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expressed in their papers* 3,500

Editorial

IN this edition we commemorate, in the memoirs section, the lives of three Sapper officers, who by chance died within four months of each other, and who were the engineer commanders of each of the nuclear weapon test operations in the 1950s. This is a timely reminder of the contribution that the Corps made to the support of the national deterrent and of the remarkable achievements of the individuals who took part. The story is told in greater detail in a chapter of Volume X of Corps History which will be published later this year but necessarily this will read as a factual account of a professional operation. Some reading between the lines will be required to appreciate the stresses on the Sappers involved as the central players in operations involving all three Services as well as groups of civilian scientists unfamiliar with Service ways.

These operations, *HURRICANE* and *MOSAIC* in the Monte Bellos in 1952 and 1955, and *GRAPPLE* on Christmas Island 1955-58 exemplify the way in which, because it is the engineering that makes a plan work, the engineer becomes the focal point of planning and often effectively the arbiter in disputes, placing upon him a responsibility far beyond that of mere construction. The requirement on the one hand for early involvement of the engineer and on the other, for the engineer to have a proper insight into the complexities of the problem he is helping to solve was never better demonstrated.

The climax of the drama in which these men played such an important role was of course the H-bomb test itself and in these days when talk of SDI, START, SALT, MAD and so on sometimes seems to have lifted the realities of nuclear war into the ionosphere, it is salutary to read Brigadier Muir's own recollections of the tests. "Having been engaged in a very much demolition orientated Second World War, flash and blast were nothing new although the scale was out of proportion to anything previously experienced and required a distinct physical effort to maintain equilibrium. An entirely new sensation was the build-up of heat generated; temperature within the protective clothing increasing relentlessly with a distinct impression of relief when the peak was overcome. The resultant cloud of megaton explosion was awe-inspiring in terms of suddenness of appearance and the colossal mushroom shaped head supported by the giant stem with its characteristically serrated profile and constituent bands of remarkable uniformity. It was a complete contrast to the cloudless blue sky of a few minutes before". And later Brigadier Muir wrote: "On reflection perhaps the outstanding personal impression from nuclear weapon explosions was the reality of the horrific overkill propensity."

37 (Falkland Islands) Engineer Regiment

LIEUT COLONEL F A F DANIELL RE and MAJOR W B COBB RE



Lieut Colonel Francis Daniell commanded 37 (Falkland Islands) Engineer Regiment from November 1984 until its disbandment in March 1985. His early service included a tour of secondment to the Malaysian Engineers as well as service in BAOR, UK and the USA. Before going to the Falklands he was CRE Northern Ireland.



Major Bruce Cobb joined the Corps in 1971 after five years commissioned service with the Royal New Zealand Engineers. His first unit was 37 Engineer Regiment immediately prior to its disbandment at Longmoor. His route back to the regiment as Second-in-Command took eleven years and included tours with 41 Commando Group, AAC Chepstow and 29 Engineer Brigade.

INTRODUCTION

In the June 1983 *Journal*, Colonel Derek Brownson presented an article on the work of the Corps in the Falkland Islands, covering the period from July to December 1982. The aim of this article is to provide a summary of the work of 37 (Falkland Islands) Engineer Regiment from its formation in August 1982 until its disbandment, on 14 March 1985.

The article is divided into four parts:

- Part 1 — Regimental History and Chronology
- Part 2 — Command and Control
- Part 3 — Major Tasks
- Part 4 — Conclusion

Because the information in this *Journal* is unclassified, details concerning locations and tasks will be necessarily vague. In Part 3, tasks are grouped by type or location rather than being described individually; the list of achievements is too vast to allow that. There is little emphasis on "lessons learnt" in this article, mainly because most of the documents studied during its preparation continually hammered home the message that our combat engineer and professional training, allied to initiative at all levels, prepared us for the challenge of the Falkland Islands environment (climate, long tenuous exterior lines of communication, poor interior communications, use of unfamiliar resources and some discontinuity due to the short tours of sub-units).

Lieut Colonel F A F Daniell RE and Major W B Cobb RE



Photo 1 The Canache Development with Stanley in the background. Shown from bottom to top: Boxer Bridge, Stanley Petroleum Depot, three Coastels, FIPASS and FILOG. In the centre are Gordon Lines (Field Squadron location) and the two Chinook landing pads

The Falklands challenge is a success story for the Corps and is probably unique in that it is the only period since World War Two when the Corps has had the opportunity to develop a Military Works Area, control and operate it and then to hand over to Government Agencies the responsibility for what had become a nearly 'normal' garrison and civil environment.

PART 1—REGIMENTAL HISTORY AND CHRONOLOGY

HISTORY

37 Engineer Regiment was first formed at Abergavenny, Wales in 1949 and served for ten years as a Field Engineer Regiment before disbandment. It was reformed in 1967 at Longmoor, Hants, for units returning from the Far East, after the Borneo campaign. The Regiment again disbanded in August 1974 with squadrons deploying to Northern Ireland, or in support of "Harrier" Squadrons.

The Adjutant at that time, Captain Peter Roulestone, wrote, "It is with much regret that I have to write this record of the disbandment of the Regiment since it represents the passing of an era. Perhaps in another eight years the Regiment may once again be reformed". How right he was, for on Friday 20 August 1982, 37 Engineer Regiment flew its flag again, this time in the Falkland Islands, following the conflict which had ceased on 15 June 1982. The Regiment reformed with a Regimental Headquarters,

37 Falkland Island Engineer Regiment 1

Workshops and Design Cell formed by trickle posted soldiers on 4-6 month tours and with Squadrons detached from Regiments either in UK or BAOR. The number of Squadrons under command of the Regiment at any one time varied according to season and the envisaged work requirements. During the Falklands summers of 1982/3 and 1983/4 the Regiment had a total strength of over 1200 men. Those Squadrons which served in 37 (FI) Engineer Regiment are listed at Annex A, together with those Corps represented either by detachments or individuals, in the Regiment. The third disbandment of the Regiment occurred on 14 March 1985. A parade to mark the occasion was held on the Sapper-built AM2 mat apron of RAF Stanley. The parade marked not only the demise of the Regiment, but also the formation of the Falkland Islands Field Squadron, based on the roulement UK field squadron (9 Parachute Squadron at the time) with trickle posted elements forming the EOD detachment, Design Cell and FI Field Squadron Workshops REME.

RHQ was originally located in the Ionospheric Research Station, half a mile East of the town of Stanley, but was eventually moved to a Portakabin complex built on top of the old RN ammunition bunkers beside the narrow entrance to the Canache, at the Eastern end of Stanley Harbour and adjacent to the 14 bay DSR HGB (named 'Boxer Bridge', after 25 Field Squadron who were mainly responsible for its construction).

CHRONOLOGY

Immediate Post Hostilities Period. During this period, which lasted from June until mid-July 1982, command of the Sapper workforce was exercised by the CO 36 Engineer Regiment. The priorities and works undertaken are covered in Colonel Brownson's article. The sub-units who had been involved in the conflict returned to the UK during the period mid-July to mid-August and were replaced by the first of the roulement squadrons and an ad-hoc RHQ.

Military Works Area. The Falkland Islands were declared a Military Works Area (MWA) immediately following the cessation of hostilities. This state remained until 1 April 1984 when the task was transferred to the PSA, and the ODA and local PWD once again became responsible for the civil infrastructure of the islands. The transfer began in October 1983 and at the time was in eight stages, many of which were concurrent. Where implementation or completion dates are known, they are shown.

The stages of the transfer were as follows:

Stage 1—Setting up of the stores and stock control systems, to work alongside the Theatre Depot. Much of the Vote 1 resources stock (the 'Mega bid') was transferred from the Theatre Depot to PSA, leaving the Theatre Depot holding, primarily, RE controlled equipment, special task stores, "shopping list" project stores and the reserve stocks of airfield expedients. This stage began in October 1983 and was finally completed just prior to the Regiment's disbandment.

Stage 2—The takeover of the Mary Hill Quarry, to the north of RAF Stanley, by a PSA term contractor. Handover occurred in January 1984.

Stage 3—Transfer of electricity generation systems, starting with those in the Stanley area and then progressively taking over those in the outstations, as their construction was completed. It is unlikely that this stage will be completed before the move of the Military to Mount Pleasant in 1986/7.

Stage 4—Transfer of Works commenced on 1 Apr 84.

Stage 5—Following the transfer of Works, the PSA established a Military Agency Works Area (MAWA), responsible for control, administration and finance. The Corps remained the contractors.

Stage 6—PSA assumed responsibility for works in the Stanley area, using a UK contractor, in mid-1984.

Stage 7—PSA began to assume responsibility for the remote camps, with priority to the long term camps. At the time of the Regiment's disbandment many of the hilltop sites, and some camps, were still being constructed and maintained by the Sappers.

Stage 8—PSA responsibility for the maintenance of defence sites at Mount Pleasant Airport (MPA) will begin about May/June 1985.

Summer Surges. During the Falkland Islands Summers of 1982/83 and 1983/84, the Sapper work force was boosted, to take advantage of the good weather and flying conditions. The surges increased the number of field squadrons to six (three each from UK and BAOR) and one field support squadron.

"Normalization". To coincide with the transfer of works responsibilities, the accounting systems on the island were 'normalized'. This period began in earnest in July 1984 and was still continuing at the time of the Regiment's disbandment. The process entailed the cessation of flexible wartime accounting and the imposition of peacetime procedures for accounting and examination of unit holdings. The field squadrons were not greatly affected, but 6, 15 and 60 Field Support Squadrons had the mammoth task of attempting to track down items which had previously either not been properly incorporated in tasks or during transfer from site to site had not been properly accounted for. The final transfer of Vote 1 resources to the PSA and the backloading of 'C' vehicles, ECP and resources, to UK, prior to the run-down of the sapper force level fell on 6 Squadron's shoulders. It says much for the expertise within the support squadrons that the tasks were completed on time.

PART 2—COMMAND AND CONTROL

COMMAND

Four different systems of command were practised, reflecting the changes in strength and tasking of the Corps. During, and immediately following the conflict, the CO 36 Engineer Regiment commanded all Sapper units (less, of course, the Postal Detachment) as both CO and CRE. Prior to his return to the UK, he was replaced by a CRE (Colonel) and a CO who commanded 37 Engineer Regiment through an ad-hoc RHQ.

The second command system continued through both summer surges and ceased in May 1984, when the CO once again had the dual appointment of CRE/CO, with two separate staffs. HQRE was based in Stanley, at HQ British Forces Falkland Islands (HQ BFFI) and the RHQ remained in the Canache area, beside 'Boxer Bridge'.

At the time of the Regiment's disbandment, a new RE command structure, to suit the reduced Corps strength on the Islands, was being implemented. The CRE/CO was replaced by an SO1 RE on the staff of HQ BFFI. His staff now consists of one SO3 RE and a small clerical team. The FI Field Squadron consists of a roulement field squadron, design cell, EOD detachment and a workshops REME, a total of 255 men.

CONTROL ORGANISATION

Colonel Brownson's article outlined the system for tasking and task control during his period as CRE. That system has largely remained unchanged. During the latter part of the 1984 Falklands winter the CRE (Works) organisation was reduced to an STRE (Works) to reflect the smaller Sapper workforce and works commitment of the Corps. On 1 March 1985 the STRE (Works) was disbanded and in its place a Design Cell was formed, consisting of two Officers (E & MO and GE) and three Clerks of Works, together with clerks and draughtsmen. That cell is considered to be sufficient to support the FI Field Squadron and forms part of the establishment of the squadron.

The process for obtaining a non-operational works service of any kind was simple and well known by all units on the Islands. Whether the work arose as the result of unit need or a staff requirement, the focus was always the J4 (Quartering) staff division at HQ BFFI whose task is to examine bids and if they are accepted, to decide whether PSA or RE should carry out the works, and with what priority. HQ RE agreed the tasking and priority, or either attempted to cancel the task or re-negotiated the priority, in cases where it was considered necessary. Once RHQ were ordered to do a task, either the STRE (Works) or a sub-unit carried out a detailed reconnaissance, which when costed and agreed by RHQ was sent back to J4 (Quartering) for approval.

Following staff approval, the task was carried out by the Regiment with, where necessary, STRE (Works) supervision.

For some complex, technical tasks, STRE (Works) provided an officer or Clerk of Works continuously on site. This was particularly true of Project ZEUS and the follow-on site development which was still not complete when the Regiment disbanded. On other technical sites supervision took place when necessary. For many of the "combat engineer section" tasks undertaken, there was no specialist supervision. The STRE (Works) also provided the link between the Regiment and the PSA.

Command and Control for EOD operations followed the normal procedure of tasking by J3 (Ops), at HQ BFFI, through the Joint Service Explosive Ordnance Disposal Operations Centre (JSEODC) in Stanley. The OC 33 Engr Regt (EOD) detachment acted as the CBF's adviser. Initially, when the army EOD workforce was an EOD Squadron, it was commanded (except for tasking) by the CRE. Later, when only a small roulement detachment was present on the islands, command changed from the CRE to the CO.

From cessation of hostilities to the end of the 1983/84 summer surge, the Theatre Depot was controlled by HQ RE, through OC Field Support Squadron. When the Sapper force level was reduced and the CO became, once again, double hatted, control passed to RHQ. By that time much of the transfer of Vote 1 resources and 'C' vehicles from the Theatre Depot to the PSA had taken place and the HQ RE control of resources was purely routine.

Finally, in this section, a note on the manning of RHQ and the Workshops. From August 1982 until January 1983 and from May 1983 until disbandment, the RHQ was manned on a trickle posted system with a small but adequate staff, for the work involved. The exception to the trickle post system occurred from January to May 1983 when the CO and most of the RHQ of 38 Engineer Regiment moved to the Falklands to command 37 Engineer Regiment. This must be a unique situation within the Corps. Command of two units, 8000 miles apart, was an experiment tried once only! Throughout the life of the Regiment, the Regimental Workshops was manned on a trickle posted system which provided essential continuity for an extremely hard pressed element of the unit. At the end of the 1983/84 summer surge the total unit holding of 'C' vehicle main equipments was 151 (including 28 Haulmatic medium dump trucks) and as many ancillaries. The 'B' vehicle peak liability is not known.

PART 3—MAJOR TASKS

Priorities The lack of good surface communications is probably the most critical factor faced by the staff of HQ BFFI, and HQ RE in particular. Almost every task the Corps has been called on to do has required stone for roads, hard standings and bases or aggregate for concrete. Therefore, no matter what priority was assigned to particular tasks, almost invariably the real priority was to keep the quarry and crushers operating.

Mary Hill Quarry. (See also *Journal March 85*). Mary Hill Quarry is the generic term used to describe what was the only readily accessible source of stone, at the start of the post-conflict construction boom. It is on the Northern side of the Stanley airport and consists of deposits of extremely abrasive (initially value 3) and dense (2,500–3,500 kg/m³) fine grained Quartzite, with a very glutinous blue clay filling the depressions between outcrops. Overburden, where it exists, is either clay or clay peat. The rock is too hard (metric hardness scale 7) to be ripped without primary blasting. Quarry development eventually encompassed three sites. The first was chosen, not for the quality or quantity of the stone, but simply because there were no tracks available, nor means of making them, which would have allowed the crushers to be set up at much better locations near the old Mary Hill site, used in 1974–76 when the original runway was constructed. The first site was abandoned on 25 August 1982 and the second at the beginning of November the same year. The third site was still being developed by the term contractor in March 1985. Two Goodwin Barsby Goliath crushing trains were used and a third was available, but not operational, at the time



Photo 2 Crushing at Mary Hill Quarry

of the handover of the quarry and crusher operation to the PSA term contractor in January 1984. To produce quarry products in the quantities demanded (1000 tonnes per day, at the peak of the 1982/83 summer surge) required two troops operating 24 hours per day. 24 Field Squadron, who were responsible for the operation during the first surge, produced over 125,000 tonnes in the period 1 December 1982–20 April 1983.

RAF Stanley. The article in the June 1983 *Journal* described the initial development of RAF Stanley between July and December 1982. Since then further development has occurred:

- An 8500m² extension to the main apron.

- New approach lights at each end of the runway.

- Construction of a liquid oxygen plant.

- Three dispersals with a total of fifteen 20m×25m Rubb shelters providing covered accommodation.



Photo 3 MWT's carrying out an AM2 mat straightening operation on RAF Stanley. Bowing is clearly visible in the row in front of the strop anchor points.

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Three bulk fuel installations, with over 4km of pipeline.
Service ducted hardstanding and five shelters (2 Rubbs and 3 Spandrell Orbitts) for the Engineering Wing.

Four kilometres of extension to the airfield road complex.

Intermediate Power Station (three remain to be constructed).

6000m² of service ducted hardstanding and two 18m×51m Rubb shelters for the Supply and Movement complex.

8.5km of communication cable has been buried.

To improve the RAF Rapier Squadron servicing facilities two 10m×21m Spandrell Orbitt shelters, access roads, hardstandings and services were installed.

Erection of dog kennels for the RAF guard dogs.

Routine maintenance, except for that shown below, has been passed to the PSA.

In general, the Corps remains responsible for maintenance of the runway, taxiways and ground lighting.

Clearance of drainage ditches.

Repairs to the AM2 surfacing by 'plank pulls' or repairs, in situ, of individual planks.

Sub-grade repairs on the runway, dispersals and aprons.

Runway ground lighting maintenance.

Operations to remove bowing of plank rows.

Maintenance of Spandrell Orbitt shelters.

The Canache Development. In order to allow troops garrisoned in Stanley to live and work outside the town, an area to the East of it was developed and became known as the Canache Development. The first stage, provision of roads from the airfield to the site of the first Coastel and construction of anchorages and stone filled groynes, has already been reported in the *Journal* (June 1983). Further development included:

Approach roads, mass concrete anchorages and stone filled groynes for two more Coastels.

