squadron have a definite role in 1st British Corps and will move to 29 Brigade with the rest of the Regiment.

74 Regiment retains its role, but will come under 30 Brigade in peace.

The Royal Monmouthshire (Militia) and 75 Regiment will remain with 30 Brigade.

We have taken advantage of this period of enforced change to review the organisations of the Plant and Field Support Squadrons. There will inevitably be some disappointment amongst members of those Regiments whose current role is in support of forward Divisions which are now being tasked for rear areas. This is natural, but there were always difficulties in deploying TA units in the Combat Zone. They lack armoured protection and mobility, and have insufficient opportunity to train sufficiently to be placed into the forward area early in a situation of very high intensity operations.

I said earlier that a Regular Brigade, 24 Infantry Brigade, is to be based at Catterick and that will be in early 1983. It will require the support of a regular Field Squadron. The Squadron chosen should be as closely located to Catterick as possible for obvious reasons. I have therefore proposed that 51 Field Squadron (Construction) now part of 38 Engineer Regiment at Ripon, twenty-five miles away, should be re-roled for this task. This will allow the second of the Field Squadrons at Waterbeach to assume an ADR role, which is consistent with another of our aims, that is establishing a centre of excellence and focus for ADR training and command at Waterbeach.

I now come to the part of the story where no happy ending is in sight. The pressure to reduce the size of UKLF and District Headquarters has led to the decision to reduce Engineer representation in peace to two Grade 2 Staff Officers integrated into G3/G4 Staff (G and Q Staff in traditional terminology) in the restructured HQ UKLF with no Engineer representation at normal District level. This is, in effect, the rustication of the Chief Engineer of which I gave warning last year. However it is recognised that the duties now performed by the Chief Engineer still need to be performed, and additional command functions are needed for the ADR units about to be raised. Therefore by restructuring the Headquarters ESG and the units now at Barton Stacey (which is due to close in late 1984) and taking their manpower, and the balance of the Staff of the Chief Engineer, two effectively new organisations are to be formed. A Headquarters, to be known as Headquarters Engineer Support is to be formed at Tidworth later this year. This Headquarters and its Commander will be available to C-in-C UKLF in peace to provide Engineer advice beyond the range of that given by the two RE Staff Officers integrated into the G3/ G4 Staff. In transition to war and in war, the Commander Engineer Support will to all intents and purposes function again as the admitted Chief Engineer. He will have some additional responsibilities:

- Command of 33 Engineer Regiment (EOD) in peace and its UK elements in war.

- Overall responsibility for the Central Engineer Park at Long Marston and other Engineer Parks in Great Britain, but not in Northern Ireland.

- Inspection of Engineer Equipment world wide on behalf of D Engr Svcs.

--- Responsibility for project planning; technical supervision and advice on the tasking of UKLF Engineer units employed on exercises world wide.

— At District Commanders' request—the provision of advice and assistance on the technical aspects of Engineer Training for any Engineer units in UKLF.

- On request, advice to the Major General Royal Marines on Engineer support to the Commando Brigade.

- and to C-in-C Strike Command (RAF) on the Special Safety Organisation and Crashed Aircraft Recovery.

When you consider the ramifications of these tasks, and the way they can best be performed, you may well wonder if it was a wise decision to rusticate the Chief Engineer from the Headquarters of UKLF.

I would like now to return to our field of greatest potential growth, Airfield Damage Repair. I was able to tell you last year that the need to increase our capability and to provide cover for airfields in UK had finally been recognised. Progress has been desperately slow, but decisions are now firmly being taken. Provision has been made for the formation of the first six TA Squadrons dedicated to ADR; the detachment at Leuchars is to be properly established as an "independent" Squadron (in the TA sense of the word independent) and five "sponsored" Squadrons are to be raised over the next four years. There is still no decision or agreement on Regimental Headquarters. There is however no doubt that an overall ADR Headquarters is required to coordinate the formation of the new units, to devise their operational doctrine consistent with the limited amount of equipment likely to be available, and to provide the direction and overall supervision of their training, much of which will inevitably require assistance from the Regular Field Squadrons (Construction). As the time available for training TA soldiers is markedly less than that for Regulars, new techniques for ADR, requiring less time to practise, must be evolved and maximum use must be made of the experience available in Regular units. The development of new techniques must follow research and development for new equipments. A new integrated concept is required for plant and vehicles capable of performing repair and EOD functions. Such research and development must be based on Staff Targets and Requirements drawn up in full knowledge and with the experience of both Regular and TA ADR units. The Headquarters required for ADR must, therefore, be at a level to exercise ADR technical control and training responsibility for the four Regular Squadrons and the six TA Squadrons: the responsibilities required to be exercised by this Headquarters convince me that it should be commanded by a Brigadier, and I understand the Establishment Committee agreed this yesterday. A Brigadier is in fact available in the person of the present Commander Engineer Support Group from Barton Stacey. (The Commander of the proposed new Headquarters Engineer Support is, of course, the Chief Engineer UKLF by another name).

The new Headquarters ADR is to be set up at Waterbeach where there is sufficient accommodation for the new organisation. An Engineer Regiment with its regular ADR Squadrons assigned to RAF(G) would then logically come under command of Headquarters ADR in peace and would provide the focus for training the TA. I have already mentioned that it is planned to re-locate all the units currently based at Barton Stacey. HQ Commander Royal Engineers (Airfields), commanded by a Lieut Colonel (currently in the Falklands), is to move to Waterbeach to work directly for Commander ADR. The Military Works Force (MWF), commanded by a Colonel is to move to Chilwell. In peace and war, part of the MWF is assigned to ADR and the MWF should, therefore, come under the control of Commander ADR who will, under these proposals, be in the same District. Thus, although the various establishments have yet to be worked out in detail, it is envisaged that the Commander ADR will have under command or control:

- 39 Engineer Regiment, whose primary role is ADR in Germany.

- CRE (Airfields) whose role in future is to be ADR in the United Kingdom, and

— The Military Works Force.

The Headquarters of Commander ADR is to move to Headquarters Strike Command (RAF) in war.

Many of you will have noticed that we have travelled the full circle in the last six years with Waterbeach becoming again the centre for Airfield Damage Repair. This is necessary because we need a centre to develop new techniques for RAF(G) and the UK, to train TA Squadrons and we need a Regimental Headquarters to improve command and control in Germany in war. In the meantime 34 Field Squadron is to remain at Waterbeach but its role in war is the support of 19 Infantry Brigade at Colchester.

May I recapitulate the main changes in organisation, and the proposed time table?

(a) The re-roling of 29 Engineer Brigade and 30 Engineer Brigade should take place by 1 January 1983, to conform with the return of HQ 2 Infantry Division to the United Kingdom.

(b) The regrouping within 29 and 30 Engineer Brigades should also have taken place by 1 January 1983.

(c) 48 Field Squadron at Waterbeach will become a Construction Squadron and

51 Field Squadron (Construction) at Ripon becomes a Brigade Field Squadron by 1 April 1983 to conform with the return of 24 Infantry Brigade to the United Kingdom; this will allow sufficient time for the associated cross postings to have been completed.

(d) Headquarters Engineer Support and Headquarters ADR should be established as soon as possible after 1 October 1982 and, in any event by 1 January 1983, so as to conform with the reorganisation of HQ UKLF and the planned closure of Barton Stacey.

(e) The MWF are to be re-located at Chilwell as soon as the necessary Works Services there have been completed; this will be achieved during FY 1983/84.

I think you will agree that the reorganisation, the regrouping and the changes in role are a most complex affair. Parts of it I regret. My aim throughout has been to reduce the disruption caused to individual soldiers and Squadrons, to a minimum, even at the expense of shifting Commanders and Staffs. However we are never allowed to forget that the whole exercise is being driven by considerations of cost and expense.

Let me assure you that all this change will be taken in their stride by the splendid officers and men we have in the Corps today. They are the best in the British Army and are the most professional of soldiers. They also show their quality by another quite excellent year in the major sports, and may I remind you that 35 Engineer Regiment won the *Princess Marina Cup*. Another extraordinary success was the award of the *Wilkinson Sword of Peace* to 62 Near East Support Squadron, the second time running that this coveted award has been won by a Sapper unit.

CONCLUSION

I have made my own task of drawing this report to a conclusion all the more difficult by talking about two such disparate subjects as the Falklands and Reorganisation. It is certainly far too early for me to venture into the lessons learned from operations in the South Atlantic. I think instead I should take up three themes upon which I concentrated attention in 1981; firstly the importance of the defence debate which I highlighted in this forum last year, and the two themes of my 1981 Engineer-in-Chief's Conference—getting our structure right and being prepared for the unexpected.

The Royal Engineers without doubt, and I suggest the Services in general, have nothing to fear from a well informed public debate about Defence. We should encourage it and where we are allowed, contribute to it. The more that Defence is made a Ju-Ju or it is wrapped up in unnecessary security classification the more power we give to the evil or the stupid who advocate we should not defend ourselves or our interests.

May I remind you that stupidity or ignorance is not necessarily the prerogative of civilians. In fact when we in the Services are put under severe financial pressure you get some remarkable statements made by Officers who ought to know better, but are desperate to find a target for their savings measures. Do not fall into this trap.

You and I must make those inside and outside the Services aware of just what a valuable contribution Sappers make, both in peace and in war, and that is no easy task.

Now the Structure of our Corps. The leaders of the Corps in recent years have spent a great deal of time trying to get our structure right driven by a large number of changes in the Army as a whole. We have probably spent more time on this aspect in the last year as ever before and I am confident that what we have proposed is sensible, simple and will give us the flexibility to react to changes in the future.

I must say what a great debt we in the Royal Engineers today owe to our predecessors over many years for the system and structure they designed for the Corps. It was proved completely in the South Atlantic Operation; every facet of the Corps played its part and without any single component we would have been much less effective. Regular Sappers from every branch or discipline carried out the tasks, with important inputs from the TA Pool and the Engineer and Railway Staff Corps. The Sappers in Operational Requirements, Procurement Executive and the Research and Development Establishments are all still working to solve our problems – largely mines at present.

Lastly I must remind every serving Sapper of the vital need for us to be able to react and cope with the unexpected. The unexpected may be strategic or tactical or technical, and nothing could illustrate this better than operations in the South Atlantic. There is a dangerous illness to which it is too easy to fall victim. I call it the "Priority One Syndrome". Of course the greatest task we have to do is support the British Army to be part of the conventional deterrent in NATO and to be ready to fight should the deterrent fail. But no one must be mesmerised by their plans, which are all based on assumptions we only think are correct or likely. Sappers must be ready at all times to do anything Sappers are known to do, and more; and in any theatre, with whatever is available.

The History of the Royal Engineer Yacht Club

THE History of the REYC is now published, the publishers being the well-known firm of Geoffrey Tulett and Associates. They have produced a high grade volume to match the quality of the contents, the culmination of five years work by Major General Sir Gerald Duke KBE, CB, DSO, DL.

The History covers the period from the Club's formation in 1846 at Chatham, with the various triumphs, vicissitudes and personalities in the early years. The influence of the REYC on offshore racing and cruising is chartered up to recent



The History Of The RE Yacht Club

THE ROYAL ENGINEERS JOURNAL

The listed requirements of the self-propelled lorry included:

 The lorry to be used upon rough roads, or to a limited extent across country. To be able to go wherever a country cart can go.

(2) The lorry to be able to run for 48 hours without overhaul or cleaning

(3) The lorry, carrying its full net load of 3 ton, and drawing a trailer loaded with 2 tons, to be capable:

- (a) of a speed of 8mph on fairly level roads in fair condition.
- (b) of a mean speed of at least 5mph on average roads, up and down hill.
 (c) of taking its full load without assistance on an average road, up and down a
- (c) of taking its full load without assistance on an average road, up and down a slope of 1 in 8.

In considering the merits of the competing vehicles, special importance would be paid to the following points:

(a) Price having regard to efficiency.

- (b) Distance that could be travelled by the vehicles when fully loaded with 5 ton, with the fuel and water carried on the lorry, ("Great importance would be attached to this").
- (c) Economy in weight.
- (d) Durability.
- (e) Accessibility of all parts.
- (f) Simplicity of design.
- (g) Ease of manipulation.
- (h) Absence of noise, vibration and smoke.

Detention allowance of 5/- per day would be paid by the Secretary of State for War to one attendant for each vehicle for every day during the period of the trials.

"On no account are competing vehicles to pass each other when descending steep hills, nor when crossing bridges".

The trials lasted seventeen days and included a thirty mile route from Aldershot via Odiham, Bagshot and Farnborough, and back, and a thirty-four mile route via Guildford, Farnham and Worplesdon.

Eleven firms entered the trial. Vehicles by Thornycroft and Fodens came first and second and were sent to 45th Company in South Africa, as related earlier, where the Thornycroft was by far the most reliable. A third steam lorry, the Straker, had a mishap with a weighbridge just before the trial, but was purchased



A History Of Steam Road Traction, Part five with notes and appendices 11a

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times. The story is halted at 1980 when the REYC reverted to being a private club and the REŞA formally took on the responsibility of sailing as an Army Sport within the Corps.

Rowing was very much a part of REYC affairs from the very beginning; it was only in 1950 that the RE Rowing Club achieved its separate existence. General Duke devotes two of the book's ten chapters to Corps oarsmen's achievements, of which there were many, over the years.

A foreword by The Duke of Edinburgh introduces the history.

Appendices to the book list the Club's Flag Officers up to 1981, the Club's yachts over the years and entries in the RORC and Fastnet races from 1925.

THE BOOK

The book has about 150 pages of print and some 25 pages of illustration, mostly of yachts throughout the Club's history. The quality of the production was aimed at producing a handsome volume which will make a fine gift or presentation volume, apart from being a pleasure to have on one's own bookshelves.

Price-£12 per copy-Postage and Packing are £1 per copy extra. Cheques should be made out to "REYC (History)" and sent with applications to the Honorary Secretary, Lieut Colonel M B Mounde MBE, RE, Brompton Barracks Chatham, Kent, ME4 4UG. Books can of course be collected from the Hon Secretary.

A Flow Chart Based Method of Improvised Bridge Design

MAJOR R H SMITHERMAN RE, B Sc (Eng), C Eng, MICE, MIE Aust



The Author was commissioned from RMA Sandhurst in July 1964. He attended No 20 Degree Course at RMCS Shrivenham between tours as a Tp Comd with 32 Armd Engr Regt in Hohne and in Malu. He was a San 21C at Dover and was on the Staff of 2nd Division. After a tour as an A1 in the Bridging Wing at RSME he attended No 24 PET (Civils) Course. He was recently the British Exchange Officer at the Australian SME and is now a San Comd in BAOR.

Thus article is the first of two which are intended to provoke thought on the subject of Improvised Bridge Design by offering alternative methods to those taught in the Field Engineering Wing.

Improvised bridging is an aspect of combat engineering which is gradually being squeezed out of normal training because it is not deemed to be appropriate to a European war. However unfashionable it may be to say so it is nevertheless conceivable that improvised bridges could be used across short spans, up to 10 metres say, to replace expensive equipment bridges and thus free the equipment bridges

Major R H Smitherman RE SC C Eng MICE MIE

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for use elsewhere on the battlefield. Even if non-equipment bridges are not going to be used in Europe the Corps will still have to construct them on various projects.

It would be a pity if a situation ever existed in which only PQE and Degree Officers could cope with the design of a simply supported non-equipment bridge. This would be so even without the existence of the law attributed to a certain well known Irishman.

There is a requirement for a single method of designing an improvised bridge – one that can be used both by Officers and NCOs. When the Author was an Instructor in the Bridging Branch Officers were taught from the 1971 version of *Military Engineering Volume III* whilst NCOs were taught from the simple tables in the 1957 edition.

DESIRABLE FEATURES OF A DESIGN METHOD

The Author is well aware of the frustrations associated with teaching improvised bridge design, to both British and Australian Young Officers, and has come to the conclusion that for a design procedure to be suitable for the Military Engineer it should:

- (1) Be simple
- (2) Follow a flow chart or design proforma
- (3) Incorporate the provisions of civilian codes in simple tables, graphs or charts
- (4) Include a statement of any implied assumptions so that users can apply valid engineering judgement to their results.

This article illustrates a flow chart based procedure for designing steel roadbearers in accordance with the Australian Steel Structures Code. The second article illustrates a design proforma based method of designing roadbearers to the Australian Timber Engineering Code.

SUMMARY OF SIMPLE THEORY USED

In simple terms the process of designing a non-equipment bridge is done in two parts: firstly the load that the bridge will have to support is assessed and the live bending moments and shears induced by the load are calculated, and secondly decking and longitudinal members are chosen—members which will neither become overstressed nor deflect too much.

Bending Moments and Shear Forces. The method of calculating the Live Load Bending Moment (LLBM) and Live Load Shear Force (LLSF) is described fully in Military Engineering Volume III Part 1A. In it the "one-way" Unit Bending Moment (UBM) and Shear caused by each military vehicle is tabulated for each Military Load Class (MLC). The effects of impact and load distribution are allowed for by multiplying the static moments and shears by an Impact Factor (IF) and by a Distribution Factor (DF). Therefore:





LLBM = No of traffic lanes \times tabulated UBM \times Span \times IF \times DF and:

 $LLSF = No of traffic lanes \times tabulated Shear \times IF \times DF$

Load Carrying Capacity of Decking and Roadbearers. The maximum moment that a beam can carry in bending is found by multiplying the allowable bending



Figure 2. Flow Chart of the Design Process.

stress by the section modulus (Z) of the beam. The maximum shear a beam can carry is the product of the allowable shear stress and the area of beam which resists shear. The rules which determine the allowable stress vary from country to country and from material to material. The rules may be complex. However the user does not need to know these rules as they can be reduced to three graphs; the first concerned with decking performance, the second with moment carrying capacity and the third with shear capacity. (Figure 1)

Decking Graph. The decking graph plots the maximum span over which various thicknesses of decking can support a given vertical load. A different graph is required for each new material.

Moment Graph. The moment graph is a plot of the maximum bending moment a specific roadbearer can carry against the distance between lateral bracing members or chocks. Each line represents a single beam size.

Shear Graph. For most codes of practice this "graph" can be reduced to a table with a single entry for each beam size, ie a maximum shear which applies to all effective spans.

DESCRIPTION OF THE DESIGN PROCEDURE

As can be seen from Figure 2, The Flow Chart, the design is carried out in nine steps each of which is described briefly below.

Step 1. The Briefing and Reconnaissance. The briefing must include a statement of the biggest load the bridge is required to carry and whether this load is a one or two lane load. The allowable deflection to span ratio should also be stated at the briefing. The actual span of the bridge is determined from the reconnaissance. The span assumed in the design should include an allowance for the bridge abutments.

Step 2. Calculate the LLBM and LLSF. The LLBM and LLSF are calculated from the nature of the load, the span and the number of lanes needed. Both are calculated without the DF at this stage because the DF depends on the number of roadbearers. The DF is brought into play at Step 5. Therefore:

(1) LLBM (less DF) = $N \times UBM \times Span \times IF$

(2) LLSF (less DF) = $N \times \text{Shear} \times \text{IF}$

The UBM and Shear are either read from tables (such as Tables 26(M) and 27(M) in *Military Engineering Volume III Part 1A*) or calculated from first principles.

Step 3. Select the Decking. The decking graph is used to select a sensible deck thickness and determine the minimum number of roadbearers required for the selected thickness. The decking graph will vary from material to material and from country to country. The example in Figure 4 is based on the Australian Timber Code and assumes that the whole of the point load is taken by a 300mm wide plank



For M_b girders and N lanes:

$$DF = 1 + \left\{ \frac{12(N_b - 1)(B - N \times A)}{(N_b + 1)(N + 3)C} \right\}$$

Figure 3. Formula for Calculating the Distribution Factor (DF).

with an IF of 1-15. The decking is assumed to be continuous over the roadbearers. The assumed timber properties are shown on the graph. The maximum point load in kN can be calculated from Table 4(M) in *Military Engineering Volume III Part IA*. The minimum number of roadbearers required (N_b) can be found from the Carriageway Width (W_k) and the Spacing (s) found from the decking graph.

 $N_b = \{1 + \frac{w_k}{s}\}$ rounded up to the next whole number. Step 4. Calculate the Dead Load of the Superstructure. The dead load is calculated



by multiplying the end area of each portion of the bridge superstructure by its density. This product expresses the dead load of the bridge as a force per unit length and is given the symbol (w). The units of w are kN/m in the SI system. With



Note: This example of a moment graph is based on that produced by the Australian Institute of Steel Construction. It gives the permissible bending moment in kNm for steel with F_y =250 N/mm² and produced to AS 1204. Uneconomical sections are shown with dashed lines. A 760UB244 has a nominal depth of 760mm and a self weight of 244 kg per m run. Chocks are effective lateral restraints because they ensure that no beam can fail by lateral buckling without all beams having to fail thus at the same time.

