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A Suggested Forces Mortgage Scheme for Officers and Other Ranks

WOLJ W DIPLOCK ARICS, AIQS, MIOB, RE



Warrant Officer Class I Diplock is a Chartered Surveyor employed as the Senior Military Instructor of the Building Construction Department at the Army Apprentices College, Chepstow, He has been employed on New Works at Aldershot, as a Quantity Surveyors Assistant at Bielefeld with PSA, on external project work at DCRE Nepal; and in Malta with the STRE working with PWD Malta providing a deep sea concrete wharf and local authority housing for "council" tenants. He is the only regular serving Chartered Building Surveyor in the Corps and professional Associate of the Institute of Quantity Surveyors. He moves to Cyprus early in 1980 for work with the UN Force, for his last 15 months service.

This paper is the revised version of an original scheme submitted to MOD in 1978.

THE EXISTING ARRANGEMENT

The object of the introduction of the Military Salary in the early 1970s was to relate Service pay to pay for jobs of comparable skill and responsibility in civil life established by objective standards, while at the same time preserving internal coherence in the complex rank and trade structure; and to relate charges for food and accommodation to living costs in civil life in a way that is accepted as "fair to servicemen".

This objective has been distorted in the past few years but we now have full comparability from 1 April 1979.

The basis for calculation of accommodation charges, stated in successive Armed Forces Pay Reviews, was intended to match the expenses of servicemen to the corresponding expenses of people in civil life, whose pay, in general, provided the basis of comparison for the military salary, in order to provide an assurance to servicemen that their standard of living in the armed forces would be broadly equivalent to the standard that they would reasonably have expected to achieve if they had been employed outside. By using a National Board for Prices and Income Formula, rents originally were fixed to reflect four elements: unfurnished rent, rates, furniture hire, and additional maintenance by PSA. Current rents are calculated using this principle but successive increases were abated pending an investigation into an alternative method of rent assessment. This is now being undertaken and we must expect an increase in rent if the current formula is unchanged. *THE PROBLEM*

The existing arrangement does not give the serviceman the choice open to civilian colleagues, namely to rent or buy. The regular occupant of service matried quarters does not have the opportunity to own his house and therefore benefit from the increase in value of that property.

Since 1969 house prices have risen rapidly resulting in the inability of servicemen

2

A Suggested Forces Mortgage Scheme for Officers and Other Ranks - J W Diplock upon leaving the service to afford to buy a comparable dwelling with his gratuity, terminal benefit and resettlement commutation. He also has to overcome this problem at the time that he is settling into civil life with the problem of raising a mortgage whilst looking for a job.

Whilst in the service he is required to live in service accommodation if he is to be accompanied and to take an active interest in the Regimental life at that duty station. Regimental life suffers when a large number of servicemen return to their own home away from duty stations at the weekend.

The existing system of married quarter rental means that the serviceman has to choose between:-

(a) living in service accommodation paying rent, or

(b) to purchase a private house at a duty station, hoping to find a suitable tenant when posted, or to incur the expense of selling and then buying at the new duty station.

Despite recent improvement a serviceman living in his own house has many problems especially when posted and either has to:-

(a) sell and buy a house in his new location with little financial help from MOD (the current rules governing refund of expenses are almost impossible to comply with to recover the costs).

(b) live in barracks and return to his family when possible, (this is the cause of much loss of regimental life, separation, marriage problems and consequential loss of trained service personnel),

(c) or occupy a married quarter and rent out his house risking the well publicised problems concerning repossession, damage, poor rent (taxed), high rates and insurances, loss of furniture etc, as well as having to pay a mortgage, married quarters rent and contents insurance.

Clearly there is a requirement for a scheme to enable the serviceman to choose between continuing to rent and to buy "his" married quarter. Many consider that with the present increase in house prices (24% in 1978) they cannot afford to continue to pay rent but must start a mortgage if they are to ever own their house. THE SOLUTION

(a) to continue to pay rent calculated in accordance with existing rules based on council house rents (or any charges resulting from the current review),

(b) or to contribute to a "Forces Mortgage Scheme".

The MOD forms a separate agency to administer the scheme with the assistance of a Building Society. The serviceman is able to "purchase" a married quarter from the MOD Agency. A deposit is paid and the monthly mortgage repayments are calculated using the current formulae used by the Building Societies. Tax relief is allowed by the Inland Revenue on interest paid according to the individuals' personal situation and an additional payment is added to cover rates, additional maintenance carried out by PSA and furniture pack rental.

The value of the property is fixed yearly by using the figures produced by the Royal Institution of Chartered Surveyors/PSA and is the average value for that type of dwelling calculated ignoring geographical differences. The serviceman decides on the mortgage advance that he requires and pays the deposit accordingly. A mortgage advance ceiling is fixed at a maximum of 95% so that the serviceman has to show a commitment. The repayments are then calculated and the serviceman's pay is debited at source.

When the serviceman is posted he moves to his new location and is allocated a married quarter according to existing rules. He marches out and in, and continues to pay his unchanged mortgage repayments. If he changes the size of married quarter due to a change in family size, promotion, unavailability of certain quarters etc, he "sells" back to the MOD Agency at the new (higher value) and commences a fresh agreement based on his "new" married quarter value.

At the completion of his service he "sells" back his married quarter to the MOD

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Editorial

THE RIGHT PERSPECTIVE?

"Dear Mummy and Daddy,

I am sorry I have not written to you for such a long time, I hope you have not been too worried. When we had the fire in the dormitory I was lucky to escape with a few of the other girls, but when I jumped from the window I unfortunately missed the net and then had to spend some time in hospital. Fortunately, the doctor says that my head injuries will not leave me with any lasting disability, and providing I am careful I

should be able to lead a fairly normal life. "You will be glad to know that I am quite comfortable in this small apartment. After the school was destroyed, we had nowhere to go, and Mark-he is the school boiler man who helped pick me up when I feil-suggested that I should move in with him. He is such a nice boy, and I cannot wait to tell you that we are going to be married. I know that with your customary tolerance and broad-mindedness it will make no difference to you that the colour of your prospective son-in-law is not the same as ours. He comes from a good family in the Congo, where his father runs an armaments business, so they are quite well off. Mummy-I am dying to see you and to have a heart-to-heart talk to you about the baby. I realize that there will be problems, but I know we can all work together to overcome any prejudices which

may arise in our circle of friends and neighbours at home. "Dear Mummy and Daddy—now that you have read as far as this I am glad to say that there has been no fire, I have not been injured, I am not living with a coloured boy, and I am not engaged, nor am I pregnant. I have, however, failed my 'A' Level

French, and I just wanted you both to get this news in the right perspective." It is a matter of some regret that the original source of this letter cannot be located

but it does make a very good point! To keep things in perspective is seldom easy as such a judgment is a personal and

unique attribute. The Editor has been asked why he publishes "I Was There" type of articles which have little professional military engineering content relevant to today's problems or tomorrow's solutions. His simple answer is:-

(1) It depends on what is meant by "professional". A professional military engineer should be able to provide whatever is required of him by higher authority whether it be to support an attack or a defence, to construct field kitchens or sophisticated structures, to provide temporary forward airfields/pads or a third London airport, to replace a fuse or commission a power station, to ... or ... -com-

(2) One can always learn from people who have done something, even if only how parative examples abound.

(3) The worthwhile standards of life and behaviour were developed in the past not to do it. and without knowledge of them the standards of the present and future will neces-

(4) The Journal is meant to be read and not to provide a relatively convenient, sarily suffer.

albeit expensive, 3mm packing piece for unstable furniture. Every effort is made to maintain balance in each issue of the Journ 1, old, new, future, provocative, amusing but above all interesting and readable. If we balance is

wrong it can be adjusted. It is all a question of the right perspective.

A SUGGESTED FORCES MORTGAGE SCHEME FOR OFFICERS AND OTHER RANKS 4

Agency and recovers the "betterment" (the amount of market increase in the value of that house) plus the amount that he has reduced the mortgage principle. Thus the system is flexible and is tailored to meet service requirements whilst giving him the chance to gain the "betterment" which all house owners in civil life enjoy. He can then afford to buy a house of a standard at least equal to that enjoyed during his military service.

When he leaves the service he may wish to find employment in a more expensive area and will have to pay the difference in value between his "new" house and his "average value" house (or conversely is able to purchase an equal quality house by raising a smaller mortgage in a lower value area). A possible refinement would be to grade areas according to geographical price range resulting in a higher service mortgage when the serviceman moves into the higher cost area. This would lead to a complicated system of different mortgage repayments and the more simple system is to be preferred.

The serviceman could obtain assistance in raising the mortgage deposit by receiving an advance of terminal benefit or a loan to be repaid over (say) two years. This system is preferred to prevent the incautious serviceman raising the deposit externally and becoming financially embarrassed.

Existing house owners may wish to "buy into" this scheme by using the balance of their existing house sale to pay the deposit and raise a mortgage with the Forces Scheme in the normal way.

The scheme could also include servicemen living-in barracks by extending the same facilities based on the value of their "flat" accommodation. (It may also reduce damage to barracks.)

The Crown manage the existing stock of married quarters "in trust" for the tax payer (and that includes us!) and are not able to actually sell accommodation to servicemen, but the sale can be the subject of a contract without actual exchange of title.

The contract provides:-

(a) assurance to the MOD Agency concerned who would not have the bricks and mortar to sell if the serviceman defaulted,

(b) assurance to the serviceman who would not hold the "title" in the normal way, and

(c) a guarantee by the Crown to repurchase at a future price fixed by prevailing market values.

The main advantages of the proposed scheme are that it treats the serviceman in the same way as a similar civilian; gives him the opportunity to qualify for tax relief; allows him to gain the increase in house value whilst retaining the flexibility that is needed, and should result in a return to full married quarters with the associated improvement in Regimental life.

The existing "Wharf Scheme" could still operate, the serviceman would continue to have the opportunity to purchase his own furniture during his service instead of having to buy all new at higher prices at the end of his service. The furniture pack would remain optional so that the individual would have room to accommodate his own furniture.

Once the serviceman has started his mortgage, his repayments remain unaltered. Thus although this scheme represents a large increase on current married quarter rents when expressed as a percentage of pay, repayments are fixed whilst rents are not. The slight fluctuation in national interest rates result in a minimal change to repayments. The interest gradually reduces as the principal reduces and as the tax relief is only allowed on the interest the actual repayments after adjustment for tax slowly increase. We are assured that salaries will be kept fully comparable so the actual effect of this increase will be lost.

Example Table 1

Mortgage	over	25	years	@	11.75%
----------	------	----	-------	---	--------

	Loan Value after			
	deduction of	Existing Abated	Mortgage	Payments
	deposit paid	1977 Rent	(adjusted	l for tax)
	· £ ·	£ pa	£ per year :	E per month
Type A	12000	328	1053	88
В	14000	431	1228	103
С	16000	500	1404	117
D/WO	18000	573	1558	129
5	17000	686	1491	124
4	20000	817	1754	146
3	24000	923	2105	176
2	30000	1044	*2631	*219
t	40000	1164	*	*

* "Grey areas" much depending on individuals tax situation at this salary level and family size.

The loan value depends on the average value of the married quarter and amount of deposit paid.

Taking the Type C Example from Table 1 Mortgage at 11.75% over twenty-five years:—

Loan Value after deduction of deposit paid Monthly payments 30% average tax relief	16000.00 167.06 50.12
Actual monthly payments	116.94
Annual cost	1403.28

c

Table 2 shows the cost to the serviceman of subscribing to the Forces Mortgage Scheme. It compares the current and 1975 pay situation being the last time that the pay and rent ratio was free from Government policy distortion.

It will be seen that although the serviceman would have to pay out higher amounts initially the long term benefit presently enjoyed by civilian house buyers would be his.

The scheme reflects actual house prices and is not tied to unrelated factors such as insurance schemes, salaries, last two years service or 50% ownership.

RECENT DEVELOPMENTS

Following the recent change of government fresh proposals have been outlined for the sale of council houses to sitting tenants. This further justifies the introduction of this proposed forces mortgage scheme. A discount of between $33\frac{16}{2}$ to 50% is to be offered depending on the length of tenancy completed. After three years $33\frac{1}{2}\%$ is to be offered rising 1% per year to a maximum of 50%. The affect of this discount is shown in Table 2. Service married quarters rents have been fixed since 1970 using the same council house rent formulae so similar discount treatment is fully justified. THE COST

Having served in Yorkshire and being familiar with the saying "Yer never get owt for nowt", what is the cost to MOD?

The main financial cost will be that of rent paid. However certain personnel are at the moment accommodated free, NAAFI, PSA etc, personnel abroad (including incidentally heating and lighting). The Crown would also lose the betterment, already enjoyed since the inception of married quarters!

These costs are partly offset by the interest gained on monies paid into the Scheme by participants. This sum could be considerable, ranging from 5% deposit from first

Table 2	197:		1975 1979			79 1980			
						UNDISCOUNTED FIGURES		35% DISCOUNTED	
	1975 Pay £	Rent £	% of pay £	Pay (fully comparable) £	Pay Increase 1980 (say) 10% £	Mortgage Re- payment after tax relief plus 10% for rates furniture etc £ pa	% of pay (Col 6)	Mortgage Re- payment after tax relief plus 10% for rates furniture etc £ pa	% of pay (Col 6)
1	2	3	4	5	6	7	8	9	10
4 yr Major Type 3	5599	694	12.4%	9249	10174	2315	22.8%	1578	15.5%
4 yr Capt Type 5	4559	519	11.4	7433	8176	1640	20.8	1118	13.7
Band 6 WO 2/Type C	3873	376	9.7	7103	7813	1544	19.8	1053	13.5
Band 6 Sgt/Type C	3526	376	10.7	6529	7182	1544	21.5	1053	14.7
Band 2 Cpl I/Type B	3040	325	10.7	5661	6227	1351	21.7	921	14.8
Band 2 Spr I/Type B	2405	325	13.5	4523	4975	1351	27.2	921	18.5

NOTE: (1) 1975 rates are used because present rents are low due to the Government abating increases in 1977, 1978 and 1979.

(2) The national average in 1978 for column 8 is 19%.

6

time buyers to a much larger percentage from existing owners "buying into" the scheme. The MOD Agency could also offer other Building Society services including encouragement of regular savings accounts (Paid-Up Share Department Class 2 Accounts) attracting interest payments back to servicemen both married and single, in exchange for regular savings payments already made by some personnel in the "Save While You Serve" scheme. This could result in quite large amounts of savings being transferred from Commercial Building Societies to the MOD Scheme. *CONCLUSIONS*

The serviceman is not currently being given the same opportunity to own his house as his civilian counterpart, contrary to the objects stated when the military salary concept was introduced in 1970.

The serviceman should therefore be given the choice of either continuing to pay rent calculated according to the current rules or to purchase a standard married quarter suited to his service requirements.

This will enable the serviceman to fully enter into the Regimental life at his duty station free from the worry of falling far behind in the House buying stakes.

The return to married quarters life brings many financial savings itself:-

(a) a reduction in catering costs for married personnel living in barracks,

(b) a reduction in the amount of separation pay made,

(c) a reduction in the number of separation warrants issued,

(d) lower welfare costs as morale improves,

(e) a reduction in PVR,

(f) an increase in length of service commitment, both due to the removal of the fear that the serviceman (and family) will never be able to afford to buy his own house, and

(g) an improvement in standards as competition increases.

As the service continue to lose valuable trained men despite the fully comparable pay rates recently introduced, it should give careful and considerable thought with a view to introducing a Forces Mortgage Scheme on 1 April 1980 a full ten years after the Military Salary was introduced.

AUTHORS POSTSCRIPT

Since this article was originally written in November 1978 several changes have taken place including a change of Government! Whether or not it is good for the proposed Forces Mortgage Scheme remains to be seen. However measures are to be introduced in the current session to *require* Local Authorities to sell council houses to sitting tenants at generous discounts. The similarity between MOD and Local Authority Housing is obvious. This article is offered to promote constructive comment and debate from a wide body of specialized and experienced readers. The main problem areas are to persuade Inland Revenue to allow Forces Mortgage Repayment tax-relief on "notional" real estate and to persuade Building Societies and the Treasury to become interested and to finance the Scheme.

A Postal Palliative

COLONEL D J LONDON OBE, FBIM, FAAI

"Whereas We deem it expedient that a body of our Regular Forces shall be formed to conduct the postal duties when Our Armies take the field...."

Royal Warrant 20 Gen No 1469 dated 22 July 1882.

BACKGROUND

Recent industrial disputes within the British Post Office, coupled with considerable staff shortages at the main letter distribution offices throughout Britain resulted in a well-publicised worsening of the first class letter mail service. Whilst it is true to say that the situation was not perhaps quite so bad as the National Press and the Post Office Users National Council (POUNC) would have had us believe, there certainly was a marked deterioration in the transit times of letter circulation, particularly to incoming overseas airmails, the bulk of which are processed through the Mount Pleasant Sorting Office in London.

Direct airmails from overseas Forces Post Offices were due to process through Mount Pleasant at that time.

The Director of Forces Postal and Courier Services (DPCS) was informed of the developing situation by the Headquarters of the Operations Division of the Post Office and then kept up to date at all times by means of daily situation reports. APPRECIATION

As the backlog of incoming mail at Mount Pleasant increased it became apparent that the needs of both the civil and military postal services would be best served if:

(1) Incoming mail from overseas Forces could be kept out of the London distribution centre, and,

(2) The range of sorting selections made at the despatching offices overseas could be enlarged to speed circulation through the UK distribution system by reducing the number of sorting stages in the UK.

At the same time as this appreciation was made, the Post Office Corporation was negotiating contracts to establish an interconnecting network of internal UK airmail services centred on Speke (Liverpool) Airport. A limited airmail network became operative initially in late July with the fully developed service effective from mid-August. This service has worked extremely well to date. *DECISION*

In the light of the then prevailing difficulties at Mount Pleasant and the anticipation that improvement there would be slow in coming (if at all), it was decided to completely revise inward selection, sorting, despatching and circulation of Forces mails world-wide to avoid London, and at the same time by so doing take advantage of the improved UK internal airmail network.

NEGOTIATION

To effect the wide range of changes proposed it was necessary for DPCS to enter into negotiations with the following organizations:

Operations Division
Transport Division
Staff Branch and Unions
North West Region
Head Offices and Operations Divisions
Entrepot clearances
National and International air schedules, capacities, costs
Internal BAOR postal service aspects

EXECUTION

Once exploratory negotiations had been completed and agreement obtained from all interested parties to the changes proposed, it then became necessary to:

(1) Increase the total number of direct incoming letter mail despatch selections to some sixty UK destinations from a previous total of forty

(2) Rewrite letter sorting plans for every BFPO overseas

(3) Relabel all sorting frames and fittings

(4) Reprint all bag despatch labels (initially some 12,000 hand printed labels as time did not allow machine print)

(5) Change mail documentation and accounts

(6) Re-route all inward airmails

(7) Re-train all involved staff

The above was accomplished by 3 September 1979 when the new system became operative.

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Direct transfer airmails from the BAOR being loaded on to the connecting night internal air service at Speke (Liverpool) Airport for UK distribution—in this case for South East Region.

CONCLUSION

This short article is entitled a "Postal Palliative" by way of acknowledging that whilst we are dependent on systems outside of our own control we may do only so much by way of alleviation but can never completely cure inherent faults. It is to be hoped that the medicine administered in this case eased the circulatory passages, unblocked the Forces postal intestine in the UK and allowed normal movement to be resumed with a minimum of inconvenience to the patient.

The improvements were effected at no increase in operating costs.

Allied Geologists in the Second World War

PROFESSOR JOHN SUTTON FRS



After graduating at Imperial College the author was commissioned in REME where he served for five years with Workshop Companies. After the War he returned to Imperial College and subsequently became Head of Department and Dean of the Royal School of Mines. His principal geological interests have been in the early history of the earth, an activity which has enabled him to travel widely in Africa, Asia and the Arctic examining Pre-Cambrian rocks.

Allied Geologists in the Second World War John Sutton FRS

IN 1939 geologists made up no more than 1 per cent of scientists and engineers in Britain. Thirty years later, what stands out is not only how successfully that small group of geologists and geophysicists dealt with the problems of war but how acutely they laid the foundations for the expansion of post war Earth sciences, and in particular for the successful exploration of the continental shelf around the British Isles. This article first appeared in *New Scientist*, London, the weekly review of science and technology, who hold the copyright and have kindly given permission to republish.

In January 1942, when sixteen airfields were under construction in East Anglia alone, each of which required 70,000 tons of ballast, the Air Ministry turned to the Geological Survey of Great Britain for advice on where to find a million tons of gravel close at hand. The Geological Survey responded with maps and lists of sites and construction went ahead. The records providing this information had been accumulated during more than sixty years of geological investigation in East Anglia. Contingency plans were also drawn up for the provision of emergency supplies of water in southeast England should enemy air attacks disrupt the normal water main system to London and the Home Counties. Here again the Geological Survey was able to call on the necessary geological information from its records of underground water resources.

The solution of problems such as these, which arose repeatedly during the Second World War, illustrated the truth of a comment made by Paul M Price, who served in 21 Army Group with the American Armies in France, and who after the war wrote "the greatest value of the geologist in war lies in his activity between wars". To a large extent it must be true that much wartime geology lies in the application of existing knowledge.

But as Paul Price's own experience illustrates, a lot could depend on the initiative of the geologist in the field. For example, when the US forces reached Argentan in August 1944 after a breakout from the Normandy beachhead it was to find a town with shattered water mains, no water supply and a pumping station which the retreating Wehrmacht had stripped of equipment. Price located an undamaged tank in a creamery, found a pump with the fire brigade and soon had a water supply from the underlying chalk available for troops and civilians. Part of the pre-invasion allied planning had been to ensure that geological advice was available for just such situations so that services could be quickly restored behind advancing troops.

In the British Army, a close link between geologists and the Royal Engineers had been established during the static trench warfare of the First World War with the double problem of sinking dry dugouts and tunnels in waterlogged country and of obtaining water supplies for troops in the field. W B R King, who as a young officer was concerned with the search for water on the Western Front, published a paper in 1921 on the geological structure of northern France as revealed by the Army's borcholes for water. He became the senior British geologist with the Army in the last war and, after winning a Military Cross in 1940, was to return yet again to France as a geologist with HQ 21 Army Group. One of the geological highlights of the Second World War was the location of previously untapped water supplies during the planning for the Battle of Alamein along the line of advance which the 8th Army was to take. The geologist concerned was F W Shotton, an expert in water supply problems, who has recently retired from the chair of geology at Birmingham University.