Hardstandings for use as firm bases for a large number of Romney, Packaway, Wiseplan and Portakabin buildings which house one of the Field Squadrons, The Theatre Depot, a Field Workshops, the PSA resources yard, Infantry Battalion Echelon, FI Logistic Battalion (FILOG) offices and stores, NAAFI shop and stores complex, the Bakery, Pay Office, Post Office, BMH and Garrison Chapel.

Hardstandings for the theatre vehicle depot.

An 8000m² container park.

Two concrete Chinook landing pads.

A 300m access road to the Falklands Intermediate Port and Storage System (FIPASS). (FIPASS was constructed in the UK by Harland and Wolf, towed down to the Falkland Islands and installed, in mid-84, by a PSA term contractor and is an integrated, floating wharf and covered storage system).

Water, electricity and sewage systems.

Stanley Petroleum Depot.

A fourteen bay DSR HGB (Boxer Bridge) with over 100m of crushed stone approaches and piled abutments.

Concrete bases for radio masts.

Finally, and important to the Regiment, an RHQ complex adjacent to Boxer Bridge.

Helicopter Support. A heliport for light helicopters was constructed. The project included the construction of a 20m×24m Rubb shelter, concrete Lynx, Gazelle and Scout pads, taxiways, access roads and offices for an AAC squadron. Three sites, consisting of servicing hangars, dispersal areas, taxiways and landing pads were constructed for Support Helicopters (SH) and Search and Rescue (SAR) helicopters. The hangars are 25m×36m×13m high. In addition, almost every camp and hill top site has a landing pad capable of taking an SH, constructed from concrete or an expedient surfacing material.

Camp Construction. A large number of houses, the Stanley Town Hall, Gymnasium and many other buildings and troopships were used as accommodation when our



Photo 4 FIPASS approach road. FIPASS in the early stages of installation, in the background

troops first moved into Stanley. The situation was expedient but not conducive to efficient working. One of the early priorities was camp construction and by the time the Regiment had finished, camps had been constructed in nine different locations, on both East and West Falkland. All the camps are self sufficient for electrical power, water purification and sewage treatment. The synopsis for the camps includes roads, drainage, helicopter landing pads, concrete bases for radio aerials and where necessary, provision of a jetty and rubbish tips. The buildings used were Portakabins, Packaways, Wyseplans, Portaloos, Modus units Cosalts or modified ISO containers.

Water Supply. Despite the generally very wet ground and high water table, the supply of water in sufficient quantity is not straightforward. Sources used by the islanders had to be improved, increased and repaired while at the same time new sources had to be found to supply everyone with the water needed. Temporary and permanent water supply systems have been installed throughout the islands in more than 30 different locations. In three areas, at Lookout Camp, the Canache and Kelly's Garden nearly 13km of 50mm pipeline has been installed. A 676,000 litre reinforced plastic tank mounted on a steel grillage forms part of the system serving Lookout Camp and the Canache area. Two 30,000 litre hydroglas tanks were constructed at Kelly's Garden to increase water storage capacity. Two further tasks deserve mention. 11 Field Squadron constructed a pipeline from the Moody Brook treatment plant to the Dairy Paddock reservoir, to improve the Stanley Supply and 5 Field Squadron constructed a permanent buried, pipeline from Lookout Camp to FIPASS for the water bunkering of ships.



Photo 5 The Stanley water main from Moody Brook treatment plant to Dairy Paddock reservoir. Dewatering in progress

Telephone Communications. The Falkland Island Trunk System (FITS) consists of a series of unmanned micro-wave communications installations, generally sited on mountain tops. The Regiment's task was to construct concrete plinths and tie down points for the ISO containers used in the system. The anchorages are designed to withstand winds of 150 mph. Only five of the sites are in camps, or easily accessible. The remainder required helicopter support and, due to the inclement winds and conditions, took far longer to construct than was first planned.

Radar Sites. Projects *ZEUS*, *SHEPHERD* and *TANTARA* were projects to provide radar sites as part of the FI Air Defence Ground Environment (FIADGE). The work included construction of bases for radomes, command centres, power stations, support services, water supply and sewage disposal, accommodation and helicopter landing pads. Project *ZEUS* started in December 1982 and was operational, but incomplete by May 1983. Development of the site continues. *SHEPHERD* and *TANTARA* took place during the second summer surge (November 1983–April 1984) and were constructed on sites on West Falkland. As with *ZEUS*, delivery of material to site was by helicopter. Because of the remoteness of the sites, each was allocated a dedicated support ship. Since the 1983/84 surge, further development and modification of the sites has taken place. Until the three initial projects were completed, a temporary radar site at Cape Orford was constructed with Sapper assistance.

Bulk Fuel Installations (BFI). Seventeen bulk fuel installations mainly constructed from Emergency Fuel Handling Equipment (EFHE) have been constructed since the conflict. Several have been de-commissioned, ready for dismantling. At most sites equipment has been installed to allow ships off-shore to discharge fuel into the BFIs. *EOD and Battle Area Clearance (BAC).* Immediately following the cessation of hostilities 9 Parachute Squadron and 59 Independent Commando Squadron undertook initial reconnaissance of the mined areas utilizing information gained from captured records and prisoners. A large number of minefields and booby trapped areas were laid by the Argentinian forces, to defend Port Stanley from British attack. The initial obstacle plan concentrated on a seaborne threat, with the secondary plan concentrating on a land based attack. After attempts to lift minefields had led to some British and



Photo 6 Laying electrical cables in ladder racking during the further development of the Project *ZEUS* site

one Argentinian casualty, the work was suspended. Further work involved identifying and fencing off suspect areas. 69 Gurkha Independent Field Squadron replaced the two conflict squadrons and spent four months working outwards from Stanley, to the main battle field sites to the West of the town. Concurrent with the minefield task, BAC was carried out, starting in Stanley and on the airfield. Lieut Colonel Howgate's article in the June 1983 *Journal* describes the process. After the return of 49 EOD Squadron to UK, 33 Engineer Regiment (EOD) provided a detachment which has been fully employed on bomb disposal and BAC. The role of the detachment was defined as:

Running the Joint Service EOD Cell (JSEODC).

Tasking, organisation and conduct of minefield, booby trap and EOD clearance operations and trials.

Briefing and training of RE and other personnel in aspects of minefield, booby trap and EOD policy and techniques.

Maintenance of minefield and suspect area fences.

By the time the Regiment disbanded, over 18,500 hectares had been cleared and more than 2.5 million items of ammunition recovered or destroyed. As is to be expected, the detachment's task continues.

Further Tasks. Many of the tasks and projects worked on by the Regiment have not been mentioned in the paragraphs above and it would be almost impossible to provide an exhaustive list in an article such as this. However, some of the tasks undertaken, but not mentioned above include:

Construction and maintenance of cemeteries and memorials.

Diving operations.

Combat Support Boat operations.

Maintenance and construction work carried out in South Georgia.

Road and Track construction.

Production of thousands of signs and other items in the Support Squadron Workshops.

Adaption of freight containers to other uses.

Repair and construction of jetties and slipways.

Ship to shore pipeline systems.

Construction of Harrier Forward Operating Base.

Repairs to farm buildings and stockyards.

Construction of a Satellite Communication base.

PART 4—CONCLUSION

MANY good experiences have gained by those who served during the conflict or later, as members of the Regiment. The Falklands are probably the first place in which many of us have served in an integrated tri-service environment and to find that our skills are not just needed by the army has been a fillip to morale. Previous projects and exercises in many difficult parts of the world had not prepared us for the unique conditions experienced in the Falklands. Cross country movement off tracks and roads is difficult in summer and almost impossible in winter. Even the roads and tracks are barely passable in good weather, to four wheel drive vehicles. The islands seem to consist of stone runs or peat wherever we have wanted to construct a road, hardstanding or building base. This led to the use of geo-fabrics which were not previously familiar to most of the Corps. The very long lead times for normal priority resources provision meant that forward planning had to be very accurate, particularly so for the small items which are often purchased on the local market. There isn't one in the Falklands. More use was made of helicopter support than ever before and the lack of an optional means of transport, other than by sea in some cases, has led to frustration on tasks, or getting to and from tasks. Perhaps though the greatest experience is simply looking around at all the installations constructed in the (nearly) three years since the conflict—all, almost without exception, have a Sapper thumb print on them. To have achieved so much in the time is remarkable.



Photo 7 Shackleton House, King Edward Point, South Georgia

Mention has not previously been made of the support given to the Corps by the attached Royal Pioneers. At the disbandment of the Regiment 'our' Pioneer Platoon proudly took part in the parade. They worked on a tremendous variety of tasks with the squadrons and provided a much needed skilled labour force. Immediately prior to the disbandment they were involved in a fairly typical mixed bag of tasks; track improvements (including culverting and the use of explosives), decommissioning of EFHE installations, resources handling, sangar construction and runway maintenance.

In January 1985 a signal was received which dampened our disbandment ceremonial aspirations somewhat:

"211615Z JAN 85

FROM: MODUK ARMY

TO: CDFFI

FROM ASD 3. FOR G3 (O & D), SUBJECT IS DISBANDMENT OF 37 ENGR REGT.

UNDERSTAND YOU WISH TO DISBAND THIS UNIT. THE PROBLEM IS THIS UNIT HAS NEVER BEEN OFFICIALLY FORMED. WE CANNOT THEREFORE OFFICIALLY DISBAND IT. WE UNDERSTAND THAT THIS TITLE HAS BEEN USED AS A GENERIC TITLE TO ENCOMPASS ALL THE VARIOUS ENGR BITS AND PIECES IN SOUTH ATLANTIC.....

IF YOU WISH TO DISBAND IT THEN YOU MAY DO SO ON YOUR OWN AUTHORISATION."

Looking around at what has been unofficially achieved in three years makes one wonder what we really could have done, given a legitimate start.

* * * * *

ROYAL ENGINEER OPERATIONS IN THE SOUTH ATLANTIC 1982

THERE are a number of copies still available of the booklet "Royal Engineer Operations in the South Atlantic 1982 and Its Immediate Aftermath in the Falkland Islands". This is a collection of the articles published in the *RE Journal* about the Falklands War and its aftermath which has been placed in a special cover along with a Foreword, a map and some additional photographs.

Remaining copies will shortly be offered for sale to a wider public than hitherto. Anyone contemplating buying a copy is advised to do so now. Price £4.00; (all profits to the Ravelin Museum Fund). Cheques to Institution of Royal Engineers with £0.33 added for postage within UK or to BFPOs.

37 Falkland Island Engineer Regiment 7

**SQUADRONS WHICH HAVE SERVED IN 37 (FALKLAND ISLANDS)
ENGINEER REGIMENT**

3 Field Squadron	August 1982–November 1982 November 1983–April 1984
50 Field Squadron (Construction)	August 1982–November 1982 January 1984–May 1984
30 Field Squadron	August 1982–January 1983
60 Field Support Squadron	August 1982–January 1983 March 1984–June 1984
69 Gurkha Independent Field Squadron	August 1982–January 1983
51 Field Squadron (Construction)	November 1982–April 1983
8 Field Squadron	November 1982–April 1983
24 Field Squadron	November 1982–April 1983
34 Field Squadron	December 1982–May 1983
52 Field Squadron (Construction)	January 1983–June 1983
7 Field Squadron	February 1983–July 1983
15 Field Support Squadron	February 1983–July 1983 June 1984–November 1984
32 Field Squadron	May 1983–September 1983
48 Field Squadron (Construction)	May 1983–September 1983
25 Field Squadron	July 1983–November 1983
6 Field Support Squadron	July 1983–November 1983 November 1984–March 1985
20 Field Squadron	September 1983–January 1984
42 Field Squadron	October 1983–March 1984
61 Field Support Squadron	October 1983–March 1984
73 Field Squadron	November 1983–April 1984
53 Field Squadron (Construction)	December 1983–April 1984
39 Field Squadron	December 1983–April 1984
29 Field Squadron	March 1984–June 1984
59 Independent Commando Squadron RE	May 1984–September 1984
1 Field Squadron	July 1984–November 1984
11 Field Squadron	September 1984–January 1985
5 Field Squadron	November 1984–March 1985
9 Parachute Squadron RE	January 1985–March 1985

CORPS THAT HAVE BEEN REPRESENTED IN THE REGIMENT

Royal Army Ordnance Corps
Corps of Royal Electrical and Mechanical Engineers
Royal Army Pay Corps
Royal Pioneer Corps
Army Catering Corps

“If You Know of a Better ‘Ole, Go To It!”

The Development of Airfield Damage Repair

BRIGADIER A J V KENDALL

The author was commissioned in 1951, serving initially with 55 Field Squadron in Korea. His early experience of working with the RAF included tours in 9 Parachute Squadron and HQ 16 Parachute Brigade and as an airportability instructor at Old Sarum. After commanding 1 Field Squadron he was CO 38 Engineer Regiment in support of the RAF Harrier Force, and was subsequently AAG AG7. He has spent more time as student and DS in staff colleges around the world than he cares to admit and since March 1983 has commanded 12 Engineer Brigade.

INTRODUCTION

BACK in the sixties the key to survival of tactical aircraft in any future European land battle seemed to lie in off-base operations. The successful advent of the VTOL concept was widely felt to mark the end of an era of dependence upon fixed bases. The need for extensive areas of concrete to sustain reconnaissance, air defence and strike operations would soon be a thing of the past, said many critics. Dispersal into the field would be the name of the game twenty years ahead.

That situation has not materialised. Despite the success of the Harrier concept as practised in Germany over the past 15 years the Royal Air Force, like other major air forces of NATO and the Warsaw Pact, still relies principally for its survival in war on the continuance of operations from fixed bases. Moreover with the advent of Tornado this dependence will continue well past the year 2000. The decline of the aircraft carrier and the small proportion of our air defence resources devoted to VTOL operations mean that permanent airfields are today just as important as they were in 1940, when the Prime Minister issued a short, sharp directive which signalled the birth of the airfield damage repair:

“All craters should be filled in within 24 hours at most, and every case where a crater is unfilled for a longer period should be reported to higher authorities. In order to secure this better service it will be necessary to form some crater-filling companies.

These should be equipped with all helpful appliances and be highly mobile so that in a few hours they can be at work on any site which has been cratered. Meanwhile at every aerodrome there must be accumulated stocks of gravel, rubble and other appropriate materials.”

Much has happened in the intervening years to change the face of air forces, but the acute problem of survival on the ground remains. This brief survey highlights post war developments in airfield damage repair, outlines the effect on the Corps and indicates future trends.



Photo 1. A runway crater

EARLY DAYS

IN the aftermath of World War Two scant attention was paid by NATO's member countries to airfield survivability. The limited resources available for defence at a time of economic stringency went mainly into new aircraft, ships and weapons rather than the infrastructure to sustain them. Moreover in Britain the dozens of airfields built during the war, many of which remained in use well into the V-bomber era, provided sufficient scope for dispersal to satisfy the most ardent critics in the light of a threat which was regarded at the time as fairly low due to the limited range and payload of Russian aircraft. SHAPE started to pay serious attention to the airfield survivability problem only when the greatly increased offensive potential of the Soviet Air Force in the sixties and seventies could no longer be ignored.

For twenty years after the war the responsibility for expeditionary airfield construction, which also embraced repairs to damaged surfaces, had rested mainly with the Royal Air Force. When the Corps took over from the RAF's Airfield Construction Branch in 1966, 39 Engineer Regiment (Airfields) was formed at Waterbeach and subsequently entrusted with developing a rapid runway repair (RRR) capability for the four main airfields of RAF Germany in the event of general war in Europe. One field squadron (airfields) was allocated to the support of each RAF station and required to deploy there from time to time for training.

MORE RECENT DEVELOPMENTS

THE catalyst which revolutionised international thinking on the survivability of airfields was provided by the six-day war in the Middle East in 1967. The pre-emptive destruction of the Egyptian Air Force on the ground by the Israelis triggered worldwide alarm bells on the vulnerability of airfields to precision weapons, and this was reinforced in 1970 by Indian success in the two-front war in Pakistan which served as a classic reminder of the damage saturation bombing can achieve.

The increasing awareness in the West of the importance of developing a rapid repair capability was reflected in changes in our own outlook and organisation. 39 Engineer Regiment's capability had already evolved to embrace the restoration of essential services such as electrical power, water supply, fuel storage and other facilities needed for sustained operations. The term RRR (still used by the Americans today) was replaced by ADR in recognition of the need for more than just hole-filling following an enemy attack. The dispersal of construction squadrons to individual regiments in the mid-seventies, the formation of CRE (Airfields) in 1977 and the subsequent rerolling of 39 Engineer Regiment back to airfield support in 1983 were all part and parcel of a changing scene, but the regiment's task today is essentially unchanged.

The acceleration in the Warsaw Pact's offensive capability throughout the seventies considerably raised the level of the threat against UK. This development (and a decline in the number of diversion airfields available) led to a realisation that steps must be taken quickly to follow RAF Germany's example and make provision for an ADR capability in Britain. However, no additional regular army manpower was available and the idea of converting more field squadrons to a new role at the expense of divisional combat support was unacceptable. The Corps therefore looked to the TA for the provision of ADR support to Strike Command, and a two-year pilot scheme at RAF Leuchars using men from 117 Field Support Squadron (Volunteers) confirmed that TA units could indeed undertake runway repair as a single, dedicated role. The outcome was a decision by the Army Board to form eight volunteer squadrons between 1983 and 1986 as part of the TA Enhancement Plan to support key airfields in Britain nominated by the RAF.