Figure 5. A Moment Graph.

the dead load in this form:

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(1) DLBM =
$$\frac{\text{w.L}^2}{8}$$

(2) DLSF = w.L

Step 5. Calculate the Maximum Moment per Beam. The DF and the moment per beam both depend on N_b . They are calculated, for 3 or 4 values of N_b greater than that found at Step 3, as follows:

- (1) The DF. The DF is calculated using the formulae shown in Figure 3
- (2) Moment per Beam. For each value of N_b the maximum moment per beam (BM_{max}) is found as follows:

 $BM_{max} = [LLBM (from Step 2(1)) \times DF (from Step 5(1))] + DLBM (from Step 4(1))$ N_{b}

The calculation of the DF and BM_{max} can be set out in a table for added neatness. This calculation can be further simplified using a programmable calculator.

Step 6. Beam Selection from the "Moment Graph". Having found the maximum moment per beam in Step 5 the next stage is to select a suitable beam from the "Moment Graph". Such a graph for Australian Universal Beams and the Australian Steel Code is shown in Figure 5. A moment graph can be drawn for any steel section and design code combination. The beam or section selected needs to allow some extra capacity for the self weight of the beam or section. The interval at which the roadbearers need to be braced together or chocked is also selected at the same time from the "Moment Graph". Step 6 is repeated for each value of BM_{max} and the combination which looks most efficient, ie which just does the job with the minimum wasted capacity, selected.

Step 7. Adding the effect of Beam Dead Load. Having checked that the decking is still suitable from the Decking Graph, add the DLBM and DLSF (due to the self weight of the beam) to those values calculated at Step 4. Check that the total moment still does not exceed the maximum allowed on the "Moment Graph".

Step 8. Deflection Check. Because excessive deflections give users the impression that bridges are unsafe, even though this may not in fact be the case, bridge codes all lay down a maximum deflection to span ratio. Table 1 gives some values which might be applied to non-equipment bridges.

Serial	Use	Maximum <u>Deflection</u> Span Ratio	Remarks
(a)	(b)	(c)	(d)
1	Civilian	3642	
2	Main Supply Route	<u>і</u> Зяк)	Suggested
3	Lateral Supply Route	 Зня)	Suggested
- 4	Tactical	240	Suggested
5	Emergency	180 to 120	Suggested

TABLE 1: MAXIMUM DEFLECTION TO SPAN RATIOS ON BRIDGES

The deflection check is subordinate in status to the strength check implied in Step 7. A rapid method of calculating deflections will be described in the second article in this series. The deflection check itself involves calculating the deflection induced in each beam by the live and dead loads, and making sure that this deflection does not exceed the span multiplied by the deflection to span ratio.

 $\Delta \leq \text{Span} \times \text{Allowable deflection to span ratio}$ Step 9. Shear Check. The shear check has the same status as the bending check implied in Step 7. It is done after the deflection check because it is the least likely condition to be limiting.



Problen Class 30	SPECIMEN CALCULATION . Design an improvised bridge, using steel roadbearers, to carry a two-way) wheeled load across a 16m span.	Comments
Step 1.	The load is MLC 30W. It is a two-way load and the span is 16m.	From data
Step 2.	The one-way UBM is 59kN The one-way Shear is 231kN	From Table 26(M):ME Vol III Part 1A From Table 27(M):ME Vol III Part 1A
	The LLBM (less DF) is: $2 \times 16 \times 59 \times 1.15 = 2171.2$ kN	IF = 1.15 for military loads
	The LLSF (less DF) is: 2 × 231 × 1·15 = 531.3kN	$ \mathbf{F} = 1 \cdot 1S$
Step 3.	The maximum point load on the deck is: $6.12 \times 9.81 = 60.04$ kN	From Table 4(M):ME Vol III Part 1A
	The roadway width is: 2 × 2·44 + 1·5 = 6·38m Therefore use 6·5m. Footnote to Fig 4 completes Step 3.	Vehicle width is from Table $4(M)$:ME Vol Part 1A
Step 4.	The dead load per m run of the bridge superstructure is: $(2 \times .15^2 + 7.5 \times .15) \times 1200 \times 9.81 = 13.8$ kN/m	Dead load = End Area × Density
	for a $\cdot 15m$ (= 150mm) thick deck. = 11.5kN/m for a $\cdot 125m$ thick deck. = 9.1kN/m for a $\cdot 125m$ thick deck. DLBM = $\underline{13.8 \times 16^2}$ = 441.6kNm with a 150mm deck.	1200kg/m ³ is a realistic timber density <u>9.81</u> converts kg to kN 1000
	= 368 k/m with a 125mm deck. = 291.2 k/m with a 100mm deck. DLSF = 13.8×16 = 110-4 k/N with a 150mm deck.	
	2 = 92kN with a 125mm deck. = 72.8kN with a 100mm deck.	

Step 5. The DF is calculated using the formula under Figure 3. Therefore for 4 See Figure 3 beams:

DF = $1 + \frac{12 \times (4 - 1) (5 \cdot 5 - 2 \times 2 \cdot 44)}{(4 + 1) (5 \times (6 \cdot 5 + \cdot 15))}$ = 1.35 DF = 1.39 with 5 beams. DF = 1.42 with 6 beams. The maximum BM per beam (BM _{max}) is: $\frac{171.2 (from Step 2) \times 1.35 + 441 \cdot 6 (from Step 4)}{4}$ = $843 \cdot 2$ kNm per beam with 4 beams. and $\frac{2171.2 \times 1.39 + 368}{5}$ = $677 \cdot 2$ kNm with 5 beams. $\frac{5}{5}$ and $\frac{2171.2 \times 1.42 + 291.2}{5}$ = $562 \cdot 4$ kNm with 6 beams. $\frac{5}{6}$ Suitable beams are chosen from the moment graph: (1) For 4 beams try 760UB 197s with chocks at 4m intervals. (3) For 5 beams try 760UB 147s with chocks at 4m intervals. (3) For 6 beams try 690UB 140s with chocks at 4m intervals. (3) For 6 beams try 760UB 147s with chocks at 4m intervals. (4) For 4 beams try 760UB 147s with chocks at 4m intervals. (3) For 6 beams try 760UB 147s with chocks at 4m intervals. (3) For 6 beams try 760UB 140s with chocks at 4m intervals. (3) For 6 beams try 690UB 140s with chocks at 4m intervals. (4) For 4 beams try 600UB 140s with chocks at 4m intervals. (5) For 5 beams try 600UB 140s with chocks at 4m intervals. (6) $197s$. The revised total moment is: 600UB 197s. The revised total moment is: $600UB 147s \times 16^2 = 606 \cdot 4$ kNm/beam $760UB 140s \cdot 16^2 = 606 \cdot 4$ kNm/beam 7000×8 $7000 \times$	-15 is an estimate of the clearance needed betwee the roadway and the outside roadbearers	s still	A very safe option. <u>9.81</u> 2000 converts kg to kN Unsafe! This is just above the allowable value so use <u>6 × 690UB</u> 140s.	
ý ř.	DF = $1 + \frac{12 \times (4 - 1) (6 \cdot 5 - 2 \times 2 \cdot 44)}{(4 + 1) (5 \times (6 \cdot 5 + \cdot 15))} = 1.35$ DF = 1.39 with 5 beams. DF = 1.42 with 6 beams. The maximum BM per beam (BM _{max}) is: $2171\cdot2$ (from Step 2) × $1.35 + 441\cdot6$ (from Step 4) = $843\cdot2$ kNm per beam with 4 beams. and $2171\cdot2 \times 1.39 + 368 = 677.2$ kNm with 5 beams and $2171\cdot2 \times 1.42 + 291\cdot2 = 562\cdot4$ kNm with 6 beams. 6	 6. Suitable beams are chosen from the moment graph: (1) For 4 beams try 760UB 197s with chocks at 4m intervals. (2) For 5 beams try 760UB 147s with chocks at 4m intervals. (3) For 6 beams try 690UB 140s with chocks at 4m intervals. As no changes have been made to the original deck selection it is good. 	7. 760UB 1975. The revised total moment is: 843-2 (from Step 5) + <u>197 × 9.81 × 16²</u> = 905.1kNm/beam 760UB 1475. The revised total moment is: 677-2 + <u>147 × 9.81 × 16²</u> = 723.4kNm/beam 690UB 1405. The revised total moment is: 562-4 + <u>140 × 9.81 × 16²</u> = 606.4kNm/beam	Therefore use $6 \times 690 \text{UB}$ 140 beams.

The use of the deflection chart will be described in detail in the second article in this series.	Axle loads are in tonne.	The theory behind this statement is covered in ME Vol III Part 1A on page 128.		From Figure 6	From Figure 6	From Figure 6	From Figure 6	9.81 converts tonne to kN.	<u>9.81</u> converts kg to kN	
In the deflection check the load is first positioned to cause maximum bending. The deflection is found by using Figure 6. Conversion factor C is the amount by which the deflection due to a uniformly distributed load, of the same magnitude W as the load under consideration, must be multi- plied by to give the same deflection as the load under consideration. (1) The position at which the load will cause maximum bending and the conversion factors at this position are found as follows: 3.05m 1.22m 3.66m	$\bar{x} = \frac{9.98}{2.98} (1.22 + 2 \times 3.05) + 5.44 (3.05 + 1.22 + 3.66)}$ $\bar{x} = \frac{9.98}{2.68} (1.22 + 2 \times 3.05) + 5.44 (3.05 + 1.22 + 3.66)}{2.(5.44 + 9.98)}$	= $3.76m$ from A. Therefore for maximum bending the centre of the span is $(3.76 - 3.05)$	= 0.36m past axle B. Axle $\frac{a}{r}$	A $\frac{8 - (3.05 + .36)}{1.6} = 0.287$ 1.23	B $\cdot 287 + \frac{10}{1.60} = 0.4775$ 1.60	C $.4775 + \frac{10}{1.22} = 0.554$ 1.57	$\mathbf{D} \qquad \cdot 554 + \frac{3.66}{1.6} = 0.7825 \qquad 0.98$	(2) The sum of the products of C and W for the live loads is: $2 (5.44 (1.23 + 0.98) + 9.98 (1.6 + 1.57)) \times 9.81 = 856.6 \text{kN}$	For the dead loads the product is: 9-1 (from Step 4) \times 16 + $\frac{6 \times 140 \times 9.81 \times 16}{1000}$	= 277-5kN
Step &										

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The total shear on a beam is: $\frac{531.3 (from Step 2) \times 1.42 + 9.1 \times 16/12}{6} + \frac{140 \times 9.81 \times 16}{1000 \times 2} + \frac{9.81}{1000} \text{ converts kg to kN}$ $= 148.9\text{kN}$ $= 148.9\text{kN}$ The allowable shear is: $\frac{37 \times 250 \times 12.4 \times 615}{1000} = 705.4\text{kN}$ The allowable shear is: $\frac{37 \times 250 \times 12.4 \times 615}{1000} = 705.4\text{kN}$ Six 690UB 140s will not fail in shear. Six 690UB 140s will not fail in shear. The example illustrates how quickly the information in the decking and moment graphs can be used to give a design which minimised wasted dead weight. The method shown is simple because all calculations can be done on a simple four fino.	m $\frac{5 \times W \times L^{3}}{384 \times E \times 1}$ I_{xx} for a 690UB 140 is 1360 × 10 ⁶ E_{steet} is 210 × 10 ³ N/mm ²
The allowable shear is: 37 × 250 × 12.4 × 615 = 705.4kN 1000 = 705.4kN Six 690UB 140 has a web within the foldism. The pro- Six 690UB 140s will not fail in shear. Six 690UB 140s will not fail in shear. The example illustrates how quickly the information in the decking and momenting and momenting shear. The example can be used to give a design which minimised wasted dead weight. The method shown is simple because all calculations can be done on a simple four func-	$\frac{40 \times 9.81 \times 16}{1000 \times 2}$ converts kg to kN
Six 690UB 140s will not fail in shear. CONCLUSION The example illustrates how quickly the information in the decking and moment graphs can be used to give a design which minimised wasted dead weight. The method shown is simple because all calculations can be done on a simple four func-	The allowable shear stress is 0.37 lian Code. A 690UB 140 has a web width of 1 length of 615mm. The product of
Conclusion The example illustrates how quickly the information in the decking and moment graphs can be used to give a design which minimised wasted dead weight. The method shown is simple because all calculations can be done on a simple four finc-	resisting shear.
 tion calculator with a single memory. Any complicated theory is incorporated into the following tables or graphs: (1) ME Vol III Part 1A: Tables 4(M), 26(M) and 27 (M). (2) A decking graph. (3) A moment graph. (4) A shear graph. (5) A plot of conversion factors for deflection. The calculation follows a simple flow chart. The assumptions inherent in the decking and moment graph of the order for the conversion factors for deflection. 	Conclusion by quickly the information in the decking and moment of a design which minimised wasted dead weight. The enemory. Any complicated theory is incorporated into phs: : Tables 4(M), 26(M) and 27 (M). : fables for deflection. I factors for deflection.

Step 9.

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pared but could include:

- (1) The timber strength assumed in the decking.
- (2) Whether the decking was considered as a continuous beam or not.
- (3) Details of the version of the Perry-Robertson formula used to determine the maximum moment in each beam.

The second article in this two-article series will describe a design-proforma based method of selecting timber roadbearers. Taken together it is hoped that readers will be convinced that improvised bridges can be designed, to modern codes of practice, by simple souls without sacrificing theoretical exactitude. It is hoped that they will stir our pamphlet writers into rewriting the relevant pamphlet so that it can be used both by officers and soldiers. Improvised bridging is not a subject which can or should be left to PQEs—it is a subject which concerns all combat engineers.

Tel-el-Kebir—13 September 1882

ANNE CAVENDISH

The Author served for thirty-two years in the Directorate of Military Survey as a Map Research Officer in Egypt, Cyprus and MOD. Now retired, she is able to concentrate on a long-held interest in Military History.

Introduction

Tel-el-Kebir—what does that mean to most of us today? Very little. Perhaps the memory of one of the most unpopular postings in the Canal Zone in the 1940s and '50s, familiarly known as "Tek". Tek, where the Ordnance Depot burned ten thousand army blankets, said to be infested with the verminous parasite called "woolly bear", while the Egyptian labourers looked on in uncomprehending anguish. But a glance through the Army List provides us with deeper insight, in the illustrious Regiments which carry its name among their proudest Battle Honours. Many are now amalgamated or have vanished, with their brave Colours rotting and dusty in our cathedrals and in the churches of our county towns.

The short campaign in Egypt was Sir Garnet's Wolseley's "hat trick": the third of his brilliantly successful, meticulously planned expeditions. First was the Red River in Canada in 1870, second the Ashanti War in 1873, and then Tel-el-Kebir in 1882.

In 1875 the British Government purchased from the bankrupt Egyptian Khedive Ismail his shares in the Suez Canal. This huge investment caused the British and the already committed French to become more and more heavily involved in Egyptian affairs. Egypt came increasingly under European control. English and French Ministers served in the Egyptian Cabinet. This influence was very irksome to Ismail. Secretly, he instigated a revolt. The revolt failed, and resulted in the removal of Ismail from his position by his suzerain, the Sultan of Turkey. Ismail's son Tewfik was appointed in his place, and England and France adopted a system of dual control by which they ruled over Egypt, to the great resentment and discontent of its inhabitants. Colonel Ahmed Arabi of the Egyptian Army emerged as the champion of the people, his professed intention "to deliver Egypt from the domination of Europe and Turkey". Tewfik was too weak to control Arabi, and compromised by including him in his Government and creating him a Pasha. In May 1882, a riot in Alexandria brought the British and French Fleets to the scene. At the last moment the French withdrew from the inevitable operations, leaving the responsibility with Britain.

At home Gladstone's Government pursued its usual custom of looking the other way and hoping that the problem would miraculously disappear. As late as 13 May the Secretary of War, Mr Childers, was writing to the Duke of Cambridge that "no military action had been decided upon", and the Prime Minister himself was declaring that he was "unaware of anything which demanded military preparations". On



14 June, Arabi's forces rose and massacred Europeans and Turks in Alexandria. The Government was forced to take some tardy steps to protect the vast British interests in Egypt. The Mediterranean Fleet, under the command of Admiral Sir Beauchamp Seymour, had been lying off Alexandria for several weeks, itching to intervene to stop the looting and killing in the town.

On 10 July the Admiral issued an ultimatum. Either the forts at Alexandria would surrender or Alexandria would be bombarded. At 7.00am on 11 July, the Fleet opened fire, and by noon all resistance in the forts was at an end. Arabi's Garrison withdrew and dug in at Kafr Dawar. Arabi himself returned to Tel-el-Kebir to perfect the fortifications which would defend the road to Cairo.

Preparations at last

Reluctantly Gladstone and Childers agreed that an Army must be despatched to deal with this tiresome affair. Sir Garnet Wolseley was the obvious choice to command the force. His appointment was strongly opposed by the reactionary old Duke of Cambridge, Commander-in-Chief of the British Army, who considered that the ultimate in military excellence had been achieved at Waterloo and that the formation of a square was the answer to any threat. Wolseley, the reformer, the believer in promotion by merit and not by purchase, was an anathema to him. The Queen always supported her cousin. However, realizing the appointment was inevitable, she contented herself with asking acidly, "Is he our only General?"

It was indeed the only credible appointment. Wolseley was the veteran of innumerable campaigns in all of which he had given evidence of more than ordinary courage and imagination. Burma Wars, Crimea, Indian Mutiny, China: all lay behind him as well as his famous victories in Canada and on the Gold Coast.

Though hastily assembled and small in numbers, the Expeditionary Force was a noble one, consisting of the cream of the British Army. It was a mere 40,000, which included the Household Cavalry, going into action for the first time since Waterloo, a Guards Brigade and the Highland Brigade. Wolseley was supported by a glittering array of "brass" (Colonel Butler, a member of his personal staff, calculated that there was a General for every nine hundred soldiers), and additionally he had surrounded himself with his disciples of the "Ashanti Ring", men he trusted and relied upon and who knew his methods: Redvers Buller, William Butler, Baker Russel, Frederick Morris and Herbert Stewart important among them.

The main force was divided into two Divisions, each supported by its Sappers and Gunners. The First Division was commanded by Lieut General Willis, with the Duke of Connaught and Major General Graham as Brigade Commanders, and the Second Division, under Lieut General Sir Edward Hamley with Sir Archibald Alison and Sir Evelyn Wood as his Brigadiers. These two Division were to be augmented on arrival by crack units of the Indian Army, under Sir Hugh McPherson, coming direct from India and about 7,000 strong. They included Bengal Cavalry and the 1st Madras Sappers and Miners.

The Plan

Garnet Wolseley arrived at Alexandria on 16 August, having occupied the voyage in preparing his plans. On the 17th he met his old friend, "The Ocean Swell", as he called Sir Beauchamp Scymour, on board the Flagship. To him Wolseley revealed his plans for the campaign, but to no other. There could be no clearer or briefer way of unfolding these plans than in the memorandum sent home by Wolseley to the Duke of Cambridge:

"Rough Draft of arrangements agreed to at a Meeting between Sir B Seymour and Sir G Wolseley, 17th August 1882, for the occupation of the Suez Canal and for seizing Ismailia.

"All the transports carrying the troops to be employed in this operation will leave the harbour of Alexandria on Friday the 18th and early on Saturday, the 19th, and will rendezvous outside. The Fleet will do the same.

"Khedive and everyone here and with the Army and Navy to be told we are to bombard the forts of Aboukir and land there for the purpose of taking Arabi in flank from that direction. Fleet and transports to anchor at 4.00pm on Saturday in Aboukir Bay to make a demonstration as with the intention of landing.

"When Fleet leaves the rendezvous outside the harbour of Alexandria HMS *Halicon* and *Salamis*, and the Transports carrying the 2nd Brigade will proceed to sea, and when out of sight of land will turn them toward Port Said, so as to reach that place before daybreak on Sunday morning.

"As soon as it becomes dark on Saturday evening the remaining Transports will weigh and sail for Port Said, to reach there as soon as possible, and to enter the Canal at once upon arrival.

"On Sunday morning Admiral Hoskins will occupy Port Said and take possession of both telegraph stations there allowing no message to be sent on any pretence along the line. He will then occupy Kantara and will cut the telegraph to Syria.

"Captain Fitzroy will seize Ismailia and its telegraph office at daybreak on Sunday morning also the waste weir there; and Admiral Hoskins will arrange for seizing all dredging machines etc that might possibly interfere with traffic through the Canal if sunk by Mr de Lesseps.

"Admiral Hewett will send on Seaforth Highlanders at daybreak on Sunday morning to Serapeum with fourteen days supplies, to seize the lock and railway station there, and fortify his position assisted by the Navy who will perhaps land a couple of guns there. He will prevent all ships from entering the Canal on Saturday without further orders, having previously taken possession of the Canal telegraph.

"Admiral Hoskins will arrange for stopping all ships from entering the Canal at Port Said on Sunday until further orders."

The meeting with the Admiral concluded, Wolseley went on shore and with some gusto began his great deception. In a letter to his wife he describes how he impressed the Egyptian Army entrenched at Kafr Dawar with his warlike intentions: "We rode about and I did the "Commander-in-Chief" putting on an air as I looked towards the enemy that would have done credit to Napoleon as he was crossing the Alps".