SUBSURFACE MAPS FOR INVASION

Between Dunkirk and the Normandy invasion Colonel King, as he then was, was responsible for such matters as water supplies for troops in England and the planning for the return to Europe; he had a desk in the South Kensington headquarters of the Geological Survey and worked closely with the Survey staff. From the invasion of North Africa onwards, this combination of geological expertise provided a range of

geological information on terrains where campaigns might be expected. In addition to water supply questions, three further needs had to be met. Mobile warfare demanded maps which would show the "going" for vehicles off roads; such maps based on British geological maps obtained before the war had indeed been prepared in 1940 by the Germans for the invasion of England. The allies produced similar maps as overlays for the General Staff topographic maps. There was also a requirement for maps which showed the suitability of country for the rapid construction of airfields. Detailed maps at scales of 1:5000 were prepared of coastlines to show possible landing sites; these were based both on published material and samples obtained beforehand from the beaches where landings might be made. A critical problem in Normandy arose through the lowering of the sea which had taken place during the last ice age after which peat bogs and forests formed below the level of the present day beaches. Plastic clay and peat, across which vehicles could not travel, were thus to be expected beneath apparently firm sands. When planning began in 1942, the Normandy beaches appeared to have adequate sand cover but during 1943 storms exposed dark patches in runnels. After these had been seen in aerial photographs a pre-invasion reconnaissance by commando volunteers showed that peat was in fact present. Professor Shotton, by then geologist at HQ 21 Army Group, carried out the greater part of the careful geological research needed to show the points where vehicles could pass. The success of the landings in 1944 demonstrated the value of this work.

While planning the invasion, a need for cross-channel pipelines to supply petroleum became apparent. This was the start of PLUTO (Pipeline under the Ocean). Existing methods which would involve joining sections of pipe during the crossing were out of the question and novel methods were devised which provided two types of continuous pipe-a lead pipe of 2in internal diameter and a seamless steel pipe of 3in internal diameter. These were laid between the Isle of Wight and Cherbourg, but principally between Dungeness and Boulogne where seventeen lines were eventually completed. In all, 172 million gallons were pumped to the Continent. Whereas lead pipes had much in common with existing submarine cables the laying of taut steel pipes raised wholly new problems. It was thought that vibration by tides might break such lines if they crossed an irregular bottom. It thus became necessary in June 1942 to determine the nature of the Channel floor. Colonel King checked a model he deduced from the known geology on land with scarce information on the nature of the sub-Channel rocks and with the results of echo soundings. One of his sources of information was his own work on the results of British Army borings in France during the First World War. King's report enabled the pipe lines to be laid successfully.

Before leaving this pioneering wartime investigation one other point might be mentioned. As is well known, during the war scientists were involved in the operation and design of advanced weapons such as radar and anti-submarine devices. The latter led to what Sir Edward Bullard has suggested was the most significant wartime development for the earth sciences—increased knowledge of the propagation of sound under water. This opened the way to a host of echo sounding devices which not only detected the topography of the sea floor but which could provide reflections from underlying rocks and so help to establish the concealed geological structure. Thus anti-submarine asdic led to new geophysical methods of looking downward at the Earth's crust as effectively as wartime radar led to present-day radio astronomy. After the war, Maurice Hill, a Cambridge geophysicist who had worked on counter measures to defeat the German acoustic homing torpedo, joined W B R King in investigations of the English Channel which located a basin of sediments 8000 feet thick, a discovery of great importance to the petroleum industry.

Geology impinges in many ways on modern war and the Geological Survey had to meet many responsibilities, some old, some new, between 1939 and 1945. Among their achievements were the provision of annotated records on 15,000 wells published in a series of Wartime Pamphlets which in all covered 25,000 square miles of the country. When open cast mining was proposed the Geological Survey supplied the newly established Directorate of Open Cast Coal Production with information on the location of shallow seams and of possible hazards such as existing shallow works and areas where underground flooding might ensue. Started as a wartime expedient, open cast working produced 20 million tons of coal between 1942 and August 1945, and went on to become a profitable way of winning coal. Although the general geological mapping programme had ended, mapping of mineral resources continued and 800 square miles of outcrop of the sedimentary iron ores of the East Midlands, the major British iron field, were geologically mapped. By the end of the war 2300 million tons of ore had been identified.

As shortages developed sources of such scarce materials as glass sand, mica and wolfram were located. Problems such as these had been anticipated but a totally new requirement was the need for uranium. The discovery of economic concentrations required both understanding of the complex factors that control its distribution and the development of instruments to detect natural radiation. Early in the war a joint British-American effort to explore for uranium began in great secrecy. CF Davidson headed the British contribution as chief geologist of the newly established Atomic Energy Division of the Geological Survey. Uranium is not a rare element for it is as abundant in the Earth's crust as silver or mercury, but there had previously been no incentive to establish the geological conditions in which uranium can be concentrated. A review of descriptions of radioactive mineral occurrences, including early Russian accounts of radium deposits, sparked off the search, which yielded the major sedimentary deposits in the US. One of Davidson's contributions was his successful follow-up with American colleagues Weston Bourret and G W Bain of a reference made thirty years earlier by the South African geologist A N Rogers, to the occurrence of radioactive substances with the gold ores of the Witwatersrand. In October 1945 Davidson reported to the then Department of Scientific and Industrial Research that "Present evidence appears to indicate that the Rand may be one of the largest low grade uranium fields in the world". Post war production has proved this to be so.

HINTS OF NORTH SEA OIL

Perhaps the greatest geological advances made during the war years resulted from the petroleum exploration programme of D'Arcy Exploration, a subsidiary of Anglo-Iranian, predecessor of British Petroleum. D'Arcy Exploration, which in December 1935 had set about the exploration of 7500 square miles of the British Isles, located natural gas at Dalkeith two years later, and oil at Formby in Lancashire, and near Newark at Eakring in June 1939. War-time production from the Eakring field amounted to 300,000 tons. The successes of 1939 ensured that work continued in the most promising locations throughout the war. This effort by some dozen geologists and geophysicists, led by G M Lees as chief geologist, for the first time employed geophysical methods capable of determining the deep structure below the surface rocks. The scene had been set by a geological appreciation of the petroleum possibilities in Britain, a published version of which had been presented by G M Lees and PT Cox at a meeting of the Geological Society in 1937. On 6 December 1944, when the war was nearly won, though the last German offensive in the Ardennes was to open ten days later, Lees returned to a crowded meeting of the Geological Society to describe seven years progress. The President of the Society, Professor W G Fearnsides, himself an economic geologist of great experience (who incidentally had appeared in his early Daimler on the evening in June 1939 when oil was first produced at the Eakring No 1 well, such was his nose for interesting geological events) commented on the paper by G M Lees and A H Tait, "Never before, had so much exact and new information about underground geology of Britain been presented to the Society". This indicated the size of the sedimentary basins in north-east and north-west England flanking the North Sea and Irish Sea and, with the geological and geophysical investigations of King and Hill in the English Channel paved the way to the study of the deep structure of the continental shelf. Strictly speaking perhaps not wartime geology, but a good example of how in war geology can both meet immediate military objectives and plan for the future. Lees was not only the moving spirit behind the D'Arcy Exploration for oil in Britain, but also served with the Petroleum Division of the Ministry of Supply and was very much concerned with PLUTO.

I have mentioned wartime geology with rapidly moving armies, during static trench warfare and in support of industry, but some of the most remarkable individual feats occurred when geologists were working in occupied countries, under threat of capture or in captivity. In Holland the search for petroleum had reached much the same stage as in Britain when the country was occupied in 1940. Past successes were concealed from the Germans, but in 1941 the Dutch were compelled to resume exploration. In January 1944 the Schoonerbeek oilfield, which by 1950 could be described as the largest in Europe west of the Iron Curtain, was discovered. Production was successfully held up by the Dutch until liberation, after which output rose to five million tons per year. As a laconic postwar report from the Dutch petroleum industry was to put it, during the occupation "an active development of this field could, however, be avoided".

Professor Hanno Martin the distinguished German geologist, then working in South Africa, vanished into the desert of South West Africa with a single companion to avoid possible internment on the outbreak of war. Only the illness of his fellow escaper ended their exile after more than a year during which they used their knowledge of desert life to survive on their own. In the southwest Pacific the Australian geologist who now directs the Bureau of Mineral Resources, LC Noakes, was one of the volunteers who remained in solitude in Japanese occupied islands as a coast-watcher to report intelligence of Japanese movements. A unique geological paper is the account published by Professor F Ellenberger in 1949 at the University of Besancon of the geological investigation of the prison camp OFLAG VXII which he and his companions carried out during five years as prisoners of war. This is a memorial to French courage and enterprise under most difficult conditions. Imprisoned on the crystalline rocks of Austria they studied their "overpopulated desert" as they termed this camp, made geological maps, took clandestine photographs with an illicit camera, provided themselves with two microscopes, prepared thin sections of rocks and successfully brought their scientific material away as they were evacuated westward on foot in the closing chaotic months of the war.

In writing, I have drawn on many sources, but I would particularly mention accounts by the late W B R King and the late G M Lees. I myself took no part in wartime geology being one of the many biologists and geologists diverted to electronic warfare, an experience which undoubtedly helped with the spread of physical methods into other sciences in postwar times.

MORRISON'S ACADEMY Crieff, Perthshire

Situated in spacious grounds in beautiful Perthshire, Morrison's Academy is an independent school for boys and girls which, since 1860, has been equipping young people for life all over the world. The reputation of Morrison's is based on sound Scottish formal education, along with a wide range of sports and activities. 'O' grade, Higher grade and Sixth Year examinations are taken while Oxford and Cambridge A-levels can be added if desired.

Boarders, who form a third of the roll of 920 pupils, are accepted from eight years upwards, and are accommodated in eight comfortable houses within easy reach of the School and are under the supervision of a housemaster or housemistress who is on the Staff of the School. A few day pupils are admitted each year to Primary 1 and Primary 2.

Boarding fees for Session 1979/80 are \pounds 535 per term. The Rector wil be pleased to forward further details on request.

German Military Geologists in the Second World War

LIEUT COLONEL E P F ROSE TD, RE(V), MA, D Phil, FGS, MIWES



Dr Ted Rose lectures in geology at Bedford College, University of London.* He is Vice-President of the Palaeontological Association; councillor of the Palaeontographical Society; member of the International Union of Geological Sciences "Working Party on the Paleogene-Neogene Boundary"; UK national correspondent for UNESCO/IUGS International Geological Correlation Programme projects 25 (Stratigraphic Correlation of the Tethys-Paratethys Neogene) and 117 (Geological events at the Mio-Pliocene boundary). He was formerly an Honorary Scholar of St Edmund Hall, University of Oxford, and transferred into the Engineer Specialist Pool (TAVR) in 1969 after Territorial Army service in the Queen's Own

Oxfordshire Hussars. He has served widely as a geologist, in countries including Thailand, Malta, Gibraltar, and Hong Kong.

INTRODUCTION

THE preceding article¹ outlines the activities of geologists during the Second World War from the Allied point of view. An unpublished document¹ has recently been sent to me which illustrates a German point of view. These two accounts^{1,2} amplify the summary of military geological activity already recorded in the *RE Journal*,³ and illustrate similarities and differences between the British and the German use of military geological principles which are basic to the solution of war-time problems, irrespective of nationality. Differences because they indicate alternative, battle-tried organizations designed to make the most effective use of geology in war. This paper summarizes German military geological experiences in 1939 and 1940, using data hitherto uncirculated in Britain, and comments on the lessons learnt.

ANALYSIS OF GERMAN MILITARY GEOLOGY 1939-1940

The document on which this analysis is based is the report of the 6th Course for (German) Army Geologists, held at Heidelberg from 14 to 20 December 1940. That geology was important to the German Army is indicated both by the number of the course, and the number of its active participants. Earlier courses had been held in January and February 1940 at Aachen, Giessen and Tübingen, and already by only the second winter of the war (when outside work was limited by the weather) the number of courses had reached a total of six. Thirty-five papers were presented at the Heidelberg course, from twenty-nine authors, and printed as a course book of over 150 pages.

The book records geological work by the German Army in the then occupied territories of France, Holland, Belgium, Poland and Norway. The Germans had thus found widespread use for their geologists. Geological knowledge was applied to the construction of airfields, tunnels, mine chambers, and fortifications. It was used in the siting and construction of field positions, anti-aircraft positions, air-arm installations,

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German Military Geologists in the Second World War Lieut Colonel E P F Rose TD RE and coastal defences; in the procurement of building materials and supply of potable groundwater; in assessing the effects of shells and bombs on rocky and loose soil, and of military flooding of terrain; and especially in assessing trafficability of terrain for particular military vehicles. Applications of geological knowledge to military problems were thus many and varied.

Apart from describing case histories of military engineering geology, interesting from a historical viewpoint and now less so from a technical one, some papers in the book relate to two topics of recurring interest. First, to the organization of a geological staff so as to contribute the most effective advice in a war-time situation. Second, to the presentation of geological information in a way suited to most efficient use during a war of movement.

With respect to staff organization, a keynote paper in the book reviews the then current German system, plus the alternative system adopted by the French, and concludes that neither system was entirely satisfactory. Despite the impressive geological establishment in the German armies during the 1914–1918 war and the then clearly defined scope of work for Geological Groups (fully described elsewhere⁴ in the context of geological work on the Western Front), it appears from the paper that a geological organization had to develop afresh from 1939. The paper complains of a lack of peace-time instruction and tradition, lack of clearly defined operational roles, lack of reserves of geological manpower and equipment. In 1940 each military geologist wore the uniform of a *Technische Kriegsverwaltungsrat* (Technical Army Administration Councillor) whatever his age, experience, or responsibility. A distinctive epaulette was used to indicate merely whether or not the wearer was at least thirty-five years of age. There was thus no pyramid rank structure for army geologists, a fact which caused them some concern.

The French had adopted a completely different system of providing geological advice to the army. The civilian staff of the *Centre National de la Rechèrche Scientifique Appliquée* (broadly corresponding in function to the British Geological Survey) was required to give advice to the army in war-time in the same way that advice had been provided for government use in peace. The advantage of this system lay in its complete exploitation of scientific resources. The disadvantage was that its geologists were not militarily informed. In consequence, their advice was allegedly sometimes badly timed, misleading, or difficult to apply. Moreover, being civilians, the geologists could not readily be deployed to give advice on the battlefield. The results were "serious offences against the simple principles of militarily applied geology... which one would not have expected from the scientifically and especially geologically so well trained French."

The structure recommended for the future German army was a reserve or active corps of army geologists, their ranks to be similar to those of medical officers. Some officers were to be placed in permanent advisory positions with "high level authorities," others to be organized and equipped in cadres available to undertake geotechnical or geophysical fieldwork when necessary.

Presentation of geological information for use in a war of movement was the second topic of general interest, an interest sharpened in that the movement then being prepared was "an attack upon England". Because of the shortage of time in which to make decisions in such a war, three basic requirements were identified:—

(a) Specialist geotechnical maps. The best way of advising commanders when making their decisions was to foresee the need for advice, and prepare relevant military-geological maps in advance. A good working relationship between geologists and the cartographical and survey service involved in map production was essential, and facilitated production of new or amended maps at short notice.

(b) Geologist readily available. Since plans could change several times in a day, it was proved useful to have a geologist readily available to answer questions on points of detail. A geologist was generally attached to the Chief Engineer of an Army HQ, and recommended always for attachment "within the first echelon command of the higher staffs."

(c) Background geological information. "... the answer to geological questions had often to be based on the instinctive interpretation of insufficient material.... The fact that a reply was generally possible in spite of difficulties seems to have been mainly due to the fact that a geologically trained expert was asked for advice ... a large part of these questions could not have been answered in the same manner by other than geological experts". Yet the best advice required use of background maps and monographs, not readily available in wartime. The German geologists therefore argued that military geological information and documentation for potential operational areas should be prepared, and made available to the relevant geologist for assessment well in advance of action.

CONCLUSIONS

There are striking similarities between the use of geologists on both sides of the 1939–1945 War, exemplified by the American³ and German armies. On both sides geologists initially complained that they were not being used effectively. Both sides began the war with an incompletely organized geological staff, but found it necessary to organize one. The range of technical applications was comparable on both sides. Both found that the best way to present geological information for military use was in the form of specially prepared maps submitted through the appropriate Chief Engineer.

The differences were primarily in the organization and scale of a geological staff. The Americans and French used a civilian-based organization, whereas both British and German armies used serving (if reserve) officers. The structure recommended in 1940 for the German army is similar to that later recommended, but in more modest scale, for the British.

A principal lesson learnt was that geologists can be useful in a variety of ways during war-time, even a war of movement, but for most efficient use they, like other troops, have to be suitably organized, trained, and equipped during the preceding peace.

ACKNOWLEDGEMENTS

I am grateful to Dr Gwyn Thomas of the Imperial College of Science and Technology, University of London, for sending me a translation of part of the German Army document² found amongst Geology Department papers at the College.

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You Had Better Belize It

MAJOR T J W ROBERTSON RE, B Sc

The Author was commissioned from RMAS in 1965 and after graduating from Shrivenham in 1969 served as a Troop Commander in 9 Independent Parachute Squadron doing two tours in Northern Ireland and one in Kenya. He has served as Adjutant of 35 Engineer Regiment, Company Instructor at RMAS, QC 57 Trg Sqn and OC 9 Parachute Squadron. He is a graduate of the Royal Naval Staff College and is currently serving on the staff of the Berlin Field Force.



Photo 1. The Author

INTRODUCTION

The two-year cycle for a UK based field squadron can hold an enormous variety of interesting and challenging tasks, exercises and deployments. I was particularly lucky in my first year to see troop deployments to Canada and The Gambia, a squadron exercise in Denmark, a full scale regimental FTX (Field Tactical Exercise), a deployment to Germany, initially on a camp construction task and latterly as part of the Regiment in a field force FTX and finally involvement in a UKMF FTX.

Next on the programme was Belize '79. What was this to be? A vision of DR and PRs (Detailed and Preliminary Recces), of cascade diagrams, of critical paths and project deadlines passed before me. However despite speculation and rumour no "project" emerged. This was to be "general support engineering"-six months of trade orientated sappering in support of British Forces Belize. What a rewarding and interesting six months it proved to be.

This article attempts to describe those six months, the challenges which faced us, the opportunities, the variety of work and recreation and the problems of six months hard work in a hostile climate 4,000 miles from home.

THE VARIETY OF WORK

A tour in Belize is General Support Engineering in its widest sense; it embraces almost everything from fixing a door hinge to building the Hilton. The staff and other arms in Belize soon saw us as "Mister Fixits". Though gratifying, this attitude is a simple recipe for over commitment and one of Squadron headquarters major tasks

You Had Better Belize It Major TJ W Robertson RE B Sc was to sort out the worthwhile, the challenging and the necessary tasks from the stream of requests. The tasks we undertook fell into one of four major categories; these were tasks directly concerned with the operational plan, construction tasks on behalf of the DOE/PSA, construction tasks in non DOE/PSA sponsored locations and routine support tasks such as boat handling and water supply.

On top of this we got through a certain amount of training. This included jungle warfare training, adventure training, range days, demolition training and training in helicopter operations.

THE OPERATIONAL PLAN

The Force operational plan is reasonably straightforward and is devised to counter a number of well defined threats. With the limited resources available it was not difficult to fit a simple but effective engineer plan around the Force concept of operations. With our arrival the engineer force level in Belize had risen from troop to squadron size and so some adjustment to the previous plan was necessary although one troop was to be held in reserve.

The operational engineer requirement consisted mainly of denial tasks both of routes and installations. To finalize a workable plan acceptable to both battlegroups and to Force headquarters required considerable recce, consultation and rationalization of resources. This proved_a useful exercise for troop commanders and recce sergeants who worked in consultation with their own battlegroup commanders.

Once recce'd and rehearsed the operational side of life consumed little of our time and energy although exercises occasionally highlighted a need for minor amendments.

SUPPORT TO THE DOE

One of the main reasons that Sappers are deployed to Belize in squadron strength is to supply a workforce to assist the DOE in their building programme. Local labour is in short supply and local contractors are unreliable and their work is of widely varying standards. The answer is to provide a sapper squadron to act as subcontractor to the DOE. When Belize sprang into focus on the operational map in 1976 the call for large builds to house reinforcements was initially met by 32 Field Squadron in the prodigious *Operation Silicate* which created Rideau Camp. *Operation Kris*, which followed, further expanded and sophisticated the accommodation, especially in Battlegroup South.

By the time we arrived in January 1979 the majority of the *Op Kris* tasks were complete. However there remained a sizeable DOE action list. In the north local contractors had been found who were capable of fulfilling DOE contracts, so it was in the South that we found most of our work in support of the DOE.

Battlegroup South which operates in the Toledo District consists of two infantry companies, a gunner troop, a blowpipe detachment, two sapper troops, elements of a support company and the infantry battalion headquarters which becomes the battlegroup headquarters. The second sapper troop is deployed to the South because that is where the majority of the peacetime work is to be found.

The Toledo district is some 140 miles by road from Belize City and communications with it are tenuous. There is only one road link which takes over six hours and is prone to closure in the wet season; the local airline is of limited capacity flying only one Islander twice a day during weekdays. British Forces Belize rely on RAF Pumas for moving troops and small stores and on two ramped powered lighters for moving rations, NAAFI stores and construction materials.

Local contractors are few and unreliable and the only construction materials available in the South are the spasmodic products of two sawmills and the hardcore and aggregate from Lesters Quarry which is run by the Squadron in conjunction with the Public Works Department. Sand is also available from a local sand pit. Thus one of the Squadrons major tasks in support of the DOE was the movement of a considerable volume of DOE stores and resources to be used for the projects undertaken either by us, or by contract, in the Battlegroup South area.

Battlegroup South is housed in two main camps at Rideau and Salamanca with a



Photo 2. The Primary Crusher at Lesters Quarry. All the fill and aggregate for Battlegroup South is produced from this crusher.

small detachment of support company in a non DOE sponsored camp at Cattlelanding. All work in Rideau and Salamanca camps is done to DOE specification and the design authority is PSA Croydon. Thus all plans and specifications emanate from Croydon and any alterations or assumptions are subject to approval by PSA Croydon. The work involved was very much trade orientated and alforded very good experience for the Squadron tradesmen. Bricklayers, concretors and carpenters were in most demand but there were also opportunities for electricians, plumbers and painters.

The major tasks undertaken at Rideau were the construction of a central servicing station complete with inspection pit, a washdown area with petrol interceptor, the construction of a blockwork armoury with an in-situ cast concrete roof, about 200m of camp road with culverts and monsoon ditches and the preparation of a vehicle park and DOE stores area.

At Salamanca the majority of the work was in support of the DOE. The major tasks were the completion of an ablution block complete with showers, wash hand basins, flush lavatories and its own sewage disposal unit, the construction of a packed POL store, the refurbishing of the kitchen, the completion of Nissen dining halls for Officers/SNCOs and other ranks, the construction of concrete paths and steps throughout the camp and the improvement of camp roads and the drainage system. In addition to construction tasks an electrician was permanently on loan to the DOE to assist in supervising and maintaining the power generation and supply throughout the camp.

RE TASKS

The DOE are responsible for all the works services within the main camps in Belize. However there exist outside the main camps a number of locations in which members of the force live and work, such as isolated rebroadcast stations, observation posts and temporary camps. These locations are maintained and improved by the Sappers using resources acquired through the RE vote. The RE vote as initially

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authorized was insufficient to give great scope to our activities but we soon discovered that the vote could easily be supplemented, when additional undertakings were justified, through headquarters British Forces Belize. The main resources acquired through this vote were timber, corrugated iron, concreting materials and small domestic fittings.