The formation of this force is well advanced and the last of the eight units will raise its flag in April 1986. The two independent squadrons in Scotland, recruiting and training on their own parent airfield from the start, are local in character, but the six sponsored units south of the border recruit nationally, train centrally at Waterbeach for two years and will then deploy to parent airfields in east and north-east England. Each squadron is 85 strong, will hold 3 million pounds worth of ADR plant and is

commanded directly from HQ 12 Engineer Brigade at Waterbeach. This headquarters, rising phoenix-like from the ashes interred at Barton Stacey four years earlier, was formed in October 1982 to raise and train the volunteer squadrons and direct ADR training and development in the Regular Army. Wearing the hat of Inspector ADR the brigade commander acts as adviser to commanders worldwide, while Waterbeach is being developed as a centre of excellence. Although 39 Regiment retains responsibility for ADR training standards in the four construction squadrons (two of which are part of other regiments in peace), brigade headquarters has its own TA training wing and a technical wing for the furtherance of ADR techniques.

The territorial element of the brigade is now at the height of its expansion and we are continually looking for new people, whether experienced ex-regulars, TA officers and soldiers seeking a change of scene or young men and women direct from civil life. Although the new squadrons are still recruited nationally while under training at Waterbeach, once they move to their stations we will be aiming to recruit from areas within easy reach of the airfield and so develop a local flavour. While much of the emphasis is on people with experience of plant, we are prepared to train any licensed driver as an operator provided he shows the required degree of commitment. The officers are a balanced mix of experience and youth and several of the troop commanders are recent graduates from university, while the girls can be signallers, drivers or clerks.

THE NATURE OF AIRFIELD DAMAGE REPAIR

So much for history—now to the problem itself. Put simply, the aim of airfield damage repair is to restore the operational capability of a military airfield quickly after an enemy attack, and in this context it is worth trying to visualise the circumstances facing the ADR squadron at the moment of truth. The central feature of air raids will probably be a series of conventional bombs aimed at cratering the runway, destroying key facilities and preventing the continuance of air operations. Operating surfaces will contain holes up to 20 metres wide in diameter and 5 metres deep, while the airfield will be covered extensively in rubble and broken concrete. Area denial weapons the size of mortar bombs, set to explode on time delays or when disturbed, may be scattered liberally to form an irregular minefield. Several unexploded bombs will have penetrated the surface—some will be duds but others will be fitted with delay fuzes to explode within hours of the attack. Shrapnel or cannon fire will cause scabs on pavement surfaces—indentations which need repairing to allow operations by fast jets. There may be extensive fires and damage to buildings, communications, power cables, water mains and fuel tanks. There will be casualties, and where chemical weapons have been used there will be widespread contamination. Since repairs may have to be undertaken at night and there could be a ground threat from irregular forces, the difficulties can be imagined.

The job of restoring sanity to the situation rests principally with the Sapper OC, who as the station commander's principal ADR adviser has a cell in the combined operations centre. Hopefully his troops and equipment, tactically deployed and dispersed away from the target area, will be relatively undamaged. The immediate need is a joint reconnaissance, followed by concurrent activity in the other key elements of ADR, namely explosive ordnance disposal, the repair of aircraft operating surfaces and the restoration of essential services.

The first of these functions is an RAF responsibility on airfields, whereas the others belong firmly to the Sappers and (in the case of essential services on UK airfields) to the PSA. They are worth a closer look.

Reconnaissance

This must be undertaken by whatever means are available, whether it be helicopter, microlite or drone from the air, armoured (preferably) or soft skinned vehicle, or in the last resort by teams on foot. The prime requirement is speed of information. Details of damage and casualties will flood into the operations centre from all parts of the station, but the RAF commander's first task is the identification of a likely



Photo 2. Damage reconnaissance



Photo 3. Removing the ejecta



Photo 4. Placing the fill

If You Know of a better ole go for it 2, 3 ,4

minimum operating strip (MOS) from which aircraft can take off and recover as soon as possible. Once this is done, the recovery operation can be initiated.

Explosive Ordnance Disposal

Access to intended repair sites will be difficult, if not highly dangerous, until UXOs in the immediate vicinity are neutralised and a safe path cleared through rubble for plant and other equipment such as lighting towers for night work. Clearance is a joint operation, the RAF EOD teams being responsible for "hands-on" disposal and RE for pathfinding and "access engineering" through the damaged area. The ADR squadron must have a comprehensive awareness of the EOD problem and its effects as well as a capability of neutralizing bomblets before effective repair work can begin.

Repair of Aircraft Operating Surfaces (RAOS)

The title is self explanatory but the techniques are many and varied. All regular and TA ADR squadrons have repair troops specifically established and trained for this role, whether on runways, taxiways or access routes needed for the movement of aircraft from hardened aircraft shelters to the takeoff point. The task is plant intensive and demands not only a high standard of operator skills but also good collective training if the "ADR ballet" around a repair site is to be orchestrated by the troop commander to maximum effect. The job is incomplete until each completed repair has been swept and then pronounced operational by the RAF.

Restoration of Essential Services

This task demands a wide range of technical skills and a high standard of specialist artisan training. On operations the construction squadron forms an E & M troop which must be ready to perform tasks like cable jointing, operating standby power systems or replacing airfield lighting. In Germany each squadron is reinforced by a STRE (BP) responsible for the repair of fuel installations and the construction of emergency fuel handling equipment; this task is well suited to the sponsored element of the TA, since the teams consist mainly of technicians from the larger petroleum companies who (apart from basic military skills) need little additional training in the unit. For (BP) read British Petroleum!



Photo 5. A cable jointing exercise

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ADR TRAINING

TRAINING for airfield damage repair falls into two distinct categories—individual and collective. The most important feature of individual RAOS training is enhancing the ability to operate items of ADR plant to the best advantage with due regard for safety but with the speed demanded by the situation. The young plant operator mechanic fresh from training at the RSME is well versed in the normal earthmoving application of the wheeled tractor and grader, but their use on crater repair requires different techniques which must be taught and practised in the squadron. Moreover several of the machines held by the squadrons do not feature on regular POM courses, so *ab initio* training must be staged in the unit before collective repair can be practised at troop level. To remain fully operational, the regular construction squadron needs to spend at least a month on low level ADR training in the UK before moving to Germany for its annual two-month spell on the parent airfield, which usually includes at least one full scale exercise. Despite the many and diverse demands on the construction squadrons, whether it be tours in the Falklands and Belize, overseas projects or the insistent demands of the Regular Army Assistance Table, it is essential that sufficient time is set aside in their busy programme for collective training in the ADR skills on which the RAF depend in war.

Specialist training is by no means limited to crater filling. Electrical and mechanical tradesmen in the regular squadrons must become thoroughly familiar with essential services on the airfield, rehearse specialist skills such as cable jointing and keep pace with new circuits and systems as each station obtains more hardened accommodation for aircraft and support facilities. Combat engineers, too, must be well versed in matters like protective works and the shoring up of buildings damaged by bombing but still usable. REME forward repair teams must practice field repairs on the squadron's plant which is stored in protective envelopes on the airfields in peace. Finally the orchestration of damage repair at squadron level, embracing post strike reconnaissance, tactical deployment, communications and NBC procedures must be regularly practised. Unfortunately the rapid turnover in personnel poses a continuous problem of retaining hard won expertise, and longer tour lengths for soldiers would pay tremendous dividends.

Training in the TA squadrons has a very different flavour. The limited time available during a fortnight's camp and a few training weekends each year means a gradual build up to operational status rather than the concentrated bursts of ADR training which characterise the regular squadron. Provided the wastage rate inseparable from any voluntary unit can be kept below the national average—and there are signs that it will—the volunteer squadron should be able to reach as high a standard of training as its regular counterpart within two or three years and then maintain it. It has one main job in war and, unlike most other TA units, will be thoroughly familiar with its potential battleground should the balloon go up. All ranks must practise the mandatory military skills, but in ADR terms the squadron can adopt an unusually single minded approach to training. More basic trade training is carried out within the unit than in the regular squadron and HGV drivers are introduced to plant—an incentive in itself for the younger soldier to stay with the unit for the 10 years or more needed to maintain professionalism. To avoid staleness opportunities must still be found from time to time for squadrons to train elsewhere than on their airfield, and this year's camp for a volunteer squadron alongside a regular squadron on a Germany airfield is an example.

METHODS OF REPAIR

CRATER repair is a prime task facing any ADR commander. The objective is simply to fill the hole with material which, when compacted and capped, will successfully resist the pressures imposed by the wheels of modern jets and enable air operations to continue.

Current Techniques

Taking the capping material first, for years we have relied on the Class 60 Bomb



Photo 6. Preparation for mat laying

Damage Repair Mat (BDRM) as standard equipment. Once carried to the site and positioned by the heavy tractor, the mat is unrolled and secured to the surrounding pavement with holding down bolts. The ramp at either end of the mat is easily trafficable for aircraft, the only critical constraint being limits on mat spacings along a MOS to prevent oscillations in the airframe. The fill can be provided in one of two ways; the clean bowl method entails removing fallback from within the crater, pushing the ejecta and heaved pavement off the strip, filling the hole with selected aggregates and capping with a BDRM. Once mats have been placed along a MOS, the strip is swept clean and checked by Operations Wing before being declared ready for use. The time taken to effect repairs will vary enormously depending on the scale of damage, the serviceability of plant and the standard of training, but we aim to restore the surface to operable condition within hours of the attack. The alternative method of "dynamic compaction" involves most of the rubble and broken concrete being pushed back into the hole and then compacted by dropping a 5-ton weight from a height of 10 metres from a special crane before the mat is laid. Both techniques demand a high standard of individual training on the part of plant operators and the collective experience of working in teams on concurrent repairs.

Future Development

The BDRM is by no means the ultimate answer, since any repaired surface which does not lie flush with the surrounding pavement clearly has its limitations. Two alternative methods of providing such a surface are currently being trialled with the aim of developing an improved capability over the next few years.

The first of these is the concrete slab method of repair. This entails laying a series of precast slabs flush with the pavement on to a level, compacted surface. Following removal of ejecta from the crater area, a square or rectangular cut is made in the surrounding pavement using a special saw or hammer before the fill is inserted, levelled and rolled. This system, although slower than using a mat, is being developed mainly to provide a suitable repair for heavy, wide-bodied jets of the type available for intervention or reinforcement operations.

The other method under trial involves dispensing a magnesium phosphate cement grout into a 200mm thick layer of single size capping aggregate screeded flush with the surrounding pavement. The grout is a similar material to that used in scab repair (which can take loads after only 30 minutes), and the main problem is mixing and dispensing the material at the rapid rate required.

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INTERNATIONAL ASPECTS

SINCE ADR is a national responsibility, there is no standardisation programme in NATO and member countries are developing an independent capability. Yet there is plenty of liaison and exchange of information, with each nation monitoring the other's methods and techniques. For years the Americans have depended on the AM2 mat, the equipment used by the Corps in 1982 to lay the highly successful airstrip at Stanley which is still operational. The Dutch, German and US Air Forces use their own method of concrete slab repair, whereas the French depend on a cheaper, more labour intensive system called the "embedded mat" technique whereby a PSP type mat is constructed from panels, dragged to the compacted hole and embedded in the stone by roller, the edges being sealed with a quick setting resin. The Soviets, too, have their own version of slab repair. In most Western countries ADR remains an air force responsibility, and the British system whereby army engineers act as main contractors for the air force arouses considerable interest. Hence visitors to Waterbeach are plentiful!

THE FUTURE

ADR is still a young art, and there is a long way to go before repair systems measure up to the requirements imposed by modern aircraft and the enormous loads they place on pavements. There is much to be done improving training and developing new techniques and equipments which will do the job faster and to higher engineering standards, while more enhancements to the TA ADR order of battle are also possible. For the regular officer or soldier a tour with a construction squadron provides a completely different environment from normal combat engineering. For the territorial, service in an ADR unit seems to attract the man who likes to identify his wartime job and train for it hard in peace. The qualities needed to overcome the conditions imposed by air attack on a military airfield in any future war recall the caption of the World War One cartoon portraying two indomitable Tommies crouching for cover in a Flanders shellhole—"If you know of a better 'ole, mate, go to it!" That is the spirit we are looking for.

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Journal Articles

THE Editor is always pleased to consider articles and correspondence submitted for publication in the RE Journal.

The latest date for submission is two and a half months before publication (eg, by 15 September for the December Journal).

Submissions should be typed double-spaced, ideally no more than 12 to 15 pages of typescript.

Illustrations can be reproduced from coloured or monochrome photographs, slides or negatives, drawings, maps or sketches. They should be accompanied by a suitable caption.

Only *unclassified* material can be published. Security clearance should be obtained before submission.

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Service as a Diplomat in Moscow

BRIGADIER R C PLUMMER



Brigadier Robin Plummer was commissioned into the Corps in 1951. He served in 4 and 7 Field Squadrons in BAOR and commanded 33 Field Squadron and 33 Engineer Regiment (EOD). He has attended the Army Staff College and Joint Services Staff College. From June 1982 to September 1984 he was Military Attaché at Moscow.

It was with a sense of some coincidence that in the autumn of 1980 I learnt that my next appointment was to be Military Attaché at Moscow. The first of my earlier tenuous links with Russia had been provided by my father who had served as a member of the expeditionary force to North Russia in 1919/20 and who must have been familiar with the conditions depicted so well in Terence Cuneo's picture of the "Sleigh Post". The Soviets would have called my father an interventionist. My own slight connection with the country arose from a period of service with 33 Engineer Regiment (EOD) in which also served a group of Ukrainians who had been doing sterling work in clearing explosive ammunition from former British training areas since the end of World War II. It was therefore with these links and by then a thoroughly whetted appetite for the strange but compelling country of the Soviet Union that my wife and I arrived in Moscow at the end of May 1982.

Although members of the Corps frequently serve in many far-flung parts of the world I confess I was both surprised and delighted to find several ex-members in the Embassy at Moscow. Two former officers served in the administrative section; one being responsible for "works services" and the other administering accommodation. Two ex-warrant officers also served as security officers one of whom I discovered had served with me many years ago in a squadron commanded by the present Chief Royal Engineer. Indeed we had the pleasure of two visits from General Sir Hugh Beach during my time in Moscow when he came as a member of a delegation to what were known as the "Edinburgh Talks". Sappers are no strangers to Russia, though, as is evidenced by the splendid punch bowl in the Corps HQ Mess presented to Colonel Sir Colin Scott-Moncrieff by Tsar Alexander III for his irrigation work in Central Asia.

By chance my tour in Moscow was full of interest with major changes occurring in Soviet leadership and I certainly appreciated the first class seat that I had at many important events; not least those at the funerals of Brezhnev and Andropov. Less fortunately my tour coincided with a period of difficult relations with the West which had its repercussions on my contacts with the Soviet military and the people of the country. Nevertheless my wife and I welcomed the opportunity to travel extensively throughout the vastness of the Soviet Union. There were times when I suspect my Ambassador considered me more of a "country" than a "town" member of his Embassy but he showed considerable forbearance in my many absences from Moscow.

Brigadier R C Plummer



Photo 1. Inside the War Memorial at Stalingrad (Now Volgograd)

This article contains my views of certain aspects of life and the nature of the Soviet Union as I saw them. I should stress at the outset that my wife and I enjoyed enormously meeting many Soviet citizens who as private individuals were invariably kind and generous to us. I have, however, been forthright when setting out my less than enthusiastic views of the Soviet system of life as a whole.

THE COUNTRY AND ITS PEOPLE

INEVITABLY the first point to strike any traveller within the Soviet Union is the sheer size of the country. It is vast. My wife and I travelled well over 100,000 miles by train, air and road to visit each of the fifteen Republics. All train travel, other than local services, is by sleeper since it invariably takes days rather than hours to reach all other major towns from Moscow. For example, a journey via the Trans-Siberian Railway took five days from Moscow to Ulan Bator in Mongolia.

It is difficult to convey to someone from our own country the idea of space. But one can literally sit for hours on end in an aeroplane flying over the featureless *taiga* of Siberia without seeing any sign of habitation. The image that remains in my own memory is from a visit to Karaganda, a city almost lost in the grassy steppes of Kazakhstan. Rolling grassland was all that could be seen from horizon to horizon even from the air. Karaganda lies on the main highway from Sverdlovsk at the southern end of the Ural mountains to Alma Ata opposite north west China. The road leading south out of Karaganda runs as straight as a die across the steppes with no other feature in sight. The signpost to the next large town reads "To Alma Ata

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1006 km². It is difficult to image a more desolate place yet some 600,000 live in Karaganda.

The most predominant feature that remains in my memory is the flatness of the country. Nevertheless there are considerable variations. In the Kola Peninsula which lies within the Arctic Circle there are no trees and much of the topography is bare rock interspersed with sparse heather; altogether bleak and inhospitable. Further south in the central parts of the country the traditional Russian scene of fir and pine forests and frequent clusters of silver birch divide the land under cultivation. Yet further south again the soil changes to the black earth of the Ukraine, the Soviet Union's richest agricultural area. Finally, to the east of the Caspian Sea there are the brown sun-baked deserts of Central Asia across which ran the former caravan silk routes from China. Such mountains that are accessible to foreigners are tucked away along the southern border in the Caucasus and with Iran, Afghanistan, China and Mongolia. The mountains here have a sweep and majesty which lifts them above the cloying atmosphere of the Soviet Union. I recall a marvellous day in the foothills of the Pamir mountains where it was difficult to imagine that the war in Afghanistan was only 100-200 km away. An incongruous sign on a mountain top, however, declared that Lenin was still with us. It was difficult to escape the propaganda tentacles of the state anywhere in the Soviet Union however remote—a theme I will return to later.

The land mosaic is divided by the great rivers—those in the west flowing south into the Black and Caspian Seas and those further east flowing north into the Arctic Ocean. Their value as a means of communication in a country with a poor and inadequate road system is easy to appreciate. Our rivers in England are mere streams in comparison. The Volga near Moscow is over a mile wide some 2000 miles from where it enters the Caspian Sea. The River Ob at Novosibirsk in the geographical centre of the Soviet Union is also a mile wide likewise nearly 2000 miles from its mouth. The ports on the great rivers are as large as the major ports in England and to my non-naval eyes the ships on the rivers and canals appeared comparable in size to sea going vessels.