Owing to the presence of so large an enemy force outside Alexandria, Wolseley was forced to leave Sir Evelyn Wood's Brigade to protect the town. This was a source of misgiving to him and of disgust and frustration to Wood. Only about three among the soldiers knew the true destination of the Army, and Wolseley completely bamboozled the Press. It is rather odd that they did not smell a rat, for such a sunny distribution of information was not at all Wolseley's style, his dislike of reporters being well known. He took a malicious pleasure in requiring one of his two Divisional Commanders, General Hamley, to prepare plans for an attack on Aboukir, and discussed his proposals seriously with him. Hamley did not know until he opened his sealed orders at sea that there had never been any intention of attacking Aboukir. He did not forgive Wolseley. *Takeover*

The scheme worked perfectly. On the afternoon of 19 August the Transports set sail. They lay off Aboukir, the warships apparently cleared for action. At nightfall they weighed anchor and departed. By the time they entered Port Said early next morning, naval forces had taken the Canal and all the main points on its shores. A fifteen-year-old Midshipman had captured the Company's telegraph station. No information could reach the enemy. A party of armed sailors landed at Ismailia. Old Ferdinand le Lesseps came hurrying down to the quay, crying out that over his dead body would the despicable English come ashore. He was pushed gently aside with the words, "We don't want no dead bodies lying around 'ere, Sir."

Wolseley established his Headquarters in the Governor's house. The two vital items at the start were to secure the water supply and if possible the railway. By 23 August it became obvious that the Sweet Water Canal, the only source of water, was shrinking fast. The enemy had dammed the Canal and had also smashed the railway line.

During the 21st to the 23rd, the Army was landed at Ismailia, and at daybreak on

the 24th they began to move out into the desert along the Sweet Water Canal, to seek and destroy the dams made by the Egyptians.

Tel-el-Mahouta

A small reconnaissance party, led by Wolseley himself, set forth early on the morning of the 24th to see what lay beyond the soft sand hills behind Ismailia. The party consisted of Wolseley, Butler and one or two other Staff Officers, and of Mounted Infantry, followed at some distance by two RHA guns and two Infantry Battalions. When they were about four miles out they were disturbed by the sound of cannon. They moved into the oasis of Abu Suez and took stock of their position. From the oasis the desert rose gradually to Tel-el-Mahouta, a ridge of high sand hillocks, beyond which it was impossible to see. These hillocks were rimmed with dark figures, and right and left a long line of mounted camels and horses were to be seen on the sky-line. Behind them others pressed towards the summit. From farther, black oily smoke rose straight into the air, betraying the fact that Arabi was bringing up train-loads of reinforcements from Tel-el-Kebir.

Wolseley decided to turn what had been merely a reconnaissance into a military operation. He was in a reasonable position for fighting an Advance Guard action during which he would have six to eight hours in which to bring up reinforcements from Ismailia. He sent an ADC back to hurry the Guards Brigade and others already disembarked at Ismailia. It was by then 9.00am, and the heat of the sun was becoming intense. Arabi opened the engagement with a shell which passed only a couple of feet over Wolseley's head. Soon more guns appeared on the ridge and many shells fell among the tiny force in the oasis. The sun rose higher and the heat grew more violent; the unfortunate British soldiers sweated in their stifling uniforms. So recently arrived, they had had no chance to become acclimatized.

Had the Egyptians attacked during those early hours, their sheer weight of numbers and the quantity of heavy guns lined up on the ridge might have brought them a victory, or would at least have inflicted heavy casualties on Wolseley's little group. Unaccountably they held back, and by the time evening came with its cool breeze and setting sun, the Duke of Cornwall's Light Infantry, some Squadrons of Dragoons and the Guards Brigade were on the scene; the Egyptians had missed their opportunity.

Butler gives an account of Wolseley's behaviour at this engagement which captures the admiration: "Cool and cheery, with a kind word for everyone who approached . . . During the afternoon when the Egyptians were pushing their attack with great ardour, and the fire had compelled our Cavalry on the right to retire from the position they occupied directly on our right flank, he ordered his horse to be brought up, mounted, and telling me to accompany him, he rode in the direction of the Cavalry, who were then about a mile distant in the desert, where they were drawing a good many of the enemy's shells upon them. When we had got about half way across the intervening space and the Egyptians, spotting us, had begun to favour us with some shots, the Commander-in-Chief pulled up saying "I cannot stand the pain of this leg of mine any longer, the *** London boot-maker has made the leg of my right boot so tight that when I was dragging it on in the dark this morning the riding breeches got so wedged and crumpled upon the calf of the leg that the pressure has been intolerable for some time past. Can you get it right for me?" We dismounted. I made him sit on the sand, got the boot off, cut a slit in the leather, and we went on again. I thought it strange at first that he had not required this little service of me while we were still among the troops in the sand hillocks, instead of waiting until we were out in the barest part of the desert and quite visible to the enemy on two sides; but then it occurred to me that had this boot pulling-off been performed in the midst of the men, who were by no means too happily situated under the conditions then existing, there might easily have spread the idea that the C-in-C was down, and that the surgeons were preparing to cut his leg off; and so he had kept the pain to himself for hours rather than ease it under the eyes of his soldiers."

When Wolselsey and Butler arrived at the Cavalry position, they were in time to see a falling shell kill a horse. Its rider scrambled to his feet, shouting: "Three cheers for the first charger in the Life Guards killed since Waterloo."

Deciding that the long march in the heat so soon after disembarkation rendered the newly arrived Guards Brigade dangerously exhausted, Wolseley delayed his attack on Tel-el-Mahouta till the morning of the 25th. But when the dawn broke, the Egyptians and their guns were already retiring in the direction of Kassassin. Ordering Drury-Lowe and his Cavalry in pursuit, Wolseley urged him to try to capture some of the enemy's railway engines. In his meticulous organization, the railways had been the least successful. Although stores were lying in quantity on the quay at Ismaila, troops only twenty miles away went hungry. He wrote: "The next time I come on any expedition I shall insist on having a full staff of engine drivers, traffic managers etc. The RE are most willing and anxious, but railway management is a trade in itself."

Drury-Lowe and his Cavalry set off with great dash, but their horses, stale from ten days on board ship and totally unaccustomed to the heat and the heavy desert going, were showing great strain. Though guns, railway coaches and enormous quantities of supplies were captured, the engines got away. *Kassassin*

At the same time Wolseley sent General Graham with an advance force to secure Kassassin with its vital water and railway installations. General Sir Gerald Graham VC was a Sapper, and a character of heroic proportions. Having won the Victoria Cross as a 2nd Lieutenant in command of a ladder party in the assault on the Redan before Sevastopol, he continued to rise rapidly in his career. He served both in China and in Canada, and he and Wolseley must have known each other well. So frequently had Graham been promoted for gallantry in the field that when he became a Major General in 1881 he was forced to go on the Half-Pay List as no sufficiently senior post was vacant. Not, however, for long.

Graham occupied Kassassin on the 26th with a force of little more than 2000: the York and Lancasters, the Duke of Cornwall's, a few Cavalry, some Mounted Infantry and two guns. The water supply was secured. Some miles to the rear at Mehsama, Drury-Lowe was encamped with the Cavalry. The Egyptians made several attempts to dislodge Graham, and on the 28th they launched a full attack. After holding Kassassin for some two hours against a determined assault, in which his force was outnumbered by at least ten to one, Graham ordered a counter attack and general advance. The Cavalry advancing, guided mainly by gun flashes, came suddenly upon the extreme left of the Egyptian line, and the enemy guns were turned upon them. The Horse Artillery rushed forward and unlimbered their guns to clear their front. Baker Russel, holding his sabre aloft, rose in his stirrups and gave the command not issued since Waterloo: "Household Cavalry—Charge!"

The Egyptians retreated in disorder and finally withdrew behind their heavily fortified position at Tel-el-Kebir.

In his Despatch after the campaign, Wolseley wrote, "... the brunt of the fighting throughout the campaign fell to the lot of Major General Graham, VC, CB, commanding Second Brigade, and it could not have been in better hands. To that coolness and gallantry in action for which he has always been well known, he adds the power of leading and commanding others."

Needless to say, the victory at Kassassin was greeted with joy and enthusiasm. Now all, including his own Chief of Staff, Sir John Adye, were urging Wolseley to hurry on and finish things off. Wolseley was not to be rattled. He had his plan, and nothing was to interfere with it. He wrote to the Duke of Cambridge: " – all will be concentrated and ready for an advance upon the enemy on Tuesday or Wednesday week (12th or 13th inst)." He also re-stated his determination to enter Cairo on the

¹ Two months later the intention of converting some Companies of RE into a Railway Corps was announced in Parliament,

15th or 16th. He considered it essential to get to Cairo with all speed to protect the city from Arabi's retreating and marauding army.

On the days between Kassassin and 12 September, the Army worked early and late. Trains were at last organized, and supplies began to accumulate in comfortable quantities at Kassassin. The telegraph cable was brought up from Ismailia and was ready to be carried forward when the advance came. Nothing that could be thought of was left to chance. On 9 September, Arabi, with 8000 men and twentyfour guns, emerged from his fortifications and made a last attempt to rush Kassassin. The attack, though lacking in skill, was a spirited one and by no means onesided, though it proved to be unsuccessful. By the 10th, Wolseley had brought up his entire Army into camp at Kassassin, ready to move out to face the six miles of open desert which separated them from Tel-el-Kebir.

Arabi's position had been well chosen and skilfully laid out. Great earthworks had taken months to erect. The hard sand parapets, over six feet high, were fronted by ditches six feet deep and ten feet wide, and smooth sided. These stretched from the Sweet Water Canal into the desert for nearly four miles. At intervals, wellmade redoubts, with a maximum field of fire, were situated. Behind these defences were a further two miles of trenches, rifle pits and artillery strong-points. Tel-el-Kebir, according to Intelligence information, was defended by 20,000 Regulars, 6,000 Bedouin, 2,500 Cavalry and sixty guns. Arabi was convinced that he would be invulnerable within his fortifications.

The problem confronting the British Commander was a considerable one. He could not, with his inferior numbers, storm entrenchments uphill and with no concealment of any kind from what would inevitably be scorching fire. To try to turn the enemy on either left or right would mean a long and exhausting desert march, and he might fail to come close enough to engage the entire Egyptian Army, thus leaving the score unsettled. Many reconnaissances had shown that Arabi's sentries were poor. Wolseley decided on a bold plan: a surprise attack at dawn after a night march.

The Battle

Wolseley was fully aware that a night march could be both deadly and difficult, with panic being aroused among tense troops by the merest bird call. When he outlined his plan to his Field Commanders on the morning of the 12th, he was well aware of their misgivings, particularly those of gloomy old Sir John Adye who thought the plan over-bold and dangerous. However he asked for no opinions and knew he would receive loyal co-operation from his Army. All day was spent by the staff in preparing copies of the orders, with rough plans of the alignment of the troops; 11,000 bayonets, 2,000 sabres, sixty-one guns and six machine-guns. The Army was to march in the formation in which it would fight, since any realignment before the attack would be impossible.

The positioning of the Army was as follows.

On the extreme right, Willis's 1st Division, two Batteries of the RHA and the Cavairy Brigade, then Graham's Brigade. The Royal Irish, the Royal Marines, the York and Lancasters and the Royal Irish Fusiliers, supported by the Brigade of Guards—the Grenadiers, Scots and Coldstreams under the command of the Duke of Connaught—marching 1,000 yards behind. Between the 1st Division and General Hamley's 2nd Division were forty-two guns.

The left of the attacking line was occupied by Hamley's 2nd Division, the front position of honour and danger going to the Highland Brigade, under their onearmed commander, Alison. The Highland Brigade consisted of the Black Watch, the Gordon Highlanders, the Cameron Highlanders, and the 74th Highlanders, fighting for the first time under their new title, the Second Battalion the Highland Light Infantry. In reserve, behind the Highland Brigade, were the King's Royal Rifles and the Duke of Cornwall's, and behind them the Marine Artillery and the 19th Hussars. On the railway was the armoured train, manned by 250 British sailors, and on the extreme left were the Seaforths and the Indian contingent. Short perhaps in numbers but not in military fame.

Camp at Kassassin was struck on the evening of the 12th, as darkness fell. All baggage was piled along the railway so that it could be easily loaded into carriages and sent off to the troops. Then, leaving their cooking fires burning, the Army moved quietly out into their positions in the desert. A Company of Royal Engineers was employed in laying out a line of telegraph poles to give the direction for the advance of the Highland Brigade. This extended for some two miles beyond the British outposts. The guidance of the Highland Brigade, beyond this point, was in the hands of Wolseley's Naval ADC, Lieutenant Rawson, to whom navigation by the stars was no mystery.

The Army was in formation ready for the advance by midnight, and all lay down in the desert till the time for the beginning of the advance should arrive. Wolseley rode round his army and lay down among them, as Commanders since the days of Agincourt had rested with their armies. "Who," he wrote to his wife, "except a man in my position, can understand my feelings and thoughts as I lay on the ground among the troops, anxiously striking my repeater watch from time to time. It is only those to whom the lives of considerable forces and the honour of one's country have been entrusted who can really know what tension there is on every nerve at such a moment. I fully realized the danger of the operations I had determined upon, and knew that if I failed, every wiseacre in England would have said what a fool I was to have attempted a night attack."

The main body, North of the Canal, moved off from its bivouac at 1.30am on the 13th, to cross the six miles of open desert extending to the Egyptian entrenchments at Tel-el-Kebir. The formation in which it set out must be the formation in which it met the enemy. The entire front from North to South measured 7,400 yards, and its depth, from East to West, about 2,000 yards. The going was good, hard enough to be easy, and soft enough to be almost soundless. No loose ammunition had been permitted—all was secured in pouches—and rifle fire had been forbidden before achievement of the summit of the Egyptian defences. It was to be a storming by bayonet.

The night was dark and moonless, though the sky was brilliant with stars. Looking ahead into the desert, all was muffled in a thick grey haze. The march proceeded in total silence until, at about 4.00am, came the incident which would be remembered with shock and horror by every person taking part in the advance. Suddenly, out of the deep hush rang a wild peal of hilarious laughter. A peal of laughter which, though it was instantly silenced, seemed as if it must be clearly audible not only in Tel-el-Kebir but in Cairo itself. All waited breathless, but nothing followed. The deep silence reigned once more. A Highlander of the 74th had succeeded under cover of darkness in having his canteen filled with rum during the distribution of the ration. A doctor, marching near, chloroformed him, and he was carried into battle by two disgruntled bandsmen. Only one other incident might have caused disaster during the classic night manoeuvre. An order to halt for a few moments had been given by General Alison. This order was delayed in transmission to the flanks. When the centre halted, the two sides, still keeping in touch with the centre, continued to advance. If this had not been discovered, the right and left columns would have met face to face, and in darkness and confusion might have taken each other for the enemy. Luckily it was discovered, and the ranks were realigned.

The Army was very close to the enemy, but the darkness and silence were as profound as if many miles still separated them. The C-in-C dismounted to await the dawn. "In the next twenty minutes," Butler reported, "I could hear the repeater repeating its minutes frequently, four forty, forty five, fifty...."

Looking to the East they saw a large shaft of pale light, shaped like a sheaf of corn, gold coloured, rising into the sky from the horizon. They believed this strange glow to be the approaching dawn. It was in reality the Great Comet of 1882. It vanished, and darkness returned. They remounted and rode cautiously on. Suddenly firing broke out, both musketry and heavy guns. In ten minutes dawn broke and the enemy lines were revealed. There was no longer any need for silence. Orders rang out, followed by the sharp click of bayonets being fixed. The Highland Brigade advanced steadily, making no attempt to return fire. Hardly were bayonets fixed when the Buglers sounded the charge. Leading Companies of the 74th plunged into the deepest of the ditches at the centre of their advance, struggling and floundering to find a way out and to mount the counter-scarp, to charge down upon the enemy Batteries with the bayonet and to engage in savage hand-to-hand fighting. From either side came the sound of cheering Highlanders who had found the way less hard and of the pipes urging them on. The Egyptians fought with courage and tenacity, but once the summit of their defences had been scaled they were finished. All along the line the British broke in upon them, and their retreat became a rout pursued with shot and shell and sabre. By 6.00am it was all over. Arabi's fleeing army left 2,000 dead and countless wounded on the field. British casualties were comparatively light: nine officers and forty-eight men killed, and twenty-seven officers and 350 men wounded. Of these the bulk were in the Highland Brigade, which the gallant Lieutenant Rawson had guided to the very foot of the defences before falling mortally wounded.

The telegram announcing the victory of Tel-el-Kebir reached the War Office at 3.45pm on the same day.

Afterthoughts

Drury-Lowe and his Cavalry reached Cairo, after an epic dash of sixty-five miles, on the 14th, and bluffed a Garrison of six times their number into surrender. Arabi Pasha handed his sword to Drury-Lowe that night.

Wolseley entered the town on the 15th, one day ahead of his schedule. His whole campaign had been faultlessly concluded within one month of his arrival at Alexandria.

The aftermath of a battle is never pretty, but the events following Tel-el-Kebir were singularly mild and lacking in reprisals. Arabi was court-martialled and sentenced to death for High Treason. The sentence was immediately commuted and he went into exile in Ceylon.

Never again would a British Commander be in untrammelled control of his Army. The net was closing. The world was shrinking. The civilians would be in ever closer contact with and control of the man on the spot.

Two comments made by the Duke of Connaught ("my dear son Arthur"), who conducted himself with the greatest coolness and bravery throughout the campaign, are of interest.

The first was made in a letter to "Uncle George"—the Duke of Cambridge: "The clothing supplied to the men—viz red serges and blue serge trousers—was thoroughly inappropriate to this climate, and the men suffered terribly from the want of a cooler and more comfortable dress. Khaki is the only sensible fighting dress for our men, and had they been dressed in it like the troops from India, it would have been an inestimable boon to all. At the present moment the clothes of the troops from England are in such a state that you would be horrified to see them, whereas the troops from India look just as clean today as when they disembarked."

The Duke's other comment was in a letter to the Queen, and referred to his Commander: "... I don't wish to serve under a pleasanter chief, or one in whom I feel greater confidence. He is the least fussy General I have ever served under, and his orders are short and clear; he never interferes with one, and always gives one credit for what one does."

The Queen graciously sent a copy of this tribute to Lady Wolseley, who wrote to her husband complaining, "I can't call you a fussy little General now"!

It was left to Butler to provide an epitaph for the Egyptian dead: "Peace to them lying under these big mounds on the lone desert . . . No word should soldier utter against them; let that be left to the money-changers. They died the good death. Dust to dust. They did not desert the desert, and Egypt will not forget them."

A History of Steam Road Traction in the Royal Engineers—Part Five with Notes and Appendices

LIEUT COLONEL J E NOWERS RE, B Sc (Econ)

Chapters 1-11 were published in the last four issues of the RE Journal This is the final instalment of the history

12. THE MECHANICAL TRACTION COMMITTEE

Crompton's first task in England was to brief the C-in-C, the Duke of Cambridge, on affairs in South Africa. Shortly after this the War Office formed a Committee to consider the future of mechanical transport. The Adjutant General, Sir Evelyn Wood, supported the formation of the Committee:

"There is no doubt that the time has arrived when we should endeavour to utilise motor transport for Army purposes.

"Hitherto, except in so far as a small steam transport unit has been used in South Africa, we have perforce had to rely on animal transport for conveying stores from the railway or other base to the troops.

"It is a costly arrangement, and I should hope that on investigation it will be found that recent developments in motor vehicles will afford an economical means of relieving the animal transport of a considerable portion of their work. I support the appointment of a strong Committee . . . and advocate that it should not aim at finality of perfection in the vehicles for adoption by the War Department. To do so would be to defer to the Greek Kalends the prospects of supply".

The President was the Financial Secretary, Lord Stanley. The Secretary was Major F Lindsay Lloyd RE, who had been Crompton's Second-in-Command in the Electricals. Major Lloyd spent the rest of his life, in and out of uniform, on mechanical transport work. Later, he managed the Brooklands Racing Track and often made it available for War Department trials. There is a story that the track officials, who were used to vehicles travelling at over 100mph, noticing a WD vehicle apparently stationary on the far side of the track, sent the wrecker to recover the casualty, only to find it was moving, but slowly, testing the cooling system in bottom gear.

The Committee was divided into Sub-Committees for the Royal Engineers, Royal Artillery, Army Service Corps and an Experimental Sub-Committee. Crompton was retained as the only member of the RE Sub-Committee with any experience of mechanical transport. They held frequent meetings in No 3 Committee Room of the Old War Office, now the Royal Automobile Club in Pall Mall, and the New War Office, now the Old War Office in Whitehall.

The RE Sub-Committee reported in May 1901 that mechanical transport could be widely used in the Corps with advantage. They recommended 12-ton steam tractors and 3-ton steam lorries be used in a wide variety of units and that the Engineers of an Army Corps should have eighty or ninety 3-ton lorries for their own use. Their findings were not accepted and they made no further reports.