The major advantage of the RE tasks was that design, resources procurement and the actual work were all completely under the Squadron's control. The designs were simple and based on resources we knew to be available; thanks to a hard worked resources cell there were seldom denys in procurement; and modifications, improvements or alterations could be made without reference to outside authority. This gave the troop and even section commanders the opportunity to test their ingenuity with locally available materials and, with advice from our resident Clerk of Works, to see a task through from design to completion. In all, over fifty RE tasks were undertaken during the tour ranging from the construction of a five-roomed bungalow for a rebroadcast station on Mountain Pine Ridge to the installation of a grease trap at the Cadenas OP perched on a mountain top near the border.

The largest single RE task was the provision of accommodation for the signals detachment at the Baldy Beacon rebroadcast station. This installation which rebroadcasts the Force command net and the air management net and monitored and relayed various other nets was situated high in the Bald Hills on the eastern end of Mountain Pine Ridge some seven miles from the nearest habitation and three hours by appalling road from Airport Camp, the nearest source of materials. The accommodation to be provided, which had initially been designed by a previous Clerk of Works, consisted of a blockwork bungalow with a radio room, sleeping accommodation, a kitchen and ablution facilities. Certain modifications were mode during construction to suit the requirements of the signals detachment. The construction team lived in their own tented camp some seven miles from the site where they could make use of the cookhouse facilities of Cooma Cairn Camp.

Another challenging little task was to provide accommodation for a smaller two-man rebroadcast station which served the Battlegroup South command net. The only access to the station, perched on a hilltop in the middle of nowhere, was by helicopter and the landing site was such that no helicopter could close down; all off-loading was therefore carried out in the deafening roar of engines. The concrete



Photo 3. A POL cage constructed at the jungle camp at Salamanca.

You Had Better Belize It (3)

for the base of the timber and corrugated iron hut that was built was batched at Salamanca and delivered to site by underslung skip. The hut was then pre-assembled, dismantled for delivery to site and then erected and fitted out in a 48-hour period during which the team camped out with the signallers in what was an already cramped and exposed temporary shelter.

Other RE tasks included the provision of a launching ramp with car park and mooring facilities with access to the Belize river near Airport Camp; the provision of a kitchen and showers at Cattelanding; the construction of an explosive store compound at Salamanca; the complete refurbishing of the 50m range at Rideau and the construction of a volleyball court at Rideau. OTHER ACTIVITIES

No description of a sapper tour in Belize would be complete without a mention of the many opportunities for non-sapper activities. It had been clear to me from the outset that although a great deal of sapper work remained to be done the absolutely vital construction tasks were complete and therefore we could afford to take advantage of the opportunities for variety.

Belize is one of very few theatres in which the British Army is actively engaged in jungle warfare training. Both battlegroups ran their own jungle warfare schools and they were more than willing to take sapper students. We took full advantage of this opportunity to retain some jungle skills within the Corps and indeed sappers being what they are they did extremely well, invariably coming out near the top on the courses. Towards the end of the tour we were able to run our own short jungle survival courses.

Belize also offers unique opportunities for adventure training. The Force runs an adventure training centre on St Georges Caye one of the offshore islands and we took full advantage of this. The centre run one-week courses in sailing, canoeing or sub aqua diving and the Squadron was allocated two or three vacancies a week. Also during the tour the Squadron Sergeant Major led a Squadron expedition to climb



Photo 4. A Blockwork building under construction on Mountain Pine Ridge. To supply materials to this site was an eight-hour round trip.

You Had Better Belize It (4)



Photo 5. Accommodation constructed for a rebroadcast site high in the Maya Mountains with access only by helicopter.

Mount Popocatepetl in Mexico. The expedition successfully reached the summit but due to frostbite and altitude sickness were forced to abandon an attempt on a sister peak.

During the six months in Belize each man was allowed a weeks leave for which he received a travel allowance of up to the cost of a return trip by road to the furthest point in Belize. El Salvador was unfortunately out of bounds but many got away to Mexico or the United States including thirty-two who went to Fort Bragg in South Carolina to earn their US parachute wings. The Force Commander looked kindly on any measures that might improve the lot of his soldiers and thus several members of the Squadron were able to take advantage of the opportunity to "indulge" their wives out to Belize by courtesy of the RAF. This worked well and all those who applied were successful in getting their wives both there and back. CONCLUSION

This article began with a promise to describe the problems we faced. That scant reference is made to problems does not mean that they did not exist; delivering a forty foot cylindrical sewage plant over 140 miles of appalling road and emplacing it by helicopter in the heart of the jungle is not without hazard; delivering concrete to a remote jungle hilltop is fun; keeping an old vehicle fleet serviceable with constant use over attrocious roads kept the workshops happy; acquiring resources in a slowly developing country where manyana often means next week instead of tomorrow was often a herculean task; but they were very much our own in-house problems and overcoming them was our greatest source of satisfaction.

Six months in Belize is a unique experience for a squadron. The Squadron Commander is very much his own boss with direct access to the Brigadier; there is an enormous variety of satisfying work to be done which keeps the sappers fully employed and happy; there are opportunities for unusual adventure training and a wide variety of other arms training; and one benefits from the shared experience of living alongside other arms and earning their gratitude for the contribution that a sapper unit can make.

You Had Better Belize It (5)

Commemoration of the Anglo-Zulu War of 1879

LIEUT COLONEL A B SHEPHERD BSc, RE (Retd)

The Author represented the Corps of Royal Engineers at the Centenary Ceremonies Commemorating the Anglo-Zulu War of 1879. The official ceremonies were preceded by a guided battlefield tour. An account of the actions and a sketch map of Rorkes Drift will be found in Corps History Volume II pps 24–43.

Battlefield Tour-24 May 1979

As I sat on the rocky Mabuso Hill around which the Zulu Regiments of some 22,000 men had surged as they ran on 21 January, 1879, to attack part of Lord Chelmsford's column in bivouac around the brooding lion shaped hill of Isandiwana, history came to life through the commentary of Mr George Chadwick, the organizer of the commemoration ceremonies in Natal marking the centenary of the Anglo-Zulu War.

This was the start point of the tour of the battlefields of Isandlwana and Rorkes Drift, as a prelude to the official ceremonies to be held successively at Isandlwana, Rorkes Drift and Ulundi on the two following days at which I had the honour of representing our Corps.

There is nothing quite so effective as such a tour under the guidance of our expert historian to bring understanding of the difficulties, the effects of decisions good and bad, and the heroism of the combatants on both sides, and few would guide us better than George Chadwick, who had grown up in the area and had even spoken to Zulus who had fought at Isandlwana.

I am giving no account here of the actual battles which are well documented for those interested, but simply a short description of some aspects of the commemoration ceremonies. Rorkes Drift is perhaps the battle most well known to Sappers, as a Sapper Officer, Lieutenant J R M Chard, was in command of the composite force of 139 all ranks, including twenty-five sick which took part in the historic defence of the drift. His was one of the eleven Victorian Crosses earned at that battle, another seven being awarded to Welshmen of "B" Company of the 2/24 Regiment who formed the main body of the defenders. It was of particular interest to me that Lieutenant Chard's unit was 5th Field Company, as I had commanded 5 Field Squadron in Rhine Army in 1951.

While at Rorkes Drift on the tour day I witnessed a brief ceremony at which representatives of the South African Military History Society and South African Sappers Association laid a wreath against the simple stone monument marking the graves of those who fell in that action. I was also able to confirm that the Corps' presentations of a photograph of a ceremony held at Colonel Chard's grave at Hatch Beauchamp on 21 January last year and a fine piece of Corps china plate, were suitably installed in a small museum in the restored farm building which, acting as a hospital, was a focal point of the battle. They were mounted in a large glass display cabinet beside a full size wax figure of Lord Chelmsford, and a similar model of Lieutenant Chard in the uniform of the period is to be added later. *Ceremonies at Isandlwana and Rorkes Drift*—25 May 1979

It should be mentioned that these ceremonies were not held to celebrate victories of either side, but to commemorate a historical event "in a spirit of conciliation and dedication to a common future, while bringing honour to the brave men of both sides". The planning for the commemoration was initiated in 1973, and it was organized by the KwaZulu Government and the Natal Provincial Administration.

The first ceremony was in the morning at Isandlwana in the heart of the British position which had been over-run. Despite the thousands gathered, the black mountain somehow managed to grasp the imagination with its sombre spell enhanced by the many white painted cairns of rocks around us marking the graves of slain buried in groups where they fell. The annihilated British force lost 858 British and Colonials and 471 Native Levies, while Zulu casualties were about 3000.

The ceremony opened with a parade of banners of ex-Service and other organizations, traditional dancing by the Zulu Regiment and Zulu choral items. Then followed a short religious service, unveiling of a memorial plaque by the Honourable Dr P G Koornhof, who was accompanied on the dais by His Majesty, the King of the Zulus and the Chief Minister of the Zulus, Chief Gatsha Buthelezi. The ceremony was concluded with Retreat, two minutes silence, Reveille and the laying of many wreaths.

En route to Rorkes Drift the official party and guests enjoyed a quite lavish marquee based luncheon, a contrast to the stark conditions which the British forces must have experienced in the bare and rugged terrain which surrounded us.

The Rorkes Drift ceremony was more intimate than at Isandlwana, marshalled in a close setting in the middle of the defensive position. The area had been much restored to show the original layout, with wagons in position, mealie bag and biscuit box walls, and a stone walled kraal. The crowd was smaller and the proceedings shorter being limited to a short religious service, more fine singing by the Zulu Choir, plaque unveiling and wreath laying. Afterwards many of those present filed through the small museum.

Ceremony at Ulundi-26 May 1979

Ulundi, Capital of the Zulu Kingdom, and now the seat of the KwaZulu Government, is some 100 miles from the Isandlwana area. It was the scene of the final battle of the Zulu War on 4 July 1879, at which Lord Chelmsford fought in open square. 5th Field Company and Lieutenant Chard VC were within the square, and it is of interest that the Royal Scots Fusiliers (21st Regiment) carried their colours uncased, this being the last time uncased colours were carried into action.

The drive to Ulundi was through wild and beautiful Zululand mountain scenery, and after an early rise I arrived in good time for the start of the proceedings, which were well staged by the Zulus on the large arena of the historic Zulu parade ground. The programme began with spectacular introductory items including a massed PT display and Flag Raising ceremony by the Inkatha Youth Brigade, a parade of banners in which in addition to ex-Service and other organizations about every High School in Natal seemed to be represented, and an excellent performance by six High School brass bands in mass. We were further entertained by the awe inspiring foot stamping dancing by Zulu Regiments in traditional distinctive warrior regalia and Zulu choir singing of exceptionally high standard. Then as on the previous ceremonies, there was a short religious service followed by a speech of three to four hours by Chief Gatsha Buthelezi (in English with Zulu translation), unveiling of a plaque by Prince Goodwill, King of the Zulus, and laying of wreaths. The flag lowering ceremony by the Inkatha Youth Brigade concluded a memorable three days.

The smooth running and evident success of the whole extensive programme covering the three battles was a reflection of the far sighted planning of the organizers. There was indeed a deep feeling that the descendants of both sides who fought in the Zulu War had truly come together in their remembrance and honouring of all those who fell in that war one hundred years ago.

On a personal note it was a particular pleasure to meet again Colonel Vaughan Williams who was in command of 108 Field Engineer Regiment of 53rd Welsh Division TA, when I served as Training Major (1955–57) and to hear news of many old friends of those days, and also to meet others of the UK contingent visiting South Africa for the Centenary Commemoration consisting mainly of a large and distinguished party of the Association of the Royal Regiment of Wales, formerly the 24th Regiment of Foot.

Operation Corkscrew

COLONEL F H FOSTER DSO, OBE, TD, DL, RIBA



John Foster is now a retired architect, He was commissioned in the TA in 1924 and by 1939 was commanding 210 (Sussex) Fd Coy. His unit was with the BEF and demolished twenty major bridges prior to Dunkirk. Appointed CRE 4 Corps Troops in 1941. From 1942 to 1945 was CRE 1st (British) Infantry Division being the only TA officer to hold the appointment (UK, North Africa, Pantelleria, Italy and Palestine). In 1947 he reformed the 44 Div RE (TA), later becoming their Honorary Colonel. Was Commandant Sussex ACF 1960–69.

TUNIS had fallen on 13 May 1943 and the part of 1st (British) Infantry Division (1 Div) in the North African campaign was over. It was an incredible sight to watch the German Army driving their own transport into captivity. Many thousands of vehicles crammed to overflowing with dejected looking troops. Soon 1 Div was occupying houses on the shores of the Mediterranean enjoying a rest and the joys of swimming after weeks of road dust and water shortages.

The GOC came into, "A" Mess with the news that he and the G1 were flying that afternoon to AFHQ at Algiers to plan the next phase and that we and the brigade commanders were to follow.

We took off the following day in a Dakota transport plane, (CRA, the three brigade commanders, A/Q, CRE and CR Sigs), calling at Bizerta to pick up a wounded officer. Just as we taxied off again, a jeep ran across our path and one wheel of our aircraft was jammed and it was impossible to draw up the landing gear. After we had been airborne for a few minutes our pilot, an American Major, informed us that he would only be able to make a belly-landing and that he would fly a hundred yards or so out over the sea parallel to the coastline. We were all dished out with "Mae Wesst" and sat around looking rather wryly at one another, particularly after one bright brigadier came up with the remark that it looked as if there would shortly be a good chance of promotion for those back at Division! However, after what seemed two very long hours, our pilot made a crash landing at Tingley Airfield and we all scrambled very shakily from the plane which was almost a write-off. Within an hour we were all airborne again in another Dakota and in due ourse arrived at Algiers.

We reported to our GOC who briefed us that the Division was to take part in a combined operation Corkscrew to capture the island of Pantelleria, and that we would be relieved by US Forces after seven days.

Most people know very little about this island which is in the Mediterranean about sixty-five miles south of Sicily, oval in shape about $8\frac{1}{2} \times 54$ miles, volcanic in origin and the coastine is mostly rugged cliffs with scarcely half a mile of beach. The small port and only town is at the north west tip of the island and is known as Pantelleria.

The island was extensively cultivated in the non-mountainous areas which were divided by scone walls and terraces making cross country movement for vehicles difficult. The airfield which was on the only flat area had many underground hangars.

Operation Corkscrew Colonel F H Foster DSO OBE TD DL

and underground galleries in which the population could take shelter. The coastal road around the perimeter and the spur road to the airfield were suitable for MT. The entire island except the airfield and a few buildings in the town were dependent for drinking water on rain water cisterns fed from the flat roofs of houses.

The role of 1 Div was to seize and hold the island of Pantelleria so as to establish an air-base for future operations. The island was later described in the press as "the first outpost of Hitler's European Fortress". The Division was to provide the only troops involved, the Navy was to be responsible for the landings and the US Airforce was to soften up the island by very heavy bombing prior to the invasion. From 29 May to 10 June a greater tonnage of bombs fell on the island than on all targets in the North African theatre during the month of May. D Day was to be 11 June and on that

day the final knock-out blow by bombing and a naval bombardment was to be given. After a few days preliminary planning at Algiers we flew to Sousse where we set up our Combined Operations Headquarters at the Palais de Justice.

3 Inf Bde was to form the assault brigade group with a battery of 2 Fd Regt, a troop of A Tk guns, 248 Fd Coy RE and A Sqn 2 Lothians (eighteen Sherman tanks), charged with the task of capturing the port and establishing a bridgehead. 2 Inf Bde's role was to be the support brigade group with 238 Fd Coy RE and elements of a Docks Operating Coy and a detachment of 954 IWT (Port) Coy. The brigade was to pass through the bridgehead and, with the assault group, capture the airfield. The first Follow-Up convoy was to land 1 Guards Brigade, 23 Fd Coy RE and elements of 6 Fd Pk Coy. All units were ordered to keep transport to a minimum. The actual numbers and types of vehicles were laid down by Division. For example 248 Fd Coy's allotment was one 30cwt lorry, two D4 and one D7 buildozers, 3 motor cycles (m/cs) whilst 238 had a similar lorry, a compressor truck, a Coles crane and 3 m/cs and HQRE, had one jeep and a solitary m/c.

The assault convoy embarked at Sfax under cover of darkness on 10 June. In the HQ ship was Rear Admiral "Wee" McGrigor (later First Sea Lord), Major General Walter Clutterbuck (GOC 1 Div) and Lieut General Carl Spaatz (in command of US air operations). HQRE was there as well and the CRE recalls playing "Darts with Spaatz" during the evening!

As dawn broke the allied air and sea bombardment took place. It was described by the media as the greatest bombardment so far reported during the war. Leaflets were dropped on the island demanding surrender which the Italians were to signify by displaying a large "Croce bianca" on the airfield.

The island surrendered at 11.45hrs, just after the first wave of the assault hit the beaches, and the landing was unopposed. Within minutes the CRE was summoned to the bridge of the HQ ship where the Admiral, ship's Captain and the GOC were in conference. He was ordered by the latter to land bulldozers as first priority to start clearing the enormous quantities of masonry debris. Just at that moment a Stuka dive bomber appeared out of the sun and a stick of bombs could be seen, clearly destined for the HQ ship. Admiral, Captain, GOC and CRE rushed to a deck house to get under cover-literally falling on top of each other-not exactly a pretty sight! However, the bombs were a near miss.

The GOC and CRE landed in a small craft with the PMLO and the scene that they witnessed on landing at the harbour can best be described, in the accent of the PMLO who was a Yorkshireman, "What dev-a-sta-tion!" The whole port and little town were in complete ruin. Not one building was left standing and all roads were completely

There were three Italians "picked" infantry regiments on the island, some troops of the Fascist Militia and some hundreds of Germans, all of whom surrendered at once and were marshalled into the LSTs and shortly after conveyed to North Africa. This was the second big surrender the Division was to witness within a few weeks, The leading wave of the assault swept through the town and by 1300hrs had reached their first objective on the high ground. By this time the 2 Inf Bde had landed and

As soon as the buildozers were ashore they commenced their huge task of road clearance. Most of the side streets and the town square (the Piazza Cavour), had to be left for several days as priority had to be given to the perimeter roads and road to the airfield, not to mention the clearance of the harbour area and exits.

The first allied airman to land on the airfield was Flight Sergeant Love of London, who, on his return to base, reported that he had had great difficulty in landing because of the very large numbers of craters on the airfield and the wrecks of some ninety aircraft which were strewn about. He saw the great hangars hewn out of the solid rock capable of housing a very large number of aircraft. Their huge sliding doors had been jamed by bomb blast. Inside the hangars were galleries containing living

The infantry reported that in their advance they had found the island's defences quarters, offices and stores. completely unoccupied. No mines were encountered and apart from the areas surrounding the port very few wire obstacles were discovered. Later on when it was possible to consolidate reports it was found that the defences amounted to some 120 coastal defence guns together with many pill boxes of RC construction with domed roofs and six to eight machine gun (MG) embrasures to each. Defended localities were MG posts interconnected by slit trenches. Up to D + 4, Stukas bombed the

island several times a day with little result. Now to recount in more detail the sapper side of the operation; the "Intention"

paragraph of RE 1 Div Op Order No 1 read: "RE1 Div will open up and maintain routes and installations required by 1 Div in the assault of the island of Pantelleria." (Often a difficult paragraph to compose

concisely, this aim would seem to meet many situations!) 248 Fd Coy's task was to support 3 Inf Bde by clearing port and constructing exits of roads and tracks. By 14 June the main roads, from the breakwaters to and through

the town and as far as the airfield were clear. 238 Fd Coy's main job was the construction and maintenance of the bulk water storage and distribution centre adjacent to the harbour area. The strength of each field company for the assault was restricted to about 175 as most of their transport remained in North Africa and MT personnel were not required.

It had already been recounted that there was likely to be an acute shortage of water on the island. The troops in the assault convoy were ordered to land with water bottles filled and a two-gallon can per man was loaded into the LCTs. This was to be sufficient until D + 1 when canvas "S" tanks could be erected on the breakwater to be filled from a water ship to arrive with the first Follow-Up convoy. By 14 May 238 Fd Coy had laid a 4in Victaulic water main along the outer breakwater. The water then travelled via canvas hoses to thirty "S" tanks feeding No 4 pumping sets. During the next two days the Victaulic main was extended to serve four 19,200 gall sectional steel Braithwaite tanks, two in a workshop building area and two in a power house area, with a total of twenty-four hose nozzle points.

When the water ship arrived on D + 2 she grounded on an obstruction near the outer breakwater, and she discharged most of her fresh water into the sea in an endeavour to float off. However she berthed successfully on D + 3 and commenced filling the tanks on shore. When twenty of the canvas tanks and three of the steel tanks were almost full, a Stuka appeared and successfully bombed the water ship putting her engine room and pumps out of action.

After the disaster to the water ship (AFHQ confirmed that it was the only one available in the Mediterranean) it became increasingly necessary to investigate the island's resources. On the afternoon of D Day, the Italian engineers had been questioned regarding the existing supplies to the airfield and the principal buildings in the town. The CRE was led by the hand of the senior Italian engineer over huge piles of rubble in the Piazza Cavour area to the site of two deep wells. When the surface was cleared it was found the wells were operated by pumps driven by electric motors in a chamber fifty feet below. The current was supplied from a generating station which had been completely destroyed. However, a portable trailer-type AC

OPERATION CORKSCREW

generator was found and coupled up but was of insufficient capacity to work the pumps. A further well was then found, the portable generator was coupled to its pump and water was produced at 1,600 gall per hour to feed an intact concrete tank. Feed pipes were run to an 8-trigger filling point and a water cart filling point.

Regarding the transport of RE stores to the island, space was allotted for six shipping tons in each of six LCTs and stores were spread evenly over these craft so that work could proceed even if an LCT had been sunk; viz, six "batches" were made up of water supply components, 4in piping, hoses, Braithwaite tank sections, pumps, sandbags, picks and shovels, camouffage nets, Summerfield track, flexboards and explosives. G1098 equipment and tools were loaded in the 30cwt trucks specially selected for the operation. The dozers, compressor and crane were loaded in other LCTs. All loading was carried out by 6 Fd Pk Coy at Sousse. More bulky stores to the tune of 114 ton were loaded into the first Follow-Up convoy.

For six days the field companies toiled on the clearance of the docks and town and the back-filling of endless craters. Much of the work meant the demolition of very unsafe buildings and pick and shovel work. Officers and senior NCOs were constantly occupied making the necessary reconnaissances and preparing reports for transmission to AFHQ regarding the island's resources. These involved the defences, power stations, water supply, a concrete block works and its light railway and rolling stock, main roads and tracks. On D + 6, the CRE was able to have a "Cook's Tour" of the whole island by having an unobstructed drive round the perimeter cosstal road!

Early on D + 7, exactly on cue, the US forces landed to relieve the Division and many of us were back in Tunisia by nightfall. The only casualty on the island was a military policeman who was killed by a dive bomber. It is sad to record however that as the LST with 238 Fd Coy on board was just outside Sousse harbour, she struck a mine and seventeen men of the company were killed or drowned and several were wounded.

What during the planning stages, and in fact right up to H hour, appeared to have all the makings of a "sticky" operation, turned out to be otherwise, nevertheless the Division's mission was very successfully completed.

Food For Thought. . . .?

MAJOR J A JENNINGS-BRAMLY RE, MA, C Eng, MICE



The author joined the Corps at the age of twenty-six after working in Construction, E & M Research and Building and enjoying three years at Cambridge. Since commissioning he has been almost continually employed in technical appointments. He is now Senior Instructor Design at the RSME.