Many of the rivers are unfortunately heavily polluted but this is not surprising when one sees the haphazard development of heavy industry in the major towns and



Photo 2. A Siberian village in winter



Photo 3. On the Black Sea coast.

their almost permanent envelopment in clouds of obnoxious smoke. The large aluminium smelting plant, one square kilometre in size, in Volgograd stands in a permanent pall of smoke on the slopes of a hill; and Krasnoyarsk in Siberia remains in my memory as the most polluted town I encountered in the Soviet Union. Every building, street and factory was covered in grime and the whole was enclosed in smoke which almost shut out the Siberian sunshine. The driving force in industry, however, is to meet production norms. There are few prizes for preserving the local ecology.

As for the people of the Soviet Union it is impossible to describe so many disparate races as one entity. Only a number of distinct events and impressions remain in the memory. The instantaneous kindness of an elderly Georgian who immediately gave us one of his two loaves of bread when we asked the way to the bread shop, the spritely Soviet war veteran who was very friendly on a flight to Dushanbe and to whom we showed and explained the use of a tea-bag. He had never seen one before. The children who we met on duty at war memorials delighted my wife and myself with their openness and unaffected simplicity. We were very impressed with the behaviour and demeanour of Soviet children. Of all the many races we saw we were perhaps most attracted to the Tadzhiks. The men were handsome and the women attractive. They walked with dignity and a sense of freedom that must have come from the independence and remote heights of their mountain villages. We were rarely disappointed in the friendliness of the individual Soviet citizen that we met.

Only *en masse* or in positions of authority are the Soviets less attractive. The daily scrum on public transport to get to work and the queues and bureaucratic procedures in the shops, where people are chasing too few goods and little of quality, all contribute to a shortness of temper in the daily round and ill regard for the comrade who is in the way. I have been flattened on many occasions by one of those formidable Russian ladies who would do justice to the second row of the pack in a first class London rugby club. A Soviet citizen in some position of authority is also an individual to be avoided. The authority is generally used to improve the working lot of the individual concerned and is not dispensed with any helpfulness to those who might expect some service. Thus the old lady at the ticket office will finish making her tea or her

conversation with a friend before issuing a ticket to the head of a patient queue. Often the reply to a request for a seat on a plane, train or at a restaurant is that there is none. No attempt is made to suggest alternatives or to be helpful generally. In a country where everything is state owned and where any attempt at free enterprise is stifled the individual sees little or no need to work unduly hard. In general, I sense that life for many Russians is a struggle despite improved conditions and the better availability of goods in comparison with earlier years. The Russian tends to fear the worst rather than hope for the best. The state propaganda does not help in this respect, playing an almost constant stream of comment about the threat to peace by the imperialistic Western bloc. So fearful does this crescendo become that some people living in Murmansk thought that the first exchanges in a nuclear war were occurring as the Soviet ammunition and missile dump near there exploded in May 1984. The same apprehensiveness and uncertainty was evident when Brezhnev died.

For me much of Soviet life and attitudes only began to make sense when considered against the background of the continuous autocracy under which the people have lived for centuries and the suffering that has been imposed on them by invaders like the Mongols, and in this century Hitler, and also by their own leaders such as Ivan the Terrible and Stalin who slaughtered their subjects with almost the same profligacy as the invaders. It also needs to be remembered that whilst our own industrial revolution occurred 150 years ago, most Russians were rural peasants until two generations ago. The Russian experience of life therefore is very different from our own and to be able to think as a Russian is a feat of mental gymnastics which is far from easy for us.

CIVIL ENGINEERING

It is a well known truism that anything newly constructed in the Soviet Union looks instantly old when completed. This is partly because the Russians often spend years rather than weeks or months on their construction projects with the result that some sections of a project are genuinely old before their time. The main reason for the statement, though, is that there is simply no quality control in the Soviet Union in the Western understanding of the term. Whilst plant operators, concretors, steel erectors, carpenters, electricians etc all contribute to the final structure it is nobody's responsibility to ensure that the end result is fit for its intended use. It is sufficient that the project has been completed. The fact that the lifts, the electrics or the plumbing do not work is immaterial. The construction industry is no exception to the norms of Soviet life but it comes as a surprise to the engineer who immediately has qualms on the score of safety.

I have witnessed sections of buildings coming adrift in heavy rain and narrowly missing pedestrians and have seen cracks in buildings that one can literally put ones fist through. Balconies of flats look so unsafe that I resolved never to put foot on one. A fellow attaché tried to persuade me out on to his balcony one day with what he thought to be the encouraging statement that his balcony was safe; it was only the continuation beyond to his neighbour's flat that was unsafe! Despite these weaknesses most Soviet structures seem to survive. I can only conclude that design safety factors must be high.

Another aspect of construction that has fascinated me is that Soviet construction sites seem to be devoid of level marks. This is understandable in so far as roads are concerned since they are like switchbacks. I have occasionally seen Soviet engineers levelling but have never detected the results of their handiwork. Nevertheless most Soviet buildings are vertical. A future sapper attaché will have to resolve this problem.

The muddle and incompetence is well demonstrated by the water, gas and drainage repairs being undertaken in a well known area of Moscow, the Arbat. The area was like the aftermath of a wartime bombing raid with craters and excavations to be seen in every direction. This had been going on for two years with many an excavation and repair being effected several times at the same spot. As a newcomer to Moscow and

a witness to the start of the work I asked my driver how long the repair might inconvenience us expecting the answer to be a few days. He cast his eye upwards and pointed out that the overhead trolleybus wires were being removed and accurately forecast that it would be sometime yet. Russians seem to have a sixth sense about these things, or is it just the hard school of experience?

Painting and weatherproofing is another very necessary occupation in the extremes of climate. I have yet to see a professional tradesman painter in the Soviet Union. Teams of enthusiastic amateurs are allotted to a building and simply weatherproof or paint everything in sight. Windows, the pavement below and parked cars all receive their fair share of the covering. No rubbing down or preparation of woodwork or metalwork is undertaken beforehand except perhaps some filling of plasterwork. Work begins and ends with the liberal distribution of paint.

In order to keep some semblance of balance to my comments I should add that I have been impressed by the Soviet ability to improvise in the construction field. Piling, timber shuttering and shoring seem to be of second nature to the Soviet engineer who is equally good at improvising structures with timber. Prestige structures are a different matter. Care is taken with the work and the finished structure is of a high standard. A new annex to the General Staff building in Moscow and a successful modernisation to the forbidding Lubyanka both bear witness to this.

The majority of buildings, even new ones, look old and in need of repair. Superficially many structures appear unsafe. Maintenance is a constant requirement but is seldom adequate. Painting literally covers the cracks and not much more. All Soviet construction sites have a degree of permanency since the site is never cleared of debris when the project is finished. Project landscaping is virtually unknown except in the Baltic Republics. Construction engineering is still essentially functional in the Soviet Union with some very rough and surprising edges.

THE SOVIET SYSTEM

In this section I come to the heart of my comment on the Soviet Union. It is a state that in my view is supported on the twin pillars of the Communist Party and the armed forces. The first providing the credo and the second the means of protecting it. Moreover, the Soviet Union is a state founded and sustained by force and structured to resist political change. The internal infrastructure by which this is achieved I have termed the Soviet system.

The armed forces are a visible and powerful manifestation of the system. Within Moscow and other large cities they provide a cocoon of protection for the Party leadership. This first came forcibly to my attention at Marshal Bagramyan's funeral in Red Square in the autumn of 1982. To reach my position near Lenin's mausoleum I had to pass through two cordons of KGB troops at which my pass and credentials were checked each time. Around Lenin's mausoleum was yet a third line of KGB troops standing shoulder to shoulder and completely sealing off the Politburo representatives from everyone else. The crowd opposite in the Square was ringed with Internal troops. In effect the troops controlled every aspect of movement into and within the Square and provided complete protection for the Party leadership.

This example was magnified many times over on the occasion of Brezhnev's and Andropov's deaths. When these occurred the centre of Moscow out to a radius of about two km was largely sealed off to normal movement by a ring of Internal troops and conventional Ground Force troops whilst the transfer of power was being decided and effected. The impression I gained from such deployment was of an almost effortless ability to call on the enormous resources of armed strength to protect the leadership of the Communist Party at a particularly vulnerable time of change.

Internal troops are used to back up the Militia during important foreign visits to the capital and very often a company of these troops was stationed by the bridge across the River Moscow near the Embassy for these events. I also saw a battalion deployed to control a football crowd in Tbilisi during a key match. Perhaps there is a lesson for the Football Association here? Soviet matches do not suffer from



Photo 4. Russian Generals and an Admiral on Red Square on 7 November, the anniversary of the Revolution

hooliganism. In practice Internal troops are frequently deployed to control crowds and sporting events. It is an indictment of the system that it should be necessary to station Internal troops in Moscow and the major towns. Wherever there may be incipient resistance to the system, such as in the Baltic States, the presence of Internal troops is strong.

Force and armed strength are also particularly evident along the borders of the country. These are sealed by the KGB Border troops who ceaselessly patrol them on land, from the air and by coastal craft. In Grodno, near the Polish border, when a train arrives to cross into Poland the station is sealed off from all passengers, the train stands on a track well clear of the platform. It is circled by guards and then searched from one end to the other. The search is a model of thoroughness with every compartment being examined from top to bottom and even roof and corridor panels are removed to ensure that no one is hiding. The over insurance to see that no one may leave the country who is not so authorized is also exemplified at Tallin Olympic yacht harbour. Hardly any craft are moored there, and certainly not more than one or two sea-going yachts. Soviet citizens are simply not allowed to sail away over the horizon when the horizon lies outside the Soviet Union.

The Militia, or police, must also be counted as an auxiliary service to the armed forces. In Moscow they are more numerous on the ground than anywhere else that I have seen. They are positioned at least every 200-300 metres along the main streets of Moscow in daytime. Their authority over drivers and pedestrians alike verges on the draconian. At Riga they pushed passengers to one side of a railway platform with quite unnecessary force to allow a visiting delegation to pass. This action was clearly strongly resented by young and old alike. The Soviet Union has no inhibitions over employing its police and armed forces to exercise such arbitrary control as it wishes over its people. The sad thing is that people seem inured to the treatment.

Militia posts are sited along all main roads at the entrances and exits from towns and at major junctions between them. They are thus able to stop and check traffic as they wish which includes foreigners as well as their own traffic. A frequent target is unauthorized loads on state transport. One of their less attractive functions is to act for KGB or MVD officials. In Kharkov one night my car was stopped and I was falsely accused, through two inches of window space, of drunkenness. Two witnesses were summoned from the darkness who I never really saw and who I am sure barely saw me. When the legalistic process was over my car was escorted back to my hotel. The Militia seem to have no qualms in manufacturing false evidence as required by the KGB. On yet another occasion an MVD official claimed that I was outside a city

Service As A Diplomat In Moscow 4

boundary yet I was on a city bus. All the civilian passengers were turned grumbling off the bus which was then used to drive me as a personal taxi back to my hotel. No thought was given to the passengers who were treated as mere cyphers by the "Organs of the State".

I have concentrated on those aspects of the Soviet system of which I have had first hand knowledge but the tentacles of it spread through all aspects of life. Jobs, housing and travel can all be used to exert pressure on people. External telephone calls are controlled. Even internal telephone calls are not easy to make because telephone directories are non-existent or are guarded like gold by the few who possess them. Foreign radio stations are jammed and the towers carrying the jammers are a feature of every major city. Internal passports are issued at the age of sixteen and are another means of control for without them internal movement is restricted. Many people in rural areas receive no passports. If they did they would desert the country for the towns and agriculture would suffer or collapse. The media are tools of the state. Only information which is acceptable is broadcast or published. At best Russians learn the facts of an event; at worst they are fed disinformation, distortions and untruths. There is an unrelieved diet of the military threat posed by the West and constant allegations that war is imminent. As a result people are naturally jumpy and concerned. All of the foregoing elements of the system and many more can be orchestrated at will to enable the state to sustain and protect itself.

Finally, there is one aspect which I found particularly abhorrent. It concerns the manipulation of people and how they may be employed as puppets in the service of the state. I could draw on several examples but one stands out above all others in my memory. I was present at a press conference at which Marshal Ogarkov gave the Soviet version of events which led to the shooting down of the KAL airliner in the autumn of 1983. As befits a Chief of General Staff he spoke well and succinctly but I listened with increasing horror as this very able man, the then professional head of the Soviet Armed Forces, wove a tissue of half truths and eventually a bare-faced lie to the effect that the airliner was a US reconnaissance plane. He must have had access to most of the real facts yet in his country's interest he was quite able to stand up and state that black was white. Whilst I was quite aware that any Party member would not regard it as immoral but merely his duty to follow the agreed line on a particular issue it was a most unreal experience and quite horrifying to see the system using Marshal Ogarkov in this way.

CONCLUSIONS AND THE FUTURE

REVULSION for the system which draws on a bankrupt ideology and which in turn leads to political repression, economic failure and stagnation stands out above all other memories of my time in the Soviet Union. Against this must be set a fascination for the scale and sweep of the country, its history and its people. All Russians have exceptionally strong ties with "Mother Russia" and my wife and I became imbued with some of that attraction.

Despite the enormously strong grip of the system the Soviet Union is, I believe, inherently unstable. A society that is virtually imprisoned, isolated and stagnating in its own country must in the long term be vulnerable to change as ideas and knowledge of achievements elsewhere in the world percolate through to the people. The portents are there; a restlessness in Eastern Europe; dissatisfaction with an ideology by some sections of Soviet youth; an ever increasing expansion of world communications and with it a greater penetration of the Soviet Union; a well established understanding that Western goods are generally much better than their Soviet counterparts; an increasing sluggishness and a falling behind of the Soviet economy and finally a gradual passing of the generation which was steeped in the Revolution. Exactly when change will come or in what form is impossible to predict. It is a consolation to know that it must.

South Seas Sappers

CAPTAIN and QM BJ KNOWLES, RNZE



Captain Knowles joined the NZ Army as Regular Force Cadet in June 1957 and graduated into RNZE in July 1959. He originally trained as a vehicle mechanic but later changed to storeman. As an Other Rank he held a number of stores appointments including SQMS 1 Field Squadron and Warrant Officer Instructor NZ Army School of Administration. In 1979 he was commissioned as a Lieutenant and posted to the Army Training Group Waiouru as the SO3 Works. Since January 1982 he has been the Quartermaster, 1 Field Squadron.

FOREWORD BY LIEUTENANT COLONEL S D JAMESON, AFNZIM RNZE
(CHIEF ENGINEER, NZ ARMY)

FOR over two decades, RNZE personnel have been actively involved supporting various NZ Government aid and disaster relief tasks in the South West Pacific. The latter aspect is especially relevant as a number of RNZE officers and SNCOs are currently deployed in Fiji assisting with hurricane damage repairs and school reconstruction following Cyclones Eric, Nigel, Gavin and Hina. However, one particular RNZE skill has produced a steady trickle of bids for support from our Ministry of Works and Development (MWD) which provides works and design assistance to a number of South Pacific governments. The skill in question is that of Army diving.

In 1963-64, RNZE diving made its first official foray into the Pacific to blast a channel through a reef surrounding the tiny atoll of Fakaofu in the Tokelau Group. This sort of task was to be directed to the Corps with some regularity in the following years. Diving teams have since been dispatched to Tuvalu (formerly the Ellice Islands) and the Cook Islands. More recently, an RNZE officer was included in a MWD team which reconnoitred a series of tasks in the Tokelau Group; these tasks included reef gapping, construction of breakwaters, removal of shipping wrecks and the construction of an airfield.

The most recent task, however, arose from a harbour modernization project being undertaken by MWD on behalf of the Cook Islands Government. Avatiu is the only port on Rarotonga which is the main island in the Cooks. The project would involve harbour deepening, replacement of the sheet piling and renovation/relocation of some of the harbour buildings. The RNZE diving team was to be responsible to MWD for the works associated with the harbour deepening. Leading the team was Capt B J Knowles, one of the most experienced diving supervisors in the Corps, and a member of the original team which went to the Tokelaus in 1963.

BACKGROUND

LOCATED approximately 3000 kilometres north of New Zealand midway between Samoa and Tahiti is the Cook Island Group. This group which comprises fifteen

Captain Q M B J Knowles RNZE



Photo 1 Coral blasting on Rarotonga. A 30kg ringmain is initiated.

islands covers an area of approximately 2.6 million square kilometres. The population of the Cook Islands is about 18,000, half of whom live on the main island of Rarotonga. In 1965 the Cook Islands became a self-governing territory in free association with New Zealand.

As the country developed, there have been greater demands on existing port facilities, and recently priority was given to upgrading the main port of Avatiu in Rarotonga. In conjunction with the NZ Ministry of Foreign Affairs (MFA) and the Cook Islands Government, the NZ Ministry of Works and Development (MWD) commenced a NZ\$3.5m project to reconstruct the harbour. Scheduled to take up to three years to complete, the project involves re-alignment of the wharves, replacement of unservicable sheet piling with concrete piles, dredging and deepening the inner harbour, and widening and deepening of the harbour entrance. The latter two sections of the task would involve the underwater use of explosives to break up the coral deposits.

In July 1984, MWD approached the NZ Ministry of Defence (MOD) and requested the assistance of an RNZE diving team to undertake the harbour entrance element of the project. The task itself involved the removal of a submerged 10 metre-wide bank of coral extending 130 metres along the western side of the harbour entrance. MWD initial estimates suggested that approximately 4000 cubic metres of coral would have to be removed to achieve the desired result. The existing harbour channel was 12 metres deep and the RNZE task would be to blast the adjacent coral to a depth of at least 6.5 metres, with the overburden being reduced to a size able to be removed with a mechanical grab.