The Experimental Sub-Committee began work with a steam traction engine fitted with an oil burner and steam condenser to secure a wide range of action. It was not a success and their next endeavour was the steam lorry. The specification was drawn up as a result of demand from South Africa for a lighter and more mobile vehicle than the traction engines in use there. The lorry was to carry 3 ton and draw a trailer carrying 2 ton. Prizes of £500, £250 and £100 were to be awarded.

The trials were based at Aldershot and the instructions make interesting reading: "HMG have the right to purchase after the trials any or all of the competing vehicles at the price stated by the competitors".
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Photo 11b. Two engines with RE crews in tandem, winching a train at Long Valley, Alder shot, in the 1902/3 trails

by the War Office and sent to work at the SME Chatham.

In October 1903 a trial was held for long range tractors. The first prize was £1000 plus £10 per mile over forty miles that the vehicle would run without replenishment. Only one vehicle was entered, a 2-cylinder Hornsby engine which ran for fifty-eight miles at 3mph. Although it was awarded the prize it did not meet any military requirement. It achieved lasting fame later when, fitted with caterpillar tracks it became the forerunner of the tank.

In July 1903 the Mechanical Transport Committee made a number of recommendations which led to the Army Service Corps becoming responsible for mechanical transport. The Royal Engineers were to hand over their responsibilities as the ASC developed.

In 1902 the ASC formed a MT Section of thirty-four all ranks. In 1903/4 two complete MT Companies were formed and underwent a year of training in the workshops at the SME Chatham. A number of RE personnel were transferred to the ASC as part of their build up.

For the Army manoeuvres of 1903 a number of traction engines, lorries and cars were used, manned mainly by RE personnel.

On 6 February 1903, 77 Company ASC formed at Chatham. In 1904, 78 Com-



Photo 12. Colonel Templer, in civitian clothes in front of the motor car, watching the 1960 strials

A History Of Steam Road Traction, Part five with notes and appendices 11b 12 pany ASC tormed at Aldershot. These two units took over all transport from 45th Company Royal Engineers and by 1906 operated a sizeable fleet: 10 Thornycrofts, 2 Wallis and Stevens, 6 Foster Wellingtons, 2 Tasker Little Giants, 4 Aveling and Porter and 3 Baby Fowlers, all steam; 1 Hornsby, 1 Thornycroft and 2 Wolseleys, all oil-fired tractors, and 4 Milnes-Daimler petrol lorries.

This transfer marked the end of the Royal Engineers' interest in mechanical transport. Individual Sapper Officers continued to be involved, particularly in the later development of the tank. On later occasions the Corps used steam power again – even in the Second World War, steam rollers for airfield repair during the siege of Malta and steam traction engines for laying PLUTO across the Channel. But that is another story.

13. Notes

(1) Nominal Horse Power. This rating, used by the manufacturers, dates from the 17th Century. The Royal Agricultural Society wanted a comparison between the power of an engine and the power of a horse.

The formula stated by the Royal Agricultural Society was:

10sq in of piston area = 1 nominal horsepower

ie nhp = $\frac{A}{10}$ \therefore A = 10nhp

Since area is proportional to the square of the diameter (D)

 $D^2 \propto 10$ nhp or $D \propto \sqrt{10nhp}$

For Duplex cylinders 9sq in of piston area = Inhp

(2) Testing of Traction Engines. Early tests were carried out by the manufacturers themselves. Later the Royal Agricultural Society arranged comparative trials.

One set of really detailed tests was carried out in August 1911 by Mr J W Landen, at the suggestion of Prof Hopkinson. He was assisted by R M F Hedges, H N Davies and D W Sanford, all members of Cambridge University Officer Training Corps, and Captain Hutchinson, ASC. Prof Hopkinson was Major and OC of the RE Company, CUOTC.

The engine was a Fowler Lion belonging to the ASC but used by the CUOTC. It was typical of several supplied to the War Office, being a 4-shaft, double crank compound engine with three road speeds.

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(2) For the development of the Steam Sapper, see contemporary reports in the Sapper, the RE Journal, The Engineer and various newspapers.

(3) For details of J L B Templer, see:

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(5) For accounts of the Boer War period and after, see: Various official reports in the Ministry of Defence Library. *The Biograph in Battle*, by W K-L Dickson 1901. *The Daily Graphic* for 18th May 1900 for a detailed description of the armoured traction engines.

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The Story of the Steam Plough Works, by M R Lane, Northgate Publishing Co Ltd, 1980. This is a little inaccurate about the Boer War period.

(7) For an account of Royal Engineer involvement in the development of mechanical transport generally, see:

Mechanisation of Rail-less Transport. The part played by The Royal Engineers. An unpublished manuscript by Colonel A E Davidson, RE Library. (8) For photographs illustrating this story, see:

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Appendix 1

			ENGINES BUILT BY A	AVELING AND POP	TTER FOR THE	WAR OFFICE TO 1	899
Serial	Works No	NHP	Type	Delivery Date	For	Of	Remarks
(a)	(b)	(c)	(d)	(e)	(1)	(g)	(h)
1	437	6	Commercial	14 Dec 1868	War Office	Chatham	"Prince Arthur"
			Traction E				later Steam Sapper No I
2	554	6	Portable	20 Oct 1870	War Office	Shocburyness	
3	684	6	Ordinary TE	21 Sep 1871*	SME	Chatham	Steam Sapper No 2
							*Some records say 1872
4	722	6	Agricultural	Jan 1872	War Office	Shocburyness	Steam Sapper No 9
5	822	б	Road locomotive	28 Mar 1872	SME	Chatham	Steam Sapper No 3
6	829	6	Road locomotive	1 Apr 1872	SMF	Chatham	Steam Sapper No 4
7	830	6	Road locomotive	10 Apr 1872	SME	Chatham	Steam Sapper No 5
							Illustrated with flanged
							railway wheels
8	831	6	Road locomotive	17 Apr 1872	SME	Chatham	Steam Sapper No 6
9	832	6	Road locomotive	26 Apr 1872	SME	Chatham	Steam Sapper No 7
10	939	6	Crane engine	27 Jan 1873	SME	Chatham	Steam Sapper No 8
							Joined Ashanti expedition
11	1306	8	Traction engine	1877	SME	Chatham	Steam Sapper No 11
12	1307	8	TE engine	1877	SME	Chatham	Steam Sapper No 10
13	1316	6	TE engine	17 Apr 1877	SME	Chatham	Steam Sapper No 12
14	1317	6	TE engine	1877	SME	Chatham	Steam Sapper No 13
15	1424	8	TE engine	30 Apr 1878	Dockyard	Woolwich	Steam Sapper No 14
16	1425	8	TE engine	26 Apr 1878	Dockyard	Woolwich	Steam Sapper No 15
17	1426	8	TE engine	30 Apr 1878	Dockyard	Woolwich	Steam Sapper No 16
18	1427	8	TE engine	20 May 1878	Dockyard	Woolwich	Steam Sapper No 17
19	1529	8	TE engine	1879	Curragh	Ireland	
					Camp		
20	1593	8	TE engine	1880		Bermuda	Steam Sapper No 20
21	1611	6	TE engine	15 June 1880	War Office	Chatham	Steam Sapper No 21
22	1621	6	TE engine	12 Aug 1880	Curragh	Ireland	
					Camp		
23	1879	6	TE engine	31 Jul 1883	SME	Chatham	Steam Sapper No 22
			.				with train gear
24	2051	8	Road locomotive	1885			
25	2058	8	Crane Engine	1885	Balloon	Chatham	Steam Sapper No 24
			with dynamo		Corps	a	"Bailoon"
26	2069	<u>0</u> +	Road locomotive	27 May 1885	Balloon	Chatham	Some records say 1886
					Corps		Sold to Mr S Don
							22 Apr 1890
	2007					-	fSome say 8nhp
27	2093	ò	Road incomotive	1886		Chatham	10 h 1000
28	2105	9	TE with dynamo and	1999.		Chatham	"Some records say 1885
202	7445		spring wheels	33 M	T	Charles 1	Steam Sapper No 17
29	2403	4	LE with oynamo	23 May 1889	Road	Chatham	Built in 1880?
					Committee		
20	7403	4	Cami nomahla	34 MEAN 1880	Und Office	(Loshow	
21	2902	12	Semi portable	20 BIAI 1009	war Once	Weathink	
31	2/49	12	Senir portable	15 JAN 1891	Assant	wootwich	
27	2763	7	IST Dollar	27 fee 1801	Roual	Dublia	
32	2100	,	to a sconer	22 340 1071	Arrenal	20010	
33	2010	5	10T Roller	26 Nov (89)	Royal	Aldershot	
	4777	2	NOT AORA	20 109 1071	Assenal	Profitent	
3.4	3226	6	15T Convertible	29 Aug 1893	SME	Chatham	Steam Sanner No 23
	****	Ň	Roller	277106 1075		some od th	Account on Part 110 Th
35	4422	10	Road locomotive	4 Nov 1899			King type
							To SA in Boer Wat

Appendix 2

TRACTION ENGINES IN BRITISH SERVICE IN SOUTH AFRICA Type and Date of Building Remarks Works Number Fowler Horizontal Plough 8516 1900 8531 16 Jan 1900 Side-Winder 8536 ך 17 Jan 1900 Sold second-hand to WO 8537 17 Jan 1900 🕽 6 Horse Power 7626 1896 Bought by WO in South Africa New to W A Sheppard. To WO Jan 1900 8430 26 May 1899 8665 29 Sep 1899 "Florence". New to WO. Ex SS Denton Grange 8805 19 Feb 1900 "Ursula". New to WO 8810 26 Oct 1900 New to WO. Arrived in South Africa Dec 1901 on SS Manhattan Rigid B4 8198 8 Nov 1899 10 Horse Power B4 7643 17 Sep 1896 New to J W Waddington, Leeds. To WO 20 Feb 1900. Reconditioned by Fowlers 8057 16 Jul 1898 "Lion" 8060 14 Jun 1898 "Onward", To WO 1900 8062 20 Mar 1899 New to J Wagstaff, To WO 20 Feb 1900. Reconditioned by Fowlers 8219 23 Aug 1899 8225 27 Jul 1898 Armoured B5 8894 29 May 1900 To South Africa in SS Clan Bouchanan 8895 11 Jun 1900 To South Africa in SS Clan Fraser 8898 ך Oct 1900 ך Arrived South Africa December 1901 8899 19 Oct 1900 J 10 Horse Power B5 "Lion" 8379 10 Jun 1899 New to John Allen, Oxford. To WO 1900 8382 2 Aug 1900 8383 2 Aug 1900 8385 13 Oct 1899 8388 19 Oct 1899 8389 26 Aug 1899 23 Nov 1899 8466 New to F J Barnes, Potland. Fitted with crane jib and wood block wheels to work in the stone quarries. To WO Jan 1900. Reconditioned by Fowlers 8470 23 Jan 1900 26 Jan 1900 8471 8472 29 Jan 1900 8722 13 Mar 1900 8723 30 Mar 1900 27 Sep 1900 8727 8728 31 Dec 1900 8729 12 Jan 1901 8730 21 Jan 1901 8936 8837 28 Feb 1901 8900 31 Dec 1900 Convertible road roller

Type and	Date of Build	ding Remarks
Works Nun	nber	0
10 Horse Pe	ower B6 "Big Li	ion"
9153	26 Nov 1901 \	Arrived South Africa 5 Jan 1902 in
9154	26 Nov 1901 ∫	SS Manchester Merchants
McLaren		
603	One of these wa	as a crane engine
604		-
Aveling Pol	rter	
4422	1899	"King" type
Marshall		
29111	Crane engine.	Purchased in South Africa for £800
Thornycrof	t	
6	1901	3-ton steam lorry
Foden		
524	1901	3-ton steam lorry
Burrell		-
2224	1899	WD registered No 1885
1599	1892	Reconditioned for WO. EE1
2262	1900	New to WO, EE2
2267	1900	New to WO. EE3

Notes to Appendix 2

(1) This list is based on Captain Scholfield's official report which showed 44 engines in the hands of Steam Road Transport in June 1902.

(2) The manufacturers' records list a number of other engines supplied to the War Office during the period. Some of these stayed in England. Others were sent to South Africa but were lost in the stranded SS *Denton Grange*. Records are incomplete and it seems impossible to fill in more detail.

(3) In addition to the engines listed, the following were used in South Africa:

Two Fowlers from Koffiefontein Mines, commandeered at Modder River Station in July 1901.

Two Wallis and Stevens from Talle Bay Harbour Board. Hired at Cape Town in April 1900.

(4) The following engines were also supplied to the War Office:

Fowler 8054 obtained in South Africa

8517 plough engine, and 8532, horizontal plough, believed lost in the SS Denton Grange

7783 8726 8807 New to WO 8835 8836 Aveling 2465

PORTRAITS AND SILVER OF RE HQ MESS

Published by Institution of Royal Engineers. Price £2.00

This beautifully illustrated book contains the photographs and descriptive details of fifteen Mess portraits and forty-one pieces of Mess silver. It is a fascinating reference book on the familiar items we have seen and on which our knowledge (for most of us to say the least), is sketchy. Which portrait was the first to be acquired by the Mess? Which piece of silver is the most valuable? Who was Ko? Who was the first engineer officer to command a British army in the field? The answers to these questions and many others are yours for the asking price plus UK 94p Overseas £2.46 postage and packing.

Each of these constituent parts of 75 Engineer Regiment has a geographical association as well as a logical (or sometimes illogical) military derivation. This history first traces the connection of each sub unit from the early days to 1967, and then the story of the Regiment, as we now know it, from 1967 to the present day.

THE CHESHIRE ENGINEERS

In 1860, Mr Lewis Hornblower, a Birkenhead architect met with a few of the more influential local citizens in the Park Hotel. There he proposed they raise a Volunteer Corps to be drilled and instructed in duties very similar to those of today's Sappers. They decided to place an advertisement during November in the *Birkenhead Advertiser* to put the idea to the public. It was suggested that they raise four Companies each of 100 men which were to be composed mostly of artisans. Each member would pay two shillings annually as a subscription of one shilling and a further shilling for their equipment. They also paid an initial deposit of five shillings on joining. The advertisement also asked for donations and names of annual subscribers.

Six months later Queen Victoria gave Hornblower permission officially to recruit two Companies of up to 200 men each, and he was gazetted as Captain Commandant of the Corps. Captain Gaskell was appointed as his assistant and Commander of the other Company. The Corps was allowed one regular Sergeant as an instructor in 1861.

Not only did the men have to pay for their own uniforms and equipment and the annual subscription, but there were no government allowances for food, fodder or travel. Mounted men had to supply all their own animals and saddlery. On top of that the 1890 Rule Book allowed the men to be fined for such offences as wearing their uniform other than on official parade times and absence. Such penalties ranged from half a crown to 36/-, which was a great deal of money. Officers' subscriptions ranged from £3 for a Subaltern to £20 for the Commandant. Poor attendance carried the penalty of double subscription.

The donations and subscriptions enabled the unit to lease a house and later build a large CI hut in the garden to provide a suitable area for drill. The Corps, under the title of the Cheshire Engineers, trained there for twenty years. In 1881 they were renamed as the 1st Cheshire Royal Engineers Volunteers and attended their first camp in 1886, which became an annual affair.

In 1899, during the Boer War in South Africa the Cheshires sent twenty Volunteers under the command of Captain R L Hutchison to join the campaign. They sailed from Southampton on 14 April 1900 and returned to Birkenhead after a year's service in May 1901. The casualties are uncertain but most of the Volunteers seem to have returned. When they got back plans were started for a new drill hall.

A suitable plot of land between Harrowby Road and Shitford Road was bought, and the new barracks and drill hall built in 1905 for £4741. At the time it was reported that the main entrance would be greatly improved if some of the houses in Harrowby Road could be demolished . . . we are still waiting! The same year Haldane's Territorial and Reserve Forces Act changed their name to the 2nd Cheshire Field Company Royal Engineers and for the first time, in 1908, the Sapper Cap Badge was worn.

Having joined the Sappers, the Company had the dubious privilege of mobilising in 1914 and being the first TA Sapper Unit to go to France, where they took part in the first battle of Ypres, and every other major engagement up to the end of the War. The Old Comrades Association erected a memorial to the fallen which still stands in the Harrowby Road Drill Hall, and a service is held there each Remembrance Sunday. In memory ofher husband, Mrs Andrew MacIver gave the Company a ship's bell, which still takes pride of place during the reunion functions of the Cheshire Field Squadron.

In the peacetime of the twenties the Company settled back with the TA in Harrowby Road as the 2nd Cheshire Field Squadron, and was affiliated to the prestigious 1st Field Squadron of the Regular Army. All Sapper sub units were Companies then except for those two because they supported the 1st and 2nd Cavalry Divisions respectively. They trained as a mounted Sapper field unit until in 1937 they became the last Royal Engineer Squadron to be mechanised and lose their horses. This was followed by the 1939 expansion of the TA, which was to play active and successful parts in the coming war.

At the beginning of the Second World War the Cheshires formed another Company (the 3rd Cheshire) and 141 Field Park Troop. All three units were sent to the Middle East, where the 2nd served in Palestine, Egypt, Cyrenaica and Palestine again. Troops also went to Syria and the Iraq oilfields, but came back together in time for the victorious battles under Montgomery at El Alamein. The 3rd were at Alamein too, having stayed in the Western Desert to that time when they found that their soldiers were of such a high calibre many were granted emergency commissions. Meanwhile 141 Troop was supporting in turn 1st Cavalry Division, 7th Armoured Division under Wavell and finally the 10th Armoured Division at El Alamein.

The 2nd Cheshire finished with the Middle East theatre, sailed to Italy, were equipped with specialised Churchill tanks and became a Sapper Assault Squadron. There they suffered the numbers craze of the General Staff and bore the indignity of being called 622 Assault Squadron. They ended the war in North West Europe in time for the final push into Germany.

After the war all the units went home to their various Drill Halls and the Cheshire Association were told to form an Assault Regiment from the existing Squadrons. By now the 3rd had become an assault unit as well, and 141 had been promoted from Troop to Park Squadron. So 113 Assault Engineer Regiment Royal Engineers (TA) was born. It held the honour of being the only such unit in the TA, if only for a short time before being reorganised again. This post war period from 1947 to 1967 was a trying era for the Territorials as there were so many changes. In 1956 the Regiment mutated to an Army Regiment, on 1 March 1961 they were reduced to Squadron size and called 113 Cheshire Indep Fd Sqn RE (TA) and later amalgamated with the Lancashire Regiment in 1967 to form the unit which eventually became 107 Fd Sqn (V), part of 75 Engr Regt (V).

THE LANCASHIRE ENGINEERS

Since the beginning Lancashire has had two distinct Corps affiliated to the Sappers, one from the East and one from the West of the County. They were both started in the same way as the Cheshires, by public subscription, but at different times. The older of the two units is the West Lancashire Regiment, whose descendant unit is now 107 Fd Sqn (V) in the Liverpool area. The East Lancs gave rise to 202 Fd Sqn (V) now based at the Clifton Drill Hall.

Until the formation of the present Regiment, the two County Corps never amalgamated and must be one of the very rare parts of the TA in this area not to do so. During the two wars they served in the same theatres for some of the time.

The 3rd Lancashire Royal Engineers (Volunteers), later to become the East Lancashire Engineers, were formed in Manchester at the turn of the century. By March 1900 more than 900 men had applied for the limited places in the Corps and a drill hall was built in Seymour Grove, Manchester. The Secretary of State for War gave his approval and the Corps was gazetted in February 1901. In the first gazette of the Reign of Edward VII, Major H T Crook was promoted to Lieut Colonel from the West Lancs Engineers and appointed to command. Colonel Crook served as CO until just before World War I and retired in 1913; a memorial plaque to his public service still stands in the new Regimental Headquarters of 75 Engr Regt (V).

The original establishment was for eight Fortress Companies. By 1907 they had fully recruited six of them and a Telegraph Company, before being reorganised by the Territorial Army Act of that year into two Field Companies and a Telegraph Company. So the 1st/1st and 1st/2nd Field Companies were created. The telegraph

75 Engineer Regiment (V) The History of the Cheshire, Lancashire and W Yorkshire TA Sappers

MAJOR R C BURMAN MBE, TD* and CAPTAIN D M J KIRBY RE



Roy Burman joined the TA in April 1939 from his school OTC. On mobilisation in 1939 he served as a LCpl (photo) until he went to OCTU in 1941. He was posted to India and in due course became OC 611 E&M Coy (Chittagong), OC 610 E&M Coy (Singapore, Java and Sumatra) and CO Depot Bn No 1 E&M Gp RIE in Lahore. On demobilisation he joined "L" Fd Engr Regt as a 2Lieut. By 1951 he was a Major commanding 203 Fd Pk Sqn and then 201 Fd Sqn. In 1964 he became 21C 42 Div Engrs. He retired from the TA in 1974. He is now the Regimental Historian for 75 Engr Regt, the successors of 42 Div Engrs.



David Kirby joined the Army in Sept 1969 as a potential officer in RGJ prior to attending one of the last 2-year courses at RMAS. He was commissioned into the Corps and joined 74 Amph Engr Sqn as M2 Tp Cornd, This tour included a spell in Londonderry in the infantry role. He then became a Tp Cornd at Jnr Ldrs Regt. In 1975 he was posted to 38 Engr Regt as a Captain 10/Trg Off with PR connections! After JDSC and a 6-month tour as Watchkeeper on the AIS Press Desk in HQNI he was appointed Adji 75 Engr Regt (V).