THE time has come for microcomputers to be issued to units for a wide variety of good reasons, some of which will be explained. However, random proliferation must be avoided and this article attempts to provide some goals and requirements. The views expressed are entirely personal and may well conflict with those of others more qualified to reason the case.

Food for Thought Major J A Jennings- Bramly RE The article explains how a microcomputer is used and what types of program are likely to be developed for unit use. It suggests that a support system within the unit and a reporting chain will be necessary if the equipments are to be used effectively. It describes the hardware and gives an example of a "conversation" between a computer and a user for the benefit of the totally uninitiated.

THE HARDWARE

A microcomputer normally consists of the following components which comfortably fit on a normal office desk:

A Keyboard & Processor

A Visual Display Unit (VDU)

One or two Cassette Tape Reader/Writer (R/W) Units

A Printer or Typewriter

The present total cost of the equipment is about £1000 and is falling very fast. To increase the "memory" a "floppy disc unit" would probably be worth providing for some units at a further cost of some £800. Such a system occupies little space and most of its components are reasonably robust, though not designed for portability. The power requirement is well within the capacity of most vehicle alternators, the power from which could be suitably converted.

Some major RE units already hold programmable desk top calculators, but the microcomputer is many times more powerful and of much wider potential use. The Royal Engineers are in an excellent position to lead the way in the introduction of such equipment throughout the Armed Forces.

The capabilities of the microcomputer, in terms of the amounts of information that can be handled, depend upon the size of the memory. Without discussing the problem in technical terms even the "small" microprocessors will be found very useful, and most of them can have their memory enlarged though the equipment will look no different. The provision of a floppy disc memory as already mentioned is a further possible enhancement.

USERS

Many of the more repetitive clerical and numerical activities so irksome to unit 2ICs, Chief Clerks, Orderly Corporals, Regimental Sports Officers. Mess Treasurers etc can be automated. Such automation requires programming and these individuals will seldom have any interest in such a task, despite the fact that many of them could write useful programs after a week's instruction. It seems probable that if microcomputers were issued to units next month few of them would earn their keep in the first year.

It would not be necessary for users to attend a course to use programs prepared by others. All those listed above, and many others, would have direct access to the microcomputer for their respective needs.

To provide control within a unit a nominated officer and a "computer technician" would organize and maintain the equipment and its associated library of programs which would be maintained on cassettes. The computer technician would be qualified as a result of about a month's course in addition to his artisan and combat engineer training. Design tradesmen would be the most likely candidates initially. The technician would not undertake repairs so the title may not be entirely appropriate. He would, however, introduce users to the equipment, provide user and programming advice and help the unit to obtain the best value possible from the equipment.

USES

A short list of possible uses follows:

(a) Combat Engineer Calculations:

Minefield quantities and offloading plans

Improvised bridging design

Bailey bridge design, temporary works layout, chalk loads etc

(b) Project Planning Calculation and Information Sorting:

Cascade Planning (to sort CAN numbers and compute critical path length) Resources, Ordering, Accounting, Costing

Earthworks Computations

- (c) Unit Movement Planning:
- Chalks and Manifests
- (d) Unit Clerical Records:

Returns NOK Records Duty Rosters Leave Records Staff Lists

Pt 1 Orders (if an adequate "word processor" program is available)

(c) Medical and Dental Records: Routine Inspections Inoculations etc

(f) MT Records and Planning Aids:

Unit POL and Mileage Accounts

- Spares Ordering and any necessary follow-up
- Plant and MT Servicing Schedules

(g) Mess, Club and other Accounts (as agreed by RAPC concerning security and auditability)

(h) Signals Information

Suitably flexible programs could probably be written for all the above subjects and could be so written as to allow for wide application within different units. The programs designed to remind the user of diary entries will, of course, only provide information when questioned, but such programs remain valuable in spite of this apparent drawback.

While most of the above programs could be written within units, and many will be, the introduction of microcomputers will fail unless a number of useful programs are issued at the same time as the hardware. Also, sufficient confidence must be placed in the computer to avoid the need for the duplication of manual records if any value is to be derived. This confidence requires that programs be acclaimed as labour saving, reliable, flexible and subservient.

Although courses may not be required for users to enable them to use the equipment, courses may be required to acquaint users with the advantages and disadvantages of its use. Chief Clerks, for instance, should learn to discuss programs constructively with programmers and thus remain "in charge". *EXAMPLES OF USE*

Many readers will, even now, be unaware how simple such a computer may be to handle, so an example of a dialogue between user and computer is given below. This hypothetical example concerns the account kept by the treasurer of the "RSME Paper Chasing Club". It is assumed that each week he enters information concerning payment or receipt vouchers (PV and RV), and that the equivalent of the double entry account ledger and lists of vouchers etc are kept on cassette. They may be printed out at will for visual checking. The computer "speaks" via written messages on a "television" screen and the user "speaks" via a typewriter keyboard. The user loads the two cassettes and waits, ...

Computer: Account Access Number? User: 527416

(Without entry of the correct code number no information can be gained from the data tape or added to it)

Computer: Today's Date? User: 16 12 79 Computer: New entry? (Yes = Y, No = N) User: Y

Computer:	Payment (P)?	
	Transfer (1)?	
	Receipt (R)?	
User:	P	(P. minus
Computer:	PV number is 41	Previous
	Payment to whom?	recorded PV was
User:	Jones & Sons Ltd	No 40)
Computer:	From Bank (B) or Cash (C)?	
User:	В	
Computer:	How much, £?	
User:	17.60	
Computer:	Cheque No?	
User:	217632	
Computer:	From:	(The names of the
- 1	(1) General Purpose Fund (GPF)	columns are not
	(2) Paper Purchase Fund	known to the
	(3) Subscriptions	program because
	(4) Bar	each user will
	(5) Weather insurance	have different
User	4	column names.
0.0011		However, the
		club data tape will

have these names recorded. Note also that VAT entries would be

simplified.) Computer: Cash in hand now £97.20 (Summarizing Cash at bank now £-6.17 IN THE RED updated Bar account balance now £10.21 information for PV No 41: 16.12.79: Jones & Son Ltd: 17.60 checking by user.) Payment out of Bar and Bank: cheque no. 217632 Is entry correct? (Y or N) User: Y (Reverts back to Computer: New Entry? (Y or N) 3rd question.) User: N Computer: Printouts required? (1) All ledger entries since last audit double entry (2) Last 10 ledger entries with current totals (3) GPF analysis (4) VAT analysis (5) PV list (6) RV list (7) Cheque counterfoil list (8) Sundry Creditors (9) Sundry Debtors

User: 2, 5

The computer prints the equivalent of the last 10 lines of a normal double entry ledger brought up to date and showing net balances.

A list of all 41 PVs follows as requested. Both printouts are retained by the Club Treasurer until superceded by new information.

And he will probably decide to take avoiding action to pacify the Bank Manager.

Note that the computer does the "thinking" by asking the right questions and by doing the "sums".

A more complicated ledger entry involving the GPF Analysis Book, VAT

Analysis Book etc would have better demonstrated the advantages of computer accounting, but at the expense of some complexity in print. If the example is perhaps a little large to be handled by today's hardware it is unlikely to be too large by the time this article goes to print!

Prior to audit the club treasurer will submit printouts of all the information recorded on tape together with receipts and bank statements in the normal way. A refinement would be for the data tape to be processed by an "auditors program" which could, amongst other things, check that sums of cash handled were within the insurance cover for the account.

The "program cassette" will be available for all account holders within the unit but the "data cassette" will be kept by the individual account holder with his printouts and supporting paperwork.

The security or inviolability of programs on cassette needs to be checked for certain applications. Alternatively certain otherwise avoidable procedures may become necessary to ensure that program cassettes have not been tampered with for criminal or any other reasons. The security of information is no real problem because when a microcomputer is switched off the memory stores forget all previously held information.

COMPATIBILITY

There are many manufacturers of microcomputers and the author cannot make recommendations concerning the choice. However, even though most such computers use a programming language called *BASIC* there are many variations to this language which prevent full compatibility. Once the first batch of programs have been written to suit a particular machine the manufacturer of that machine will have captured a market for subsequent sales throughout the services. Conversely if the manufacturer ceases production of machines compatible with existing programs then all such programs will have to be revised to suit the new variety of *BASIC*.

This problem could be overcome by insisting that all programs use standard *BASIC* thereby removing the advantages to be gained from the variety of language enhancements available.

It would be possible for all unit microcomputers to be connected via the telephone network to a central control. While this may have some advantages as a means of passing information, the users would probably be happier to feel that "big brother" could not even take a benevolent interest in the day-to-day work of his unit via its computer. A totally independent facility is recommended for "in-house" use.

Compatibility between all user cassette tapes and all issued microcomputers will prevent embarrassment during breakdowns. All data being held on cassette or floppy disc, the user could then probably borrow another computer within his Regiment in emergency.

CONCLUSIONS

If a current cost of $\pounds 1000$ is assumed, it seems to the author that an initial issue of one microcomputer per major unit is amply justified. It is anticipated that if the issue of equipment, the writing of a suite of programs and the training advocated above can be co-ordinated, then units will quickly find that one per minor unit is too few!

This leads to the following conclusions:

(a) A study is required of which equipment system to adopt

(b) A number of programs must be developed

(c) Computer technicians should be selected and trained

(d) User trials should be initiated in one UK and one BAOR major unit (and key personalities should attend "User Courses"). It is suggested that the User Trials should start within two years.

Why the rush?

(a) The equipment now exists at a suitable stage of development, though a little soldier proofing may be required

(b) The Forces cannot afford to miss the possible savings in time and improvements to efficiency at such a low cost.

CREDITS AND CREDENTIALS

The author is not "ADP Trained" and does not represent a policy-making body but is a frequent user of calculators and is becoming acquainted with small computers. Much useful advice from other members of the Brompton Wings at the RSME is acknowledged.

Technical Information Centre, Royal Engineers. TICRE

LIEUT COLONEL J G F CLARKE AMBIM



The Author was a member of the pre-war TA. He joined the Royal Bombay Sappers and Miners early in 1941 and served in field companies in the Middle East and India until after partition in 1947. After return to the UK, a long spell in 1 Trg Regt was followed by Staff College Camberley, RMC of S and US Command and General Staff College. He commanded three independent squadrons and has served on G, A & Q Branches of the Staff with international assignments in ALFSEE (Turkey), SEATO (Bangkok) and AFCENT (Holland). After retirement in 1970, was a member of the Q Qtg Staff at HQ BAOR until Apr 1979.

"Knowledge is of two kinds. We know a subject ourselves or we know where we can find information upon it"

Samuel Johnson, 1709-1784.

Is submitting an article for publication in this illustrious journal on the occasion of an addition to the Corps estate, a scientific introduction might have been appropriate. Indeed, consideration was given to offering an original mathematical estrawaganza on the relationship between information and attainment in a given situation. However, little purpose would have been served by such an exercise and, in any event, this article is primarily concerned with information—attainment is another story.

As information (intelligence in some circles) is one of the cardinal requirements for successful military operations, it is surprising that the Corps, with its continuous world-wide activities, has thus far lacked a central technical information agency. Could it have been resistance by the anti-centralized-anything lobby?? Of course, in addition to its book function, the Corps Library has been the repository for literature of every type and description including engineer project reports, but with limitations of staff and equipment, it could do no more than hold technical documents received without detailed examination, analysis or publicity. In any event, the raison d'être for the Corps Archives is historical rather than as a bureau for the dissemination of technical working data. Thanks to some enlightened members of the Corps and their sustained campaign over the years, TICRE was born in April 1978 and after a few teething troubles, is now growing up in Barton Stacey as part of the Military Works Force under the wing of Engineer Support Group.

The role of TICRE is to collect, collate, catalogue, store, publicise and distribute technical information of value to RE units and individuals world wide. For this, a small staff has been established—an OIC (RO), a librarian, a clerical officer and a typist.

Technical Information Centre RE TICRE Lieut Colonel J G F Clarke
Copies of post-war engineer project reports (some 3,000) are now held by TICRE and a retrieval system (Anson Optical Coincidence) to permit rapid research and response to enquiries is in use. Depending on the popularity and growth of the service, consideration may have to be given to replacing this relatively unsophisticated system by mini-computer. Liaison is maintained with other "centres of knowledge" within the Army, eg Royal Military College of Science, and with civilian institutions and professional bodies so that information not held by TICRE can be quickly obtained on behalf of clients. In addition, a comprehensive and up to date technical library is being built up and although, starting from scratch, this will take some time to develop fully, a useful nucleus of text books and periodicals (regrettably not *Playboy*) is already in existence. Contents of this library and additions thereto are publicised from time to time.

While TICRE's primary aim is to provide units and members of the Corps with technical information, this facility is also extended to the rest of the Army and to the other Services and entitled MOD Civilians. With an eye to Public Relations (and reciprocal treatment!) enquiries from civilian organizations are accepted as time permits and within the constraints of security.

The mechanics of requesting information from TICRE are simple—say what is wanted and by when. If some guidance can be given to assist research, ie dates, units, authors, so much the better. Any form of communication is acceptable letter, signal, telephone. Visits are welcome although in present accommodation, facilities for individual research and study on the premises are very limited.

The success of this new service depends mainly on two things. Firstly, it should be remembered that TICRE is a retailer and processor of information, not a producer. It has no crystal ball of its own and can only pass on information which has been obtained from other sources. It is important, therefore, that units and individuals who produce engineer reports, studies and indeed anything of general Sapper interest, should ensure that a copy is passed to or is at least registered with TICRE. Only with a continuous inflow of good information will the service survive. Secondly, TICRE cannot help if it is not asked to help so please make use of it. Finally to the still unconverted—"blessed are those who have not seen and yet have believed."



"It is a capital mistake to theorize before one has data". Sir Arthur Conan Doyle 1859–1930

The Development and Training of the West African Engineers and Works Services in West Africa to 1949

BRIGADIER H W BALDWIN OBE, C Eng, FICE, FI Struct E, FIHE, FBIM



The author spent six years in West Africa. In January 1941 he was posted to 5 (WA) Fd Coy and in 1942 became DCRE Takoradi. He commanded a Works Section through the BLA campaign and returned to the Gold Coast as OCRE District in 1945. This was followed by tours as SORE II at WA Comd HQ and OC 35 Fd Sqn WAE. After appointments as DADFW in the War Office and Chief Instructor of a Trg Regt he held three CRE Works appointments including building the Dharan and Malacca cantonments.

the War Office he was the last Chief Engineer Middle East. On return to the UK he was seconded to the Ministry of Transport where he continues to serve after retirement in 1971.

INTRODUCTION

THE History of the Corps of Royal Engineers Volume IX, in its chapter on West Africa, deals mainly with the aspects of Transportation, Movement Control and Survey. It makes little reference to the development, training and operations of the West African Engineers and the organization of Works Services in West Africa during the period 1939–1948. I feel, therefore, it worthwhile to collate the information I have available of this period and of the period between the Wars. It is hoped that this brief history will stimulate those who served with the West African Engineers or in the Works organization of West Africa to fill gaps in the history "while memory serves".

I had the good fortune to serve in West Africa in Works, on the Chief Engineer's staff and as the OC of 35 Field Squadron WAE. This Article is based on papers produced and notes made at that time. Particular tribute should be made to the late Colonel H W Blakeney MC who, as Chief Engineer West Africa Command in 1945–1947, initiated the collection of much of my information and to Major P M Bussy WAE who, in 1945, prepared notes on the origin of the West African Engineers.

Prior to 1940 each of the West African Colonies recruited and trained its own military units, and each Colony had its own legislation for the control of such Units. It is difficult to present an accurate picture of the early growth of the West African Engineers as many of the Colonial records relating to the subject during the period to 1937 were, by 1946, either inaccessible or had ceased to exist.

The first paragraphs of this Article are produced from information given by Officers who participated in the organization of Engineer Units within the various Colonies, from the Gold Coast Record Office and from records in General Headquarters, West African Command.

Tribute is due to those Colonists of West Africa who, in their own time and by their own initiative, recruited and trained personnel to assume the role of Military Engineers in a time of Emergency. Some of the local Engineer units were raised ten

The Development and Training of the West African Engineers and Work Service in West Africa to 1949 Brigadier HW Baldwin OBE years before the commencement of hostilities, which proved the keeness and foresight of the mining officials and others who were Royal Engineers during the 1914–1918 war, and who accompanied their units in the 1939–1945 war as far as Abyssinia and Burma.

THE DEVELOPMENT OF THE WEST AFRICAN ENGINEERS

After the 1914–1918 war, a considerable number of ex RE Officers went out to the West Coast of Africa either to resume their peace time jobs or to take up appointments with the Mines or under the Colonial Governments. It was due to these and to their *esprit de corps* that Volunteer Engineer Units within the Colonies were gradually formed during the period between the Wars.

Nigeria being the largest of the West African Colonies and having the largest proportion of Europeans, was able to take the lead in augmenting the small number of regular European troops by the raising of a Reserve. In December 1928 the Nigerian Government passed the European Reserve Force Ordinance, 1928 (No 24 of 1948). This authorized the creation of a Reserve which would, in a time of Emergency, complete the establishment for European personnel in existing units of the Nigeria Regiment, and provide European personnel for new units that might be raised in the Nigeria Regiment.

In October 1929 the European Reserve Force Regulations 1929 (Regs No 19 of 1929) were made by the Governor in Council under Section 18 of the Ordinance and laid it down that "the Force shall consist of Infantry and Artillery and such special units as may hereafter from time to time be approved by the Governor" (Reg 3). The Regulations gave the mining officials and others interested in Military Engineering, an opportunity to commence the raising of Volunteer Engineer Units, personnel for which were almost entirely found from European and African personnel of the Mining Companies or Government Departments concerned.

The Geological Survey Department of Nigeria organized, in 1930, a Water Section for the purpose of acting as a water locating and supply unit for service with the armed forces in cases of an Emergency. This unit was probably the first engineer unit of the RWAFF to be raised on a volunteer basis since the 1914–1918 war: it was attached to 1 Bn Nigeria Regiment at Kaduna for administration.

In 1931 Major H H W Boyes MC¹ (RE 1914–1918) and Captain J M Foley MC² (RA and Gold Coast Light Bty 1914–1918), both mining engineers, obtained permission from the Nigerian Government to form an Engineer Cadre of the European Reserve Force at Bukuru, on the Banchi Plateau. They mustered volunteers from the surrounding mines and from the Colonial Departments, and built up a formation which was known as the Jos Engineer Cadre which Major Boyes commanded. The object of this formation was to provide Europeans, and some Africans, with a certain amount of military engineering training so as to be capable of undertaking a military role in a time of Emergency.

This Cadre existed for a number of years, though at times financial difficulties and constant movement of the Europeans to and from the United Kingdom interrupted the continuity of its training. This state of affairs was improved when the Cadre assumed a more official status by the passing of the *Local Forces Ordinance No 32* of 1938 which superseded the *European Reserve Force Ordinance No 24* of 1928 and amending legislation. Under the new Ordinance, the "European Reserve Force" became the "Supplementary Reserve, the Nigeria Regiment" (section 3b); the "Jos Engineer Cadre" remained a self-contained unit (sec 3(2)(c)) and an Engineer Company styled the "Engineer Company (Territorial)" was established (section 3(2)(d)) to consist of "persons who undertake compulsory training in time of peace or war" and "composed of Africans who enlist as soldiers" (sec 23).

The Engineer Company (Territorial) was formed at Bukuru in January 1939 under the command of Lieut Colonel Dent Young,³ the Commander of the Jos Engineer Cadre. He was primarily responsible for its recruitment and training over a period of six months before handing over command to Lieut Colonel H H W Boyes MC in June. From the formation of the Engineer Company to the outbreak of War, the Cadre and the Company were usually referred to jointly as the "Engineer Unit". European personnel were posted to the Engineer Company from the Engineer Cadre (Ord Sec 25). All forms of training had to be carried out with very limited material and it was not until mid-September 1939 that a Permanent Staff Instructor (Corporal McNally RE) arrived from the RE Depot at Chatham and full time could be devoted to its training.

On 1 September 1939 the Engineer Company was embodied "for service with the Nigeria Regiment". The Company comprised three field engineering sections and to these were added the Water Section from Kaduna under the command of Captain C M Tatham.⁴ The Officer Commanding the Company was Major A P A Robertson ED.⁵

Upon the outbreak of war the increased pressure of work in the mines and Colonial Departments necessitated a number of the European personnel returning to civilian duty, and their place was later taken by an Officer and some BNCOs from the Southern Rhodesian Regiment.

In October the Local Forces Amendment Ordinance 1939 (Sec 2 of No 26) changed the style of the "Jos Engineer Cadre" to the "Jos Engineer Corps". This nucleus engineer formation and the Engineer Company (Territorial) combined and were redesignated "1 (Nigeria) Field Company".

The outbreak of war accelerated the establishment of Engineer Units in West Africa. In each Colony every effort was made to raise and locally train engineer formations. Whilst Nigeria was putting its first Engineer Unit on a war footing the Gold Coast was mustering its first Field Company. Sierra Leone, with the help of 39 Fortress Company RE, raised and trained a Field Company that was later to be known as No 6 (WA) Field Company. Gambia, with its very small area and European population, assisted greatly with the supply of recruits and stores for training.

The first Gold Coast Field Company, designated 2 (Gold Coast) Field Company, was formed in September 1939 at Akwatia and was initially commanded by Captain F Butler. He was succeeded by Major J S Thain MC.⁶ The European personnel of this Company were found mainly from the Public Works Department and the Mines of the Gold Coast. As in the case of all West African Engineer Units, the African rank and file were also obtained from these sources in small numbers. The remainder consisted of carpenters and masons etc who had their own small businesses, and personnel who had been enlisted as potential Infantry but who were, after reconsideration, thought to be better suited for Engineer training. Training in all Engineer Units in West Africa during the early period of the war was most difficult as there were few tools, no military bridging equipment and only a negligible quantity of training mines and demolition stores. Shipping could not be spared to augment supplies, and replies to requests for stores were always "Improvise and obtain stores upon arrival in theatre of operations".

By June 1940 three West African Field Companies had been trained and prepared for embarkation with the two West African Brigades, I (Nigeria) Brigade and 2 (Gold Coast) Brigade, which were to take part in the East African Campaign against the Italian Army. In order that confusion should not result through the West African Engineer Units having similar numbers to those units of the South African Engineers who participated in the campaign, the designations of the West African Field Companies were changed for the duration of their overseas service. Thus the 2 (WA) Fd Coy commanded by Major J S Thain MC, became 53 (WA) Fd Coy. The 3 (WA) Fd Coy commanded by Major C Alderson DSO ED, became the 54 (WA) Fd Coy, and 1 (WA) Fd Coy commanded by Major A P A Robertson ED, became the 51 (WA) Fd Coy. Similarly the two Brigades were renumbered 23 (Nigeria) Brigade and 24 (Gold Coast) Brigade.