RECONNAISSANCE AND PLANNING

A reconnaissance team comprising myself, an RNZE senior NCO diver and the MWD Project Manager flew civil air to Rarotonga in 26 July 1984. The reconnaissance established that the team needed to be completely self-sufficient, as the equipment available on the island was in a doubtful state of repair. Taking into account such factors as the type of coral to be removed, weather conditions at that time of year, delays likely to be caused (by the presence of civil shipping in the harbour) and anticipated equipment serviceability, it was estimated that the task could take up to two months to complete.

The two major limitations in determining the dates for deployment were the onset of the hurricane season (mid November), and RNZAF commitments on pre-planned tasks. Both would fix the date by which time the task would have to be complete and the team recovered to New Zealand. (The prospect of having to spend an extra month or two in the Pacific sun was tempting but would have hardly drawn favourable comment from Defence Headquarters). Consequently, to meet the November deadline, it would be necessary to deploy by mid-September and this gave rise to some rapid planning and preparation.

The team selected comprised one officer (myself), a SNCO diver (the same NCO who had been on the reconnaissance), five Sapper divers and an RNZCT cook; the latter being granted 'honorary sapper' status for the duration of the deployment. The inclusion of a cook enabled the team to work flexible hours to overcome any difficulties with delays through tides, shipping etc. However, more importantly, it ensured that the divers had well prepared meals. The divers had been selected from units throughout the Corps to ensure that all units would benefit from the experience gained on the task. Since New Zealand was still feeling the cold of winter at this time, there was no shortage of volunteers. For six members of the team, it was to be their first tour outside New Zealand and they were obviously excited at the prospect of working in a new environment.

The team assembled at 1 Field Squadron (in the Auckland area) on 3 September 1984 for pre-deployment training. This included briefings on the geography and customs of the Cook Islands, refresher training, operation and maintenance of the equipment being taken, fitness training and preparation of the stores for the flight to Rarotonga. The main equipments comprised a 0.75 tonne Landrover, an Atlas Copco 250 cfm air compressor (for drilling the coral), a small concrete mixer and a diving compressor. The multitude of other small stores brought the total payload to approximately 7300 kg.

We flew out of Auckland on 12 September 1984 courtesy of RNZAF C130 Hercules and five hours twenty minutes later landed in Rarotonga. Although the temperature on arrival was 24°C (75°F), the humidity certainly made it feel much warmer—a welcome change to the cool climate we had left in New Zealand. Coincidentally, we had crossed the International Dateline enroute so we actually arrived the day before we had left New Zealand; if that was not confusing enough, we also had to put our watches forward two hours!

TASK

THE first four days after arrival were spent settling in, unpacking and preparing the stores for work. An underwater grid system was established on the sea bed work site to enable the divers to properly orient themselves once work commenced. The grid comprised a weighted line which was laid along the side of the area to be blasted and to which bouyed shotlines were attached at ten metre intervals. To position a charge at a specific point the diver simply descended at the initial shotline, proceeded along the axis line to the required reference shotline then paced out at right angles the distance required. Such a system was necessary because, although the team had anticipated clear water conditions, a dredge operating in the inner harbour was at times stirring up the silt and reducing visibility to less than one metre.

Once the grid has been established, the team set about establishing the size and type of charge to use. Coral differs in hardness and on previous similar deployments in the South Pacific it had been necessary to drill and blast the coral. At Avatiu, however, the coral was soft enough to allow the use of plaster charges, ie, charges laid directly on to the surface of the coral. This was an unexpected bonus as drilling coral can be very time consuming, and cause excessive wear on machines and associated equipment.

The method of attack employed was to establish a quarry face and, applying quarrying techniques, work along the coral bank until the task was complete. Once the face had been established, the task progressed quickly and by selective placement



Photo 2 Preparation of 10kg charges

of charges it was possible to 'throw' a great proportion of the overburden into the main channel. The initial ringmain comprised 90 kg of explosive. However, after experimentation this was quickly reduced to 30 kg—three separate 10 kg charges placed at five metre intervals. Tamping was not required because of the containing effect of the water itself. The charges were connected using detonating cord (Redcord) which was then connected to an electric detonator. This was in turn connected to D10 firing cable which was attached to the nearest buoy and then across to the firing point located on the causeway. Charges were initiated using a Shrike exploder.

The task progressed faster than had been anticipated due largely to three factors; first the 'softness' of the coral had saved considerable time as the charges reduced it to fine rubble, able to be handled by the harbour authority's clamshell excavator. Secondly, work was able to continue while shipping was present in harbour. (It had been expected that blasting would have to be curtailed once a ship arrived in harbour; the ship's masters, however, were quite happy for the work to continue.) Finally, the Cook Islands Government attached three local civilians to the team to assist with the preparation and packing of charges, thereby enabling the divers to concentrate on the work underwater. These factors enabled the task to be completed three weeks ahead of schedule and substantially assisted in reducing project costs overall.

EXPLOSIVES

BASED on past experience it was decided to use Ammonium Nitrate—Fuel Oil mixture (ANFO) as the explosive. ICI (NZ) Ltd in their Manual of Quarry Blasting state the following in regard to the use of ANFO: 'The experience of thousands of quarry blasters throughout the world provide ample warning that the blasting performance of ANFO cannot be relied upon in the presence of water.' Contrary to this warning, RNZE teams have used ANFO underwater on numerous occasions without failure—the secret lies in the packaging of the charges and the organisation of the task to ensure that the ANFO is under water for the shortest possible time. ICI 'Nitropril' was used on this task. Being in the form of small porous spherical prill, it absorbs fuel oil readily, resulting in a dry mix with good pouring quantities.

The ANFO was mixed on site in the concrete mixer in 30kg batches which were

then broken down into 10kg charges. This proved to be an optimum size for the divers to handle underwater as well as ensuring that the charge would be adequately protected against water damage (seepage). The ANFO was poured into a heavy duty plastic bag and then sealed with highly sensitive tape. This package was then placed in a second plastic bag, re-taped and then placed in a 'Nitropriil' bag and sealed again. Extra 'Nitropriil' bags had been obtained because their robust construction provided extra protection against the abrasive coral. Molanite was used as the booster charge because of its excellent water resistant qualities.

INNOVATIONS

As indicated earlier the dredging operations, which were proceeding apace with the blasting, reduced underwater visibility considerably. The team leader's daily works inspection had to be conducted early each morning before this dredging commenced. Early in the task it was found that the divers' fins stirred up the silt formed by the dredge thereby further 'clouding the issue'. We, therefore decided to change to gumboots (wellingtons) and extra weights to enable the divers to walk on the sea bed. The sensation of weightlessness together with the walking technique employed resulted in something akin to 'moon walking'. However, even though divers sometimes had to walk up to 100 metres underwater, this technique proved satisfactory.

To protect the wet suits against the sharp coral, the divers also wore overalls over their wet suits. (The Harbourmaster—a retired RN Diving Officer—was somewhat bemused when he saw the sappers dressed in overalls, gumboots and CABA gear.) To assist with the problem of poor visibility below the surface, the team experimented with a pair of iridescent orange overalls. These proved successful and even at ten metres it was a simple matter to locate the diver in the murky conditions. It is intended that these overalls become standard equipment on tasks of a similar nature.

DIVERSIONS

In their off duty periods, the team became involved with the local sports team, played golf and generally explored the island. One particular noteworthy event, however, was in support of the local Rotary Club which had embarked on a project to raise funds for local charities. The members of the team decided to run a sponsored relay around the island (32 kms), dressed in wet suits (complete with air bottles, weight belts) and



Photo 3 At the Telefon Appeal 'Round the Island' Run startline

South Seas Sappers 3

carrying fins and face masks. Running in pairs, the team ran one km legs and completed the journey in three hours forty minutes. The locals naturally thought that we had been affected by the heat (mad dogs and Englishman and all that...). However, the run was a financial success, with the locals donating a total of NZ\$450 towards charity.

Pacific Islanders are traditionally friendly people; certainly the Cook Islanders were no exception and at times the team was embarrassed with the overwhelming hospitality. The Prime Minister of the Cook Islands, Sir Thomas Davis, made several visits to the job-site and took a personal interest in our progress. At the conclusion of the project he honoured the team with an official function, an occasion we will long remember.

CONCLUSION

PLANNING for blasting operations of this nature is essential and requires full consultation with the appropriate interested parties, such as police, harbour authorities and public services. Avatiu Harbour remained fully operational throughout the task so there was a need for close coordination with all concerned. Notices were published in the local newspapers warning the public of the blasting, and radio announcements were broadcast regularly. Indirectly, however, these tended to exacerbate the crowd control problem. It did not take the Islanders long to realise that the blasting would produce stunned fish; our announcements simply gave them early notice to get down to the harbour to collect them.

For those statistically minded, the task was completed three weeks ahead of schedule. It had consumed 3627kg of ANFO, 1336 metres of detonating cord, and had removed nearly 4000 cubic metres of coral. Divers' personal times spent underwater ranged from 975 minutes to 1659 minutes, with the team grand total being 7534 minutes. It was a reluctant but weary team which packed up for the move back to NZ. Sappers worldwide have the happy knack of being able to fit in with the local community; the RNZE diving team in the Cook Islands in 1984 was no exception.

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DFDS SEAWAYS

The "Mowlem Army" Remembered A Sapper Story

D G CARPENTER ESQ

David Carpenter joined John Mowlem & Company in 1968. After many years of contract management he is now responsible for training graduate engineers and for the company magazine London John. He was in the Royal Engineers and RASC as a National Serviceman from 1947 to 1949 during which time he saw service with British Troops Berlin. John Mowlem & Company have had close associations with the Corps for many years, most recently in connection with their joint venture contract (Laing-Mowlem-ARC) for the Mount Pleasant Airport in the Falklands.

No 691 (MOWLEM) General Construction Company, Royal Engineers, was raised in a most informal manner, in response to a War Office request to the firm late in 1939, by Major E G Mowlem Burt, a Director of John Mowlem & Company. Most of the officers, NCOs and other ranks were Mowlem volunteers, who would otherwise have remained in their reserved occupations. One section came from the employees of Percy Bilton Ltd.

The "Mowlem Army", as some of its old sweats affectionately remember it, was called to the Colours at Clacton, Essex, on 12 February 1940. Its first barracks was the Butlin's Holiday Camp, through whose grim portals came an unmilitary but stout-hearted body of over 200 men. They hurriedly drew clothing and equipment, suffered their inoculations and formed into sections. At this time they were joined by the only Regular soldier in the unit, Company Sergeant-Major W Evans.

Under Major Burt, the Officer Commanding, the Company's officers had been appointed with Direct Commission: 2Lt J H. Brass, who soon became Second-in-Command as a Captain; 2Lt J Westacott; 2Lt J W Kendrew; 2Lt R G Cross of Percy Bilton Ltd. The NCOs were foremen, young site engineers and surveyors, including many well-known names, then and later, like H N Gray, G W Iggulden, Fred Bull, John Wells, Cliff Godfrey, Ken Earl, Tom Scott, Jock Brennan, and Tommy Hooker.

SEASIDE TRAINING

The company moved to Margate for about three weeks to be turned into trained Sappers. During the second week there, John Westacott was detailed to parade the company on the beach. It was a fierce Thanet winter. Perhaps the order "Company will advance . . . About Turn" was carried away by the wind. With commendable fortitude and great precision, for they had been drilled several times already, the whole company marched without hesitation into the sea. It was then that 2Lt Westacott realised with what dedicated (if somewhat damp) soldiers he was privileged to serve. He also recalled the apocryphal tongue-tied subaltern of an earlier War, drilling his troops on the cliffs by Dover Castle, urgently advised by the drill-sergeant "For God's sake say something, Sir, if it's only goodbye", as the platoon approached the edge.

WITH THE BEF TO FRANCE

Jim Kendrew took the advance party over from Dover to Dunkirk towards the end of February, about twenty men and the Company transport. This crack military unit was unarmed, without identification papers, and the "Imprest Account" was £20 in cash, a parting gift by Major Burt for emergencies. It was a wise precaution, as the Field Cashier at first refused funds from Army sources in the absence of proper identification. The advance party joined the BEF near Doullens under the protection of No 1 Graves Registration Company, a somewhat ominous beginning to their active service. The main body of the company duly sailed on 11 March, 1940, from

Southampton to Le Havre, where they entrained for a destination somewhere in France.

At one stage in their slow and halting journey the train rested in Abbeville for a long time. An alert sapper noticed an *estaminet* open for custom by the station. The temptation was too much for some, who left the train and crossed the tracks to satisfy their hunger and thirst (the "unexpired portion of the day's ration" had long gone). When the party, which included Ken Earl, left the *estaminet* a little later the train had vanished. Fortunately it soon returned, having been shunted to another track. They clambered gratefully aboard, relieved from fears of being posted as deserters within 24 hours of disembarkation.

After a roundabout journey 691 Coy reached its destination, Frévent station near Doullens, at midday on 13 March. Now it so happened that the BEF blew whistles and donned gas masks in practice at 1200 hours every Saturday. Jim Kendrew was by then, "dead regimental" after his three weeks in France. His whistle produced a rewarding confusion as the company detrained under "gas attack".

BEAUVOIR AERODROME

691 immediately joined two other General Construction Companies, Nos 664 and 680, on the site of the RAF Aerodrome at Beauvoir. The RFC and RAF had first used Beauvoir during the Great War 1914-18. About twenty Nissen huts had already been erected and next day most of the company joined in the airfield construction, while others built latrines and cookhouses for the camp. The weather was extremely cold. Maj Burt was appointed OC Site soon after 691 Coy arrived.

At first the two runways, each 1100 yards long and 150 yards wide, were excavated by hand, the muck being taken to be tipped for filling on 2ft gauge Jubilee track. Later small skimmer excavators were provided, though frequent requests were made for Caterpillar tractors with scraper boxes to do the job more effectively. A standard-gauge railway connection brought intermittent supplies of very hard Marquise limestone, which was distributed to the runways by Jubilee skips and tipped into bays approximately 50ft wide and 15in deep on the prepared formation. The stone was then grouted with a cement-and-sand Colcrete mixture. The technique perhaps



Photo 1. Loading from a Decauville skip (Imperial War Museum photo F4889)

The Mowlem Army Remembered A Sappers Story 1



Photo 2. Mechanical equipment on a military airfield in France. (Imperial War Museum photo F4888)

fell a little short of the best standards of airfield construction but the runway was completed on time in mid-May, with two-thirds of the taxi track.

THE BLITZKRIEG BEGINS

On 10 May 1940, the Germans attacked and 691 Company found themselves "standing to" in the chilly dawn each day. The battle to the East was going badly, rumours were rife and streams of refugees were passing. A Hawker Hurricane force-landed on the unfinished aerodrome and John Brass took the unhurt RAF pilot, a Flight-Lieutenant, back to Auxi by car. There he first heard the depressing news that the Air Component of the BEF was leaving France. At this time some transport was handed over to the Tyneside Scottish, who were going forward to face the advancing enemy.

After many conflicting rumours and instructions the Company was ordered to move at 1900hrs on 19 May 1940, towards the Belgian frontier. They were told to commandeered any extra transport needed from passing refugees and proceed to Bøeseghem, near Hazebrouck. Before doing so they did what damage they could to the plant and burnt the wrecked Hurricane, which finally blew up. In their own transport and about six assorted requisitioned vehicles (none worth more than £10, according to the War Diary) they travelled all night along roads packed with refugees, through St Pol to Bøeseghem, arriving between 0230hrs and 0830hrs on 20 May. The latecomers, who had been delayed by the condition of the commandeered transport, barely had time for a breakfast of bread, Camembert cheese and wine, before they were ordered back towards Boulogne. They learnt that the camp at Beauvoir had been heavily bombed after the company had left.

That night 2Lt R G Cross (of Percy Bilton Ltd) rejoined the Company with his section. They had been detached a week earlier with orders to work on the grass airfield at Auxi-le-Chateau. He found the Company encamped with others in the wooded grounds of a chateau at Wimeroux, on the Northern outskirts of Boulogne. The rhododendrons were in full bloom in the only gardens that they saw in France. During the night of 20 May the Luftwaffe dropped a few bombs on the camp. John



Photo 3. Work on the runway at Nuncq (Imperial War Museum photo F4887)

Wells and Cliff Godfrey threw themselves down on a tarpaulin. They soon realised this was covering the unit's stock of ammunition. But all went well and the company survived without serious casualties. The next afternoon, 21 May 1940, when a tented camp was growing in the woods, the Germans came again, circling around and dropping HE bombs among the tents. Again all survived.

THE AMMUNITION DETAIL

On the morning of 21 May 1940, volunteers were called for to unload an ammunition ship in Boulogne Harbour. The French dockers were unwilling to do this work because of the bombing. As a result, Ken Earl and others found themselves in a human chain stretching from the bowels of the ship out to the dockside where Army lorries were loaded. Once all the "ammo" was discharged, two soldiers were allocated as escort to each lorry and the convoy set off on roads packed with refugees heading in the opposite direction.

Each time an aircraft was spotted the convoy stopped and everyone hastily left his vehicle. No one fancied being bombed or shot-up while sitting on boxes of ammunition. Nor were the refugees particularly friendly. They felt that the convoy provided an incentive to enemy attack and some showed their disapproval by a throat-cutting gesture. It was past midnight when most of the convoy reached its destination, a long straight road in the countryside somewhere near the Belgian frontier. They were told to keep quiet and needed no encouragement to unload the lorries rapidly beside the road. The boxes were camouflaged with brushwood, cut by bayonet, to look something like a hedge.