Forement as little as fourteen years ago, 75 Engineer Regiment (V) can trace its history back as far as 1858. In its present order the unit comprises 106, 107 and 202 Field Squadrons. a Headquarters Squadron and the REME Workshop. These subunits derived troin three engineer Regiments, an Independent Engineer Squadron and a Yeomary Squadron, all of which were part of the local Territorial Army. 181

Major R C Burman MBE TD and Captain D M J Kirby RE

THE RISTORY OF THE CHESHIRE, LANCASHIRE AND W YORKSHIRE TA SAPPERS 184



Photo I. The East Lancs Div, later to become 42nd Div, on parade at Salisbury Plain in 1910. The Colours are all draped in mourning for the late King, Edward VII.

unit became the forerunner of the 42nd Division Signals Regiment.

The 42nd Division was a Lancashire formation set up about 1907. It mobilised in 1914, and established the Div Engrs for three Field Companies coining the 1st/3rd in addition to the others. Needless to say the Sappers were all soon renumbered and became 427, 428 and 429 Companies. Under the old titles they accompanied their Division abroad which included service in the Dardanelles and Egypt. They were sent back to the Hellespoint with their new numbers and were eventually withdrawn to Egypt where the units saw farther service before moving to France where they campaigned until their disbandment in 1919.

The cadres left behind when the 42nd Div departed built up a second line called



The History Of The Cheshire Lancashire and W Yorkshire TA Sappers 1,2 66th Div. This was established for three RE Field Companies, which were 2nd/1st-3rd and later 430, 431 and 432 Field Companies. They were recruited in 1916 and worked from 1917-1919 in Northern Europe.

The various units raised by the Territorial Army should not be confused with the Volunteer Regiment raised in Manchester in 1914/15 for Kitchener's "New Army". After being judged fit for war this Sapper unit became the 30th (County Palatine) Divisional Engineers, whose Companies were 200, 201 and 202 Field, and 203 Field Park. Very little is known of their war history, except that they departed for service "overseas" in November 1915. Whether they served as a unit or were broken up as reinforcements is not known. There is no mention of this unit in the Corps History.

In 1920 when the Territorial Army was reformed, recruiting began again for the 42 Div Engrs at Seymour Grove, Stretford, Manchester. Interestingly the Companies were given the numbers of the disbanded Kitchener units, the 200 series, rather than the more logical 400 series from which they had developed. During the inter war years the Sappers trained regularly and were up to their full War Establishment when they were embodied.

In 1939, they went to Annual Camp for a fortnight but were mobilised and didn't return home for six years! They left their drill halls to the care of the 66th Div Engrs who formed the second line again. 200 Fd Coy was posted overseas to "X" Force, but the other Companies were detailed to the construction of POW camps and air raid shelters. When these were finished they were under orders to go to Finland, but in the event went to France and withdrew over the Dunkirk beaches. In the changes after Dunkirk the Div was broken up, the Sappers, less 202 Fd Coy, became 42 Armd Engr Regt and saw service with the Engineer Assault Brigade of 79 Armd Div in the final assault.

This change in roles for the East Lancashire Engineers brought yet another alteration in their titles. They joined their Armoured formations as 16 and 617 Armd Engr Coys and 149 Armd Engr Park Coy. At the same time the second line units of the 66th Div were posted to join the 59th (West Lancs) Div, and its story continues under that county's history. The remainder of the 66th Div Sapper units were attached to 9th and 10th Corps for Montgomery's El Alamein battles, and continued to serve with those Corps during the fighting in Sicily and up through Italy.

The East Lancs Sappers demobilised in 1947 and returned to their drill halls to form two regiments, "L" Fd Engr Regt TA and a Construction Regiment. The latter never really became effective and shortly afterwards was amalgamated into "L" Regiment. "L" Regt was renumbered twice, first to 123 Fd Engr Regt (TA) and then in 1960 it reverted to its old title of 42 (East Lancs) Div Engrs (TA). Until 1956 the unit was made up to establishment by National Servicemen and "Z" Reservists, but in that year the TA became the all volunteer force it is today. The Squadrons built up gradually by recruiting young men with no previous military service, which meant that full training had to be undertaken at every level in the Regiment.

The Drill Hall at Seymour Grove was finally closed when the TA disbanded in 1967.

The 42 Div Engr then formed the HQ of 75 Engr Regt and two Troops—one Field Troop of 107 Sqn and a Troop of 143 Plant Sqn, although the former became an unofficial "M" Sqn.

Initially the HQ was only established as a training HQ with eighteen personnel but in 1969 authority was given to increase the Regt to a full three Sqn Regiment and 202 Fd Sqn was reformed. Almost immediately the units were able to come to full establishment from the men who had not been selected in 1967, but who now took the opportunity to re-enlist. This was a typical demonstration of the "volunteer" spirit of the TA.

In West Lancashire the story is not nearly so complete, especially of the early days. What is known is that in 1868 a St Helens builder called John Rothwell was

promoted from Captain to Major and given command of a new unit with an establishment of four Companies. Major Rothwell continued in command for the exceptional period of twenty-seven years. When he eventually retired in 1895 his Regiment was accommodated in the drill hall at Croppers Hill, St Helens which he had built himself and which was known as Engineer Hall.

At the same time as St Helens raised the 2nd Lancs (St Helens) RE (V), Liverpool were recruiting for the 1st Lancashire Engineers, who were to become Submarine Miners. Through the years to 1908 the Liverpudlians changed names, first to the Mersey Volunteers and then to the Lancashire Fortress Company. They entered the Great War as 585 Army Troops Company and 599 Fd Coy.

Following the Haldane Reforms, the 2nd Lancs joined the 55th Div, the West Lancs TA Division, as their integral Sappers. In 1913 they took the title of 1st Bn (West Lancs) RE with 252-4 Fd Coys and 255 Fd Pk Coy. Western Command's Telegraph Coy (later Signal Coy) was also founded by the St Helens volunteers. All these units served through to the end of the War.

Between the wars 55 Div changed from an infantry to a motorised formation, and this meant that only two Fd Coys were required to support the two brigades. In 1929 254 Fd Coy was redesignated as the independent 509 Fd Coy, and in 1938 255 Fd Pk Coy was disbanded. The new 509 Coy was billeted at the Tramway Road Drill Hall in Liverpool, and formed the cadre for a Field Engineer Regiment when the TA was doubled in 1939.

On mobilisation for the Second World War the West Lancs Sappers sent one Company straight out to join the BEF as 3 Div Engrs. They were followed very shortly by another two sub units which were posted to "X" Force. Eventually all three Companies were attached to 5 Div and took part in the Dunkirk evacuations. Subsequently 252 and 254 Fd Coys went to India in 1942 and thence to Iraq, Persia, Syria, Palestine and Egypt. Before the Sicily invasion, but after a rest in the Middle East, they returned to North West Europe. 253 Fd Coy had remained in the UK until D Day in June 1944.

The second line Company at Liverpool formed a third line and these joined with Companies from the East Lancs second line, 257 Fd Coy of the 66th Div Engs, to make a composite unit act to as the Divisional Engineers for the 59th (Staffordshire) Division. With this formation they took part in the attacks on Caen and the Falaise gap and on up to the Rhine crossings.

When the TA reformed after the war three full Regiments of Sappers were manned by volunteers from the area. These units were 130 Constr Regt, 128 Corps Engr Regt and 107 (West Lancs) Engr Regt. In 1949 these all become 107 Corps Engr Regt until disbandment in 1967; when the new T&AVR was started the West Lancashire Sappers formed 107 Fd Sqn (V) of 75 Engr Regt (V).

THE WEST RIDING OF YORKSHIRE

The West Riding of Yorkshire Engineers were formed in the same way as the other county volunteer units in 1860. It recruited for the six established Companies from 1861 to 1875. By the turn of the century they had already sent two Sections of twenty-six men under the command of Lieutenants G Bransley and L T O'Shea from the 1st (West Yorkshire) Royal Engineers (Volunteers) to support the 15th Field Company RE in the Boer War. The Sections returned to this country in 1902.

Five years later they changed from the six Company organisation to become the 1st/1st and 1st/2nd West Riding Field Companies. At the start of the First World War they expanded to make a third Company, and immediately afterwards, a second line, known as the 2nd West Riding Divisional Engineers. As with the 42nd and 55th Div, the 1st (West Riding) Sappers became the 49th West Riding Div Engrs. This was a role they were to retain right through to the disbanding of the TA in 1967, having been briefly titled "H" and 106 Fd Regts.

The second line consisted of 456 and 459 Field Companies and the 49th Div Companies were designated 455, 458 and 461 Fd Coys until the end of the war. The second line was disbanded then and the West Riding Division divided its Engineers into A and C Coys, which subsequently became 228, 229 and 230 Fd Coys and 231 Fd Pk Coy in 1929, and were commanded by Lieut Colonel F L Colley as CRE.

To add confusion the second line for the Second World War was numbered the 2nd/49th West Riding Division. That Div's Engrs were 270, 271 and 272 Fd Coys and 273 Fd Pk Coy and commanded by Lieut Colonel J A McWilliam. Before the second line could be built up, the senior of the Companies, 228 Fd Coy, was already fighting in France in support of "X" Force prior to Dunkirk.

The remainder of the Div's Sappers soon followed into active service by being posted to Norway. There the Sheffield Field Companies were responsible for carrying out all the engineering tasks required by the Allied Command during the entire course of operations in that theatre. 229 Coy actually took part in the first combined operations landing by the Allies in the War at Narvik where they found the first of the "Teller" mines planted by the Germans. The good work done by the Sheffield Sappers was praised in special dispatches from General Bethouart to General Auchinleck, the Allied Commander.

When the Divison returned from Norway, HQRE was sent to Iceland with the rest of the Div Headquarters, but the Companies were employed in the UK until 1941 as 11 Corps Troops Engrs. Later in the autumn of that year they took part in the North African landings as part of the First Army. The West Riding Engineers went all through the African campaign assisting both American and French Corps on the way. Two of the Companies, 229 and 230 were sent back to Algiers where they built the first 400ft Bailey suspension bridge to be erected in an overseas theatre.

Although none of the Sheffield men took part in the landings in Sicily or Italy, they provided many reinforcements for the units that had suffered heavy casualties, and the original Companies were sadly depleted. The whole of the 49th Divisonal Engineers were reunited when the Div HQ was recalled from Iceland and joined the Field Companies in Germany in the Spring of 1945 to replace some of the decimated Sapper units in the final advance.

The second line Sappers who formed the Div Engrs for the 2nd/49th West Riding Div went out to France early in 1940 still under the command of Lieut Colonel J A McWilliam. Their first casualty came before they even reached the Channel when one of their Troop Commanders, 2nd Lieutenant Dawson was killed in a road accident. They fought in the withdrawal and successfully evacuated through Dunkirk.

Back in England the Sappers were hard employed like everyone else building the anti-invasion obstacles. On 21 Dec 42, 270 Fd Coy left Aldershot for Liverpool en route to North Africa, shortly to be followed by the other Companies. It was ironical that the troop train should have stopped at Sheffield, their home town, so that the "passengers" could be refreshed with a cup of tea.

Having supported the Desert campaign they crossed the sea to Italy and after a brief rest they moved up and prepared for the assault crossing of the River Volturno as 46 Div Engrs. It was over this river that they built the first operational floating Bailey bridge.

After demobilization in 1947 the unit was reformed as "H" Field Engineer Regiment, later becoming 106 Fd Engr Regt before reverting to the former title of 49 Armd Div Engrs. At this time they had RHQ and one Squadron in Sheffield, one Squadron in Wakefield and one (230) which became 350 (Robin Hood) Sqn in Nottingham. In 1967 they disbanded and formed 106 Fd Sqn (V) of 75 Engr Regt (V).

THE OLDHAM VOLUNTEERS

Of all the units which now make up 75 Engr Regt, it is their REME Workshop that has the longest and most varied history. Normally the Sappers claim to be the founding fathers of the Tank Corps, but in this case it was the Tanks giving rise to part of a Royal Engineer Regiment! The story starts in 1858, beating the Liverpool Regiment by a couple of years, when the 31st Lancashire Rifle Volunteers were raised, as usual by public subscription, in Oldham. In 1876 they became part of The Manchester Regiment as the 6th Bn, retaining two of their drill halls in the Oldham area. Before the First World War they were revamped as the 10th Bn The Manchester Regiment forming part of the 42nd (East Lancs) Div like the East Lancs Sapper Regiment.

When the Division mobilised in 1914, Oldham raised a further two Battalions making the 1st/10th, 2nd/10th and 3rd/10th. The 1st continued with the 42nd (East Lancs) Div, and the 2nd went to make up the second line for the 66th Div just as the Manchester Sappers were doing. The 3rd remained behind as a depot to train reinforcements so tragically needed in this war. They also embodied the 24th Pioneer Battalion of The Manchester Regiment. These Regiments all saw service in France, and the 1st/10th, while serving with the 42nd Div, fought in the Canal Zone and through the Gallipoli landings.

After the Great War the Oldham Volunteers reformed as a Defence Force, which was badged as a Royal Engineer unit, but by 1921 it had changed back to the original title of the 10th Battalion, The Manchester Regiment. Just for something completely different, the War Office decided on 1 Nov 38 this unit should be the 41st Bn The Royal Tank Corps; so started the connection between 75 Engr Regt and the RTR.

Expansion from a single Battalion followed shortly when the second line was formed. In all, Oldham produced two Tank Battalions, the 41st and the 47th, a Sapper unit, the 71st East Lancs Searchlight Regt RE, a National Defence Company and an ATS Company, The Tank Battalions served at home with the 24th Tank Bde until 1942 when they were posted to the Middle East. There they battled in the Eighth Army. They were re-equipped after the Allied victory at El Alamein where the 47th suffered exceptional casualties and was disbanded.

New vehicles brought yet another new name for the 41st as the 1st Scorpion Regiment with the new flail anti-mine tanks based on the Matilda chassis. This Regiment with its specialised tanks then left North Africa after Tunis, for Sicily and Italy, the Gothic Line and the Adriatic front. The Searchlight unit stayed throughout the was as part of the 4th Anti Aircraft Division based at Chester.

On re-formation in 1947 the 41st returned as the 41st (Oldham) Royal Tank Regiment, and the remainder disbanded. The Regiment received the Freedom of Oldham in 1954. Later it dropped "Oldham" from its title on amalgamation with the 40th RTR, having "C" Sqn in Bootle and the Headquarters Sqn in Huyton (both in West Lancashire). The other two Sabre Sqns were in Oldham. In 1967 following disbandment, the unit formed "B" Sqn of the Duke of Lancaster's Own Yeomanry (TAVR III) before being rebadged again in 1969, to form 75 Engr Regt Wksps REME, on the raising of the Regt to full establishment.

The RTR HQ Sqn disbanded in Huyton, but many of the men joined the newly formed 107 Fd Sqn, being the West Lancs and Cheshire Sqn of 75 Engr Regt.

On rebadging, the men of Oldham changed hats from RTR to REME but there is still the odd black beret to be found whose colour is not entirely due to the quantity of grease absorbed over the years! So 75 Engr Regt Wksp (RTR) REME (V) was born, challenging even the R Mon RE (M) for the number of "Royals" in their title.

75 ENGINEER REGIMENT (V)

Traditionally the Territorial Army formed complete formations from an area, like the 42nd East Lancs Division, each with its supporting arms and services. These Reserve Divisions were employed in time of war after mobilising and hopefully being given some period for training to bring the men up to the required operational standards. In the sixties it became apparent that the next conflict would be over before the traditionally employed TA could ever be brought into the fray. So it was decided to disband the Terriers, and reform the men into a smaller, but more effective, force to meet the current perceived threat. The Territorial and Army Volunteer Reserve was devised to meet these requirements, and all the old TA formations, with the exception of a few Brigade Headquarters, were axed and the vast majority of the force reorganised into Regiments and Independent Company equivalents. 75 Engr Regt (V) was one of those units so formed, under command of the new 30 Engr Bde (V). The Regiment was given the operational role of supporting one of the Armoured Divisions in BAOR, a task it still has today.

Forging the Regiment from an amalgam of five major units and several independent sub units proved a difficult task for the first Commanding Officer, Lieut Colonel Spike Barker-Wyatt. He was a Regular Officer who had been commanding the Sappers volunteer Parachute Regiment, 131 Para Engr Regt (V), for over a year before taking on the job of welding the parts of 75 into a cohesive unit. He had an idea of the problems he faced and the extent of the dismay and disappointment of the old units at being so drastically cut. By far the greatest problem facing the new T&AVR was the very territorial and parochial nature of the old TA.

When the Regiment was formed there was concern about the use of the disbanding unit funds and the Mess silver. This was not helped by the historic enmity and mistrust between Lancashire and Yorkshire, and worse between Liverpool and Manchester. As is well known among Volunteers, the funds and property are considered to be for use only in the area of donation. One must also remember that this mistrust was exacerbated in some cases, like Engineer Hall at Croppers Hill, where the unit property included the real estate of the Drill Hall. To make various regimental associations work to an acceptable solution called for the highest qualities of leadership in the first CO.

Sadly there was not room for many of the old TA, and some had to take a reduction in rank in order to re-enlist. The process of selection was a painful one. Only two out of three men were offered places in the new unit. The unit was also allowed an increased number of Permanent Staff Instructors.

Among the past Regular Officers serving with 75 Engr Regt's predecessors, were two Adjutants of the Cheshire Engineers who became Engineer-in-Chief, and one of the 42nd Div Engrs who proved that Bailey Bridges don't float—General "Splosh" Jones! It is said that it was the Cheshires who formulated the original concept for minefield breaching which was used throughout the last war and, with only slight modification, is still in use today.

The original concept of the volunteer units of the TAVR was a few central drill halls drawing from a very wide catchment area. Men who transferred from TA were prepared to travel in this way but it was totally impractical in respect of new recruits, since each TAVR Centre had a limited catchment in practice.

It became apparent that to maintain full establishment the Sqns would have to split into a number of locations, with a central Sqn HQ. Drill halls were found which had not been used since 1967 or which were now being vacated by disbanded TAVR III units and the Regt spread into twelve drill halls, although two of these were subsequently abandoned. This greater spread achieved the right result and by 1972 the Regt was recruited at 111% of Establishment.

The first period of continuous training was at Wyke Regis in 1967—three months after the Regt formed. It was a difficult and trying time. Not only were the officers and men being pushed very hard to the new standards of TAVR but the suspicion and doubts that existed between the different component units also had to be broken down. It was nevertheless, a most successful camp and it was at that camp that the decision was taken that in 1968 we would really show the capability of the new TAVR. Thus was born the plan to go to the Isle of Skye to do a MACC (Military Aid to the Civil Community) camp, which was finally to weld the Regt together in the pride of success.

With a new CO, Lieut Colonel Gerald Carter in the chair the Training HQ at Failsworth became a fully fledged Field Regiment RHQ in 1969, fitted for the supporting role it held for BAOR. The Regiment then had an establishment of 828 All

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Photo 3. 75 Engr Regt's first camp in W Germany in 1970. Sappers are placing drill cutting charges on one of the many preliminary demolitions in practice for their war role.

Ranks forming three Field Squadrons, a REME Workshop and the HQ Troop. The third Squadron was formed from the men of "M" Troop, the ex 42 Div Engrs from Manchester and Preston and from DLOY. The Squadron was based in Clifton, was initially designated 202 (Duke of Lancaster Own Yeomanry) Fd Sqn RE (V) and was granted the privilege of continuing the battle honours and uniform embellishments of the DLOY. The DLOY formed a Cadre which came under the command of 75 Regt, but later reformed in its own right as a Regiment, when the honours were returned and the DLOY dropped from the title of 202 Fd Sqn.

The first camp in the new 75 Engr Regt's operational theatre was in 1970. Lack of stores, transport and accommodation meant that the three Field Squadrons came out in turn to exercise and train, each having a two-week slot. RHQ and REME were manned by the regular staff and as many of the TA as were available. By November of that year the Regiment had achieved 100% recruiting and was up to its established strength.

By now the Unit was settling down to a regular training schedule. This included a 3-year cycle of annual camps in BAOR, at the RETC at Wyke Regis and at MACC camp. Several MACC camps were held in Scotland like the first one on Skye. The weekend training was done twice a month and often included aid to local communities, proving the true territorial nature of the T&AVR. Many demolition tasks, construction of temporary bridges and adventure playgrounds were taken on, to the great benefit of all.

In 1970 the Borough of Birkenhead recognising the T&AVR and the Regiment as the proper successor to the Old Cheshire Field Squadron held a simple ceremony to transfer the Freedom Scroll held by the Cheshires to 107 Fd Sqn (V). In 1980 the St Helens Council conferred the Freedom of the Town on the Regt and on 103 Regt RA in a double parade which also marked the opening of the rebuilt Croppers Hill Drill Hall, now named Jubilee Barracks. It is interesting to note the TA Freedoms are granted to the particular Regiment, whereas those granted to Regular Sapper units are in fact given to the Corps as a whole. This allows the units to continue their geographical allegiances despite the frequent changes of cap badges.