The two Brigades and the supporting units embarked in June 1940 for the port of Mombassa. On arrival the East African and West African Brigades were formed into two Divisions, 11th and 12th (African) Divisions, each containing one East and one West African Brigade. After its arrival the 1st South African Brigade was attached to the 12th Division. With the subsequent arrival of the 2nd and 5th South African Brigades it became possible to place the force in Kenya on a three Division front. The three West African Field Companies served throughout the campaign with, alternately, East African, South African and West African Brigades, moving from the defence line at Garissa to the capture of Addis Ababa during their fifteen months of East African Service. Though it is not possible to record any spectacular events or major feats of engineering during this campaign, good work was done by the first West African Engineers to enter a Theatre of Operations in World War II. Limited stores and equipment made improvisation a necessity throughout the campaign, and record must be made of the frequency with which the Engineers were called upon to fight with the infantry units in the advance.

The two Brigades returned to West Africa in Oct/Nov 1941. Whilst they had been in East Africa recruitment and training of other West African Engineers had been in progress. In July 1940, 2 (Nigerian) Field Company commanded by Major A C J Anderson and 3 (Nigerian) Field Company commanded by Major D B Mackenzie were raised at Bukuru. In September Major H W Blakeney RE⁷ arrived from England to organize and direct training. In the Gold Coast, 5 (Gold Coast) Field Company was formed on 13 December 1940 by Major L G Hutchinson MC. This Officer scoured the mines and Colonial Departments until he had a nucleus of Europeans, African tradesmen, or semi-trained men with which he could form a new Company. Due to the fact that the 2 (Gold Coast) Field Company had taken most of the trained men, and there was no conscription in the Gold Coast, Major Hutchinson's task was no easy one and trained Royal Engineers did not arrive in the Gold Coast until February 1941.

During June 1941 consignments of tools and stores began to arrive from the United Kingdom and a more modern form of training based on the lessons learned from the early campaigns in Europe, Africa and Asia, was given to the increasing numbers of Engineer Units. About this time a number of Polish Army Officers arrived in West Africa and, for the period until the Polish Brigades were reformed in the United Kingdom, a number of these Officers served with the West African Engineers.

By 1941 six Field Companies and two Field Park Companies had been raised in West Africa and it was then possible to turn to the formation of three Artisan Works Groups, a Forestry Company and a number of Road Construction Sections.

In 1942 the Military Units (Army Council) Order formalized the establishment of the Corps of West African Engineers, Royal West African Frontier Force, and placed the Corps under the Orders of the Army Council. Engineer units were retitled and the words West African in brackets prefixed the designation of the unit. Thus 1 (Nigerian) Field Company RWAFF became 1 (WA) Field Company WAE.

In March 1943 the 81st (WA) Division was formed under the command of Major General C G Woolner,⁸ a former Royal Engineer, with Lieut-Colonel W W Boggs⁹ RE as his CRE. 82 (WA) Division was formed in August 1943 with Lieut-Colonel Longrishe RE as the CRE. These Divisions were to see service in India and Burma. The training of the Engineer and other types of units necessitated the forming of various training establishments throughout the Colonies. A summary of static and operational Engineer units that were formed in West Africa is given in Table 1.

During 1943/4 a tactical road was constructed between Maiduguri in N Nigeria to the frontier at Ngala and this necessitated the forming of six Road Construction Sections. These Sections were assisted by several Artisan Works (AW) Companies and large numbers of local tribesmen. After completion of this project these Sections were reduced to one which was used for maintenance of the road.

From 1944 onwards no additional units were raised, and reinforcements for the overseas Divisions were supplied from home serving Units, thus initiating the reduction scheme necessitated by the easing war situation.

In 1946 when the 81st and 82nd Divisions returned from Burma it was decided to

TABLE 1—ENGINEER UNITS RAISED IN WEST AFRICA 1930–1946 Excluding Movement Control, Transportation and Survey Units (see Corps History Volume IX)

Year				
Raised	Raised in	Original Designation	Established Designation	Remarks
1930	Nigeria	Water Section	-	*OC Capt C M Tatham
1931	Nigeria	Jos Engr Cadre for Eu	ropean Reserve Force	*OC Maj H H W Boyes MC
1938	Nigeria	Engineer Company (T	erritorial) Supp Reserve	*OC Maj H H W Boyes MC
1939	Nigeria	1 (Nigerian)	1 (WA) Fd Coy	*OC Maj A P A Robertson
1939	G Coast	2 (G Coast)	2 (WA) Fd Coy	*OC Maj J S Thain MC
1939	G Coast	3 (G Coast)	3 (WA) Fd Coy	*OC Maj J C Alderson DSO ED
1940	Nigeria	2 (Nigerian)	4 (WA) Fd Coy	*OC Maj A J C Anderson
1940	Nigeria	3 (Nigerian)	7 (WA) Fd Coy	*OC Maj D B Mackenzie
1940	G Coast	5 (G Coast)	5 (WA) Fd Coy	*OC Maj L G Hutchinson MC RE
1941	Sa Leone	6 (Sa Leone)	6 (WA) Fd Coy	
1941	Nigeria	8 (Nigerian)	8 (WA) Fd Pk Coy	
1941	G Coast	9 (G Coast)	9 (WA) Fd Pk Coy	
1941	Sa Leone		4 (WA) BD Section	Disbanded 4/43
1941	Nigeria		10 (WA) AW Coy	
1941	Nigeria		11 (WA) Corps Fd Pk Coy	Was Div Fd Pk Coy until Oct 1943
1942	Nigeria		12 (WA) AW Coy	-
1942	G Coast	-	13 (WA) AW Coy	
1942	Nigeria		14 (WA) AW Coy	
1942	Nigeria		15 (WA) AW Coy	
1942	G Coast		16 (WA) AW Coy	
1942	G Coast		17 (WA) AW Coy	
1942	Nigeria		18 (WA) AW Coy	
1942	Nigeria		19 (WA) AW Coy	
1942	Nigeria		20 (WA) AW Coy	
1942	-		1 (WA) AW Gp HQ	CRE Lt Col E C Bailey
1942			2 (WA) AW Gp HQ	CRE Lt Col Fuller (1942)
1942			3 (WA) AW Gp HQ	CRE Lt Col Coe
1942			130 Forestry Coy RE	**Disbanded in 1945

Nigeria 1 & 2 (WA) Road Constr Secs Nigeria 1 (WA) Engr Trg Centree 81 (WA) Div HQ Engrs CRE Lt Col W W Boggs 82 (WA) Div HQ Engrs ••••CRE Lt Col W W Boggs 82 (WA) AW Coy ••••CRE Lt Col W W Boggs Nigeria 23 (WA) AW Coy Nigeria 31 (WA) AW Coy Nigeria 33 (WA) AW Coy Nigeria 33 (WA) AW Coy Nigeria 34,5 & (WA) Rd Const Secs Nigeria 3,4,5 & (WA) Rd Const Secs Nigeria 1 (WA) Holding Coy Nigeria 36 (WA) Rd Const Secs Nigeria 36 (WA) Rd Const Secs Nigeria 36 (WA) Rd Coy Nigeria 36 (WA) Rd Coy Nigeria 36 (WA) Rd Coy	Nigeria	iginal Designation	Established Designation	Remarks
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*** In 1944 Lt Col N W Elgood MC took over.

retain one Regular Field Company in both the Gold Coast and Nigeria. Soldiers in the returning Engineer units with unexpired service were absorbed into 1 (WA) Holding Company in Nigeria and 2 (WA) Holding Company in the Gold Coast. These were reformed as 36 (WA) and 37 (WA) Field Companies respectively. These two Field Companies were each of strength 5 officers, 17 BOR's and 274 AOR's and were located at Abcokuta, Nigeria and Accra, Gold Coast.

The reduced European ceiling in the Command necessitated, on 31 October 1946, the disbandment of the 36 Field Company WAE, Nigeria, and the reduction of 37 Field Company WAE, Gold Coast, to a Cadre Company, designated 37 Cadre Field Company WAE. However, on 1 April 1947, the Cadre Company in the Gold Coast was authorized to expand to a full strength Company and a Cadre Company was formed in Nigeria at Bukuru near Jos, the old home of the Nigerian Engineers.

It had been found that, as a general policy, the introduction during the war of Europeans below the rank of sergeant had not been satisfactory. The new establishment for a Cadre Field Company had, therefore, no Europeans below the rank of sergeant. This was carried out partly by replacing Europeans with well trained Africans and partly by upgrading Corporals' appointments. The Field Company establishment implemented in April 1947 had a much smaller European element than that of the companies used in Burma and again no European was below the rank of sergeant. On 23 July 1948 the designation of 37 (WA) Field Squadron was changed to 35 Field Squadron WAE to comply with Imperial Unit numbering.

When the new post-war Field Squadron establishment was promulgated for British units the revisions were examined to see their implications and repercussions on the West African Squadrons. It was decided that the two West African Squadrons would be so organized, within the limited personnel ceiling, that they were capable of immediate expansion to Squadrons on the higher establishment and of further expansion in a comparatively short time to a combined Nigerian/Gold Coast Engineer Regiment.

To achieve this the Park Section within the HQ Troop of 35 Field Squadron in the Gold Coast was designed to be the nucleus of a Field Park Squadron. This meant that in peace time the Squadron would carry all the key tradesmen and tradesmen difficult to obtain direct from civilian sources, leaving the trades which could be easily recruited in war such as carpenters, drivers, etc, on a lower establishment.

With effect from 1 February 1949 the 36 (Cadre) Field Squadron WAE was expanded to a full Field Squadron on WA Establishment No WA/45/3(S) dated 1 October 1948. Later, in 1949, the Squadron moved from Bukuru to Kaduna (Somme Lines) in order that it could play a more integrated role in the Brigade Group stationed at Kaduna.

At the end of 1948 the first two African Other Rank tradesmen of the West African Engineers,—Sergeant Oto (Electrician) and Corporal Quarshie (Black-smith)—were sent to the RSME at Chatham for training as trade instructors.

Thus was laid the foundation for the eventual complete Africanization of the two Squadrons and provided potential for whatever expansion that would become necessary.

THE TRAINING OF WEST AFRICAN ENGINEERS 1939-1945

Up to 1941 all Field Companies were responsible for the training of their own men. However, at this stage the engineer training requirements got beyond the capabilities of the Field Companies and an Engineer Training Centre was established at Bukuru. This trained Africans in all branches including purely military work. Recruits generally arrived entirely untrained, though occasionally a few had had some elementary military training in the Infantry PTCs. By 1943 the Engineer Training Centre had become too small for the work and it was reorganized as a Training Battalion WAE and situated at Kaduna.

It was firmly established there by 1944 and was designed to produce thirty-six Sappers monthly for WAE Field Units overseas and thirty Sappers monthly for West African Engineer L of C Units. In addition it held up to 203 Sappers for Field Units overseas and 107 Sappers for L of C Units overseas; any further surplus trained personnel available for draft were held in a Holding Company WAE at Kibi, Gold Coast. The training Battalion was commanded by a Lieut Colonel with a Chief Instructor (Major), Administrative Officer (Major), Adjutant, and Field Works Instructor.

The Battalion also ran refresher courses for British and African NCOs, and all Europeans on arrival ex-UK were given a short course before being posted to WA Units. African recruits arrived at the Battalion having done their basic military training. The above establishment sufficed for the needs of the West African Engineers in South East Asia Command until September 1945 when it was disbanded.

Neither the old Engineer Training Centre at Bukuru nor the Training Battalion at Kaduna dealt with trade training. In the early stages of the war the artisans requirement was met by enlisting trained tradesmen as far as this was possible and Field Companies carried out trade training as far as they could from their own resources; later tradesmen were obtained from the various Army Trade Training Schools (eg Enugu, Nigeria and Elmina, Gold Coast); they then received field engineering training at the TB Kaduna.

RE WORKS SERVICES IN WEST AFRICA 1939-1949

In 1939, at the outbreak of war, the only Royal Engineer potential for Works in the four West African Colonies was a Fortress Company RE together with a small RE Works Organization in Freetown, Sierra Leone. Works in Sierra Leone were carried out mainly by direct labour. In the Colonies of Nigeria, Gold Coast and Gambia no RE organization existed and any work required by the Royal West Africa Frontier Force was carried out by the local Public Works Department (PWD).

In Autumn 1940 GHQ West Africa Forces was established at Achimota College, Accra in the Gold Coast and Major WMcM Keane,¹⁰ who had been OCRE Freetown, became CRE. In January 1941 he became Chief Engineer with the rank of Colonel.

A very large work programme was started in 1940 necessitated by the expansion of the RWAFF and the possible hostile action by Axis or Vichy France Forces. Accommodation had to be provided for the new recruits being raised. Base depots and installations had to be established and communications improved. In the initial stages, work was almost entirely carried out, after joint reconnaissance by RE and PWD reps, by PWD who were extremely co-operative in spite of much reduced staffs.

From 1941 onwards RE Works Staff arrived in increasing numbers. At first, officers and NCOs were loaned to various PWD Engineers to supervise works being carried out by them. As pressure increased, the RE organization was expanded until the following were established:

Nigeria CRI

CRE (Works and raising and commanding the WA Engineer Units)

Gold Coast	CRE
Sierra Leone	CRE
Gambia	CRE

A steadily increasing number of works were carried out by direct labour. A few small contracts were let but the number of European contractors was very limited and confined mainly to the Coastal belt. Generally speaking, the greater part of all construction was by DEL supplemented to a very great extent, particularly from 1942 onwards, by Artisan Companies assisted by Pioneers.

Construction was of local materials, at first mainly mud bricks and thatch. Concrete block, wood framing and *tukurua* (palm frond) construction was later much used and rough wood shingles used for roofing, especially in the Gold Coast. Corrugated iron was used mainly for store sheds and the like but its increasing scarcity and bad quality (gauge 24 to 36) made it essential to use substitutes wherever possible.

	1940/41	1941/42	194	2/43	1943/44	1944/45	Sub-	totals	
	10C	10C	10C	10W(1)	10W(1)	10W(1)	10C	10W(1)	Grand Totals
oast eone	253 237 210	354 295 534 103	772 352 467	510 335 319 74	444 380 325 78	650 220 109 38	1,379 884 1,211	1,604 935 753 190	2,983 1,819 1,964 545
pm	100	9/1,1	1,753	1,238	1,227	1,017	3,829	3,482	7,311
<i>ineers</i> V ter Col) earfield	Vest Africa C W McM Ker I	ommand ane 29.1	1.41-25.4.4	12		Col H A Baker Col H W Blake	r MC eney MC	12.11.43–31. 31.7.45–5.3.4	7.45 7
R Hayc Coe realDist	craft rict	17.1	.42-17.5.43 5.43-12.11.4	43		Col F C W Fos Col L I Jacque	sbery s CBE MC	5.3.47–30.7.4 30.7.48– ?	×
W Blak W Elgo	ency MC od	11.	12.40–17.7. [,] 7.42–6.12.4	42 3		Lt Col C H E) Lt Col G A He	Rebbeck enderson	6.12.43-11.6 11.6.45-1.3.4	45 6
lamson Haslar		1.3.	.46- ?			Maj P A Adan Maj F K Ward	ns Irop	? -2.49 2.49 ?	

TABLE 2---RE EXPENDITURE (£1000's)

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THE ROYAL ENGINEERS JOURNAL

Gold Coast Area/District			
*Lt Col P C R Moreton DSO Lt Col J S Thain MC	30.10.40-7.4.42 7.4.42-13.10.42 * initially DCRF Gold Coas	Lt Col H J Secker Lt Col A H Fuller 4 Area	13.10.42-11.3.43 7.4.43-15.12.43
DCsRE			
Maj R K Todd	16.12.43-4.6.45	Maj H W Baldwin	4.6.45-13.8.45
Mai H W Baldwin	14.8.45-14.5.46	Mai G M Noble	?2.49
Mai R A Smith	14.5.46- ?	Mai A C Gow	2.49- ?
Sierra Leone Area/District			
C'S KE			
Lt Col G A Bloom	10.40-29.6.41	Lt Col L G M Keevil	2.4.43-14.6.43
Lt Col A W H Woods	29.6.41-2.4.42	Lt Col F E Pool	14.6.43 - 8.12.44
Lt Col W L de Courcey Baldwin DCRF	23.5.42-11.3.43	Lt Col R Ward	8.12.44-10.8.45
Mai ? Ronald	11.8.45- ?		
Gambia Area (included in Sierra Leo	ne wef 20.3.43)		
C'S KE			
Lt Col N R Swales	21.1.42-23.5.42	Lt Col L G M Keevil	23.5.42-20.3.43
Miscentaneous Lt Col E C Bailey	CRE Artisan Works Group HQ	1943 ?	

A Scale of Accommodation, based on experience and PWD and medical advice, was started in 1941 and issued as a pamphlet for all Colonies in 1943. An updated pamphlet Accommodation for West African Forces in West Africa 1945 was issued in 1945. Colonel H A Baker,¹¹ the Chief Engineer, produced, in the same year, a monograph entitled Accommodation of Troops in Wartime West Africa.

In view of the submarine menace, it was imperative to use local materials, and demands on the UK and South Africa had to be reduced to a minimum. The chief difficulty was the supply of cement and electrical stores, all of which had to be imported. There was ample good building wood in the Colonies but this had not been exploited and a considerable strain was put on such saw mills as existed. The chief of these was the PWD mills at Ijora near Lagos. This not only turned out squared timber and scantlings but manufactured camp furniture in large amounts as well as prefabricated hutting. In addition to supplying military needs in Nigeria, great quantities were exported to Sierra Leone and to a lesser extent to the Gold Coast and the Gambia.

In the initial stages PWD supplied stores from their own stock. Later RE Stores were set up in Lagos, Takoradi and Freetown and stores were issued either to PWD or to the CRE as required.

PWD made a 5% charge on the work they carried out (including the cost of stores supplied by them). Accounting was on Vote 10C initially, changing in 1942/43 to Vote 10W. Quarterly expenditure and forecasts were submitted to the War Office. Auditing was carried out by the Colonial Auditors on behalf of the WD. Table 2 shows the actual expenditure in the period 1940–1945.

No very great technical difficulties were met with in construction. The type of construction, whether for camps or depots, was simple and the chief problems were obtaining imported stores and the recruiting, use and welfare of local labour. The language difficulty was largely overcome by the use of interpreters. In the Gold Coast, Major Maxwell Fry,¹² DCRE Accra, applied his extensive architectural ability to designing large structures, such as NAAFI's, in local materials. The design and construction of the reinforced concrete gun and searchlight emplacements for the Anti-Aircraft and Coast Defence units of the Royal Artillery Brigade defending Takoradi Airfield and Fortress were probably the most sophisticated engineering work carried out.

The chief work of technical interest was probably the construction of an all-season road from Maiduguri, Northern Nigeria through Dikwa to the frontier at Ngala where it connected up with a similar road built by the Free French Forces to their then headquarters at Fort Lamy. The road had to run through an extremely wild flat arid plain mostly of cotton soil. A dry season motorable road existed but was normally impassable in the wet season and Dikwa was frequently only accessible by boat. A number of wadis were normally dry but in spate during rains, had to be bridged. No suitable road building material was available for some hundred miles and lack of transport limited the hauling of this. It was decided that stabilization was the only practical solution and, after experiments by the PWD Lagos, work started under the direction of the local Provincial Engineer with RE Officers attached to assist. The bridging was built in timber by the Field Companies then at Bukuru near Jos (Plateau Province). The flat plain necessitated the road track being banked up from one to four feet over some sixty miles. Stabilization was effected by means of local sand and gravel in predetermined quantities. Labour was a great difficulty. The region was very sparsely inhabited by tribes some of whom spoke a practically unknown language. Famine tends to be endemic in this area and millet and guinea corn had to be supplied as part payment. Altogether some 7,000 labourers were utilized at the peak period together with Field and Artisan Companies WAE. Road machinery from locally raised Road Construction Sections proved invaluable. The road was finally completed in the dry season of 1943/44.

One other road building project is worthy of note and this was the construction, in

the Gold Coast, of a strategic road from Tamale to Bole, with a flying ferry over the River Volta.

After departure of the two WA Divisions (81 and 82) in 1943/44, RE Works were mainly confined to maintenance, minor works and the construction of demobilization centres.

Following the end of the War a new Order of Battle was agreed for the long term establishment of the Royal West Africa Frontier Force with a Command Headquarters at Accra in the Gold Coast. To assess the commitment for constructing permanent modern accommodation for the Force, in April 1947, a team was set up by the Chief Engineer. Although a comprehensive Report was completed, none of its findings were implemented under the British Government as it was overtaken by independence being granted to the four Colonies.

At Table 3 is a list of the Chief Engineers, West Africa Command and the C's RE and OC's RE of the three Areas/Districts as far as is known.

¹ Lieut Colonel H H W Boyes MC, ED

² Colonel J M Foley MC, ED

³ Lieut Colonel J Dent Young ED, RE

⁴ Captain C M Tatham RE, later Director, Geological Survey of Nigeria

⁵ Major A P A Robertson OBE, ED, RE

⁶ Lieut Colonel J S Thain MC, RE

⁷ Colonel H W Blakeney MC

⁸ Major General C G Woolner CB, MC

⁹ Brigadier W W Boggs CBE

¹⁰ Brigadier W Mc M Keane CBE

¹¹ Colonel H A Baker OBE, MC

¹² Major E Maxwell Fry, later Town Planning Adviser to the Resident Minister, West Africa

Book Review

CAMOUFLAGE

GUY HARTCUP

(Published by David and Charles. Price £8-50)

THE history of camouflage as an established branch of warfare is a relatively short one and has now passed from the stage of inspired improvization to the province of the scientist and technologist. Yet in the literature of war it is a neglected subject.

The author, a well-known historian with several excellent books to his credit, shows that man's knowledge of concealment and deception is derived from his early need to hunt and trap. The skills were later transferred to warfare. He emphasises the constant battle between the concealer and searcher who uses modern photography from satellites, and other types of remotely-piloted vehicles, flying 100 miles above the surface of the earth fitted with infra-red and thermal cameras.

He never forgets the human contribution, well-known painters played their part with enthusiasm and a fine disregard for orthodox military practice. This leads to many amusing incidents and there is plenty of light relief throughout this very readable book.

Confessions of a Construction Troop Commander

LIEUTENANT S G TENISON RE



The Author was educated at Westminster School and Sandhurst. Commissioned into the Corps in 1977. After his YO Course he joined 52 Fd San (Construction) in October 1978. He is currently at Royal Military College of Science, Shrivenham.

INTRODUCTION

CO 22 Engineer Regiment writes: "Lieutenant Simon Tenison completed nearly a year as a troop commander in 52 Field Squadron (Construction) in September 1979. Before leaving for RMCS Shrivenham I asked him to record some impressions of his first tour. I hope that his article will provide a glimpse of how rewarding and what fun life can be in a construction squadron. It may also serve to allay some of the fears recently expressed in the correspondence columns of this Journal concerning the independence of field squadrons. There is no lack of this in UKLF regiments.

In the September issue, Brigadier Aylwin Foster described how an airstrip was cratered and repaired on an exercise in the Far East. I am sure he will be pleased to hear that this is still being practised, though somewhat nearer to home, and with the full co-operation of the RAF".—FOS

. . .

I ARRIVED at 22 Engineer Regiment, at Perham Down, on 22 October 1978, after finishing my YO Course the previous month. I was to spend a year with 52 Fd Sqn (Const) before going on to the RMCS Shrivenham. The feeling of elation at having finished training was slightly offset by being a "new boy" again. Was I going to break all records for earning extras?