Most of the 691 Coy men made their way to Boulogne but some ended up at Dunkirk. Those who reached Boulogne found to their consternation that the rest of the company had departed. Somehow they had found out that it had moved to Calais. They rejoined the unit in the middle of an air raid. Ken Earl wearily crawled under a farm cart to sleep beneath its scanty protection. Just what protection it was became clear in the morning. Muck-spreading was just one of the things the farmer had to defer during the hot and hateful summer.

TOM BURT'S ROAD BLOCK

During the 21 May Major Burt had formed a road blocking party, with orders to stop the German tanks at the edge of the Forêt de Boulogne on the Desvres road to

The Mowlem Army Remembered A Sappers Story 3

the South-East. 2Lt Jim Kendrew went with him, as did Sergeants Muffett and Trinder and a party of sappers with two or three Lewis guns and their rifles. Major Burt had been in the HAC, the two sergeants were Territorial soldiers and Jim had passed Certificate "A" in the OTC at school. His first task was to instruct the thirty warriors, one by one, how to fire a service rifle, which none of them had handled before. They set to preparing an impregnable defence, while hoards of refugees poured through their position. Many armed and uniformed Belgian reservists were making for Abbeville, to the south, where they hoped to join their units. One group was relieved of an antiquated anti-tank gun, strictly for show as there was no ammunition for it. Later that afternoon Jim Kendrew was sent back to Boulogne to seek orders. About two miles behind the 691 Coy roadblock a single officer was creating a huge blockage by stopping all civilian vehicles. Boulogne was crammed with refugees and under attack by the Luftwaffe. It was obvious that this journey would be fruitless so he turned round and went back to the road block.

Next morning, 22 May 1940, some abandoned RAF lorries were added to the strength. An unguarded explosives dump inspired Major Burt to mine the road in front of 691 Coy road block. Hew went forward to reconnoitre with a small party leaving the rest behind to prepare the road for the charges. While he was away, heavy firing developed to the South. German tanks could be seen streaming down the right flank towards Boulogne. With great difficulty Major Burt and his party returned, still determined to blow up the Desvres road.

Boulogne was again bombed. The weather was glorious. There was little cover, so Tommy Burt decided to reduce the road block party, characteristically staying behind himself with 2Lt H R Smart of 664 Coy and Sergeants Muffett and Trinder, intending to blow the charges and withdraw by lorry. This was the last time Jim Kendrew saw him, as the main party cut across country to avoid the rear road block on their way back to Wimereux.

John Brass heard later, from an NCO with another RE company who was also at the road block, that a shell had burst among the Major's small group. Two wounded men had been taken back to Boulogne by Tom Burt. This NCO had then lost touch with him and later found a place aboard a destroyer leaving for home.

DEATH IN CAPTIVITY

The best account we have of the Major's fate was related to Mrs E G Mowlem Burt by a major in the Welsh Guards who had escaped from France and found his way to England. Mrs Burt visited him at his home in 1941. He was then in poor health but was able to tell most of the sad story.

The Guards major, with a sergeant of his regiment, had met up with the RE group at the road block. We do not know whether they were able to blow up the road but all hell was let loose as the advancing Germans rolled on. The two majors decided it was essential to avoid capture and to try to get their small party back to England. They eventually reached the coast, probably among the dunes south of Boulogne, where they found a rowing boat on the shore, intact but without oars. Tom Burt promptly fashioned a makeshift pair from driftwood. With one or two others he then rowed out to a French fishing boat lying offshore to parley with the skipper. Alas, the Frenchman could not be persuaded to sail for England.

The exact circumstances of their capture are obscure. After considerable privation they were eventually taken and marched to a prison camp in Boulogne, where Major Burt became seriously ill. The Welsh Guards major, to his great credit and after much argument, persuaded the German authorities to transfer his sick comrade to a Boulogne hospital, run by an Order of nuns. Sadly, Major Burt died there and his grave is to be found in the smaller of the two British War Cemeteries on the heights above the town. All this of course, was not known in England until much later. After being reported missing, he was first recorded as a prisoner-of-war on 2 September 1940. Thus were hopes cruelly raised in the chaotic state of communications in 1940, even through the International Red Cross.

HOME FROM CALAIS

The erstwhile road blockers, led by Jim Kendrew, caught up with the rest of the company near Calais. They were waiting for evacuation by a farm on the marshy western outskirts of the town. After an uncomfortable night, sleeping in ditches when not interrupted by air raids, the company was ordered to the Gare Maritime for embarkation on 23 May 1940. The dockside was crammed with troops surrounding the *City of Christchurch*, from which the light tanks of the 3rd RTR were being unloaded. There were dogfights overhead and the harbour area was being shelled. The RAF had priority for embarkation. 691 and the other airfield companies were "RE Air Component", as they emphasised to the embarkation officers. Eventually they were ordered to push transport and equipment into the harbour and they filed aboard in the brilliant sunshine. The *City of Christchurch* crossed the channel to Southampton in a glassy calm, disturbed only by aerial dogfights.

Captain John Brass and 2Lt John Westacott stayed behind for a last despairing search for Tommy Burt and his men. They gathered in a few stragglers but could find no trace of Major Burt. Overnight they joined the Royal Navy, with orders to assist in the demolition of Calais Docks, but next morning they were told to go home, finding places on a cargo boat which was serving as a hospital ship. As this ship left Calais at 0630hrs on 24 May it was bombed and shelled, going aground for one dreadful minute at the harbour entrance. They helped tend the wounded on the 24-hour voyage via Dover to Southampton, as the RAMC doctors were dead-beat after three days without respite on the hospital train from Belgium.

691 Coy, very tired indeed, were taken by train from Southampton, where they disembarked at midday on 24 May 1940, in Plympton, Devon, where they rested and regrouped. John Brass and John Westacott caught up with them in Devon. Major Clifford Jones (from SGB) had taken over the command. After a few days they moved to Horning and Wroxham on the Norfolk Broads, before being dispersed to RAF stations for airfield defence, with headquarters at Coltishall, on 2 June 1940. On 7 June home leave for forty-eight hours was started on rotation for those who had served with the BEF. Stragglers were still arriving from the Dunkirk evacuation, the last dozen sappers rejoining on 12 June 1940. While the Battle of Britain raged and Coltishall was occasionally attacked, it was curiously peaceful in the Norfolk countryside.

BACK TO THE BLITZ

THE rural peace, which 691 Company RE had enjoyed in the Norfolk countryside after their evacuation from France, was rudely shattered on 18 October 1940. On that day the company entrained at Norwich for East London, there to assist in repairing air raid damage and restoring essential services in Hackney, West Ham, the Isle of Dogs and the City of London.

During this period their home was the Cassland Road Schools in Hackney, already bomb-damaged and with much of the roof missing. The Company worked long and hard on a dozen or more separate incidents each day for the rest of the year. Their efforts were rewarded by an allowance of one shilling per man per day for extra rations on 7 November. Standards of Mowlem workmanship were maintained, particularly in the City of London, where John Westacott and others recall satisfying the demands of the Clerks of Works with quiet pride. The repairs were made to last, at least until the next bomb fell. One parachute mine burst fifty yards from the billet on the night of 8 December, fortunately without causing casualties among 691 Coy.

On 1 January 1941 a forward HQ (or military City Office) was established at Basinghall Street, covering the all-out effort of street clearance and dangerous structures demolition after the mass incendiary raid during the night of 29 December 1940. Explosives, bulldozers and manual methods were all used with a will. The sappers' natural enthusiasm was somewhat curbed when the Dean of St Paul's sent out a representative to stop the work, on the grounds that they would soon succeed, at the rate they were going, in damaging the cathedral which Hitler had failed to burn or bomb.

THE MANSION HOUSE BRIDGE

During the evening of 11 January 1941 a bomb burst in the circular Underground booking hall of the Bank Station, just outside the Mansion House, leaving a huge crater full of tangled wreckage. The task was to clear the crater sufficiently to erect a two-span trestle across the gap and to restore the road surface as far as possible around the periphery. The bridge was finished in record time, with frequent visits to the local grog shop to warm up and to consult the single borrowed RE Bridging manual. Lord Haw-Haw was watching progress as closely as the Lord Mayor. He threatened, too, that the Luftwaffe would return as soon as the bridge was ready for traffic. There was some genuine apprehension just before the grand opening on 3 February 1941, only twenty-three days after the incident. Through the fog and sleet came the drone of a single aircraft. There was no Alert but this was not particularly reassuring. RAF and civil aircraft were not supposed to overfly the London area. It passed slowly over. Nothing fell. 691 Company collectively breathed again.

After the opening ceremony the OC, Major "Jonah" Clifford Jones, escorted the Lord Mayor, Sir George Wilkinson, in the Mayoral car, followed by a No 15 LPTB double-decker bus and then the whole Company in their lorries. The Mansion House bridge held up, to the plaudits of the Press. Though the Mansion House bridge was the most spectacular, it was but one of many important jobs well done by 691 Coy in the City and East London. It was, incidentally, taken down by the whole Company working flat out for one day, 30 March 1941.



Photo 4. The Bank station bridge in use 3 February 1941 (PC Cross collection, Guildhall Library)

HAPPY ESCAPE IN HAMPSTEAD

On 9 February 1941 there had been a popular move from Hackney to more salubrious quarters in Hampstead, with one section detached to Balham for a time. The Other Ranks' mess was set up in the old gymnasium behind Jack Straw's Castle. Ten days later, on a Sunday evening at 2000hrs, another landmine floated down on its parachute, blowing up the mess, which would normally have been full of men, probably 200 of them having supper at that hour. Providentially no one was near the place. For some forgotten administrative reason the meal-time had been brought forward that day.

On 10 April 1941 clearance work in the City of London was entirely handed over to civil contractors but a week later some sappers were called to a rescue in Shaftesbury Avenue, getting people out of the rubble alive. After this the work in London was

much reduced and the Company got down to some delayed military training. This included, on 4 May 1941, a route march in respirators. The reaction of the residents of Hampstead was not recorded but the troops thought this was taking things a little too far (not so in hindsight, when Nazi poison gas development and stocks were reviewed after the 1945 collapse and the service gas mask thoroughly redesigned).

COD BICESTER

On 23 July 1941 691 Coy started its long sojourn in Oxfordshire. Its first home was a tented camp at Kidlington beside the River Cherwell. A plentiful supply of fish augmented the adequate but somewhat monotonous rations. Then they moved to Thames where a happy association with the local people sprang up. The Company was constructing the Command Ordnance Depot at Ambrosden, near Bicester. They were subsequently billeted in Nissen huts on the site and continued the construction work interspersed with training sessions at Shotover House, Wheatley, Oxon. It was useful work, if less exciting than before.

NEW DESIGNATION

On 31 January 1943, No 691 General Construction Company became an Artisan Works Company RE. By now many of the original members had left on posting or promotion, though Sergeants Fred Bull and John Wells were still there. Just before VE-Day they moved to Dorset, where their subsequent delight at the end of hostilities in Europe was tempered by a "fitness for war" inspection at Lytchett Minster on 1 June 1945. However, tropical kit was not issued and they re-crossed the Channel from Newhaven to Dieppe to build a demobilisation centre for those returning from the Eastern theatres of war via MEDLOC.

A BEAUVOIR POSTSCRIPT

691 Coy ended the War without formal battle honours but with the satisfaction of many jobs well done in the Mowlem tradition. One, at least, of the original members revisited the French aerodrome at Beauvoir, on the day Brussels was liberated, 3 September 1944. Jim Kendrew had left 691 Coy on promotion for the Middle East in June 1941. He was passing Doullens on a visit to one of his platoons which was up with the spearhead. On impulse he diverted to Beauvoir. From the main road the runway looked much as it had done on leaving in May 1940 but the airfield had been used as a V1 "doodlebug" launching site. It had been very heavily bombed, with wrecked launching ramps over by the woods and wrecked transport nearby. Unburied German dead lay near the wreckage. It had happened very recently. There was not a soul around and it was deathly quiet. Jim and his driver mutually decided this was not time for further investigation. He never returned.

ACKNOWLEDGEMENTS

We are indebted to John Mowlem and Company PLC for their permission to print this article which was first published in their company magazine *London John* in November 1984 and March 1985. Their own acknowledgement reads "Our account combines the recollections of some former members with several contemporary reports including those written by the second-in-command, the late John Brass and by Jim Kendrew. The unit's War Diary was written up to date by John Westacott about this time and is in the Public Record Office at Kew under Accession no WO 167/1055. We are indebted to Messrs Westacott, Kendrew, Wells and Earl for their stories; to Mr Kenneth Burt, brother of Major E G Mowlem Burt, for his valued contributions from the family's papers; and not least to Ian Greeves for prompting us to record this episode in Mowlem history".

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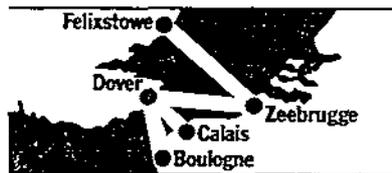
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New Town Development Corporations

BRIGADIER C H COWAN CBE, DL, MA, C Eng, MICE

This paper was presented by the author at the Association of Municipal Engineers' Conference, "Engineering for the Future", held in June 1984, and the information in it was correct at that date. An afternote to this paper brings subsequent developments up to date. The paper is published by permission of the Institution of Civil Engineers who retain the copyright.

A number of members of the Corps have played a significant part in the New Towns' movement. The first New Town General Manager, appointed at Stevenage in 1947, was Major General A C Duff, whose contribution has never been properly recognised; the first General Manager at East Kilbride was Major General W E R Dickson appointed a few months later; since then there have been Brigadier H G W Hamilton (Corby 1968-1980), the Author (Cumbernauld since 1970) and Brigadier R A S Ricketts (Irvine since 1981). In addition Brigadier John R Blomfield and Brigadier Michael W Biggs were managers under the New Towns' Commission of former new towns—and there may well have been others.

SYNOPSIS

AN account is given of the British new town movement since 1945, of its achievements and prospects, and of the underlying means. The effectiveness is discussed of the development corporation constitution and powers in co-ordinating and promoting the rapid and finite development of a new town; and this is related to current and possible future developments.

INTRODUCTION

BEYOND its obvious meaning, there is no ready definition of the term "Development Agency". The Scottish, Welsh and Northern Ireland Development Agencies, for example, are not primarily concerned with the development of real estate, let alone of specified localities; but these are the precise functions of the new town and urban development corporations. Perhaps the whole range of these agencies might be described as differing species of the genus Quango, or Quasi-Autonomous Non-Governmental Organisations (though, as the recent report to Parliament observed, a more proper term in the acronym would be "Non-Departmental"). (Ref 1).

Whatever the definition, the British new towns' programme is of fundamental significance to any discussion of development agencies; it came into being in face of the massive problems of reconstruction and relief or urban overcrowding following World War 2, and there are few examples in any western country of development agencies of any sort before the war. The best known, indeed, may be the Tennessee Valley Authority set up by the Federal United States Government in 1933 to develop and control the natural resources of the valley; and it is significant in this context because, despite its great success in the development of regional resources, it led to much concern at the risks inherent in the control of regional development by a board appointed by Washington, lacking any direct local political responsibility.

The British new towns are approaching the end of their fourth decade, and their achievement is there for all to see; they have been studied and copied by many countries, and their innovations have spread across the whole of Britain. Some of the towns, particularly in Scotland, will continue well into the fifth decade. While therefore the time of greatest activity is past, and a review of achievement can be attempted, a significant and challenging future remains. The contribution of such a study to a debate on development agencies is of course in terms of bodies directed to the physical and economic development of specified localities.

In no sense is any comparison intended with the operation of local authorities. The members of the latter are elected and depend, if they are to remain in office, on

retaining the approval of the majority of their voters; and such a system is well adapted to the running of the services of established communities. In contrast, the new town corporation is a developer, set up by parliament to carry out the specific task of planning and building its own new town, and which disappears when it has done its job.

HISTORY

THE British new town movement derives from a long and honourable series of experiments with the concept of "ideal communities" in which healthy and contented people could live a good life, and produce more in happy surroundings. In the nineteenth century several small townships were realised of which Robert Owen's New Lanark, Cadbury's Bourneville and Lever's Port Sunlight are perhaps best known.