Lieut Colonel John Timmins, an ex 42 Div Sapper became the first volunteer T&AVR Officer to command the new Regiment in 1971. He had had great influence in the binding together of the Regiment from its parent Territorial units.

The History Of The Cheshire Lancashire and W Yorkshire TA Sappers 3 Later, when the Regiment was under the captaincy of the only other TA CO, Lieut Colonel John Boys, Colonel Timmins took over from Colonel Peter Poole as Honorary Colonel to the Regiment.

The jet age arrived at Failsworth in time for the 1979 camp when the whole Regiment was required to travel to Germany as it would on mobilisation. This entailed the bussing of the men to Manchester Airport and the entire Regiment boarding a wide-bodied Boeing 747 Jumbo of British Airways. All went well until Movement Staff at Gutersloh decided that the best way of unloading the baggage was to take the first nine men to disembark from the plane regardless of rank. These naturally were the CO, several Movements "Brass Hats" and all the Field Officers of the Regiment! RCT Lance Corporals were soon advised of the error of their ways.

Having pionecred the way for *Ex Crusader* the following year, the fighting 75th was permitted to miss the biggest military happening since Korea. Camp that year was spent at Wyke doing some urgently needed Combat Engineer and Trade Training as they had now had two consecutive years in Germany, and were due to take part in 3 Armd Div's FTX the following autumn, 1981.

Under the present CO, Lieut Colonel Tony Jolley the Regiment is due yet another change around, this time supporting another Division when 1 (BR) Corps reverts to three Divisions. Doubtless they will overcome this as they have all the others.

At Arnhem—September 1944

BRIGADIER E C W MYERS CBE, DSO, BA, C Eng, MICE

Note by the Editor: With some diffidence Brigadier Myers, then CRE 1 Airborne Division, has agreed to our publication of this article which we understand may one day form a part of his collective reminiscences. We hope to be able to publish before long some further reminiscences of his on the war in Korea. His article on The Destruction of the Asopos Viaduct in Enemy Occupied Greece in 1943, RE Journal September 1981, was prefaced by a photograph and pen picture which have not been republished.

So much has already been written about the Battle of Arnhem that it is difficult for any personal reminiscences written now, over thirty years later, not to be influenced by the recollections of others. On the other hand the long lapse of time does enable me to see the broader picture of events more clearly and it has helped to heal some of the soreness caused by the feeling that 1st Airborne Division was badly let down by XXX Corps, the leading British Corps.

The Battle of Arnhem may be recorded in the annals of the British Army as one of its most glorious failures. Field Marshal Montgomery described it as having been 90% successful, in that, by tying down enemy forces, it helped the advance of XXX Corps from the Belgian–Dutch borders to beyond Nijmegen, over three of the four major water obstacles which the whole operation, involving two American Airborne Divisions as well, was designed to achieve. But for 1st Airborne Division the battle was a disaster. Of the 10,000 officers and men who landed outside Arnhem, only 2,000 returned nine days later. Of the 8,000 who did not return, more than 1,200 had been killed, the remainder, including all our many wounded, taken prisoner.

This disaster came about as a result of what seems today an almost incredible accumulation of mistakes and bad luck, including some calculated risks, particularly regarding the weather. But I am not alone in believing that an additional reason for our failure was the visible lack of any real urgency on the part of at least one of the Commanders of the leading formations of XXX Corps, which I personally experienced during the battle as a result of a somewhat tricky journey with the Chief of Staff of 1st Airborne Division, Colonel Charles Mackenzie, to XXX Corps HQ at Nijmegen, to explain our dire situation and hurry them on.

This is what went wrong.

Firstly; in the plan it was hoped that the leading elements of XXX Corps would join up with 1st Airborne Division within two days. An isolated force mainly of Infantry and some Sapper parachutists, of a total strength of about 500, reached and held on to the north end of the main road bridge over the Rhine at Arnhem against everything the enemy could put against it for four days, before being virtually eliminated. For lightly equipped Airborne troops, isolated from all other reinforcement, to withstand a considerably stronger enemy equipped with heavy tanks, mobile artillery and mortars for well over a week, as the rest of 1st Airborne Division was ultimately called upon to do, was asking the almost impossible of them. With hindsight, it certainly became a case of "a bridge too far".

Secondly, our own Intelligence Staff at SHAEF reported the probable presence of two German Armoured Divisions refitting in the vicinity of Arnhem. But, possibly because of the general feeling of optimism that the war was nearly over, and the keeness at all levels of seniority to make use of 1st Airborne Division, for which, since our landings in Normandy, some sixteen possible operations had been aborted, mostly by the rapid advance of our own ground forces, this information was discounted during the planning of the Arnhem operation. It was considered that, during the short period before the arrival of XXX Corps, 1st Airborne Division would be up against comparatively weak enemy opposition. This proved to be another grave mistake.

Thirdly, because of their equipment and vehicles, over a third of the Division had to be glider-borne. This included one of the three Brigades, the Air Landing Brigade, also all the Artillery, some of the Sappers and Division HQ. Gliders are most vulnerable to enemy interference, especially during their final approach. Surprise or protection of their LZs—Landing Zones—was therefore essential. In order to land all the gliders of 1st Airborne Division in two lifts, an area or separate LZs totallingapproximately asquare mile free of obstructions were necessary. The country immediately to the south of the mainroad bridge at Arnhem was suitable for parachutists, but because of the way it appeared from aerial photographs to be carved up by deep irrigation ditches, it was considered impracticable for gliders. After the operation we discovered that there were in fact enough large fields and tracks for a considerable number of gliders to have landed close to the bridge without excessive losses.

Fourthly, the RAF were unwilling to consider the dropping of even a coup de main force of parachutists close to the bridge on account of reports of a heavy concentration of enemy anti-aircraft guns in the vicinity. This, again, was ultimately proved to have been incorrect. It had far-reaching results, in that it was thus decided to land the whole of the Division, including the gliders of the Polish Parachute Brigade, which was under the command of General Roy Urquhart, GOC 1st Airborne Division, for the operation, on the nearest extensive areas of open ground some six miles west of our primary objective and task, the seizure intact and holding of the mainroad bridge at Arnhem.

Fifthly, with two American Airborne Divisions to transport simultaneously on tasks of more immediate priority, because they were located nearer to the leading elements of XXX Corps, there were insufficient aircraft left over to bring in the whole of 1st Airborne Division, leave alone the Polish Para Brigade, in one lift. No less than three lifts were required, on three consecutive days; two Brigades, the Artillery, some Sappers and Division HQ on D-day, 17 September, 1944; only the third Brigade and its Sappers on D plus 1, because of aircraft requirements for resupply; and the Poles on D plus 2. To protect the dropping and landing areas for the second lift, one of the two Brigades landing on D-day had to be used to hold these areas. This left only one Brigade and supporting troops for the primary task of the Division and to reap the maximum from the vitally important dividend of surprise; a mere quarter of the total offensive strength of the Division and the Poles.

Because of fog in England, the second lift was delayed for half a day and did not arrive until late on D plus 1. This was only the beginning of the havoe caused by the weather. The Poles were unable to take off from England throughout D plus 2 and D plus 3, by which time we had been forced off the landing areas by the enemy. Eventually, on the afternoon of D plus 4, two thirds of the Polish Para Brigade were dropped south of the Rhine, around the village of Driel. Sadly, by then we had also lost the only crossing place over the Rhine with road access via a ferry site, called Heavadorp, into the by then diminished area north of the river held by the remnants of 1st Airborne Division.

The only river crossing equipment we had brought in by air was some half a dozen two-men inflatable reconnaissance boats. The current proved too strong for rafts made up out of jeep trailers. To transfer more than a few Poles across the Rhine, by then only possible by night, we were therefore entirely dependent on XXX Corps for additional ferrying equipment. The three-fold effect of arriving piccemeal, so far from the mainroad bridge, and over a period of five days, resulted in our never being in a position effectively to reinforce the one Brigade allocated to our primary task on D-day until too late. By then the enemy had surrounded the rest of the Division. This underwrote our disaster.

The sixth factor, which weighed heavily against us, was the severe handicap from almost useless wireless communications, particularly during the first few days of the battle, when the Division was scattered and XXX Corps was fifty miles away. The wooded and built-up area in and around Arnhem proved too much of an obstacle to our Divisional sets. In fact, for several days our only contact with XXX Corps was by means of a set operated by the small detachment of a Phantom - Special Force -Reconnaissance Unit, which had been dropped with us, with a direct link with the War Office, or by means of our BBC War Correspondent's set!

The seventh thing to go wrong was that throughout the nine-day battle we received practically no Close Air Support from the RAF, in spite of our air supremacy. Apparently this was initially due to American insistence during the planning stages of the operation that 2nd Tactical Airforce, which was based on the Continent, must be kept out of the battle zone during airborne and re-supply missions, to avoid possible mix-ups in the air. But the air control of the battle as it developed, appears in retrospect to have been hopelessly inflexible, largely due to divided overall responsibility and ineffective communications between Re-supply HQ at Ruislip in England and 2nd Tactical Airforce on the Continent. In spite of some ineffectiveness due to bad weather, an efficient set-up for Close Air Support throughout the battle would have greatly helped the Division, although it probably would not have prevented the eventual withdrawal of its survivors across the Rhine.

Lastly, it is regrettably necessary to elaborate on the lack of any apparent urgency by XXX Corps. As a result of a most gallant assault crossing of the river Waal at Nijmegen by a Combat Regiment of 82 US Airborne Division, the road and railway bridges there were captured intact on the afternoon of 20 September. The forward elements of XXX Corps were then only eleven miles and one major river obstacle away from 1st Airborne Division. And yet, four clear days later, XXX Corps was still unable to launch 43rd Division across the Rhine in sufficient strength to relieve us. This has always seemed to me to have been inexcusable. When I left XXX Corps HQ with Charles Mackenzie on the afternoon of 24 September on our way back to our own Division HQ, I was given to understand that, if we did not succeed in getting a sufficiently large part of the Polish Para Brigade across the Rhine that night in about a dozen assault boats which XXX Corps were managing to send up to Driel that day, the whole of 43rd Division, the then leading Division of XXX Corps, was to come to our help across the Rhine the following night. That night I failed to get more than about 250 Poles across the river. The Polish Sappers were insufficiently experienced to operate properly the loaded Assault Boats in the wide, fast running river and under spasmodic enemy fire throughout the night. The following day when, from the top of Driel church tower, I pointed out to XXX Corps Commander, General Horrocks, the perimeter held by the remnants of 1st Airborne Division, I learnt that only one Brigade was to come to our assistance that night. But, later in the day, when I attended the Orders Group for the attack, I discovered that the force had been whittled down to one Battalion, 4 Dorsets, supported by the whole of the Divisional Artillery. But even if there were only enough Assault Boats for an initial attack by one Battalion, there should have been enough still afloat after the assault for a further Battalion to follow them. Unknown to me then, it had already been decided by the Commander Second British Army, General Dempsey, with Montgomery's approval, to evacuate us unless the attack that night materially improved our situation. Sadly it did not.

Having attempted to highlight the main reason for our failure to secure the bridge at Arnhem, about which I can write from first hand experience, I must mention the incredible bravery of the RAF crews in Dakota aircraft who attempted again and again to drop ammunition and food to us in our ever diminishing perimeter on the western outskirts of Arnhem. The way they flew straight and low through intense enemy fire, often already a mass of flames, to do their best to drop their loads on us made us writhe as, to our chagrin, the greater part landed amongst the enemy. And, to be fair to General Horrocks, he kept on having to divert his attention to his narrow corridor between Eindhoven and Nijmegen, which the enemy succeeded in cutting more than once.

The nine-day Battle of Arnhem certainly enabled me to learn a bit more about myself, in that it tested my powers of endurance to their limit. Almost constant shelling and mortaring, added to rifle and especially enemy sniper fire—at which they were adept—is horrible at any time, especially so day after day and much of the nights. But when, in addition, one has been desperately short of sleep and short of food for several days on end, the effort to remain alert and to be able to think and lead is tremendous.

After the first four nights of the battle, every subsequent night I spent in a sort of "no-man's-land" on the banks of the Rhine, on ferrying operations of one sort or another with some of my Sappers pulled out of the firing line, initially only with improvised rafts and recce boats, attempting to get the Poles across and into our perimeter. One night my Field Engineer, David Storrs, rowed a recce boat twentythree times across the river and succeeded in personally transporting that number of Poles, an exceptional feat of strength and endurance. Sleep by day was almost impossible because of the noise of the battle. On my way back from my visit to XXX Corps HQ at Nijmegen I remember going into a deep sleep for quite a while in a cramped position inside a tank, whilst the crew ran the gauntlet of scattered enemy armoured fighting vehicles.

On the night of 25 September, when 43rd Division put in a token attempt, with just one brave Battalion, 4 Dorsets, to relieve the pressure on 1st Airborne Division, I recrossed the Rhine behind the assaulting waves in one of several DUKWs—amphibious load carrying vehicles—with urgently needed ammunition and food for my Division. We had to cross then or never at the only possible place, the ferry site at Heavadorp, which had hard ramps into and out of the river. The far side was still held by the enemy, who had a machine gun trained on to our ramp, fortunately only firing intermittently. As the DUKW I was on, the third and last to cross, moved into the water I vividly remember shouting to the crew, two RASC soldiers, "It's people like you doing things like this that makes England what it is today." They both turned round and smiled at me. Sitting on top of boxes of ammunition, I thought that these might well be the last words that I ever spoke. Nevertheless I remember feeling strangely elated. We got across safely.

I left the DUKW downstream of the enemy held exit, under cover of the steep

banks, to await the ramp's capture hopefully at dawn, and continued my journey, wading upstream until I was in no-man's-land and back to 1st Airborne Division HQ, bearing written and memorised messages from XXX Corps about our evacuation arrangements, should the 43rd Division attack that night fail to help us. These had been handed to me shortly before the Dorsets attack. I reached General Urquhart shortly after daybreak. Sadly I had to report the obvious failure of 4 Dorsets to help us in any way. Shortly afterwards he decided that our evacuation must take place that night and signalled accordingly to 43rd Division.

I still had another sleepless twenty-four hours ahead of me, making the best possible arrangements for the guiding of the remnants of the Division to the river banks and their loading into boats manned by the brave Sappers of 43rd Division, assisted by some Canadians, fortunately for us under command of that well-known Sapper character "Honker"—later Brigadier Sir Mark—Henniker, who had preceded me as CRE 1st Airborne Division less than two months previously. In addition to nightly activities on the river bank, for the past week all of my Sappers had been holding parts of our perimeter and had suffered heavy casualties. In 9 Airborne Field Company the only Officer still in action was its OC, Major—later Brigadier—Jack Winchester, who had also been representing me as CRE during my forty-eight hours activities south of the river. During our last day north of the Rhine he was of invaluable assistance, with a small party of battle-weary Sappers marking the withdrawal routes to the river with tape.

When, in the morning of 27 September I finally ended up in a barrack-room bed in Nijmegen, I do not think I could have managed any more. Nor could most of the other 2,000 survivors. Those nine days had certainly been the severest test of endurance I ever wish to experience.

But, in spite of our failure to secure the bridge at Arnhem and in spite of the many things that had gone wrong, we were all still unquestionably proud to belong to 1st Airborne Division and proud of its overall performance.

New President of Institution of Royal Engineers

MAJOR GENERAL P C SHAPLAND CB MBE MA

MAJOR GENERAL P C SHAPLAND was elected President of the Institution of Royal Engineers on 8 March 1982 in succession to Major General M E Tickell.

Fully aware of the responsibility of his new appointment, he considers that he can bring to it not only the experiences of a full military career but also that of the three or more years he has now spent outside the Army since he retired. This latter period has made him much more aware of the high standards achieved in the Corps at all levels and in such a variety of disciplines. He believes that an important task of the Institution is the publicising of those skills to the world at large. This has already started in the very successful series of Joint Professional Meetings held in the last few years and he would welcome ideas from others on how this task might be achieved.

His military career varied from five tours of duty in the War Office and Ministry of Defence, all of which he enjoyed and in all of which he made a number of friends throughout the Services, to service in nearly every station in which the British Army served between Malta and India. Not until he took over command of 30 Engineer Brigade (V) with its mobilisation role as 1 British Corps Troops Engineers did he come face to face with the problems of BAOR. After a number of visits, on all of which he was loaned a staff car by a helpful Engineer Branch at



Corps HQ, he quickly made good his knowledge of the Corps area and of its problems.

Eight of his last nine years of service were connected with the Territorial Army, Eight of his last six months being spent on producing *The Shapland Report* on the TA. Through his Honorary Colonelcy of 73 Engineer Regiment, he is able to continue his links with this important part of our Army.

Introduced to ocean sailing and racing by his two immediate predecessors as President, it has remained his principal sporting interest.

New President Of Institution Of RE

Forgotten Thambis

LIEUT COLONEL THE REVD J R S W ELKINGTON

Author's Note:

I come from Service families on both my Father's and Mother's side so perhaps a reverence for things official was bred into me. An Official History of the War takes its place in my thinking somewhere near the Authorised Version of the Bible. It was a shock to find that the Unit I had the privilege of commanding in the Malayan Campaign against the Japanese is not mentioned at all in the Official History (Volume 1 of *The War against Japan*). At the very least the name of the Unit should appear in the Order of Battle. I wrote to the Cabinet Office, Historical Section, about this and my letter has been placed on "The File" for use if a revision of the History is made. Meanwhile I think there should be some record of the Acts of 46 Army Troops Company, QVO Madras Sappers and Miners in Malaya. That is the purpose of this article. It is written almost entirely from memory and so inevitably records mainly my personal impressions. There would be no such impression had it not been for the work of our forgotten men, "*Thambis*", or, as other Units of the Indian Army would call them, our "*Jawans*". I am indebted to Philip Guest who read my draft and made some useful suggestions, adding light relief.

FROM BIRTH TO EMBARKATION

46 Army Troops Company was a new Unit raised at Bangalore in the Forming Troops Battalion commanded by Lieut Colonel R le H Guiton. In April 1941 I was appointed to command the Unit taking over from Major A Bennetts. At that time the Unit was pretty well up to strength in VCOs, NCOs and IORs but we had only three British Officers against the establishment of seven. We were not brought up to strength until just before we left for Overseas. Equipment was rolling in daily but shortages were causing some anxiety as we were expecting an Overseas posting to arrive any day.

After some weeks of intensive and arduous training we received entraining orders early in June. There was no indication of our destination but as often happens there must have been a leak of information for at Railway Stations along our way there were soldier's families waiting to wish the men farewell. Our railway journey ended at Calcutta and after a night in a Transit Camp we embarked on a ship which was to sail under sealed orders. These were given to me to be opened only after twenty-four hours at sea. This rather puzzled me for there were some civilian passengers on the ship and they surely must have had some idea of where the ship was going. During embarkation a vicious "Hoogli Bore" drove the ship away from the quayside. Some gangways fell down but no one was hurt. It was a pleasant voyage and gave us an opportunity to get acquainted with some of the equipment which had only just reached us, notably, our Bren Guns. On 14 June, my thirty-seventh birthday, we reached Port Swettenham, Malaya, disembarked and proceeded by train to Sungei Patani in Kedah where we joined 11 Indian Division and came under command of Lieut Colonel J F D Steedman, the CRE, well known to all Madras Sappers.

THE PERIOD JUNE TO DECEMBER 1941

There had been little time in India for Officers, British and Indian, to get to know each other and their NCOs and men. Work in and around Sungei Patani gave us the opportunity to get acquainted. We were employed on defence work, mainly the construction of emplacements for an AA Battery, at the airfield, but also numerous smaller works such as boom obstacles across creeks, pill boxes and Lyon Light emplacements. One Works Section was employed on improving an alternative L of C from Sungei to Alor Star along Rubber Estate roads. Small timber bridges were replaced by RC culverts. For the airfield work we were helped by a gang of Chinese



carpenters to do the shuttering work. The speed at which these men worked and their skill with their main tool, the axe, impressed our carpenters. The Chinese were a cheerful crowd and got on very well with our Thambis, there did not seem to be any language barrier. Just as we had finished concreting the gun foundations someone arrived to inspect them and told us that we had been given the wrong drawings. The correct drawings were produced and our newly laid foundations had to be demolished for the correct ones to be laid. We did this by breaking up the concrete with small charges, into pieces that could be manhandled. The experience was frustrating but taught us something about breaking up concrete. The AA Battery was successfully completed but we never saw it in action.

As the War clouds gathered Officers became increasingly involved in the reconnaissance and preparation of demolition belts forming part of the Jitra defensive position. We had the honour of tackling the most Northerly of the belts, Belt A, well in front of the Jitra position and reaching to the Thailand border. Further back we were allotted a belt near and including Alor Star airfield and yet further back one south of Sungei Patani, Belt E, based on the Muda river. It was planned to demolish all the main road and railway bridges and any bridges or culverts on Estate roads which gave a way round the main demolitions. We became quite expert on demolition projects. At this time I had a private air pilot's licence and was able to hire a Tiger Moth from the Penang Flying Club. This gave me a view of the country which was a help.