With the introductions over I got down to the business of finding out how a troop worked. A large cog is the Troop Staff Sergeant, who has had a full time job in the past year, keeping "young Sir" on the rails. Of course even Sappers have consented to pick me out of the mire before it closed over my head.

The first weeks were spent pushing paper and preparing for "Fitness For Role", FFR. This was a very useful time for getting to know the personalities in the Squadron, before moving away on any tasks. During this time I was faced with my 47

Confessions of a Construction Troop Commander Lieutenant S G Tenison RE



Photo 1. Crater repair during Mineval September 1979.

first "problem soldier". I searched desperately for the DS answer but had to seek advice. The problem was eventually sorted out, and I was left with a very satisfying feeling that he had trusted me enough to see me in the first place and that something had been done.

The mess duties were soon handed out. I was given the job of entertainments member, which was a problem as we were away so often. It was a job at which I had no experience, but I learnt a great deal and found it was very enjoyable. My inexperience showed when setting up the St Patricks Night Ball. I made a very unfortunate mistake, for which I received "four". I had to arrange for Squadrons to take on the responsibility for the decorating of parts of the Mess. Accordingly I wrote a letter to the Squadrons and included RHQ on the basis that they had a large number of Officers. The first mistake was the appalling SD, the next was for a 2nd Lieutenant not to appreciate that he does not detail all the senior Officers in the Regiment with menial tasks. The mistake was corrected and the evening turned out to be a success.

In November the Squadron Recce Team went to RAF Bruggen in Germany. This is the airfield we support for Airfield Damage Repair (ADR). We were to take part in the Station Taceval (Tactical Evaluation). We usually conduct these exercises entirely on the radio, and it was some time before I realized that one was supposed to make up the exercise answers as time went on. However, when asked where my troop was, I knew the answer was not Perham Down, but did not realize that a grid reference for their fictional harbour area was required. The next unfortunate move was to lead the convoy back to Perham Down. That should be a simple matter you say. Well, it is always said that there is nothing more dangerous than a subaltern with a map! Anyway, we went the picturesque way, although it cost me a few beers!!

On returning, I went to HMS Daedalus, a landlocked ship outside Southampton. My troop had begun to build a helicopter pad with AM2 matting. This was an interesting task using the American aluminium mats which they use for Harrier pads and ADR. Our pad is now being used by the Search and Rescue Flight. I had now stayed in Messes belonging to all three services in two weeks.

Confessions of a Construction Troop Commander (1)

On returning from HMS Daedalus we went on Christmas leave...to return early to standby for tanker driving. This was followed by more standbys for lorry and ambulance driving. Fortunately none of my plans were tested.

In January I commanded a composite troop from the Squadron on an exercise supporting the School of Infantry. This was a Combat Engineering Exercise which enabled many of the Class 3 Combat Engineers to fill in the experience cards towards Class 2, and made a great change from construction work. Our NBC training with the RAF paid dividends when we were attacked by the enemy aircraft during an advance to contact on foot. All the infantry were umpired out as dead because they failed to react. The Sappers sweating in "gassy gear" continued the advance. I actually received a strawberry instead of my more usual extras and I was now beginning to count myself as an old hand.

After this I took the troop to Halton Training Camp outside Lancaster, for two weeks Combat Engineering. We spent the time doing watermanship, aerial ropeways and minefields. Each morning we began with some PT or sports, and it was while playing football here that I managed to score my only goal in all the games I played during the year. I also learned that rations don't just arrive but have to be organized. Consequently I had to make a large short term loan to the rations account: the OC called it gaining experience.

During the second week I left to go to RAF Laarbruch on Mineval, the RAF version of a Bde FTX (Field Tactical Exercise). The Squadron were temporarily replacing 50 Sqn, who normally work at Laarbruch, but who were on exercise in Kenya. The CPX (Command Post Exercise) system was now clear to me and much time was spent on the radio sending in detailed recce reports from the comfort of the Mally Club (RAF for NAAFI).

Whilst I was away in Germany, S/Sgt Walker took the troop to Pen Hale Camp in Cornwall for a week of hill walking and rock climbing which most enjoyed. We all re-assembled at Perham Down at the beginning of March to prepare for our next operational task.

On March 20 we went up to RAF Kinloss on the Moray Firth. The task was the erection of three Frankenstein Hangars and the installation of an Expeditionary



Photo 2. A Jaguar taxiing across a mat laid over a soft patch on a grass taxiway during Mineval September 1979.

Confessions of a Construction Troop Commander (2)



Photo 3, Frankenstein Hangers at RAF Kinloss. Two up and one to go.

Rotary Hydraulic Arrester Gear (ERHAG). The hangers are temporary aircraft covers, made from rubber-coated canvas. The canopy is suspended between three 45ft masts and is large enough to hold four Phantom aircraft during servicing. We were supporting *Op Bolthole*, the temporary closure of RAF Leuchars and the dispersal of the Fighter Squadrons to other airfields. The plans went slightly awry because two of the hangars did not arrive. I hasten to add that this was beyond our control, but it did make the task easier and we even managed a few days leave before venturing on to Salisbury Plain again. This time it was to provide battle simulations for a 3 RTR exercise.

At the end of May we went to Cyprus, for a four week exercise constructing a firebreak on the Akamas Range. Sadly the RAF caught up with me and forty-nine hours after arriving in Cyprus I was airborne again bound for England, with the troop wo days behind me. The hangars had arrived at RAF Kinloss and we had to put them up. Since the task was so important the troop were flown home from Cyprus and then from Lyneham to Kinloss in our two personalized Hercules transport planes and we were accommodated in a hotel.

After much effort on the part of RHQ my troop was sent out to Cyprus again. This time we stayed for four weeks and built an Irish Bridge on the Akamas track. We started work at dawn and spent the afternoons sunbathing and swimming. The last week was left for R and R to see something of the Island. We managed to go to Troodos and Nicosia and spent a day and a half at Dhekelia.

Having returned from Cyprus we went on leave before going to Germany again. This time the Squadron went for its annual two month ADR exercise to RAF Bruggen. The time in Germany was crammed with ADR training, many demonstrations including one to a NATO audience and a host of construction jobs for the Station. We also took part in the Station Mineval. For this exercise bomb craters were blown in the alternative runway, and other craters were simulated by dropping piles of aggregate and bomb damage repair mats on access routes. This forced the pilots to taxi on grass, over the repaired craters and between the various obstructions. This made the exercise realistic for the pilots since they had never had real obstructions before and were flapping to get airborne by the end of our minimum operating strip on the main runway. Fortunately I did not get a 17m NM & D (Cost of a Jaguar)

Confessions of a Construction Troop Commander (3)

at the end of the exercise. I also had, under my command, an APC with Ranger, whose primary role with us was to lay anti-personnel minefields. As things turned out it spent more time giving members of the RAF runabouts than taking part in our exercise. Despite this it was very useful and everyone knew about the "Army tank".

Halfway through the Squadron's tour in Germany I parted company with the Squadron to go to the RMCS Shrivenham. Academic life is a considerable change from the activities of the last year, and I will miss having a troop to command. I have had considerable satisfaction from working with soldiers on the various tasks, and seeing the troop complete a job is tremendous. I left Tidworth after a year having learnt an enormous amount; all the things left untaught and unlearnt after YO training. I leave the Squadron with many happy memories and hope that I do not sever all ties with those friends I have made.

The Strip Building Industry of Burma—Part 1

LIEUT COLONEL B R WHITE MBE, TD



Commissioned in August 1942 the author was posted to 808 Road Const Coy, then building roads throughout Sennybridge Artillery Ranges. In January 1943 he joined a draft for India and was posted into QVO Madras Sappers and Miners in 431 Indian Field Company. Demobbed in 1947 he joined the family firm of Road Contractors and Quarry Owners, and joined the TA in 591 (Antrim) Indep Fd Sqn. He commanded the Squadron; became DAA&QMG of 107 (Ulster) Independent Brigade Group; and finally changed cap badges to command 5th (T) Battalion Royal Irish Fusiliers from 1967 to 1969. On leaving the TA he became a pseudo Colonel as County Cadet Commandant Armagh & Down Army Cadet Force. Retiring from business in 1970, at

the early age of 48, he was accepted into the permanent cadre of the Ulster Defence Regiment as Adjutant of 10th (City of Belfast) Battalion, a post he held until Jan 1980 when as an RO he became Regil Sec of the Regt.

INSPIRED by Colonel Jukes-Hughes letter on Airfield Engineers in the March 1979 issue of the RE Journal I looked out some notes I had written on leaving Burma in 1945. I have written these up in narrative form as this is the only way I know to convey the realism of our work and the times. The article does not claim to hold much of technical value, indeed the work was not very technical, but, in order to give some idea of the role played by Forward Airfield Engineers in Burma, I have listed some of the strips constructed for XIV Army, excluding Light Aircraft Strips, at Annex A. The list is not complete and some detail is missing. For example, three or four strips were built at Meiktila, where 4 Corps and 33 Corps axes crossed, but only one of these by 431 Indian Fd Coy.

A Strip Building Industry of Burma - Part 1 Lieut Colonel BR White MBE TD

IN September 1944 I was a subaltern with 431 Queen Victoria's Own Madras (QVOM) Indian Field Company and had, with that Company, just finished a period of attachment to the Airborne Forces Research and Development Centre, Chaklala, near Rawalpindi. We were ordered into Burma as part of 459 Forward Airfield Engineer (FAE) Group, a unit of 33 Corps.

My introduction to the SEAC theatre began when we crossed the Brahmaputra and loaded ourselves into a metre gauge train for the final stage of our ten-day journey from Rawalpindi to Dhimapur. The first vivid impressions, however, came when, after a night's sleep, we transferred our bags and baggage to RIASC lorries and began the road journey to Imphal. As each lorry was loaded it was dispatched on the 134 mile journey. Rumours had reached us of learner drivers being used on this route handling American trucks which were too big for them. These rumours were base libel, for the Indian drivers, the majority Madrassis, were amongst the finest I have met. Owing to the rigours of the journey and the state of the road, two drivers accompanied each vehicle. The spare driver occupied the front seat, so my view of that particular trip was over the tail board of a truck.

The road was terrifying. It climbed from the plains at Dhimapur across the Naga Hills to a peak height at Kohima, then switchbacked and zig-zagged down to the Manipur plains and Imphal. Most of its length, though reasonably well surfaced, was along a ledge cut from the side of the hills. It was a terrifying road for any driver. Imagine then my feelings as I sat in the rear of that truck, at that time quite unconvinced of the driver's skill, and gazed out at the view. From the road the hill sloped steeply down to the valley bottom some 1000 feet below, and upward on the other side of the road to some unseen height above. I considered sleep to be the best method of passing the time, though every time the truck swung out to pass an oncoming vehicle I could imagine the outside tyres scrabbling for a grip on the edge. I am gifted with a lively imagination. My sappers were not and happily slept all the way. I dozed, and on one occasion I awoke to see what appeared to be a wide lake beside the road. I then realized that what I had taken for water was, in fact, the top of the clouds which were resting in the valley for the night. When I awoke again we were in Imphal.

At Dhimapur we had loaded our stores in the station yard and then, as trucks were loaded, sent them off each with an escort of sappers. I was sent off in the lead truck and those following most closely behind contained tentage, for my first job was to establish a camp. On arrival at Imphal I was directed on down the road to Tamu for a distance of twenty-eight miles, to a place called Palel. About 0400hrs I pulled up outside a lonely police post where an officer rang the Administrative Commandant of Palel to report a unit's arrival. I drove into Palel at dawn and was met by the Administrative Commandant who led me to our camp site, gave me some information and left me to get on with unloading. Then it began to rain.

PALEL

I detailed my small party to start erecting tents under the control of the MT Naik (Corporal) whilst another party of two built a fire and prepared tea. I then surveyed our particular area of real estate. We were situated at one end of the Manipur plain with hills on three sides. Our camp site was reached by a track and was about a quarter of a mile from the main road. A river bounded one side of the site and the tops of the hills were now covered with mist.

I returned to the tent pitching and the tea. This was now ready and the men knocked off for a few minutes whilst they drank. The therapeutic qualities of hot sweet tea are well known, but they were never better tested than on that wet morning after a long, tiring, foodless journey.

The remainder of the Company kept arriving, lorry by lorry. The escort on each lorry unloaded it, sent it off, broke off for tea and then joined in making camp. One of the first lorries to arrive, about 0900hrs contained the cooks and the officers' mess. All were put to work at once making breakfast. By this time one or two other officers had arrived; Ron Greaves, the 2IC; Harry Lock, a platoon commander and WO2 Brown, one of our two British WO/NOCs. The work of making camp went on all day as lorries kept arriving. Finally, at about 1900hrs on 29 September, the last lorry, with a very tired Commanding Officer on board, arrived.

The next few days were idle ones. We paraded at 0700hrs and first parade was usually PT, unless it rained. It usually rained. Weapon training and route marches filled in the rest of the day and it was during these route marches that we had our first glimpses of the real war theatre. Old positions, slit trenches and defended camp sites were everywhere, allowing me to indulge in brief extempore lectures on tactics to my sappers. Under the generally dismal circumstances our evenings in the mess were relatively happy ones. We developed a craze for the card game Pontoon and in this we were joined by WO2 Brown and Sergeant Jefferies, the MT NCO. With Harry Lock (Honest Joe) and L R Franklin (Frankie) our Indian officer, we played all night and every night.

431 Company was part of an Airfield Construction Group which consisted of two Field Companies, ourselves and 430, and 21 Engineer Battalion. 430 Company and 21 Engineer Battalion were already in Burma, having preceded us, and were located at Tamu. We sent a signal to the CRE and in due course a Jeep arrived at Palel to bring Frank Ward, the Company Commander, to see the CRE and to make arrangements for our move forward. At this time our sole transport was a 3-ton 4×2 Chevrolet and a 15-cwt 4×2 , both of which we had drawn at Imphal. Two days later, on 7 October 1944, Frank returned bringing with him five Jeeps which HQ 459 FAE were holding for us. Over a hasty lunch Frank told us of the road we were going to have to drive over to Tamu and the problems we would meet on the way. I wish he hadn't.

At 1309hrs precisely Frank, myself, and Harry, each driving a jeep, together with the other jeeps set off carrying a small amount of essential stores. The remainder of the Company under Ron were to follow a few days later.

TAMU

For the first few miles the road was relatively good, resembling the Dhimapur-Imphal road we had so recently travelled, and then it became narrow with a rapidly deteriorating surface. If the previous road had been a nightmare this was ten times worse, but, at least, I had the consolation of driving myself and not gazing at it over a tail board. To add to my problems I had never driven a Jeep before, and these were the real American article with the steering wheel on the "wrong" side. I fixed my eyes rigidly on the road and drove as carefully as I knew. If I was new to the Jeeps at least they themselves were brand new and behaved beautifully. We passed a portion of the road which wound round the shoulder of a hill. The road surface consisted of two wheel tracks only with a near sheer drop beyond the left hand wheel track. The slope of the hill above was covered with acres of tarpaulin to prevent further erosion taking place under the heavy rain. It was, of course, raining.

At every bend breakdown lorries were endeavouring to recover wrecked trucks from the bottom of the *khud*. The entire length of the road was marked with trucks lying upside down at the bottom of the valley. At length the road slid down a hillside, past Bulldozer Hill, and Corps HQ, into the Kabaw Valley. We crossed the Lockchow Bridge (a Bailey) and after a further three minutes reached our camp site. We dismounted stiffly and looked around. I glanced at my watch—it was 1726hrs. Four hours and seventeen minutes to drive forty-three miles.

Frank had decided to return with the Jeeps to Palel to ferry some more stores. Whilst he reported to the CRE I gathered the few drivers I had and made bivouacs. Our 3-ton truck was following in its own time with some members of my platoon and I had my drivers arrange bivouacs for them too. When Frank returned we squatted by a smoky fire, drank hot sweet tea and smoked. At 2045hrs the personnel truck arrived carrying some of my sappers who were very tired and dusty.

430 Company had sent some of their three tonners back to Palel to bring up

stores. We had passed them on the way and didn't expect them to arrive until much later, so I crawled into my bivouac and slept. It seemed that I had just gone to sleep when someone woke me. The trucks had arrived and, digging out the remaining sappers, we set to unloading the stores. It was 0200hrs. Sergeant Jefferies had accompanied these trucks and would go back with Frank. When the unloading was finished the sappers crawled back to bed and I sat up with Frank and Sergeant Jefferies talking and smoking. At 0430hrs we had some tea and at 0500hrs the other two left on the return trip to Palel. No one else was awake so I wandered around the camp to obtain some idea of the geography.

The site was pleasantly situated down a track several hundred yards off the dusty main axis of 33 Corp's advance, occupying a clearing in what appeared to be a young teak forest. Clearly we were not the site's first occupants; bunkers and slit trenches abounded on all sides and in some bushes there were unexploded mortar shells. The camp was beginning to stir and a *Naik* (Corporal) approached me to say that he had found three bodies just up the track. I accompanied him to where three badly burned skeletons lay, clad in the tattered remnants of what had been Japanese uniform. A grenade was still attached to the belt of one, and one of my sappers nonchalantly kicked it. He received lectures on the safe handling of weapons and explosives in at least three languages simultaneously—after the rest of us had returned to the vertical position. The work of establishing the camp continued and, of course, it began to rain. At 1900hrs Frank drove in with the Jeeps having completed his fifth drive over that appalling road in four days. The route is best described by an Army Newspaper headline I saw a few days later. It said "Nightmare drive to the Chindwin Front".

The following morning, 9 October 1944, at 0700hrs Ron drove into camp. He was very cross because in preparing camp I had quite overlooked the need to put the Company's Tac sign out on the roadside and he had spent some time locating us. He had fifteen 5-ton trucks with him, carrying the remainder of our men and stores.

The rest of that day was spent in organizing the stores and the camp generally, and on 10 October, whilst final touches were made, Frank, myself and Jimmy Storrier, one of the CRE's Field Engineers, went down the road to the airfield to view the work we were required to do. The airfield at Tamu was a Japanese strip in fairly good condition and our initial work was the cutting of grass to clear pens and taxi tracks. Soon, however, more interesting work developed and we erected camouflage nets, built culverts, set up a water point and generally carried out most field engineering tasks.

Our introduction to the war was very gentle at Tamu and for many days it seemed remote. On 5 November 1944, the Japanese gave us their interpretation of Guy Fawkes day when a formation of Zeros attacked the strip and set fire to a Mitchell bomber which was making a temporary stay.

On another day, a different aspect of the war was brought home to me when I saw wounded being evacuated by air. A glider was located on the runway with a tow rope leading from it to a wide loop which was held open by means of two vertical poles. The wounded were placed in the glider on stretchers and the doors were closed. Overhead a Dakota circled waiting for the signal. When it was received the Dakota flew very slowly and very low over the strip trailing a hook on the end of a tow rope. This hook engaged in the loop of the glider's tow rope which, being nylon, stretched considerably as the strain came on. Then the glider's nose went down, and in seconds it was rolling up the runway and quickly became airborne. I remember hoping that if I was wounded I would be evacuated in a more conventional way.

Only one other incident remains in my memory of Tamu and that was meeting a Royal Signals officer whom I had last seen back home in Northern Ireland where we had both gone to school together.

YAZAGIO

Eventually our work on the strip was handed over to L of C Engineers and we moved

forward on 15 November. The road, though no longer mountainous, was appalling. It was narrow and thick with dust. There were nothing bigger than jeep bridges and often the convoy had to wade through fords. We reached Yazagio at 1630hrs and spent the rest of the day and the next in setting up camp. We had found a pleasant location beside a river where the swimming was good.

430 Company and elements of the Engineer Battalion were already working on the strip—a 1700 yard runway for transport aircraft. The work we were given was dull and, as far as I can remember, was concerned with experimenting with oil as a dust palliative. Our off-duty moments, when they occurred, were spent in swimming and fishing with explosive—a fact which displeased our CRE, a keen angler. We were, however, getting closer to the war for we could hear the guns all the time.

KALEMYO

We were all pleased to move when orders finally came and set off again on the road south to Kalemyo. This place lay at the junction of the drives of 5th Indian Division and 4th East African Division. It was apparent as we moved up that heavy fighting had taken place for stores and equipment lay everywhere with dead Japanese and mules scattered amongst them.

The strip we were to work on was at a place called Taukkyan seven miles south of Kalemyo on the Fallam road. It was an old Japanese strip in reasonably good condition with only two craters on the north end. The work we were required to do was to extend the strip to 2000 yards, repair the craters, blow a flying gap at the north end, clear a dispersal area and build a control tower. Possibly the only task requiring an explanation is that of blowing flying gaps. At either end of the runway it was necessary to ensure that no trees or other obstructions intruded into the glide path. The glide path was measured from the end of the runway at an angle of 1 in 20, by means of an inclinometer over an arc extending a few degrees left and right of the centre line. Any obstacle obtruding within these limits was quickly removed with explosives.

Our camp at Taukkyan was a happy one for several reasons. This was the first job we had taken on entirely on our own. We were off the main line of advance and nothing passed up or down the road outside the camp. The scenery was very beautiful; behind us lay the hills and mountains amongst which could be seen Kennedy Peak where such fierce fighting had taken place only a few days earlier. In front of us lay the Fallam Road, peaceful and quiet, and, in the early morning, looking like a little English by-way with its thick green hedges and trees. It was cold here too. There are only two places where I have worn my socks in bed at night; one was Barton Stacey Camp, near Winchester, and the other was Taukkyan. In the morning we wort to work wearing thick battle dress jackets and in the mess in the evening we wore the same rig. During the day, however, the sun's heat was great and we discarded shirts altogether.

Christmas came whilst we were in this camp and the weather was certainly seasonable, at night anyway. We were told that extra fare was available and, as Mess Secretary, I went back to collect our ration. Much had been talked about the tremendous spread we were to have and everyone looked forward to my return with the goods. Imagine the unkind things said by the six members of the mess when I returned with:

12 ozs of tinned plum pudding,

- a twopenny bar of chocolate each,
- 1 tin of fruit salad, and
- a handful of nuts and toffees.

In spite of this meagre offering Christmas Day was not a disaster, thanks to our cook, Stephen. We had, by devious means, acquired three ducks which we had cossetted and cherished. Stephen had also held back odd titbits from the rations for a number of days. We forgave him all the bully beef dinners of the past when he bore in three roast ducks complete with all appropriate trimmings. Our meal was helped

down by sherry and some carefully guarded beer. Our day was rounded off by a "Drama" laid on by the men who had also enjoyed an extra special meal with a ration of rum.

Having completed the work on the strip we stayed on to maintain it. This was badly needed for the strip was used jointly by fighters and transport aircraft, and, unfortunately, the transports raised so much dust that the fighters were unable to scramble when necessary. The only maintenance possible was the watering and rolling of the surface to bind the dust. We had no water truck but had picked up an old Japanese petrol bowser whose tank we transferred to our 4×2 Chevrolet. We attached taps and placed a perforated trough underneath. The result was a perfectly adequate water sprinkler with which we drove up and down the strip, followed by a makeshift roller.

All good things must end and so our stay at that delightful camp also had to end. We were once again stood by for a move further south to catch up with the fighting. This time our move was to take us across the Chindwin River and there was a great air of expectation for the Chindwin was linked in our minds with two things: General Wingate and his Chindits and the bridging of the Chindwin by what was, at that time, the longest floating Bailey Bridge ever built.