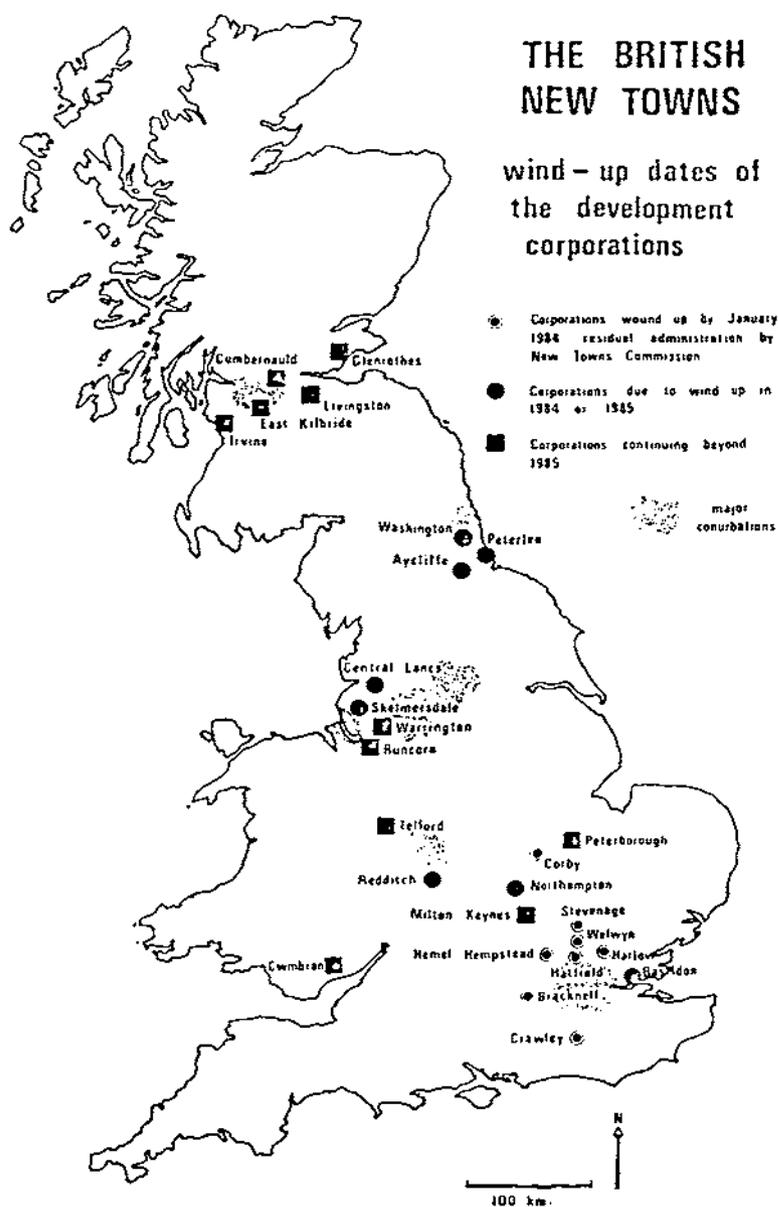
In 1898 came the first clear statement of the concept of a self-contained town of some 30,000 people, in Ebenezer Howard's great work "Tomorrow: A Peaceful Path to Real Reform" (later re-issued as "Garden Cities of Tomorrow"). This led in 1901 to the foundation of the Garden City Association; and in 1903 the Pioneer Company was formed to buy 3,800 acres in Hertfordshire to build Letchworth. This town and its successor Welwyn Garden City (begun in 1920) were successful socially and environmentally, but ran into serious economic problems arising from the high outlay of capital, and the slow build-up of an economic return.

By the late 1930s the debate as to how to overcome the problems of urban sprawl, overcrowding and ribbon development was intense. In 1940 a Royal Commission, on the Distribution of the Industrial Population (the Barlow Report), proposed a range of measures including the construction of new towns, together with trading estates, greenbelts, some twenty to thirty miles from the City Centre. The quantum of dispersal was staggering; no less than 1.25 million people, of whom 0.5 million were to go to the satellite towns. There was a similar process in Scotland; The Abercrombie and Matthew Clyde Valley Regional Plan (1946), commissioned by an Advisory Committee set up in 1943, recommended the building of new towns, the expansion of smaller ones and the reservation of open country. The dispersal proposed was of the same proportion as for London, reducing the population of Glasgow from about 1.2 to 1.0 million.

So it came about that, when the post-war government turned to the problems of the bombed and worn-out cities of Britain, there was no lack of ideas as to what might be done. The problem was how to do it, and this was put to a committee chaired by Lord Reith, the formidable father of the BBC. In the space of barely six months up to April 1946, he produced proposals which have formed the basis for new town building ever since. In a matter of weeks after he reported they became law in the New Towns Act (1946), which provided essentially that the appropriate Secretary of State could designate areas as new town sites; that he could appoint development corporations for each town consisting of a chairman and eight members, all part-time; and laying down a framework of specific powers and responsibilities.

On such a quickly devised foundation the government embarked between 1946 and 1950 on a programme of fourteen new towns, eight in the "London Ring", two each in Scotland and in County Durham, and one each in Wales and the East Midlands. One must marvel at the speed and assurance with which it was done, and reflect that only the urgency and common national resolve to rebuild the country at the time made it possible.

The Table (see annex) records the subsequent development by generations or "Marks", which gives a pointer to the period of designation and to the philosophy current at the time. This is no more than a rough guide, as each town is unique, intended to serve its own particular purpose. Broadly half of the Marks I and II towns began on generally "green field" sites, the remainder being expansions of existing towns; and the later Mark IIIs may be described as sub-regional growth centres, based on existing towns and directed as well to their urban renewal.



The progression is clear, from the first towns on largely greenfield sites to the much more complex undertakings of later years, involving close partnership with the host local authorities. This reflected the progress of the earliest towns, and the establishment of their potential as centres of economic growth. The complexities of Telford, Washington, Central Lancashire and Milton Keynes may be a far cry from Reith's deliberations; but his blueprint has served as the basis for all the developments from the first new towns, and indeed for the recently formed urban development corporations.

In the early 1970s the climate of opinion began to change. Several new towns had been completed and others were almost finished. The expected national population growth had not materialised, and the economy was in decline. Urban renewal came to be seen as a greater need and, in 1976, the Environment Secretary (Peter Shore) spoke of switching resources to the inner city. The process began in England of revising target populations and setting completion dates. It is expected that by the end of 1985 the only remaining English development corporations will be Telford, Milton Keynes, Peterborough and Warrington; and Cwmbran is to continue in Wales until 1988.

In Scotland there is a different state of affairs. Through the 1970s the primary role of the five new towns had shifted from overspill to that of centres of economic growth, in which they have been markedly successful. The Scottish Secretary acknowledged this in 1982, emphasising the major importance of their contribution to the Scottish economy, and saying that he did not envisage the winding up of any of the towns being complete before 1990. Meanwhile a study is in hand of what remains to be done in each town, with a view to deciding at what percentage of its current designated population the winding up should begin.

ACHIEVEMENTS

It is easy to say that the new towns are there for all to see; that they have largely done their job; and that they have been eminently successful socially, economically, technically and so on. This is broadly true but, as a Commons Expenditure Sub-Committee remarked in 1974, there is a lack of analysis and systematic evaluation of new town policies and programmes. With such disparate undertakings, the problems involved in such an evaluation are apparent; indeed the Department of Environment stated to the Sub-Committee that the new towns were not conceived as, and do not constitute, a single programme so much as a series of programmes resulting from decisions taken at a number of points since 1964. This has been criticised (Ref 2) as tending to obscure objectives, divergent policies and indeed the "dilution of a visionary social programme"; but it seems inescapable that regional needs and objectives will change greatly in the three decades or so required to build a town. Certainly the towns' pragmatic ability to adapt to changes of all sorts has stood them in good stead. However this may be, there is no doubt that the success and originality of the new town movement in many fields is generally recognised, not least by foreign experts and governments.

In terms of numbers over two million people now live in new towns, about 4% of the British population; 1.1 million have moved into them, and 0.9 million work in them. 400,000 houses have been built, and 13½ million square meters factory space. The population of the eight London ring towns, at 512,000, matches the Abercrombie proposal of 1944. The Scottish new towns have accepted some 65,000 people from Glasgow alone.

That the new towns have succeeded socially cannot be questioned, despite considerable difficulties in the early days of most towns. But the present massive buying of corporation houses by their tenants, and the low rates of turn-over of residents provide clear evidence that people like living in their towns. In this three factors are of particular interest. First, anyone coming to a new town did so of his own free will; and the decision to leave a well-known neighbourhood, with all its associations, can seldom have been easy. It called for thought and enterprise, and a real commitment to a big

new venture. Second, corporations have succeeded over the years in achieving a balance in their communities appropriate to their roles and surroundings, eg socially, in housing, employment, education, leisure and many other fields. Third, corporations set up social development sections designed to help newcomers to settle in, and to foster community activities of every possible variety. A small government allowance (the "Amenity Fund") was of crucial importance in persuading local authorities and other agencies to proceed with essential social facilities, eg meeting rooms, sports centres, swimming pools, playing fields, etc.

The potential of new towns as growth points was fully established by the mid-50s, and was a major reason for the designation of the second generation of towns in the '60s. With so much going for them—committed people in balanced communities—they were well placed to succeed; but there were other reasons. Whether by happy accident or not, the New Towns Act 1946 provided just the powers necessary to enable corporations to give quick and effective decisions. In the corporations the early years had knit the various professions together, and a real devotion had built up to the towns' objectives; for there can be few more rewarding tasks than to take part in the development of a new town, and seeing it appear before your eyes. So there grew up in every town a team capable of imaginative promotion and quick decision, based on a balanced view of all the professions involved. They knew their industrialists and what they wanted; they were in close touch with government and with local authorities and agencies; and they could deliver what was wanted, fast.

Precise figures are not easy to find, but a fair estimate of the net jobs created on industrial estates alone in the British new towns is of the order of 0.5 million, and a roughly similar figure has built up in all other employments, eg shops, schools, services, etc. Maybe many of these jobs could have gone elsewhere, had there been no new towns; but they have in the event gone where they are needed, and to planned communities offering far more than would otherwise have been available. As an example of new towns contributing to a regional economy, the five Scottish towns increased their industrial employment by 48% between 1971 and 1979, compared with a fall of 10% elsewhere in Scotland. Between 1979 and 1982 they lost 27%, as compared to the overall Scottish figure of 23%; but there already is clear evidence that this downturn is being reversed, and that the new towns will lead Scotland out of the recession.

The new town programme gave some thirty separate teams the opportunity of developing their ideas in as many new towns, over periods of two to three decades. The results "have caught the eye and imagination of architects and planners, and many others, all over the world. They are visited and photographed, admired and disparaged, praised and criticised by thousands of people every year. The architecture has been described as dull, drab and visually uninspired. But illustrations of development in London's new towns adorn every substantial book on planning" (Ref 3). In town layouts, house and factory designs and in shopping centres new ideas have been tested and developed. If some have failed, the great majority have not; and their adoption outside new towns affords the proof. The recognition early on of the importance of landscaping has been of enormous benefit, and its influence is to be seen throughout the land.

In the later development corporations, charged with expanding and renewing older towns, the principle of partnership has developed to the extent that joint committees of members and officials of both the existing local authorities and the development corporations have learnt to work together fruitfully and, in some cases, local authority officials have acquired a second function as members of the corporations' management teams. In general, given time, the inevitable differences of opinion have been resolved into common and constructive policies. Such an expedient requires much care and cherishing; but, to the credit of both sides, it has been made to work effectively and can fairly be put forward as an example of what might be done in development enterprises outside the new town movement.

It is generally held that the programme has represented good value for the taxpayers'

money. The first twelve towns in England and Wales paid their way within twelve years of their beginning; that is, after covering interest during construction and repayment on total expenditure (set over sixty years) they were showing a revenue surplus of about £2m. After thirty years the eight London towns showed an accumulated surplus of 19% on the advances made to them. But the return in the second and third generation towns will be slower in coming, partly because they began at lower overall rents and they carry the cost of certain industrial incentives (eg rent free periods), and partly because having started later they have had to borrow at higher rates of interest. Following the Government's decision to sell off the property assets of the new towns in 1979, almost £600m had been realised by the end of 1983 in the English towns alone. Such an assessment is of course in terms of money, and takes no account of the high social benefits; nor of the relief to the overcrowded cities, nor of the improved quality of life made possible for some two million people.

The new towns could not but be innovators, and indeed the concept itself has been one of continuous innovation, from the first simple towns to the partnership towns and the much more complex third generation; and from them the new urban development corporations are in direct line of descent. The physical innovations, in layouts of housing and industry, shopping centres, housing design, landscaping, road and transportation systems and so on need no enumeration. But there are many others: corporate workings of the various disciplines; techniques of promotion, and many aspects of social development. In the arts and sports much has been done, in particular where a leader or teacher of talent has emerged; every town has its specialities and they grow through the years.

Because of their relative freedom from physical and institutional constraints, new towns became ideal places for the testing of new ideas. Some may have been too radical for more orthodox bodies to try; certainly the corporations attracted in their heyday many forward thinking minds, and an atmosphere was generated in which original ideas could be pursued with enthusiasm. Government itself has tried out many innovations in new towns, eg graduated rents, sale of housing and partnership activities, particularly in the field of finance.

Although the new town movement has largely served its purpose, there is still much to do in the towns whose corporations are to continue beyond 1985. If there have been errors and misjudgements, the successes and innovations far outweigh them; the nation has had value for its money. It is fair to say that the British movement has led the world and that the New Towns Act (1946), and its subsequent implementation, has the admiration of competent observers throughout the world.

HOW WAS IT DONE?

THE whole programme stems from the New Towns Act (1946), a piece of legislation remarkable for its scope, flexibility and directness. It has been modified through the years by subsidiary legislation in England and Scotland, but there has been no change in principle and much of it has been used in the legislation for the recently formed urban development corporations. The main provisions are strikingly simple. The Act empowers the appropriate Secretary of State (in England, Scotland or Wales) to designate the area of the new town, to appoint a development corporation (usually one for each town) and to advance sixty-year loans to it at National Loan Fund rates of interest; it gives corporations powers to acquire and dispose of land; to provide infrastructure and build on it; to contribute to local government and local agencies in the provision of essential services and amenities; and to do "anything necessary or expedient for the purposes of the new town".

In effect, the whole of the government's intention to build a town is delegated to its corporation; but the corporation is accountable to its Secretary of State in detail, project by project, and in terms of forecasting and budgeting. He in turn is answerable to Parliament, and thus the corporation is subject to control and monitoring in the same way as any other central government activity. Corporations in no sense replace local authorities, and the whole thrust of the various acts is towards the completion

of the towns and the dissolution of their corporations. Allowance is made for certain activities in parallel, eg corporations are effectively housing authorities; and there is detailed provision for consultation on planning issues, both for overall and major proposals, and for the host of lesser planning matters which arise in the building of the town.

It is obvious that the quality of a corporation's work will depend critically on the appointment of the chairman and members; and it is one of the highlights of the movement that successive governments have, in general, maintained the quality and continuity of corporation boards. Originally they comprised a chairman, deputy chairman and seven members, and this was raised in England to a total of thirteen in 1976. In present practice about half the members are politicians at county (region in Scotland) and district level, and the remainder are chosen for their special knowledge and experience, eg in industry, estates management, commerce or, say, as an accountant. They are usually appointed for four year periods, and some serve several terms. Together they constitute a powerful reservoir of support for their manager and staff; and they are well informed on, and sensitive to local political issues. Their contribution and the hours they put in bear no relation to their small salaries.

The Board appoints a manager and a team of chief officers. Organisations vary but all are simple, embracing the main disciplines of architecture and planning, engineering, finance, commerce, legal/administration and housing/social development. There are board meetings once or twice monthly, supplemented by regular officers' meetings at all levels. A particular feature is the readiness with which an established corporation can set up inter-disciplinary teams at all levels, so that decision making is delegated as far down as possible. For most of the life of a corporation, there is vigorous development in hand on all fronts and only too often they impinge on each other. So there is constant pressure for quick decisions, particularly in industrial and commercial matters, and the whole organisation is devised to enable this; it is common practice for the chairman and manager to anticipate board decisions, and to have them confirmed later.

From time to time the criticism is made that boards are unrepresentative and secretive, because members are appointed rather than elected, and board meetings are not open to the press or public. But in many ways their activities are nearer those of a commercial organisation than of a local authority. For much of the town's growth, existing interests have to be balanced against those of people, industries and commercial interests which have not yet arrived; and a larger proportion of the board's business is taken up with matters of commercial confidence than is often realised. Above all the boards serve a national remit rather than a local one, and the urgent and consistent action required of them is not always compatible with the recurrent political pressures generated by elections. A further criticism, that boards are unaccountable, cannot be sustained; they are accountable through their Secretary of State to Parliament, and have often been the subject of scrutiny by select committees. A parliamentary question can highlight a new town issue as fast as any inquiry to a local authority.

As has been said, boards are well equipped to sense local views and trends. They must constantly be pre-occupied to secure as much support and co-operation as possible from local authorities and interest groups of all sorts. Few corporations can have had plain sailing all the way, but all have arrived at effective working arrangements. Regular meetings are held with local authorities; corporation proposals and activities are explained through the local press and by exhibitions, and every opportunity is taken to meet community councils and other interest groups.

The achievement of effective co-operation is in fact one of the main objectives of any corporation, spread across almost every field of its activities. In the later towns, of course, the very purpose of the corporation is partnership, in expanding old towns and in fostering regional growth in generally urban areas; but such co-operation extends far beyond relations with local authorities. All corporations work closely with the industrial and commercial undertakings in their towns, whether in helping them to settle in, to expand or to weather the economic pressures of the times; over the

years they have learnt much, not least that the best advertisement for industrial and commercial location in a new town is a really satisfied operator already in the town. Equally important are joint operations to fund new developments, eg for town centres, industrial estates, in which corporations and financial institutions (pension funds, insurance companies) work up financing schemes in which both parties share the rental growth arising over the years; with rent reviews now at three or four yearly intervals, growth so far has generally been well above the rate of inflation.

With the change of objectives from 1978 towards private housing and owner-occupation corporations are more and more involved in partnership activities in housing; with developers in opening up private estates; with individuals building their own houses; in various forms of joint ownership, and in joint design. From the beginning of the new town movement, corporations have striven to achieve the new, surprising and sometimes apparently unattainable, with gas, water and electricity undertakings; and right well they have been served. Corporations are of course in no way exempt from the usual fire and building control requirements, and they have learnt—sometimes the hard way—how best to achieve their ends within the regulations.

It takes twenty to forty years to build a new town, in which period there will be changes undreamt of at its designation. The overall objectives must clearly be to build the best possible town related to the target population laid down; and, with very few exceptions, this has been achieved. But so many things may change—the target itself; the designated area; the local political scene and the perceived needs; housing requirements; rates of growth—indeed almost anything except the actual location of the town. Changes of government may substantially alter objectives. In all this the corporation has to hold to its long term aim, and to turn changing circumstances to the best benefit it can devise. It is a balancing act in which civil servants can (and nearly always do) provide a steady hand; and the experience and quality of board members and staff are invaluable.