During this period we were urged to make as much use of local materials as possible. Experiments were carried out using bamboo as the tube for a Bangalore Torpedo and also on various types of booby traps using bamboo and explosive. These were fairly satisfactory but we had no opportunity to use them in battle.

The road bridges over the Muda river were our main problem. As these were well back from the main Jitra position I did not think we would ever be asked to blow them up but we had to be ready to do so. There were two bridges at a place called Bumbong Lima (Five Roofs), one an old timber pile bridge and nearby a new reinforced concrete bow string girder bridge over which the main road had been diverted. I was able to meet the PWD Engineer responsible for the new bridge and to see the drawings. I did not like what I saw. There were demolition chambers in the piers so there was no difficulty there but the massive reinforced concrete girders were a problem. None of us had any experience of demolishing RC members so we relied on a rigid adherence to the latest pamphlet which had reached us, "Pamphlet No 7 Demolitions" as far as I can remember. The campaign proved how excellent this training manual was.

There came a day when we were ordered to load the explosives into all the forward demolitions we had prepared. It was the rainy season and to keep detonators and primers dry we used contraceptive sheaths. It amused me to sign an Indent for, I think, 10,000 of them "for the use of 46 Army Troops Company". I had also asked separately for two elephants, knowing that they would be better for clearing rubber trees than bulldozers which were in short supply. A story got around that my demand for rubber goods and the request for elephants were coupled together and a footnote added that the one was not required for the other. Whether true or not the story was widely believed. The rubber goods did a good job, none of our demolitions failed. Once they were armed the electrical circuits of demolitions were tested every hour.

11 Indian Division had alternative roles. Either they were to move in to Thailand, *Operation Matador*, or to stand and fight on the frontier. In Operation Matador we, 46, were to move into Thailand and keep the communications open. We were moved forward to a position just behind the Jitra line and provided with a Small Box Girder (SBG) bridge. I had no idea how expert or inexpert the Unit were on bridging but, fortunately while waiting for orders, we found a suitable gap and were able to do a little training with the SBG. Matador was not set in motion so we returned to our defensive demolition role.

WAR

Our first indication that hostilities were imminent came in a report from our Gunner friends that on 7 December an unidentified aircraft had been over Alor Star airfield at a great height. On the following day we heard on the radio of the air raid on Singapore. In manning the defensive positions the Unit was widely scattered. We had demolition parties near Padang Besar where the railway passes into Thailand. In the centre we had parties on and adjacent to the main road from Alor Star into Thailand, the most forward of them being at the Frontier. To the East No 4 Section was part of *Krocol*, a force which was to move into Thailand to fight a delaying action. From left to right we were stretched over some eighty miles as the crow flies. We had no wireless, communication was by motorcycle DR. By a more or less continuous round of visits I kept in touch with the parties in the centre, the outpost

zone of the Jitra position, but the left and right at Padang Besar and Kroh were pretty well on their own. Right well they carried out their task with very little support from me.

Though Matador was not put in action a smaller motorized force, Laycol, moved into Thailand towards Singora to delay the enemy. I was at the Thai frontier with the Section Commander, Lieutenant Guest, when Laycol returned from their action. We blew the demolition, a chain of craters on a long embankment. This was the first demolition on 11 Div front other than those in Thailand. I reported to the CRE and General Murray Lyon that there was a useful gap in the road which would hold up wheels but not infantry. This was at about 3.00am on 9 December. The battle in the Outpost zone of the Jitra position developed on 11 December, all our remaining demolitions were successfully blown, at one of them, Lieutenant Guest's, we bagged some Japanese. Our next task was a belt of demolitions near Alor Star airfield and the denial of the airfield. It was here that we came across what might have been Fifth Column activity. A burning raft was floated down the river towards a bridge which we were preparing for demolition. It did no damage. Rumours were also being spread. I visited 28 Bde HQ (Brigadier Carpendale) to discuss with them the demolitions we proposed. While I was there a message was received that Japanese Paratroops were landing on Alor Star airfield, I was able to say that I did not think this was true for I had just come from the airfield which was only a few minutes away. Some of our men were there and I proposed to go back that way. The rumour was unfounded but perhaps served a useful purpose in alerting us to the very real possibility of an enemy paratroop landing.

Alor Star airfield had been evacuated some days previously after being bombed by the Japanese. The runways were undamaged and we set about cratering them at intervals. This was exhausting for men who were already very tired. The holes for the explosive had to be made by hand, the work went on far into the night. In the hangars there were some abandoned aircraft, presumably unserviceable, we made them more so with guncotton slabs. The bulk fuel storage tanks still contained fuel. This was discovered after most of the Unit had moved back to the next job. A British Officer and his Sapper Orderly blew up these tanks using gun cotton slabs and safety fuze of which there was a supply in the Officer's car. It was a risky operation. The charges had to be fixed under the tanks in darkness. There was a strong smell of petrol and very little ventilation. Striking a match to light the safety fuze might have caused an explosion but it did not. The stock of aviation fuel was destroyed. On leaving the airfield to seek the Unit bivouac I met one of the CRE's staff who had a broken down motorcycle. I was able to give Lieutenant Ralph a lift back.

AFTER JITRA

The battle of Jitra having been lost, the Unit proceeded steadily to the rear blowing a series of demolitions until we were back at the Muda river. The bridge here was certainly the most spectacular of our demolitions. Two sections had been on the work for some days and had been attracting the attention of the Japanese Air Force. There were large pressure charges to be fixed many feet above the roadway on top of the bow string girders. In all, some four tons of explosives and fifteen tons of tamping had to be manhandled into position. This was a most unpleasant job for the Sappers working aloft for there was no chance of seeking shelter when a Jap fighter arrived, the men just had to stay alongside the charges. There were some frightening attacks but, fortunately, no casualties. I think the Japs must have been ordered not to destroy this bridge for they did no bombing. There was heavy rain at times which made me anxious. In addition to our normal waterproofing of charges I had ordered that all firing circuits be duplicated, two electrical and two for safety fuze.

When the time came to blow, both the General and the CRE were present. There was the usual wait while the rearguard, stragglers and civilians came through, when this was over I asked permission to blow. To my horror a last check of the electrical firing circuits showed both to be faulty. I reported to the CRE that I would prefer to

try to find the fault rather than resort immediately to the use of safety fuze. There was no fault; what had happened was that, possibly overawed by so much top brass, the electrician had tried a continuity test by taking one wire from circuit (a) and the other from the entirely separate circuit (b). With great relief I could tell the CRE "it is all right now" and we were told to blow. Down came that reinforced concrete giant and so did the nearby timber bridge, the destruction of which was further increased by artillery fire at point blank range.

Some miles east of the road crossing of the Muda there was a railway bridge of steel girders. This demolition was in the charge of 10498, Subedar Doraisami. Having blown it he reported that he was not completely satisfied. He wished to return to the site with more explosive and improve the gap. We did not know where the Japs were on the railway and I was reluctant to let this valuable Officer go but I did agree. Three days later I was waiting at one of the bridges about to be blown when down the road came Subedar Doraisami and his party having done the job. I was greatly relieved. This brave and efficient Officer was lost to the Corps when he died in captivity of a heart attack after a severe beating by the Japanese.

A PATTERN OF WORK ESTABLISHED

The early days of the campaign had established a pattern for working which held good until we passed through the Australians at Gemas on about 13 January. We were employed as a Field Company throughout this time. Reconnaissances were usually in daylight, parties moved out to prepare demolitions, once they were ready, firing parties only remained on site, the bulk of the Unit moving back to work on the next belt. It was a steady round of work by day and move by night, very exhausting for both Officers and men. In this time of continual movement to their great credit the CSM and Quartermaster Havildar always managed to find out where to draw explosive and rations. Only once were we slightly short of explosive and that was because we could not get to the Depot as the road had been mined. It was also, I think, a miracle that we never ran out of maps. There was some good staff work behind their supply.

In Taiping we helped in the perimeter defence of the airfield. I was worried because nothing had been done to crater the runways. Japanese glider borne and parachute troops were expected. On a visit to Div HQ it was possible to arrange to block the runways with heavy furniture taken from nearby houses. A cheerful Sikh Subedar of the Hong Kong and Singapore Artillery who was in charge of some AA guns said to me that he hoped the Japs would come. He was ready to kill many of them. No Japs came and we moved back to the next line.

Near Tanjong Malim we had a change from destructive work. The Japs had damaged a bridge by bombing, we repaired it. The railway station had also been bombed and the track cratered. We repaired the track and so camouflaged our work that we hoped that from the air it would appear that no repair had been made. The engine drivers of our E & M Section were employed evacuating locomotives and rolling stock to the rear. Nearby we were preparing a railway bridge for demolition. Japanese aircraft were interested. I drove towards this party but before I reached them I saw what appeared to be a direct hit on one of the abutments. Two Sappers had been working under this abutment when the bomb landed. One man was deafened but otherwise unhurt. All that we could find of the other poor fellow were fragments of a gas cape and his rifle stripped of most of the woodwork.

During the retreat we inevitably lost some of our equipment. Test cells were lost quite early on. I can remember standing above an 80lb charge one night with Lieutenant Burnett and testing an electrical circuit with a torch battery and the appropriate calculated resistance. The Subedar was nearby wishing us luck. Our arithmetic was not faulty. The training manual proved its excellence again.

As Corps Troops

When 11 Indian Division were withdrawn for a short rest, which I don't think they

FORGOTTEN THAMBIS

ever got, we came directly under command of 3 Indian Corps. They continued to employ us as a Field Company and almost entirely on preparing bridges and culverts for demolition. We had known HQ 11 Indian Division and Units very well, particularly the grand little Gurkhas of 28 Brigade. We never had time to establish the same sort of relationship with 3 Indian Corps. One of their Officers made himself very unpopular by asking us to blow up a bridge which did not exist. The map reference given to us led to a river bank but there was no road or bridge. We had, we thought, already found all the crossings of this obstacle. I could not believe that Corps could be entirely wrong so spent most of the night hunting for another bridge, so did one of the Section Commanders. There was no other bridge.

There was an echo from the past at one of our demolition sites. Some years earlier while on an E & M course in England I had worked on Electrification Schemes for Malaya. I remember ordering a number of transformers for a substation at Bungsar. We passed through Bungsar and blew up the Substation. Possibly we should not have done this for a brake had been applied to the scorched earth policy, but the instruction had not reached us.

ON SINGAPORE ISLAND

The retreat across the Causeway to Singapore Island went remarkably smoothly. We saw no traffic congestion which could have been monstrous. I do not know who worked out the programme but it was good work. On the Island we came under the command of Singapore Fortress. They allowed us a day or two for rest and then gave us a number of miscellaneous tasks. These included constructing air-raid shelters, clearing disused wells to provide an emergency water supply, constructing an underground hospital, evacuating stores from forward positions and making a flame obstacle across the Krian river. We did not see this obstacle used when the Japs landed. For nearly all our time on the Island the E & M Section was detached for work in the harbour destroying boats. Our expertise on demolitions was never used. We had blown about 128 major demolitions on the mainland and many small ones, all were successful. The men had come to think that blowing things up was what was expected of them and were rather disappointed by the apparently minor role given to us on the Island. This was well expressed to me by CSM Fookes who said "I was happy when we were working on the mainland but now I feel rather lost". This excellent NCO could have been rather a lonely man for the second BNCO we were supposed to have was never posted to us.

The last days on the Island found us fighting as Infantry. We were never seriously at grips with the Japs, though there was mortar fire and random small arms fire. The retreat continued, as soon as we had settled into a position, orders would arrive for withdrawal to the next line. On one of these withdrawals something went wrong for we were shelled by our own guns. No order had reached us saying that we should be clear of our positions by such and such a time. There were some casualties from mortar fire, including CSM Fookes seriously wounded. Our Sub Assistant Surgeon, an excellent man, got the CSM into Alexandra Hospital, he was there when the Japanese stormed through the place bayoneting a number of the medical staff and patients. He survived that massacre but later died in Changi camp as the result of his wound.

On Saturday, 14 February, our last move back was to the outskirts of Singapore town. Before this we had been ordered to evacuate all our transport back into the town. When asked to move to the new position we had no picks and shovels. This should have been no problem for withdrawal took us back past the main gates of the Ordnance Depot. An attempt to beg or borrow tools, made at about 1230hrs, was met by the information that the Depot always closed at 1200hrs on Saturdays, would we please come back on Monday. Did they know there was a War on?

SURRENDER

When on the evening of 15 February, 1942, the order to cease resistance was

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received, I found it hard to believe. From the Sapper point of view everything had gone well. We had done all that we had been asked to do successfully. That movement was always to the rear did not seem to matter, I thought that in the end, somehow, Singapore would be held. I told my Officers that I felt that I should remain with the men, but that any who managed to escape would do so with my blessing. Lieutenant Burnett, who had been working in the harbour, got away, two others, Lieutenants Pittham and Severs, reached Pulau Brani Island which was held as part of the Singapore defences. They were recaptured later by the Japanese.

On the morning of the 16th we learned that British Officers were not to be allowed to remain with the men. Our farewell parade was an emotional one. The senior Subedar 4741 Govindasami was in tears. I did my best to thank VCOS, NCOs and men for what they had done and to assure them that Victory, in the end, was certain. A personal regret was that during the campaign I had not made enough use of the magic word "shabash", well done. My mind was always concentrating on the next task and even my faithful orderly. Sapper 8975, got little thanks for what he was doing. He was constantly with me, on reconnaissance and as a look-out for Jap aircraft when we were on the road. If not with me but in bivouac he would always have found me somewhere to sleep and have got someone to fix a meal for me at whatever time of the night, usually early morning. I got back. I hope that last parade did something to show my gratitude to the Thambis who are no longer forgotten.

Memoirs

BRIGADIER C E M HERBERT CBE

Born 26 June 1904, died 9 September 1981, aged 77

CHARLES EDWARD MERCER HERERT, a South African by birth, was educated at Brighton College and RMA. He was commissioned in 1924 and after his YO Course he went to Longmoor and so began his long association with Transportation and Movements. Indeed except for a tour in the early 30's with 11 Field Company and his final tour as Director of Engineer Stores he spent the whole of his service as a "Union Man" as the railway trained Sappers were affectionately known.

Of the mid 20's CAL writes: "We went to Longmoor together, the camp was in a derelict condition and the railway to Bordon falling to pieces. Working together as a team we supervised the rebuilding of Longmoor and the line to Bordon."



RM-J writes of the mid 30's: "I first met Charles when he was Staff Captain QMG 13, the RE Tn Branch at the War Office. He was a tower of strength and support as I came to appreciate between 1935 and 1939 during my service in Egypt and Palestine. These were the days of the Mussolini emergency and the Arab rebellion when railway communications and port facilities were of vital importance. Charles relieved me as Staff Captain Tn in Palestine (Haifa) in February 1939."

Within two years Charles was a Lieut Colonel and AD Tn in Haifa. His wife Joyce (he had married in 1933) and the family had gone to South Africa for the duration and he was heavily involved creating rail served Depots in Palestine and

Brigadier C E M Herbert CBE

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Syria and re-equipping the railway in Transjordan between Damascus and Ma'an. In addition he was co-ordinating the efforts of railway units from Australia, New Zealand and South Africa who were engaged on the construction of the Haifa— Beirut—Tripoli Railway. After a tour as D Tn Burma he returned to UK to take up the "double" post of Director Transportation in the War Office and Commandant Railway Training Centre at Longmoor. He devoted much of his effort to reestablishing the close links between the Regular and Reserve Army Tn units, the professional Railway and Port Authorities and the Institute of Transport.

He retired from the Active List in 1957 and after a few weeks as one of HM Inspecting Officers of Railways (he found the bureaucratic system unbearable) he became a Transportation Adviser to the Foreign Office.

The "Union Men" of his time were a closely knit band of enthusiasts who all knew one another well. Many have contributed to this Memoir. There can be no doubt that Charles was admired and respected by all as a selection of the many quotes illustrate: "He had a keen incisive mind and was quick to grasp the essentials of any problem"; "He was always considerate and thoughtful in his dealings with people"; "He dominated the Tn scene as D Tn and was an inspiring leader"; "He would always make time to help a subordinate with a problem"; "He always remembered your name, face and background"; "He had a tremendous capacity for work"; "A restless and enthusiastic person who relished tackling difficult jobs"; "He made the world seem a more rational place"; "There are not enough of his sort about today"—the quotes are legion.

Regrettably he was afflicted with serious deafness in his later years, this eventually became total. He never complained as he was sustained by a long held Christian faith and his wife and family to whom we extend our sympathy.

BSA, GCLA, GJB, PB, PDGB, WHB, JD, PJF, AHG, FMG, RCG, CAL, JFML, RL, DCM, RM-J, ILR-D, OCR, DRS, AEMW, GW, JCBW, RAPW

COLONEL H L CHESSHYRE MA

Born 29 May 1906, died 18 November 1981, aged 75

HUBERT (HUGO) LAVARD CHESSHYRE was the son of Major General Hubert Isacke CB CSI CMG. Educated at Wootton Court and Rugby he passed top into the Shop in 1924, was commissioned into the Corps in 1926 and with 15 YO Batch read for the Mechanical Sciences Tripos at Trinity College, Cambridge.

In 1930, after a tour with 59 Field Company based at Catterick he joined the Madras Sappers and Miners. He was with them for five years, two of which were spent at Wana in Waziristan. He returned to UK and served in the mounted Squadron at Aldershot. He was a very effective horseman and a fine coachman and drove the RE four-in-hand coach in a number



of competitions. He had a liking for outdoor pastimes including golf, shooting and fishing. In 1938 he changed his name by Deed Poll to Chesshyre, reviving the family name of his and his wife's mutual great grandfather.

Hugo was selected for Staff College in 1939 followed by a tour in Military Operations in the War Office. He toured all the war zones overseas to produce first-hand operational reports, visiting Burma just before the retreat. He served in Italy 1943-45 where he commanded an Engineer Assault Regiment. After the war he served

Colonel H L Chesshyre MA

as CRE 46 Division in Austria until 1947, returned to the War Office for two years in AG7 and was then posted back to Austria as CRE Austria. In 1952 he became Chief Engineer Singapore Base District returning in 1955 to be Deputy Chief Engineer Western Command at Chester, his last Active List appointment. In 1959 he joined the Authors at RSME writing training pamphlets and manuals on Military Engineering until his final retirement in 1970, thus completing forty-four years of service with the Corps.

He married Anne Boothby in 1939 and they had six children. The four boys all followed their father to Trinity College. In June 1981 all five took dinner together at the College.



There are some who are at once conspicuous by virtue of their outstanding abilities, intellectual or physical or both, but Hugo was cast in a different mould. One had only to meet him to appreciate his sterling qualities. Though unassuming, he was extremely able and utterly reliable. He had the ability to absorb problems rapidly and, by reacting at a steady pace, he gave confidence and comfort to all around him.

His friends were friends for life. They could pick up the threads effortlessly when they met regardless of the time interval between meetings. He was a good companion and his enjoyment of the humorous side of things was revealed by his capacity for amusing dry comments.

EKGS writes:

"I first knew Hugo in 1940 when we were both in Military Operations. He had then the reputation of a most promising Staff Officer with a clear mind, power of decision and sound judgement. But it was chiefly his character that marked him, his quiet manner made him easy to get on with but did not hide his singleness of purpose and his absolute integrity. After the war he worked directly under me as head of a branch of officers administration. I was delighted to work with him again. Later when Hugo was on the Staff in Singapore, where I was Chief of Staff, my previous knowledge of him was confirmed."

Latterly he was assailed by a crippling disease. To some extent it was kept at bay by modern drugs, his own determination and the love and care of his wife and family to whom we extend our deepest sympathy.

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REB, WRB, HEMC, NHLC, ROHC, JRSWE, JMWH, MCAH, MDM, CHRS, EKGS

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BRIGADIER T I LLOYD CBE DSO MC

Born 20 March 1903, died 6 October 1981, aged 78

THOMAS IFAN LLOYD was commissioned on 29 August 1923. His early career followed the conventional pattern of the time. He returned from India, where he had been commanding 1 Field Company Bengal S&M, to join the Chemical Warfare Branch of the Corps. He commanded 58 CW Company in the Dunkirk Campaign and continued with CW until it "went from the Corps unlamented" (his own words) in 1943. The Group he was then commanding became 7th Army Troops Engineers and was allotted to Second Army for the NW European Campaign with a special brief to be prepared to put top-weight Baileys across wide floodliable rivers. The highlights of their work



were probably the by-pass round Bayeux; the 684ft Class 40 Bailey Pontoon bridge over the Seine completed in 28 hours despite enemy artillery fire; the 4000ft Bailey (the longest up to that time) over the Maas utilising some 1350 tons of bridging equipment and their bridges over the Rhine and the Elbe.

Post-war he was CRE of 51, 5, 1 and 53 Divisions serving twice in the Middle East. After commanding a TA Group he became Colonel GS at SME and finally Deputy E-in-C.