THE CHINDWIN

We said goodbye to Taukkyan on 3 January 1945 and headed north for the seven miles back to Kalemyo where we turned east along the road to Kalewa and the Chindwin. We were halted at a traffic control point at the head of the Mytha Gorge where one way traffic began, and had to wait until 1400hrs when the road became open to east bound traffic. Waved on by the Military Police controller we began a descent down a winding road overhanging the Mytha River, across many Bailey Bridges which were spanning small tributary streams. Suddenly the road ahead straightened out and we could see the Mytha joining the Chindwin just ahead. The road led onto a promontory of land between the two rivers, and on the left lay the famous bridge-over 1000 feet of floating Bailey. Looking at that magnificent achievement I felt intensely proud to be a Sapper. Sitting upright and at least two inches higher in my seat I drove on to the bridge and rumbled slowly across to the other side. Four barrage balloons were attached to, or near to, the bridge and at the time I thought "How like home". Once across the bridge we were shepherded into a convoy park, for the road ahead was hilly and in bad condition, and sappers were, at that moment, working on it. Our destination was the small town of Ye-U, some ninety-seven rough winding miles south-east of where we were parked. The road was not going to be open for some time so we settled down to a meal and the inevitable waiting. Then someone, I can't remember who, told us that the road ahead was impassable to 4×2 vehicles.

Frank's immediate reaction to this startling news was to give his views on the Headquarters who had issued the movement order without mentioning this rather important detail. Then he left in his jeep for Corps HQ which, fortunately, was close by. The rest of us sat around drinking tea and telling each other how bloody life was until he returned. He had been lucky for he had run into Brigadier (Tich) Steedman, the Chief Engineer, who had settled everything in his usual forthright manner.

The road was impassable to 4×2 vehicles up to a riverside village called Shwegyn which was seven miles on from Kalewa. A ferry system was being operated by a Field Company who were stationed at Kalewa and all our 4×2 vehicles were to be ferried down river to Shwegyn. The Brigadier had made certain telephone calls which ensured that we were given priority for our nine 4×2 vehicles when ferrying started in the morning.

Frank gave us this information then detailed me to take charge of the 4×2 vehicles and bring them down river by raft. Meanwhile, the rest of the convoy would move on when the road was opened, and would meet me at Shwegyn. I went across to the Movement Control post and found that the Chief Engineer had, indeed, made

telephone calls. Even the MPs at the police post knew we were very important people due to leave on the first ferry. I listened, amused, to an irate Gunner Major and an equally irate Sapper Major protesting vehemently to an unmoved and unmoving Movement Control Officer that their guns and their Bailey Bridge equipment deserved the highest possible priority.

Returning to my vehicles I awoke the drivers and had the vehicles driven over the bridge. I parked them on or near the beach, ready to embark on the first three rafts in the morning, on which we had been allocated space. I told the drivers to get some sleep but the majority preferred to sit round a fire, brewing and drinking tea. I climbed into the front of a 15-cwt truck and settled myself to sleep, but finding the night too cold I joined the group round the fire and passed the rest of the night drinking tea and smoking. When it became light I went down to the river's edge to wash. I don't remember seeing any other river in Burma that was so clean and, somehow, this fact served to enhance the aura of romance which, in my mind, surrounded it.

Others began to appear and soon some of the resident sappers came down to the rafts and started to make adjustments to the landing ramps. As the work was nearing completion a DUKW, one of those amazing amphibious vehicles produced by the war, slid into the river and made fast to the first raft. In a very short time I had three vehicles on board and the raft left. A second raft came alongside which had been loaded with a 25-pounder gun and Quad the previous night leaving room for a jeep only. This was quickly loaded and the second raft set off after the first. The third raft tied up and I got my three vehicles aboard, not without opposition from a growing crowd of would be travellers who were becoming impatient. There were no more rafts and I settled down to wait for the return of the first.

It was after 0800hrs that day, 4 January, when the first raft was seen coming up river behind its DUKW tug. Without too much trouble my remaining two vehicles were loaded, a 15-cwt truck and our valient old Chevrolet 3-ton water truck. This load left little room on the raft for anything else but a subaltern of the Caribiniers just managed to fit his jeep on. I noticed that the driver of my 15-cwt was sitting in the driving seat with a strained expression on his face. When asked he explained that his hand brake was not good and that he would have to keep his foot on the brake pedal if he were not to roll over the edge. I suggested he might put the vehicle in gear and left him looking happier.

I turned my attention to the scenery and it was worth the attention. On one side the jungle came down to the river's edge and, in little clearings here and there, I could see the houses of Burmese who made a living by fishing. On the other bank, overhanging the water, was the road along which the rest of the Company had driven the previous night. When speaking to those who had driven that way I was told that it had been a breath-taking sight, every bend in the road showing the Chindwin bathed in the light of a full moon.

The Caribinier Officer was standing near me and we began a conversation. He was extremely interesting for he had fought over that particular stretch of road just a short time before. He pointed out old Japanese positions and strong points and locations where individual little actions had been fought. His orderly produced tea for us both which helped to make the peaceful interlude all the more pleasant. The British solider is reputed to be a great tea drinker but he is nothing to his Indian comrade to whom brewing tea on a raft in the middle of the Chindwin posed no problems. As we approached the landing stage at Shwegyn I saw Frank and my *Havildar* (Sergeant) waiting for us. I said goodbye to my Cavalry friend and made ready to disembark. Once on shore Frank told me that the convoy had halted a few miles up the road. He told me to prepare food for the men and start as soon as possible. Meanwhile he would start the main convoy and I was to catch up. A short while after he left the MT Sergeant, Sergeant Jefferies, appeared to take up position at the tail of the convoy as LAD.

YE-U

It was several hours before I saw the convoy, and when I did they were parked at the roadside. I pulled in behind and got out to stretch my cramped legs. As I dismounted a worried looking *Jemadar* (Viceroy Commissioned Officer) Chandrasekaran came up holding a map. He explained that the front of the convoy was nowhere to be seen and an MP on duty had told him that the leading trucks had turned right at a road junction. Chandrasekaran maintained, and I agreed, that our route lay straight on. After a short wait I gave orders to move out. We had only started when with a hooting of horns the Company Commander, Company 2IC and Company Subadar (VCO) overtook in their jeeps. A sheepish looking Frank explained that they had listened to the MP instead of trusting their maps.

About 1700hrs we stopped again and pulled off the road to make a meal. There was still a long way to go and Frank was anxious to push on. I argued that it would be difficult to find a camp site in the dark and suggested that we stay where we were in what was a reasonable site. We could then make an early start in the morning. Frank agreed and we settled in for the night. It seemed no time at all, however, before my orderly, 77451 Sapper Chinakalundai, was calling me with his usual "Sahib, sahib, time hogaya". I always thought it a great shame that the wonderful names of the Madras Sappers were not used because, presumably, someone found it too difficult to master the multi-syllable words. Instead my Orderly was known as "51", and my driver was "10".

I lay in the dark morning for a few more minutes, savouring the hot sweet tea which "51" had brought and listening to "10" warming the engine of my jeep. After hasty ablutions I joined the others at the mess "table", the bonnet of Frank's jeep, for a mini O Group cum breakfast. Our Indian Officer, Frankie, had gone ahead from Kalewa to find a camp site at Ye-U and Frank proposed to go ahead now, locate the camp and send a guide back to meet the convoy. This matter settled, we embussed and moved out. It was very cold but very beautiful. At first our headlights drilled channels through the mixed gloom of pre-dawn dark and tall trees, and then, very quickly, as it always happened in the East, the sun rose and alternate bars of light and shadows of trees lay across the road. Soon it was warm emough to remove the outer layers of clothing and a little later I was again driving stripped to the waist.

The road was only fair, winding through fairly dense jungle, up and down hills and across rivers—sometimes by bridge and sometimes by ford. I felt an air of unease creeping over me. This was our second day of driving without sighting another unit, and I could not locate our position on the map. However, as one of the set of maps had been unobtainable I assumed that was the one we were on. But still the uneasy feeling persisted as mile after mile went by without sight of the convoy ahead. Then, about lunch time, I saw a halted convoy ahead and pulled in behind our own vehicles.

Over tea and a K Ration, Ron and I discussed the morning's run and I was relieved to find that he too had experienced the same uneasy feelings. The convoy moved off again and shortly afterwards we left the brown scrub covered hills and saw on either side green paddy fields which heralded our arrival at Kaduma. We made a brief halt while Ron enquired at a police post if there was any message for us. Frank had left a message and we were directed down a road leading to Ye-U and our camp. Along this road were notices saying: "Vehicles keep your distance. Beware enemy bombers". With the intention of having "10" slow down to open up a distance between ourselves and the next vehicle I passed the information to him. "Ahisti jao, (Slow down) '10. Japani bomber hai". My message had the wrong effect for "10" immediately stuck his head out to survey the sky, whilst the jeep roamed perilously about the road. "Kidhar, (where) sahib"? he said when he brought his head back in again. I re-phrased my message in my limited Urdu and "10" was reassured. The notices had the desired effect, however, for I observed that all the vehicles were running with about 200 yards between each. A few minutes later we turned into our camp site and began again the monotonous business of setting up house.

On the following morning, 6 January 1945, work began on the strip. This was a

Japanese airfield which had been denied to us by cratering the runway and digging trenches across it. Fortunately little damage had been done to the taxi track which ran parallel to the strip and our job was to extend this to 2000 yards. Still without the benefit of machinery we started in mud and rain at the north end, flattening bunds, uprooting trees and hedges and filling depressions.

7 January was enlivened for us by a visit from a number of Japanese planes. They were driven away from the vicinity of the airfield by anti-aircraft fire and we watched as they dived on a target some way off. They returned in our direction but were again driven away and finally departed. It was later learnt that the target we saw them attack had been the Bailey Bridge across the Mu River. The only damage they had done was to put two British ORs into hospital after machine gunning a convoy at the bridge.

On 8 January we received orders to move but then ran into a difficulty. The advance had been so swift that all supplies of petrol in 19 Div had been exhausted. That afternoon we were given an issue order for the necessary fuel and I was detailed to take a vehicle down to the Supply Point in the morning and collect it.

At 0600hrs on 9 January 1945, I set off, after a hasty meal to drive the few miles to the SP. When I got there everyone was still in bed, but after a while an officer was found who, sticking his head through his mosquito net, perused my issue order and pronounced it satisfactory. Armed with his initials on this document I eventually collected the fuel. Before I left I was told how lucky I was as, until yesterday's supply drop, the division fuel reserve had been six gallons. I delivered my precious cargo to Sergeant Jefferies who began the task of refuelling the Company vehicles. Frank left to recee the new site and shortly afterwards the convoy moved out, once more heading south.

There was a certain air of anticipation on this trip for we were to pass through the town of Ye-U where we expected to see the first railway since leaving Dhimapur, some four months earlier. It seems a small thing to become excited over, but we had been travelling through and living in mountains and jungle all that time and were still new fangled with the sights of civilization.

(To be continued)

Correspondence

Lieut Colonel P O M Chitty MBE, RE Royal Engineers Diving Establishment Marchwood Southampton SO4 4ZG

THE NEW RE CAREER STRUCTURE

Sir,—At the E-in-C's Conference we were told that the new Career Structure for Soldiers was not widely understood and we were asked for ideas as to how it might be sold to the men.

At RE Diving Establishment we have been working on that excellent coloured Career Chart issued by the RE Trg & Dev Team. By introducing Dice and Chance Cards (based on the realities of military service such as Op Banner Tours followed by Overseas Unaccompanied Tours, Pay Banding, PVR, Undermanning, Training Without Proper Equipment etc) we hoped to produce a Dice and Board Game for up to six players in time for Christmas release.

Unhappily due to the reasons covered by the Chance Cards, we have not had enough soldiers to trial it nor have we yet had a player who has managed to attend the Mandatory Courses in sufficient time to complete the Career Game to Field Troop Sergeant. We now hope to have it ready for the next E-in-C's Conference. This delay therefore allows us more time to improve the military realties reflected in the Chance Cards.

Any suggestions your readers may have would be welcomed by us.—Yours sincerely, Peter Chitty

Colonel I T C Wilson MBE MC Bryony Cottage Kings Somborne Hants

SAPPERS FIT FOR WAR

Sir,—It had been my intention on retirement to try to write an article for the Journal. I reasoned that I had earned the right during over thirty-seven years service to philosophize about the Corps; but the pressures of a second career have left insufficient time to put my thoughts on paper. In any case, much of what I wanted to say is covered by Mike Addison's excellent article (I wish I could claim some credit for influencing him when he was commanding a troop in 9 Parachute Squadron). His comments, the Sims paper and the E-in-C's addresses to the Corps in 1978 and 1979 (not necessarily in that order) leave little to add, but there are points to emphasize.

The majority of troubles of the Corps at this stage are a reflection of the malaise which affects the Army as a whole as it converts inexorably from colonial to metropolitan soldiering and re-establishes its role, despite blips called Northern Ireland and Rhodesia on the graph of progress. The style of soldiering implies a lot more change still—more permanent bases (the housing cooperative is not so far fetched—viz Pegasus Village, Aldershot in the 1950s)—greater exposure to civilian constraints (and expectations)—almost inviolate weekends and other aspects making it harder to be fit for war. It would be encouraging to think that a plan is in progress leading to controlled evolution (incorporating perhaps a study of the best aspects of the major continental armies), rather than merely a reaction to events in the light of expediency at the time.

It would also be encouraging to see a study into Mike Addison's slaughter of sacred cows. But why stop there? Could some of the sapper tasks be done by different means? Would it be possible to use machines, not explosives for demolitions? (Certainly it might ease the sensitive considerations of firing preliminary demolitions in a European Alert). As for PQEs (a thoroughly unsatisfactory term, since all sapper officers are, or should be, Professionally Qualified (Military) Engineers), is there no better way of retaining a construction expertise than by having to manufacture tasks outside the Army which do the Corps no good in the viewpoint of the Army as a whole? Sappers are, above all, soldiers and must realize that the Army is their bread and butter and it is what they do for the Army that really counts. Yet somehow, senior engineer officers have to learn to manage the large scale engineering which might come their way if ever a situation arose again where national mobilization brought a large influx of professional engineers and skilled tradesmen.

It would be so much easier if an aim could be defined, but every sapper seems to have a different one. Certainly the aim should not be solely to have a sapper on the Army Board as suggested in the Sims paper—heaven preserve the Corps from a sort of Royal Horse Engineers! I could go on; it seems a pity that the opportunity of the rebuild of Gibraltar Barracks missed moving the Training Group to Chatham and the RSME to Minley; formal training on courses should be replaced extensively by on-the-job training; every sapper sub-unit should spend a period regularly living with (and working for) other teeth arm units; the Combat Engineer trade is a relic of a conscript army and should be abolished.

How should it be done? I wish I knew. But it does seem that Mike Addison's twenty-one points would be a good start. It's a busy life for everyone; could the Corps sponsor a Defence Fellowship Study?—Yours sincerely, Ian Wilson.

Colonel J H Edwards BSc Headquarters Royal Engineers Second Armoured Division British Forces Post Office 22

SAPPERS FIT FOR WAR

Sir,—Much of the response to Colonel Mike Addison's article has been concerned with speculation about why there has not been more response; this could become sclf-perpetuating. Perhaps the answer is that there is not very much with which to argue in the article. It is written in the well-known Addison style (which I much admire), and is very entertaining, but it is really the style rather than the content which is provocative. Most of the points he makes reflect well-known problems, and none of his solutions is particularly revolutionary.

Surely nobody is going to argue that we should not use more machines? Surely everyone agrees that PQEs and PSCs should talk to one another? Incidentally I believe that this idea of the conflict between combat and construction engineering is another bit of Sapper folklore. Any two Sapper officers discussing it will agree that the two are totally interdependent, and that one is not more prestigious than the other, but that there is a faceless body of prejudiced officers somewhere trying to tear them apart. His list of twenty-one points is probably not too different from the sort of notes that any CO makes, before he starts to plan his training programme.

I disagree with the suggestion that officers do not write to the *Journal* for fear of the effect on their career prospects. At the Staff College do they not also teach the dangers of arguing from the particular to the general? It is lack of motivation or simple indolence, rather than apprehension, that inhibits authorship.

In conclusion I should offer something constructive, and this is it. In arguing the merits of machine or manpower (and the latter does exist; Mr Green described it in his authoritative article in the December issue, and I have seen an example of it on a £15m British aided road project in Nepal, using 15,000 coolies and one bulldozer), Mike Addison has pointed, quite correctly, to the inefficiency of using men to provide power, but he has ignored their flexibility. Most of us have experience of deploying for a job with what was thought to be the correct equipment, only to find on arrival that it can not be got there, or the job has changed, or the equipment will not work. Very often it is then men, albeit working inefficiently, who do the job. Moreover men can be inspired to work less inefficiently, whereas a machine has no soul, and either works or it does not. In this connection it was a relief to read in Brigadier Henniker's letter in the December issue, that such things even happen to soldiers as distinguished as himself, when "the compressor would not start and the excavation was done very easily with hand tools".—Yours faithfully, J H Edwards.

Lieut Colonel J A Coombs FIplantE, MBIM 14 Mansion Row Old Brompton Gillingham Kent ME7 5SE

CORPS CUSTOMS

Sir,—I notice that at Chatham, the Headquarters of the Corps, the customs of the Orderly Officer wearing his Sam Browne in the Mess, and of Captains and Subalterns saluting the Adjutant when they first see him in the morning, are no longer observed.

Have these customs lapsed throughout the Corps or has the Corps Committee authorized the change? If so, when?—Yours faithfully, J A Coombs.

Brigadier A Prain CBE "Sanjoby" Eype, Nr Bridport Dorset

GENERAL SIR WILLIAM DOBBIE

Sir,-I have just read in the *Journal*, the very sympathetic review of the biography of General Dobbie. I have not yet read the book itself but there is one dramatic episode in his career, not mentioned in the review, which I hope to find written in the book.

I served as an Instructor under General Dobbie at the SME when he was Commandant and I can certainly confirm that the Dobbies "kept a good table". Also I well remember in the drawing room in Flagstaff House after one dinner party, how the general, proudly albeit modestly, showed some of his guests the actual telegram signed by him at GHQ which ordered the BEF cease fire in November 1918.

I did not serve under him in Malta, but I spent several years out there recently, and picked up from those who were still there, and had been there under him, some of the many stories concerning him during the time of the siege. One dramatic episode I heard about many times may not be true but I hope it is, because it so clearly shows how General Dobbie was once again so intimately concerned with the more momentous events in British Military History.

I have been told that during the worst period of the siege of Malta, Dobbie was presented with a telegram for his signature for immediate despatch to the UK. The wording was to the effect that Malta could no longer hold out. This would have been a cease fire acknowledging defeat. The telegram in 1918 proclaimed victory. As we know, the signal was never sent. That was one telegram that General Dobbie could never have signed.—Yours faithfully, A Prain.

> Captain M C McCabe RE HQ 2 Armd Div BFPO 22

DISTINGUISHING MARKS

Sir,—Major Russell-Jones' letter on dress touched on a subject which, in my limited experience, has always provoked a thunderclap of apathy from RE officers. I do not agree with his proposal to have our combat dress distinctively marked. Combat dress is for use on operations and is a uniform which should not aid the casual observer to identify the role of the wearer.

Barrack dress is a different matter. I support the case for a smarter and more distinctive dress for our officers. With service dress being so seldom worn there needs to be a presentable alternative for those occasions when officers appear in public. The present nondescript combination of the issue green trousers and heavy duty pullover is both drab and anonymous. When worn without a tie and with a beret, as is often the practice in units, it also looks fairly scruffy.

I do not suggest that we adopt some kind of Ruritanian fantasy as an alternative. I do suggest that consideration be given to the introduction of a little more stylish and a much more distinctive and Regimental order of dress that clearly identifies a Sapper officer. There will no doubt be more extreme and even more pompous letters than this one on the subject. If no action is taken to give the matter some attention, I for one would not be at all surprised. If I may make one final plea. Whatever the follow-up may be, I would be very much opposed to any new uniform which made us look more like Gunner officers. It is often only too difficult with some of our officers to tell the difference as it is!—Yours sincerely, Michael McCabe.

Brigadier H de L Panet CBE 161 Wilton Road Salisbury Wilts

ESCAPE FROM SINGAPORE

Sir,—A clearing out of old papers has revealed the enclosed cutting from the Sunday Express of 20 November 1949.

The "bravest man" was N H W (Noel) Corrie, a Sapper, commissioned on 31 August 1933. He joined me in 17 Field Company in Bulford in 1937, on his first posting to a unit, and became a great friend.

His death was not in battle nor did it earn him any honours except this mention by the only British survivor. To us who knew "Ivor" Corrie, this story of the courage and the dignity of his dying will come as no surprise.—Yours sincerely, H de L Panet.

This cutting is republished by kind permission of the Sunday Express: THE BRAVEST MAN

"Next morning the man I have always thought was the bravest soldier among us stepped forward with a suggestion.

"It was Major Noel Corrie. It would ease the almost unbearable overcrowding, he told the Brigadier (Paris), if he and some volunteers could construct a raft on which they might be towed behind the drifting boat. Corrie and some twenty of the men, including two or three of the Javanese seamen, swam around collecting debris with which to construct their raft. When they completed it, it was a shaky structure 20ft by 20ft, tied together with pieces of cord, strips of cloth and sisal fibre they had salvaged from the sea. They used the sisal, too, to make a tow-rope, which they attached to the stern of the boat.

"Then the twenty of them climbed aboard, and the raft sank until they were waist-deep in water. Corrie must have known that there could only be one end to the course he had chosen. Man by man through the three days that followed, members of his little band slipped off and disappeared. At last there was only Corrie himself, dazed with exhaustion, his upper body blackened by the sun, his legs bleached by the water.

"Numbers in the boat had dwindled too, and Paris ordered Corrie to return. He was pulled aboard, more dead than alive, and his gallant, piteous little raft was cut adrift. He died that night."

Memoirs

LIEUT COLONEL E H BOWEN OBE

Born 23 May 1898, died 30 April 1979, aged 80

EDWIN HAROLD (Ted) BOWEN was possibly the last Sapper Old Contemptible in that he took part in the first battle of Mons, and in the subsequent retreat, as a sixteen year old bugler RE, having originally enlisted as a boy apprentice in April 1913. He was returned to the School of Military Engineering Chatham in 1915, as being under age for field service, but returned to take part in the battles of Passchendaele and Ypres during 1918. He then volunteered to serve with the Allied Relief Force in North Russia where he served from April to November 1919. In 1921 he was posted to India where for two years he attended the Civil Engineer Course at Thomson's College, Roorkec. This was followed by sixteen years service with the Military Engineering Services throughout India. In 1940 he was commissioned into the Royal Indian Engineers and served for the remainder of the War in North West India in MEMOIRS

Works and Engineer Staff Appointments. Possibly his most rewarding task was in the period late 1942 early 1943 when he was responsible for the construction of a ring of twelve satellite airfields in North West India.

Due to ill health he retired in 1948, but in 1949 he was asked by the then Engineer-in-Chief Pakistan, General Sir Millis Jefferis, to return to Pakistan to help with the reorganization of the Pakistan Engineer Services. This was followed by a period of five years as the Chief Engineer Adviser to the Commander-in-Chief Royal Pakistan Air Force. He finally retired in June 1954 having been awarded the OBE for service to Pakistan.

On 30 September 1924 he married Eva Kelsey Fairs, in Mhow, India, by whom he is survived, together with their daughter and three sons, one of whom is a serving Sapper Officer.

DHB

BRIGADIER E J B BUCHANAN DSO

Born 16 February 1892, died 13 September 1979, aged 87

EDGAR JAMES BERNARD BUCHANAN joined the Royal Military Academy Woolwich ("The Shop") in July 1910 from Bedford School. I joined the same afternoon. He became a Royal Engineer, I joined the Royal Artillery. Until 1936, when his career will be the subject of other tributes, he was a regimental officer of great skill and drive.

The climax of his early service came in France in March 1918, when he was commander of 1st Battalion Royal Engineers of his Division. The Fifth Army was falling back in the face of great odds. The Division was on a very wide front and in great jeopardy. To fill a gap, a composite unit was formed. It consisted of his battalion and every spare man who could bear arms. Lieut Colonel Buchanan, as he then was, was put in command.



In due course the Germans attacked. While this battle was in progress he was wounded in the leg. As he lay on the ground, he was hit by a bullet from a machine gun which had appeared behind his line. The bullet went into his body at the base of his spine and finished up in his shoulder. For his action on this day he was awarded the Distinguished Service Order. This wound troubled him for the rest of his life. Only four years ago was he given a disability award, which should have been his in 1918. Teddie Buchanan, we called him "Tich" at "The Shop", was an Ulster man with

all the qualities that go with such a background. He was forthright, a man of very pronounced views and a forceful speaker. He was an officer of the "old School" devoted to the ideals of his time and a passionate defender of them. To the end he never varied.

The death of Evelyn, his wife was a devastating blow. She had been his loyal companion and was much loved wherever she went. In 1971, Teddie married Kathleen Halahan (Bridget) who, in spite of a crippling disability, cared for him with tender devotion.

I, who have known him for sixty-nine years, feel I have lost a friend, the like of

LAH

whom few can have enjoyed.

Brigadier E J B Buchanan DSO.

My memories are mainly of the time when "Tich" Buchanan was Commander Fortress RE in Malta. One could always rely implicitly on his full support in the best interests of the Corps and of all under his command. We were a happy "regiment", in work and play, due in great part to the CO. There must be many of us, British and Maltese, who remember him with affection and gratitude.

KFD

Brigadier Buchanan was a Lieut Colonel on my staff in the War Office during the latter part of WW2 and on my retirement succeeded me as Director of Fortifications and Works. As a regular Sapper he had specialized in E&M Engineering applying his professional expertise to military matters effectively, efficiently and quietly. This last quality immediately springs to the minds of those who knew him. Some might say self effacing but that would be an exaggeration as "Tich" was always there when wanted and his advice was valued. As another member of the Corps said of him, he was a gentle man, nevertheless a good soldier and a sound engineer.

HEH

I first met Lieut Colonel E J B Buchanan, affectionately known as "Tich", when he came to Malta in 1935 as CRE in Command of 16th and 24th Fortress Companies. It was a time, because of the expansion programme, for the young and junior, with ability, to gain invaluable experience. We could not have wished for a more able and experienced Commander.

Although very junior I was fortunate to get to know the CRE quite well. He was one of the most considerate and approachable senior officers under whom I have served. His standard of man management was exceptional. He once told me that however important expensive plant, machinery, tanks and weapons might seem, the most valuable element of any command was the lives of the men entrusted to us. In his terms, each one represented nineteen years worth of effort, eighteen to build and a year to train. "Look after 'em and make certain that not a single one is ever wasted" was his sound advice.

To a casual observer "Tich" would probably not have presented a colourful and dynamic military figure, but his unobtrusive human approach and his constant consideration for his men soon won for him their affection and respect. None of them would, I think, have dreamed of letting him down. I recall the occasion when the Sappers, in the absence on exercise of the infantry battalion on garrison duties, were detailed to mount the Palace Guard at Valetta. This duty provided the local version of the London effort at Buckingham Palace, and entailed long exposure of the guard to the public gaze. The guard, mounted by the 16th, were all 6 feet tall or over, with the Wolsley helmet adding a useful inch or two. After mounting and turning out for the Governor's arrival the guard were a little surprised, on being dismissed to the guardroom to find the CRE already there. He had just "dropped in" to let them know that, as a spectator that morning, he had never felt more proud to be a Sapper! Praise indeed from the former twenty-eight year old CO of the 1st Bn Royal Engineers raised to fight as infantry in WWI. It was this WWI experience, I am sure. which gave rise to his lasting concern about men and his dictum, that the standard of infantry training of the Sapper should be that of the infantryman.

Having left Malta in 1937 I next met "Tich" early in 1943 when I appeared before one of the first Regular Commission Boards. The Sapper member, for Corps applicants, was none other than Brigadier "Tich" Buchanan!! My confidence did not suffer as a result of my "special to arm" interview!

In most undertakings there has, I am sure, got to be an element of luck. My slice was, that at a very young and impressionable age, I had the good fortune to serve under "Tich" and to benefit from his wise advice on all matters military. I was fortunate too in being able to be present at his funeral, to offer my condolences to the family, and pay my last respects to a kindly gallant sapper—a warm friend—to whom I owe a very great deal.

MEMOIRS

MAJOR GENERAL R L BOND CB, CBE, DSO, MC, Hon FRAM

Born 10 July 1890, died 13 May 1979 in his 88th year

RICHARD LAWRENCE (DICK) BOND Was the youngest of three famous Sappers, his father being Major General Sir Francis G Bond and his elder brother Lieut General Sir Lionel V Bond. He was educated at Cheltenham and "The Shop" and commissioned in the Corps in July 1910. Both his father and his brother had been on active service on the North-West Frontier with the Bengal Sappers and Miners (his father had also been Commandant of the then Queen's Own Madras Sappers and Miners), and it seemed logical that he should follow their lead. But during his YO Courses all eyes were turning towards Germany and the possibility of a major war in Europe. It so happened that about



this time Lord Kitchener, under whom Sir Francis had served in both South Africa and in Army Headquarters, Simla, was paying his old friend a visit. Young 2nd Lieutenant R L Bond was present, and Kitchener asked him about his future posting when his YO courses were over. Dick Bond at once asked him whether in his view a European war was likely to break out during the next three years: and Kitchener said "Yes": so Bond applied for and got a posting to the 23rd (Field) Company in Aldershot, which, with 26th Company, formed the divisional engineers of the crack 1st Division.

No attempt will be made here to describe the extraordinary wealth of detail contained in "R B's" splendid 6-part History of "The 23rd (Field) Company RE in the Great War 1914–18" published in the RE Journals of 1928 and 1929. His meticulous record includes the many honours and awards gained by officers and men; the unit's casualty figures (total 279 all ranks killed and wounded); congratulatory messages from commanders at all levels; operational tasks carried out, it seems, almost as often with rifle and bayonet as with unit tools, and so on. R B himself commanded the Company during periods between 1913 to 1915, and he then became CRE 1st Division up to March 1918, a total of 34 years with the Division. It was only as a result of a 1918 GHQ Order (that officers who had served continuously in front-line divisions since 1914 were to be posted elsewhere for six months) that his connection with 1st Division and 23rd Company in particular came to an end.

Of particular interest is his description of the speed of mobilization in 1914. The summer (he says) was unusually warm. Bridging camp at Wallingford was over. The only cloud disturbing the horizon was the situation in Ireland. A telegram stopping all leave arrived on 30 July, when strenuous advance preparations were immediately put in hand-and here he quotes an unusual mobilization item "331% of the Company's officers got married"! (This mathematical enigma actually refers to R B's own wedding. A man of quick decisions, he married Isabelle, a daughter of Lieut Colonel T J R Mallock on 1 August.) By 1805 hours on 4 August when the "mobilize" order was received, plenty of tiresome details had been seen to. Except for one man, who arrived two days late, all Reservists and remounts had arrived by the second day of mobilization. On 11 August the Company had the honour, with other units, of being inspected by HM The King. R B writes proudly "On 15 August a fine, fit, hard-marching body of men marched off the Gibraltar Barracks parade ground" to entrain at Farnborough complete with wagons and horses. In spite of two days delay at Southampton the unit finally detrained at Le Nouvion, some 35 miles South of Mons, at 0430 hrs on 21 August: quick work by any standards.

Major General R L Bond CB CBE DSO MC FRAM

66

The unit was soon in action, but on 20 December 1st Division was hurried to the support of the Indian Corps at Givenchy, against whom a powerful German attack had been launched. (R B notes that at one stage his unit worked in close co-operation with the Bengal Sappers and Miners of the Meerut Division on their left.) The Company concentrated on trench-digging and the construction of "keeps" in the Guinchy brickfields area; and took part with the KRRC in some hard hand-to-hand fighting (with numerous casualities) to regain control of a railway embankment which dominated their position. Eventually the British defences became so strong that the area was "stabilized for the rest of the war". A laconic entry in R B's record reads: "on 10 February, the Company received a recognition of all its strenuous efforts in the award of a DSO (Lieut R L Bond.)" Three years later, as Lieut-Colonel, he was to win a Military Cross.

Anecdotes abound. In the neighbourhood of Bethune, the unit horses and chargers escaped overnight from their paddock. R B's horse "Alexander the Great" (with an Olympia record) was "recaptured" when he spotted it, ridden by the BSM of a passing Artillery Brigade, together with two of his cobs hauling a gun!

R B's recollection of individual officers and sappers, their names and achievements, was phenomenal—for example, his account of "Sapper Alfred Pratt", who won a MM collecting his scattered working party of sappers and infantry and preparing them to fight off a local counter-attack. "Corporal Nunn" (who died of wounds, a posthumous DCM) "will be remembered as a first-rate cricketer and footballer: a rare good fellow and a great loss to the Company". "Sapper Mather who arrived on the scene first . . . and with the greatest gallantry commenced to pull out the burning guncotton thereby saving the remaining 100lbs of guncotton and 50lbs of ammonal in the tool cart . . . deservedly received the MM". There are literally dozens of similar notes and citations, and hardly a page is turned without mention of one or more such comrades-in-arms.

The War ended, and after a tour of War Office duty and promotion to a Brevet Lieut-Colonelcy, R B was posted to India as CRE Waziristan, where he took part in the Waziristan Operations of 1936-37 following which he was appointed a CBE. As a Brevet Colonel he returned to the UK and an AQMG appointment in the War Office. In 1939 he succeeded Brigadier C A Bird as Chief Engineer Aldershot Command where he was to experience for the second time mobilization for a World War. He became Chief Engineer 1st Corps of the British Expeditionary Force and later Major-General in charge of Administration (1940) before proceeding to India, with his wife, to take up a similar appointment as Deputy Quartermaster-General, in 1941. Here, on 21 December, he was to receive the tragic report of his son's death in action in the Western Desert: T/Captain John R F Bond RE had been killed in mineclearance operations while serving in 4th Field Squadron of 7th Armoured Division. Earlier in the year, Mrs Bond had returned to the UK through ill-health. Now, for the second time, R B was to succeed Major-General C A Bird, this time (1942) as E-in-C India and at a critical period in India's history. He was made a CB in 1943. But once again, he was to suffer a close family bereavement for in 1943 he received the sad news that his wife had died, at home in England. During the next three years, he was to fill high appointments as GOC, first in Trincomalee, then in Sierra Leone (1944) and finally (1945-46) in Nigeria. He retired in 1946 and soon took up a most unusual appointment, that of Chairman of the Committee of Management in the Royal Academy of Music. Here, no doubt, his wide experience was put to effective use, because when he retired after eight years in the appointment, he was admitted to an Honorary Fellowship of the Royal Academy of Music. Meanwhile in 1949, he married Mary, daughter of the late Sydney How: who survives him and who still lives in Compton though no longer at "The Dykeries". Of his Masonic activities, one can only say that he attained the status of Provincial Grand Master; and that he founded a charitable trust called the "Richard Bond Homes".

His funeral on 17 May took place in St Nicholas' Church, Compton. The Royal Engineers Regimental Colonel was present and the pallbearers were found from

MEMOIRS

young Sappers of the RE units of 11 Engineer Group. The little church was packed with mourners, and one could see amongst them the full range of his many interests and local activities, over whose welfare he had for so long presided: The British Legion: RE Association; Scouts and Guides; and others including the Priors Field Girls School, Godalming, of whose Management Committee he had for many years been Chairman. Later, on 16 June a "Service of Thanksgiving for his life" was held in the Royal Garrison Church, Aldershot. Again the congregation was a large one, and to a layman's eye, this might have consisted largely of his brother-Masons: as indeed befits a Past Provincial Grand Master of the Masonic Province for Hampshire and the Isle of Wight. The Bishop of Portsmouth (the Right Reverend John Phillips) was present, and the Address was given by the Most Reverend E E Curtis, CBE, Archbishop of Mauritius and the Seychelles.

To "R B's" widow we offer our condolence on the passing of this great but kindly man, who has done so much for so many. TB

BRIGADIER R S G STOKES CBE, DSO, MC

Born 1882, died 24 February 1979, aged 96

RALPH SHELTON GRIFFIN STOKES fought in three major wars in this century. He was one of the very few who fought in the Boer War who also earned the 8th Army Clasp in WWII.

He was born in Windsor and was educated privately. In 1889 he vanished from his tutor's care and was next heard of in the Cape Province where he had enlisted in Paget's Horse, in which his elder bother was serving, operating with Methuens columns in West Transval. It was here that he had the unnerving experience of having his horse struck dead by lightning when he was standing beside it. After the Boer War he returned to the UK and studied mining at the Camborne Exhert of Mines and texted his low life of



School of Mines and started his long life as a mining engineer.

He was in Alaska when WWI broke out and he hurried home to enlist in the London TA Divisional Engineers. As a mere Corporal an inspecting General took him out to lunch at his Club to ask him whether the unit was ready to go to France. Once there he was heavily involved with tunnelling operations and it was he, with another man, who lit the fuze when the "Hill 80" mine was detonated. He finished the war as Controller of Mining, First Army and was then nominated as Chief Engineer (CE) of the British Archangel Campaign where he served for the duration of operations under General Ironside.

From 1920 to 1928 he was Superintendent of the De Beers mines at Kimberley where, in 1921, he married Lora Mary Bradford.

In August 1939 when he was nearly 57, and war with Germany seemed inevitable, he was determined to rejoin the Army and returned home. He arrived on 8 Sep and immediately reported to the CIGS, his old boss General Ironside, whose first words were: "Stokes, you are five days late".

In early 1940, in Yorkshire, he joined, as CE, what was to become part of "Rupert Force", the combined British, French and Polish Force, assembled to drive the Germans out of Norway. The word went round that he only had six years service—two in the Boer War and four in WWI! Even in those far-off days he was a veteran and because of this, his pride in the Corps and understanding of Sapper

Brigadier R S G Stokes CBE DSO MC

problems and his unflagging energy, he soon endeared himself to all ranks in the Force. When in April 1940 they landed in Norway, few of them having heard a shot fired in anger, they were immensely heartened by his courage, imperturbability and experience of Arctic campaigning.

This is not the time to describe the operations of "Rupert Force" which was admirably described by Brigadier Stokes in the September 1975 *Journal*. Two memories of his varied activities may be cited—his insistence on a field trial of the issue double Arctic sleeping-bag by himself sleeping out in the snow in it, and his unnerving habit (a South African mining engineer's trick) of crimping detonators to fuzes between his teeth!

From 1941 he spent three years in the Middle East and when asked to write about his experiences he replied: "... memory plays strange tricks and I find that my recollection of incidents and names is much hazier for that period, *only* thirty odd years ago, than for the Boer War, over seventy. Many personalities stand out vividly in my mind from those days from Methuen our General to Trooper Rose of limejuice fame."

He was awarded the MC in 1916, DSO in 1917, OBE in 1919, CBE in 1942 and was mentioned seven times.

Some quotes from the contributors to the Memoir reflect the feelings of those who knew him:

"... I had the privilege of rencwing my friendship with a man who to the end of his days preserved his outstanding qualities of alertness, unselfish courage and devotion to duty; on his mother's side (she was a Suckling) he was descended from Horatio Nelson—blood will out".

"... It was not until he was a very young 95 that I had the honour of meeting him. I was immediately struck by his alertness and interest in the Army and in particular the Corps. He was a man who had an enormous sense of service and led by example. He was also extremely modest, when I addressed him in a recent conversation as "Brigadier", he told me not to bother about his rank as he had never been a proper soldier!"

"... Whether in the Corps or out of it, there can be few contemporaries now surviving Brigadier Ralph Stokes, whose wonderful life of service to his country, his Corps and his family began in 1882 and ended only three years short of his century."

GS. PHB

LIEUT COLONEL E F BRAWN

Born 1 August 1905, died 11 July 1979, aged 73

EDGAR FRANK BRAWN was commissioned into the Supplementary Reserve RE in August 1930. After seven years with 107 Company RESR he was posted to 104 Coy in 1937 eventually attaining command and his majority. He mobilized the Coy in 1939 and landed in France on 4 September. He commanded the Coy throughout the operations in France (he was "mentioned" twice), the evacuation some three weeks after Dunkirk and in UK until, in November 1941, he was posted to War Office as ADFW 4 as a Lieut Colonel.

It was at the Directorate of Fortifications and Works that he really made his name. He was responsible for design and when he arrived he found that the design functions was spread over at least four drawing offices. He proceeded to amalgamate the fragments.

Following Pearl Harbour the Army Works Services were given the task of providing accommodation for the massive US Expeditionary Force in addition to similar work for our own expanding Army. It fell to EFB to execute a massive standardization programme for camps, huts, sheds, services (including sewage disposal plants and water supply). In this work considerable importance was placed on the preparation of standard packages of parts designed to help speedy construction. The oustanding of many achievements was the design of the Romney Hut or Shed.
Many of these can still be seen in civilian use all over the world.

In May 1944 he was posted to 4 CE Works as SO RE 1 and landed with that organization in Normandy on D + 1. Later as CRE South Beveland he was engaged on the repair of the badly disrupted (by military action) drainage system and dykes in the flooded areas around Walcheren

EFB was an excellent engineer and a perfectionist. He was modest but persuasive. His ability to grasp the main essentials of a problem and at the same time to understand and appreciate the finer details was oustanding. This combined with his propensity for hard work inspired all those who served under him.

In civilian life he was an engineer with ICI at their Billingham, Castner Kellner and Salt Works and later became Secretary of the Fibres Division of the Company. His main hobbies were fishing (his dry fly casting was a joy to behold) and painting.

To his wife and three children we offer our deepest sympathy. HEH, JSB, DB

BRIGADIER R D KEANE BA

Born August 1895, died 16 September 1979, at age of 84

ROBERT DENIS KEANE was educated at Highgate School from where he won an Open Scholarship to Cambridge University in 1914. There he completed one term only, since the First World War had started. He joined the Cambridge University OTC and took the Army Exam for Woolwich and Sandhurst. He passed in first by over 1000 marks which perhaps was a unique distinction and a record. He was commissioned in the Royal Engineers in 1915 and came to Chatham as head of his Batch.

He spent the War in Salonika, Turkey and Russia and as a subaltern in a Field Company he had the usual excitement of the Doiran and Struma fronts. On one occasion he was given the job of demolishing a bridge two miles behind the Bulgar lines and he had to work out his plan and list of stores with the help of a distant view through his field glasses. For this he was



mentioned in despatches. On the conclusion of the war he went with the Army of Occupation to Constantinople, Tiflis and Batoum and from these places had a grandstand view of the flight of the Russian refugees to Constantinople

He returned home in 1922 and was sent on the one year course at Cambridge University who very generously reinstated his 1914 Scholarship and he was able to stay on to take a First Class Honours degree.

Between the Wars he spent a long time in India where he was employed on the large Hydro Electric project in the Punjab. There he had the fascinating job of constructing a tunnel to pass the Uhl River two miles through a range of hills to another valley some 2000ft lower.

In WW2 he was sent as a CRE to Norway (Undlesness) and had Michael Calvert, who was later to become a famous Chindit Brigade Commander, as his adjutant. The last two years of the War he spent in Burma as a Chief Engineer and was again mentioned in despatches. He retired from the Active List in 1948 and then became a Civil Engineer with the Air Ministry.

He was a sound, capable and respected engineer and got quietly on with the job

Brigadier R D Keane BA

without making a song and dance about it. Much the same could be said of his private life, and even of his golf! That makes him sound a bit dull, and that is quite wrong. He had a quick and enquiring mind and a pleasing vein of humour tempered all his judgements. He had wide interests and was always a pleasant companion. For many years he suffered from the crippling disease known as Parkinsons which became progressively worse and this he bore with his customary courage and quiet humour. In 1924 he married Dolly Monckton and he is survived by a son and two daughters. W McM K, HMW

Book Reviews

FROM RECRUIT TO STAFF SERGEANT N W BANCROFT

(Published by Ian Henry Publications. Price £4.95)

THIS is a welcome facsimile reprint of the 1900 second edition, with added introduction and epilogue by Major General B P Hughes. The original title page gives an excellent summary of its contents—"The Bengal Horse Artillery of the Olden Time—From Recruit to Staff Sergeant, in quarters, camp and field; with sketches of the four great actions of the Sutlej Campaign".

In 1833, when only nine years old, Bancroft enlisted at Dum-Dum, as a boy, in the artillery band of the Honourable East India Company. Shortly after reaching the age for man service, in 1842, he transferred from the foot to the horse artillery and, apart from a short spell in the 7th Regiment of Light Cavalry in 1854 and 1855, he served in the Bengal Horse Artillery until his discharge in 1866.

Bancroft was one of those few mid-nineteenth century soldiers with a gift for descriptive writing. He tells us about the food, dress and conditions of service life in a chatty style, interspersed with anecdotes about his fellow soldiers. Whether on the march or in the middle of a bloody battle, he describes not only the major events, but also the little details which are so often left out by officers when writing their memoirs. His vivid descriptions of the battles of Madki, Ferozeshah and Sobraon, in 1845 and 1846, are the highlights of the book (he missed Aliwal, due to a wound at Ferozeshah, and only gives a second hand account). Unfortunately, he seems to have "run out of steam" after the Sutlej campaign and covers the rest of his twenty years of service, in note form, in only five pages; he therefore glosses over his court-martial and reduction to Gunner in 1857, although he subsequently rose again to the rank of Quarter Master Sergeant.

For the reader, such as myself, who has not studied this campaign in detail, the introduction by Major General Hughes gives a most informative background to the period and an explanation of the artillery drills in use at the time. In the epilogue he examines favourably the accuracy of Bancroft's account and the theory that Rudyard Kipling's Private Mulvaney, in *Soldiers Three*, is based on the Irish characters that Bancroft describes so vividly.

JTH

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Articles may be of any length, but preferably not more than 6000 words. They should be typed in duplicate on one side of the paper only, double spaced with a one-inch margin. A third copy should be retained by the author for checking with the proofs.

Articles should be accompanied by a photograph of the author, suitable for reduction to two inches width, and a pen picture of his career to introduce the author to our readers.

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The submission dates for Correspondence on published articles are therefore:

MARCH ISSUE	7 JANUARY	SEPTEMBER ISSUE	7 JULY
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