ITCW writes: "When, in 1943, I arrived as a very young, newly commissioned, 2 Lieutenant I thought Colonel Lloyd was a formidable figure with a piercing gaze under black eyebrows. He seemed to require impossibly high standards of both military efficiency and of mess etiquette. Two and a half years later when I left his command I had come to realise that what we had achieved in war owed much to his leadership and training. It was just another year before I was again serving under him in Palestine, but this time as a temporary Squadron Commander where the viewpoint was different. He was a constant source of understanding, wise guidance and plain commonsense. The awe had changed to admiration. He was a shrewd judge of men, he was never afraid of new ideas, he had the vision and drive to be an innovator. In the military sphere he was an acknowledged expert in the application of Bailey bridging, in national affairs his proposals on railway conversion achieved considerable prominence. He will be remembered with respect and affection by all who served with him.."

He was the Founder President of the Railway Conversion League. He presented a paper at the Institution of Civil Engineers in May 1955 in which he had the temerity to suggest that the rails be taken up and the permanent way be paved to provide a road surface. The concept still survives and is still being pursued with vigour by the League.

SCC writes: "I knew Tom Lloyd for over forty years and served with him almost continuously from mid 1944 to mid 1947. As Brigade Major 11 AGRE I was closely associated with his outstanding achievement in NW Europe. This was a significant individual contribution towards earning, for the Corps, that well-known tribute from Monty about Normandy to the Baltic being a Sapper war.

"In October 1946 I handed over to him as CRE 1st Division in Palestine and returned to my Squadron under his command. Tom soon made an impact on the Division as the fruits of his agile brain were plain to see. Early in 1947, Martial Law was imposed on Tel Aviv and I had to take over as CRE again as Tom was

Brigadier T I LLoyd CBE DSO MC

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appointed President of the Court set up to deal with all offences against that Law. His handling of this very tricky business was masterly.

"In these three years of war, or near war, I got to know him well and count myself fortunate to have had such a rich and rewarding experience. Tom was, in every sense, a professional. He was, nevertheless, a man of immeasurable human qualities. He was a man of courage and high principles who was never concerned whether his views were likely to be popular or otherwise. Personal ambition and advancement were not factors which influenced him. In his dealings with people he was direct, firm, fair, helpful, kind and unbelievably generous in giving credit to others. He was an Officer who lived up to the highest standards of all that is best of the Corps and set an example which was a model for all to emulate. He will be remembered by all who knew him with warm affection, admiration and gratitude."

Our deepest sympathy goes to his family.

SCC, TDO, EEP, ITCW

COLONEL T BURROWES OBE MA

Born 10 September 1909, died 9 January 1982, aged 72

TERENCE BURROWES was born to a tradition of Service—Military Service on his father's side and service in Medicine on his mother's side. Service, wholeheartedly and cheerfully given, was to be the key-note of his life.

He was commissioned into the Corps from the Shop in 1929 and went up to Caius at Cambridge University where he gained both his degree and a Boxing Blue. In 1931 he won'the Army Officers Middleweight Championship.

In 1932 he went to India where he spent the next eleven years—perhaps the happiest period of his Service life. He served mainly with the Bengal Sappers and Miners with whom he never lost con-



tact and for his work in the NWF Province he was "Mentioned" twice. Contributors to this Memoir refer to his time as Adjutant of the Training Battalion and his lectures on "The Castes and Tribes enlisted in Bengal S&M", a subject which fascinated him. He had an extraordinary, natural rapport with soldiers; and his proficiency in both Urdu and Pushtu made him an outstanding Regimental Officer in the Bengal S&M. This gift for dealing with men never deserted him.

In 1943 he and his family (he had married Denice in 1935) returned to war-time Britain. Although he was to have been on the Normandy landings, fate intervened and he was selected to be an Instructor at the Staff College just before D-Day. He was deeply disappointed but managed to get back to an active command to take part in the advance through Belgium into Germany. His unit was responsible for the building of many major bridges in the advance including the three massive bridges over the Rhine at Xanten, Dusseldorf and Cologne. The Xanten bridge was one of the two longest bridges of the war and for the Cologne bridge he was presented with a painting from "The Grateful Citizens of Cologne" by the then Burgomaster, Herr Adenaeur.

After the war his first posting was to the newly constituted RMA Sandhurst. This was followed by two years in command of the Australian Army's School of Military Engineering. In 1954 he was appointed Commander 11 Engineer Group and Garrison Commander Osnabruck. Although wearing "two hats" he found time, as a long

Colonel T Burrowes OBE MA

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time lover of horses, both to encourage and teach riding in addition to winning an Army Hunters Trials Championship, as well as running a pack of hounds. Relations with the local German authorities through his personal efforts had never been better.

Between 1957 and 1959 he spent two years in Saigon as Military Attaché to Vietnam and Cambodia.

It was as Officer IC RE Records that he retired from the Active List in 1962 and became a teacher. He had the ability to make mathematics understandable and with a combination of lucid explanation, enthusiasm and a friendly manner, he had many successes particularly with older teenagers.

So the time came for final retirement as a "salary earner"—but Terence was the type who could never really retire. He took on the Honorary Secretaryship of the Officers Association of the Bengal S&M. He brought new life and purpose to the Association. He strengthened the links with the Corps he admired so much, by his letters and by the research he carried out on historical records. These records, now lodged in the Regimental Museum at Roorkee and the Corps Library at Chatham, are the tangible proof, if proof were needed, of his devotion to the Bengal Sappers and Miners.

He was the best type of Sapper—quiet, unassuming and sound in his judgement. A leader whom everyone, British and Indian, liked and trusted; he could be depended on to get things done and to tackle any problem that might arise. The overall picture most will remember is of his smiling face and the direct friendly look in his eyes. His favourite motto and principle was "Laborare est orare". He lived and laboured happily to that principle.

To his wife Denice and the family we offer our deepest sympathy. He will be mourned by many.

EFEA, GCC, MCAH, MCPP, TW

Correspondence

Colonel R C Miall TD, B Sc, FRICS HQ 29 Engineer Brigade Newcastle-upon-Tyne NE2 2NP

THE TA SAPPERS

Sir,—I would like to comment on Brigadier Ted Willmott's "scene setting" article on the TA Sappers—let there be no doubt but that the TA is anything other than an extremely resilient organisation. Over the years we have got used to our masters, whether political or military, moving the goal posts and corner flags and generally taking liberties which in a unionised organisation would have caused an "all-out" strike—thank heavens we have no union!

Every now and again the entire pitch gets moved and that causes us to wonder whether those at the top really understand the game they are playing, and whether we really can be that important. In this latter category falls what has become a very strict control on MTD's (Man Training Days) and very severe restrictions on fuel.

On the MTD issue, if we ever get to a situation where we have to tell one of our keen young soldiers that he's used up all his MTD's, and please do not come back until the start of the next training year, then I would have thought it should have been obvious to even the most dim-witted, that there was a man that one was unlikely ever to see again, for things quickly crowd in to take up the time that was otherwise available to the TA—I have always regarded going to the Drill Hall as a bit like going to Church—lose the habit and you're in trouble.

The fuel restrictions fall particularly heavily on Sapper Units who need to collect stores from Depots and to train where equipment is located and is therefore very restrictive even when we have MTD's in hand.

When I was fortunate enough to command a TA Regiment, in what must now be regarded as the "palmy days of plenty", I was only too well aware that our training then was cut to the bone and that in the event of a crisis we would depend very heavily on enthusiasm and "on the job training" to see us through. The fact is that the TA has always operated on a shoe string and if you start to trim that shoe string there simply won't be enough to keep the shoe fastened on—I believe that we may be approaching that condition now.

There are other disturbing straws in the wind—a number of Sapper Units are located in unfavourable employment areas and a number of our "bright young things" are moving away to the seemingly more prosperous areas where prospects appear much brighter. The effect of this is that we are reaching a state where we can no longer find Officers who have both the ability and the time to command our Squadrons. Arrangements are already in hand for such units to be commanded by Regulars. This is unavoidable in the present circumstances but it is a very sad day for the TA whose Squadrons have traditionally been commanded by Volunteers. It is perhaps an indication that we are becoming less resilient than we were.

My experience of re-roling and switching units is that we will always rise to that kind of challenge—during my period of command we joined a new formation, changed our role and exchanged one Squadron for another. Six months later when we had a new Brigade Commander it was not apparent to him that we were the "new boys", I think that experience speaks for itself.

It is, however, the heavy atmosphere of restriction with the application of a continuing downward pressure that I fear will stille the life out of the TA, in spite of its great resilience. I can only hope, in the name of sanity, that we will be given back our shoe string lest we go barefoot in the park.—Yours sincerely, R C Miall.

> Lieut Colonel D A Scott TD RE(V) 71 (Scottish) Engineer Regiment (V) 51 Yorkhill Parade Glasgow G3 8SW

TA SAPPERS—AN APPRAISAL

Sir,—I refer to Brigadier Willmott's excellent appraisal of TA Sappers and wish to comment on three areas he touched.

The first concerns the implementation of the Revised Career Structure for the TA. Exceptionally TA soldiers are given paid leave in whole or part to attend an annual two weeks training. Most however forgo some element of their holidays. If a Volunteer goes on a course he probably will have to miss camp which is the highlight of the training year when he naturally wishes to be with his mates. Recent experience has shown that the leadership courses run at Chatham produce first class results and have greatly enhanced the performance of Section Commanders and Field Sergeants. However entry qualifications of B2 for Corporals and B1 for Sergeants have in the most part been gained so far by conversion from the old B3 and B2 respectively. Few have yet been in the system long enough to have attended both courses. B1 can now only effectively be obtained by a further course. Hence looking to the future the career soldier in a field troop will ideally attend the following courses: Recruits, Section Commanders, B1, Field Sergeants, RE TA SNCO plus some other course such as NBC Instructor or Skill at Arms. For the vast majority this represents an unacceptable commitment in terms of time and therefore the TA faces a long term problem pursuing the Revised Career Structure. Either too few will be trained or standards will drop.

Brigadier Willmott suggests induction training for Permanent Staff, and that would be valuable, but there would perhaps be greater value in reviewing their selection. To quote the Brigadier, "TA soldiers report for duty because they want to be there". Equally they may, and often do, choose not to be there. This is the root cause of a tremendous frustration in the life of a TA Unit. The Volunteer has lived with the problem for as long as he has been in the TA but it is a completely new "ball game" to the Regular passing through. The PSI or Officer who is sent to work with this fickle beast should of course be professionally of high calibre and well briefed but, more important, he must be capable of handling the characteristic frustration. This is an area where the Regular Sapper Officer can help. Before putting "Yes" in the appropriate Box on a Confidential Report Officers should satisfy themselves that the person reported on has the necessary qualifications for service with the TA. Firstly he should be a strong personality with an enthusiasm for anything with which he is involved. He must be an optimist, but a realist, and have considerable staying power. Lastly he must enjoy the support of his family. Provided he is technically competent these are the qualities which he must have if he is to have an impact on the unit.

The third area is Officer Training. He mentions that steps are in hand to improve it. These steps are confined to a possible JDSC type training which is not yet in being. To properly appraise the TA it should be realised that whereas the implementation of the Revised Career Structure has greatly improved the training of soldiers, and will continue to do so despite some long term problems to which I have already referred, Officer training is lagging behind. There is certainly no panacea. The difficulties vary for individual Officers and units. Generally speaking the Junior Officer finds it relatively easy to find time to attend courses but as he gets older family and civilian occupation pressures combine with his growing military responsibility within the unit to make his time more precious. The TA is a training machine, unlike its Regular counterpart the TA unit recruits its own soldiers, trains all its Class 3 and 2 tradesmen and faces an enormous wastage. Although the Permanent Staff shoulder much of the administrative load the TA Officer still spends a lot of time on administration and training his unit, not leaving much time to train himself and exercise his unit. There is grave danger that the new better trained soldiers will be prevented from fulfilling their potential because of the lack of training of their Officers .- Yours sincerely, David Scott

> Lieut Colonel H P Munro TD, B Sc (Eng), C Eng, FI Chem E, MI Mech E 4 Sunninghill Court Ascot, Berkshire SL5 7BY

THE TERRITORIAL ARMY

Sir—Having been both a Regular and Territorial Sapper, may I add a postscript to Brig Willmott's article in the June 82 Journal.

The TA brings a wealth of engineering expertise to the Corps, far beyond that of "Standard Battle Drill" engineering. When 114 (London) Engr Regt (TA) was disbanded in 1967, we had 15 Corporate Engineering Members in the Mess—Chem 1, Civil 7, Elec 1, Mech 4, Mun 1, Struct 1 plus 1 ARIBA, 1 AIOB (the Paymaster) and 1 CA. The whole Regular element of the Corps, at that time, had, from memory, only some 22 such Members.

From the November 1981 Corps list, a rough count revealed that some 10% of Regular Officers were Corporate Members, whereas the Territorial proportion was 25%.

Such skills are always useful!-Yours sincerely, Pat Munro.

Colonel J B Wilks Regimental Headquarters RE Brompton Barracks

FORTY-FOUR YEARS ON AND STILL RELEVANT

Sir,—I was looking at the 1937 Journals in connection with some research and, purely by chance, found the article by Brigadier B L Montgomery DSO on *The Encounter Battle* written at a time when the effects of mechanisation were stimulating new doctrine.

I have extracted from the article three pieces which are as relevant today as they were forty-four years ago:

1. The Problem of Ground

"The present tendency in modern armies is to reduce the numerical strengths of units and formations and to offset this reduction by increased fire power. The advantage of extra mobility given by mechanization also tends towards a reduction in actual numbers of men. In addition, armoured fighting vehicles are on the increase.

"In the British Army the underlying reasons for the changes that are now taking place are to give greater power to the attack and to increase mobility.

"There are many who consider that the progress in mechanization has given increased power to the defence, and has not greatly strengthened the attack. Certainly the power of the defence is now very great—the use of obstacles, natural and artificial, to frustrate mechanized vehicles will be normal—the fire power available is such that great depth will be possible in the defences—owing to increased mobility reserves can be moved rapidly about the battlefield to counter hostile penetrations. In fact it would seem on the face of it that the odds against successful offensive action on land in first-class war are very great.

"The progress in mechanization has resulted in the study of ground, always important in war, becoming more than ever important. From now on obstacles will play a greater part in operations than previously, and their skilful use will enable great delay to be imposed on mechanized forces. It is true that a mechanized force has a wide radius of action and can move long distances; but it is sensitive to ground, and the skilful use of obstacles and demolitions in combination may well bring it to a standstill.

"So important is ground, and so great can be the dislocation caused by obstacles and demolitions, that the initial encounters between two forces are likely to develop into endeavours to secure such ground as will enable the subsequent battle to be staged successfully. Failure to secure this ground may have far-reaching results, both tactically and administratively. Obviously, then, success in these initial encounters will be the aim of every commander and he will have to consider most carefully the best dispositions for his force in order to ensure this initial success. In thinking out the problem it must be remembered that a wholly mechanized unit or sub-unit is easily held up by obstacles covered by Anti-Tank weapons, and that in order to defeat these tactics it will be necessary to have immediately available sub-units that can operate on foot across country, using covered approaches and outflanking the resistance. Bridges, defiles, MT turning-points, road communication centres—all these have now assumed an importance they never possessed before, and a commander will aim at securing such places as his forward move progresses."

2. The Approach March

"In making his initial plan a commander must consult his senior RE Officer; failure to take this Officer completely into his confidence may have disastrous results in this age of mechanization. There will be bridges over river obstacles, and other potential bottlenecks, which, if demolished, would scriously retard the process of obtaining information and would also complicate the administrative situation; obviously it will be an advantage if these can be seized intact at the carliest possible moment. In any case RE units will be necessary for the repair of damaged communications, and their
dispositions will vary with the nature of the problem involved."

3. The Contact Battle

"The dispositions of the Divisional Engineers will require the most careful consideration. A modern enemy may be expected to make full use of demolitions, and unless prevision is exercised the administrative situation may become so compromised that the Division will be unable to receive supplies of food, ammunition, petrol, etc, and its further advance may be rendered impossible.

"There must be at the outset, before contact is gained, an RE plan for dealing as rapidly as possible with those demolitions which can reasonably be anticipated.

"Within the Corps it will usually be necessary to make an initial allotment of Corps bridging equipment to forward Divisions; this allotment should cater for probable immediate requirements, and it can be adjusted later if necessary.

"The Chief Engineer of the Corps, after he has made a careful study of the problem, should make his recommendations to the Corps Commander as to the allotment of the Corps bridging equipment. To allow of the free movement of medium artillery and tanks, pontoon bridges, if built at all, should be made "heavy" from the outset.

"An RE reconnaissance party must work as far forward on each route as the tactical situation will allow. It would move with the Cav Sqn, and the officer and other ranks composing it must not be taken from the RE Section waiting "at heel" near Bde HQ, or from the section next to be sent forward. Sections in turn should be available for putting straight on to a job of work, complete; meanwhile the reconnaissance party is again working ahead. It is vitally important that information concerning damaged communications should be sent back by the reconnaissance party to Bde HQ, without delay, giving particulars as to the damage, time required to repair, and the necessity or otherwise for using another route. This information may vitally affect the whole movement of the column; and should it be necessary to use fresh routes, or cease the forward movement temporarily, the Brigadier will be able to adjust his dispositions with a minimum of dislocation."

When this article was published (September 1937), "Monty" was fifty years of age and had just taken command of 9 Infantry Brigade in 3 Division. He wrote it on board the P and O Ship Viceroy of India on the way home after his tour as a member of the Directing Staff at the Staff College Quetta.—Yours sincerely, John Wilks

> Major M E Dooley MBE RE HQ 73 Engr Regt (V) TA Centre, Wigman Road Bilborough, Nottingham NG8 3HY

CLASS 60 TRACKWAY

Sir,—As an Armoured Engineer who was involved with Class 60 Trackway Trials conducted by 32 Armoured Engineer Regiment, I read Warrant Officer Kerr's article in the March 1982 *RE Journal* on the Development of the Class 60 Trailer, with interest.

It is never safe to date the beginning of a concept. The Trackway "Roll" concept certainly started in 1967. Indeed it was used on major exercises during 1967, the year it was issued to both Armoured Engineers and 35 Corps Engineer Regiment, and a comprehensive Trials Report was published in 1968 after the exercises.

The Trials Diary lists a number of occasions where the roll concept was used and launched from an AVRE. But I believe the concept of launching a roll was established on *Exercise Hell Tank* in the Luneburg Area and the Canadian Brigade *Exercise Rob Roy*. During the latter exercise, three AVRE's each launched a 100ft roll of Trackway on the far bank off the American Gillois bridge at Daspe, in less than twenty minutes. Paragraph 2 of the CO's comments in the Trials Report are also worthy of note and I quote: "The Trials Report contains a description of a crossing at Jastorf. This site had been used by both American and German Forces in previous years as crossing places, but they both failed to get more than 5-10 vehicles across the "snipe bog" approaches before abandoning their crossings. The Cl 60 Trackway made these approaches good for 110 tanks, 247 tracked APCs and 283 wheeled vehicles, and the site was still usable. The maintenance bill in manpower is negligible."

I feel that we have perhaps not exploited the Trackway to the full. We often have a situation where the water obstacle is bridged in the hour; the approaches taking much longer; a reversal of the situation in the days of pontoon Bailey.—Yours sincerely, Tom Dooley.

> Major D J Holtby RE HQ RE 2nd Armd Div BFPO 22

"HURRAH FOR THE CORPS OF ROYAL ENGINEERS"

Sir,—Your Editorial in the June 1982 edition of the *Journal*, whilst aimed to amuse as well as educate, perpetuates a myth concerning a sentiment of the Corps Song. It is a popular misconception that "Hurrah for the CRE" refers to a Commander Royal Engineers. This is not so and CRE, in this case, refers to the Corps of Royal Engineers.—Yours sincerely, David Holtby.

> Lieut Colonel P J F Wingate MC MA Berkenhof 89 Lower Cookham Road Maidenhead, Berks SL6 8JY

DRESS

Sir,—Colonel Whitaker's letter (June 1982 Journal) reminded me of the time in 1936 when the Corps Committee decided that we should all wear Greenly fieldboots with Field Service dress instead of ankle boots and leggings. They cost me, as a YO, more than one *month's* pay. I wore them a few times on Church Parades at Chatham but never again after leaving Chatham. Then, barely two years later, in 1938, it was decided that the Army should no longer go to war dressed as for hunting and the boots became obsolete.

I still have them in good condition and offer them to the RE Museum, complete with spurs and trees, as a reminder of an earlier Corps folly.—Yours sincerely. Pat Wingate.

ADDRESSES

A number of addresses held do not show the Post Code, a number have become "distorted" over the years, some towns have "changed" counties, some new counties have been "invented".

It would be appreciated if the address on the wrapper of this Journal/Supplement could be checked. If it requires amendment or addition please forward your correct address (Block Capitals).

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The titles are self explanatory, except for "European War" and "Miscellaneous", when one remembers that they were written in the early '20s. Although the concentration is on Europe other theatres are not completely neglected and the term "European War" would now be "World War I", "Miscellaneous", the last book of the series deals with Organisations, Engineer Intelligence, Camouflage etc, including the Training Schools set up in the BEF.

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