An extreme example of a fundamental change in the role of the town is that of Glenrothes, undertaken originally as a new community in which miners would live alongside an average mix of other trades and occupations, and work in a projected super-pit nearby. When flooding forced the abandonment of the pit in 1962, the town's future seemed grim; but within a few years the foundations were laid of a flourishing electronic industry, now one of the most successful in Europe. In another instance, designation of a corporation was sought, welcomed and cherished by its host county; but the successor authority set up in the 1970s' re-organisation of local government has chosen to oppose the new town concept forcibly. If this conflict has not yet been fully resolved, the new town concerned would acknowledge the good working arrangements which have developed in all executive fields with the new local authority.

A final reflection on the working of corporations is that it takes several years to build up an effective staff and working system. Once run in, members believe in their officers, and the professions know and trust each other at all levels; a formidable sense of purpose and motivation should develop. But this cannot be taken for granted; time must be allowed for it to come about. There is no such thing as an instant quango. Per contra, it is a sad reflection that the disbandment of a corporation brings the dispersal of an experienced and tested team, which would take years to replace.

THE WAY AHEAD

THE New Towns Act (1946) provided simply that the Secretary of State concerned could order the dissolution of a development corporation once the purposes for which it had been established had been substantially achieved, with the assets being transferred to the local authority. By the mid 1950s second thoughts arose; the possibility of new towns becoming profitable became apparent, and debate began as to the final disposal of their assets. In 1959 legislation provided in England for the setting up of a New Towns Commission (NTC) to take over and manage the property (housing, industrial and commercial) previously vested in corporations, which duly

took place in respect of Hemel Hempstead and Crawley (1962), and Welwyn Garden City and Hatfield (1966). But this arrangement, with local housing subject to central control by the NTC meeting in London, failed to satisfy local interests or the Labour Government of the late 1960s. Finally, after several studies and consideration by the Expenditure Sub-Committee in 1974/5, an amending Act in 1976 provided for the preparation of schemes for the transfer of English corporation housing to local authorities. The NTC was to continue to operate in respect of industrial and commercial property but, following the crackdown on quangos by the Conservative Government in 1978/9, its precise future has been in doubt; it seems however a fair deduction that, as these assets are the result of investment by central government, some form of central control must continue.

Accordingly, with the exception of the four third generation towns (Telford, Milton Keynes, Peterborough and Warrington), the English new towns are approaching final wind-up, which is due to be complete in 1985. The remaining four towns have clear targets and the prospect of wind-up in the late 1980s. Their tasks are those of modernisation of their areas, encouragement of private housebuilding and owner occupation, using capital receipts to achieve their ends; and such commercial and industrial development as can be arranged within the limits of cash available from government or from the roll-over of their own assets.

With the statement in 1982 by the Scottish Secretary that no new town in Scotland will complete wind-up before 1990, the five Scottish towns still have major tasks ahead. Although they share the objectives of the remaining English new towns, their primary function is to be centres of economic growth, attracting as much industrial and commercial investment as they can; to which end they work closely with the Scottish Development Agency (SDA). This Agency was set up in 1975 to bring together a wide range of functions, from those of the former Scottish Industrial Estates Corporation, to the rehabilitation of dereliction across the country; from the Glasgow Eastern Area Renewal project to investment banking, and the industrial and commercial promotion of Scotland. For this last activity the body "Locate in Scotland" (LIS) was formed in 1981, directed and staffed jointly by the Scottish Office and the SDA; and close co-operation with LIS is of increasing importance to the Scottish New Towns in their primary role.

There is specific provision in the SDA Act of 1975 for the transfer to the SDA on wind-up of the Scottish new towns' industrial and commercial assets, which parallels the English new towns' disposal to the NTC. There had been no change in Scotland from the provision in the 1946 Act for housing assets to be transferred to local authorities, and this remains the basis of current planning.

Much of this account of the Way Ahead has necessarily been devoted to the dissolution of corporations and the dispersal of their assets; but there must be no doubt that the ten or so towns continuing beyond 1985 have very substantial objectives, and major contributions still to make in their regions. In particular it is to be hoped that the aptitude of the towns as venues for the trial of new ideas will be exploited. The social complexion in Britain is changing fast, and no solutions are yet seen to the problems of unemployment and enforced leisure; here is a field for imaginative experiment, with the means on hand to carry it out.

KEY CHARACTERISTICS

THE key characteristics are of two sorts: those derived from the 1946 Act, and its application by government to individual corporations; and those which, by common experience, have developed within the corporations themselves. The main elements of the former include:

(a) A clear and simple remit; the corporation is to carry out a specified development in a given area and, when it has done so, it will cease to exist.

(b) The provision of powers, under suitable control by government, to plan, to acquire land, and to develop.

(c) The assurance of sufficient funds over a period of decades to achieve the infrastructure, development and private funding necessary to build the town.

(d) The appointment and maintenance of boards of appropriate calibre, continuity, local representation and balance.

Such a framework has enabled corporations to achieve the following:

(a) A concentration on the single objective such that a local authority, with multiple pressures and periodical elections, could not obtain.

(b) A closeness, continuity and consistency of management, which central government alone could not provide; and which often involves the honouring of commitments over decades.

(c) An immediate sensitivity to local politics and trends, and effective communications with the press and with interest groups of all sorts.

(d) A simple and flexible working organisation allowing corporate decision making, the maximum of delegation and working of inter-disciplinary teams.

(e) Motivation and continuity of working among members and staff at all levels.

(f) The ability to make decisions, and consequent submissions to government, with the minimum of delay.

(g) The accumulation of special experience and skills in many fields. Particular examples are the provision of a "one-door approach" for the foreign industrialist, to guide him through the problems of location, Government and local regulations, etc; and the promotion of private resources to exploit the publicly provided infrastructure, eg in shopping centres, hotels, industrial estates etc.

In all its working, the relationship between a corporation and central government is of critical importance. With rare exceptions, the government departments responsible for new towns have been understanding of their problems and needs and the towns have learnt how best to present their cases. In the devolution of financial powers and monitoring and the routine of project-by-project control of development, the system has worked well, with corporation and government staff in constant touch. Many corporations have benefitted from the ability of civil servants to chart a way through a labyrinth of apparently insurmountable regulations, to achieve a desired objective.

As a sidelight on the scale of government, it is a fact that the Scottish new towns perceive a more effective and sensitive control than their English counterparts. This is in no sense a criticism of Whitehall itself; rather that an office governing five million people with five new towns (all within sixty miles) seems more aware of local needs and aspirations than one with fifty million people and say, twenty towns. This is often held to be one of the advantages of the German Länder, with average populations of six million; and the population of Scotland is 5.25 million.

CONCLUSION

FEW programmes in the history of Britain can have spread over almost four decades, with clear and sustained objectives and a common method of execution. The achievement reflects the magnitude of the tasks identified by Barlow and Abercrombie; two million people now live in new towns, 0.5 million in the London ring alone. Whether different overall policies in location, target populations and objectives could have done better is outside the scope of this study; but what is clear beyond doubt is that the New Towns Act 1946 and the organisations and practices which flowed from it have proved highly effective.

If it is possible to identify the main characteristics underlying this effectiveness, it is fair to speculate that they should be at least as significant not only in current urban development activities, but in other projects still to come. The massive problems of urban renewal will be with us for decades; and the experience of the later "partnership" development corporation must be relevant. Perhaps there could be some joint government/local authority initiative to set up locality task forces, or "mini-development corporations" to undertake this great commitment.

The development and sophistication of such partnership activities calls for imagination and constant care on the part of all bodies involved; and, whatever else changes,

the proper balance between central government control and local interests, which the new towns' programme has generally maintained, will remain as critical as it was with the Tennessee Valley Authority in the 1930s.

The remaining development corporations contain teams of skills amounting to a national asset which would take years to replace; and while they exist they offer a unique facility for the testing of fresh ideas, which could be of crucial value in this changing world.

ACKNOWLEDGEMENT

The Author thanks his colleagues in his Corporation and elsewhere for their help and advice.

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Annex A

THE BRITISH NEW TOWN PROGRAMME

Designation	Dissolution	Original Population	Current Target Population	Population Planned for Dissolution	Population In March 1983
MARK Is					
Stevenage	1946	1980	6,700	XXXXXXXXXXXXXXXXXXXX	74,400
Crawley	1947	1962	9,100	XXXXXXXXXXXXXXXXXXXX	72,200
Hemel Hempstead		1962	21,000	XXXXXXXXXXXXXXXXXXXX	76,300
Harlow		1980	4,500	XXXXXXXXXXXXXXXXXXXX	79,300
Newton Aycliffe		1985	60	XXXXXXX	27,000
East Kilbride		(a)	2,400	82,500	70,600
Peterlee	1948	1985	200	XXXXXXXX	25,000
Hatfield		1966	8,500	XXXXXXXXXXXXXXXXXXXX	25,200
Welwyn Garden City		1966	18,500	XXXXXXXXXXXXXXXXXXXX	40,500
Glenrothes		(a)	1,100	55,000	36,500
Basildon	1949	1985	25,000	OOOOOOOOOOOOOOOOOO	98,640
Bracknell		1982	5,150	XXXXXXXXXXXXXXXXXXXX	48,830
Cwmbran		1988	12,000	55,000	45,600
Corby	1950	1980	15,700	XXXXXXXXXXXXXXXXXXXX	47,750

THE BRITISH NEW TOWN PROGRAMME

Designation	Dissolution	Original Population	Current Target Population	Population Planned for Dissolution	Population In March 1983	
MARK IA						
Cumbernauld	1955(a)	3,000	70,000		49,000	
MARK IIs						
Skelmersdale	1961	1985	10,000	oooooooo	43,200	41,600
Livingston	1962	(a)	2,100	70,000		38,600
Redditch	1964	1984 or 1985	32,000	oooooooooooooooooooo		68,250
Runcorn (b)		late 1980s	28,500			65,000
Washington		1985	20,000	oooooooooooooooooooo		55,000
MARKS IIIs						
Irvine	1966	(a)	34,600	95,000		56,300
Milton Keynes	1967	late 1980s	40,000		180,000	107,000
Peterborough		late 1980s	81,000		150,000	124,000
Northampton	1968	1984 or 1985	133,000	oooooooooooooooooooo		163,500
Warrington (b)		late 1980s	122,300		157,800	139,800
Telford		late 1980s	70,000		124,000	108,000
Central Lancashire	1970	1985	234,500	oooooooo	260,000	252,800

Key: xxxx Corporations wound up by January 1984.
oooo Corporations due to wind up in 1984 or 1985

Notes:

- (a) No dissolution dates have been set for the Scottish development corporations. Ministers have stated that no dissolution is expected of any corporation before 1990; they are now considering at what percentage of target population (or other bench mark) the process of wind-up should begin in each town.
- (b) Runcorn and Warrington Development Corporations were merged in 1981.
- (c) The following new towns have not been included:
- (1) Newtown (Montgomeryshire), because the commitments of its corporation, the Mid-Wales Development Corporation (and of its successor, the Development Board for Rural Wales) extend beyond that of Newtown itself, which is a comparatively small development with a population in March 1983 of 8,800.
 - (2) Stonehouse (Lanarkshire), designated in 1973. The project was ended in 1976.
 - (3) Craigavon/Antrim, Ballymena and Londonderry; their circumstances and local government powers differ in principle from those in Britain.
- (d) All figures are based on information available in February, 1984.

Afternote (May 1985):

- (1) The dates for the dissolution of a number of English Development Corporations have been deferred as follows (correct to April 1985):
- | | |
|--|------|
| Redditch and Northampton | 1985 |
| Central Lancashire | 1986 |
| Newton Aycliffe, Peterlee and Washington | 1988 |
- (2) The Secretary of State for Scotland has stated that, subject to a revision in 1989, no Scottish new town will begin winding up before 1990, and that wind-up should begin when each town reaches the following percentages of target population:
- | | |
|-------------------------|-----|
| East Kilbride | 90% |
| Glenrothes | 79% |
| Cumbernauld | 77% |
| Livingston | 71% |
| Irvine | 66% |

It is generally understood that the process of wind-up, once the percentages above have been reached, will take up to five years.

Memoirs

BRIGADIER R B MUIR CBE B Sc FICE MI Mech E MIEE
FI Struct E FBIM FRSA

Born 25 May 1910, died 15 October 1984, aged 74

ROBERT BALLANTINE MUIR was commissioned into the Royal Engineers in 1931. After a tour with 4th (Fortress) Company RE, he spent ten years in India and the Far East with Queen Victoria's Own Madras Sappers and Miners. He was taken prisoner in 1942 and on release in September 1945 returned to England to attend the Staff College. Then followed tours as GSO2 (Ops and Int) Hamburg District and TSO1 Electrical and Mechanical Engineering at the Ministry of Supply. He attended No 6 Course at the Armed Forces Staff College in the USA and returned to England as CRE Northumbrian District and from 1952 to 54 as Commanding Officer of 102 Corps Engineer Regiment (TA).

After a tour in the War Office, in February 1958 he was appointed Chief Engineer and Army Task Group Commander for Operation *GRAPPLE*, the Christmas Island H-Bomb tests. DLGB writes: "The establishment of the British Nuclear Trials Base on Christmas Island in the Pacific Ocean and the operational support for the intensive series of trials was a huge task of

the highest national importance at the time. Bob Muir saw not only the transition of the base from primitive conditions to quite respectable townships, but also the provision of port facilities, power, fresh and saline water, refrigeration, fuel storage and pipelines, a road network, an airport and a V bomber airstrip. All this was done at speed two oceans away from the home base and with almost no natural or other resources on the Island. It was my first experience of working for a truly professional engineer, in the civil as well as the military sense. I was amazed at the trust he placed in our small team's ability to produce the designs for all the structures, the provision by sea and air, all within the financial limits. And it is here, I suggest, where the secret of his success lay. He was so obviously professional, competent, calm and confident that the doubts of others were allayed; with his quiet authority and evident trust in his subordinates, they strove to reach his standards and often surprised themselves by their achievements."

On his return to London, he assisted in the compilation of the first International Nuclear Test Ban Treaty for presentation to the United Nations.

He became Senior Director of Studies and Deputy Commandant Royal Military College of Science Shrivenham in October 1958 and in 1960 moved to the War Office as Brigadier E (Q Services) under the Engineer-in-Chief. It was during this time that he presented a paper entitled "Engineer Support to the Christmas Island Nuclear Trials" at the Institution of Civil Engineers. The occasion was the first joint professional meeting between that organisation and the Institution of Royal Engineers.

Brigadier Muir retired in December 1961 to assume the appointment of Director



Brigadier R B Muir CBE B Sc FICE MI Mech B MIEE

General and Chairman, Executive Board of Scottish Industrial Estates Corporation (SIE). In 1974 when SIE had expanded to control 137 industrial locations throughout Scotland providing direct employment for over 100,000 people, it was converted into the Scottish Development Agency (SDA) with increased powers. Brigadier Muir retired from the SDA in 1976. He was Honorary Colonel, 102 Corps Engineer Regiment (TA) 1962-67 and also 71 (Scottish) Engineer Regiment (V) 1972-78 and was an elected member of the executive committee of the Scottish Council (Development and Industry) from 1972 to 1976.

DLGB DS

BRIGADIER J H S LACEY CBE BA

Born 27 January 1906, died 4 September 1984, aged 78

JOSEPH HAROLD SPENCE (JOHN) LACEY was born in Madnapalli, Southern India and educated at Merchant Taylors School, the Shop and Christ's College, Cambridge. He was commissioned into the Corps in 1926 and served with 1 Field Squadron and from 1932 to 1934 as Equitation Officer in the RE Mounted Depot. He served in Gibraltar from 1934 to 1940 returning as DAAG (Special Duties) later in 1940. He was OC 564 Company RE at the Allied Landings at Algiers becoming CRE 5 Corps Troops RE North Africa in 1943. After brief tours at the Staff College, in Washington, at the War Office and in Italy, at the end of the war he was posted to Egypt where he remained until 1949. He ended his tour there as AA & QMG (Plans). After two tours in the War Office, the second as Col E under the Engineer-in-Chief, 1953 saw him back in Egypt initially as DQMG. He became military Adviser to HM Ambassador Cairo during the negotiating of the Anglo-Egyptian Agreement and was largely responsible for the establishment of the British civilian organisation set up to operate the Canal Zone base.



He was the last Commander British Troops in Egypt and was the last soldier to leave there in June 1956. He was then one of the last to leave again, after the Suez operation, having returned there in November 1956 as Brigadier AQ 2 British Corps. His final posting in the Army was as Brigadier AQ Headquarters Eastern Command, from which he retired in December 1958 to become Secretary of the Institution of Royal Engineers which post he held until 1972.

An active man in many fields, John Lacey will be particularly remembered as a horseman. He was the last Sapper officer but one to attend the Army Equitation Course at Weedon (in 1932). He won the RE Lightweight point-to-point in 1931 and was second in 1932.

During his time as Secretary of the Institution he was Master (or Joint Master) of the Royal Engineers Draghounds. JAC writes "He was a most considerate Master to work for, never raising his voice either to the Hunt staff or the Field. He was also meticulous in explaining to the Field, particularly children, what he was going to do, or had done in hunting his hounds. When he retired from the Institution the hounds were put down and the Drag put into abeyance." He was a sailor, too, as ECWM remembers: "It was amazing what a full life he led as a young officer, entirely on his Sapper pay. Whilst a YO there were few horses at Chatham and as yet no Drag. So he sailed, both in Ilex and in dinghies. Later, in one particular race in ghastly weather

Brigadier J H S Lacey CBE BA

we had to heave-to all night off the Le Havre lightship, in mountainous seas. We gave up the race at dawn and ran for home as did every other boat in the race except one. John had been a tower of strength amongst a largely incapacitated crew until we reached a quiet anchorage off the Isle of Wight when he collapsed. He was full of guts."

Latterly, he will of course be particularly remembered for his time as a selfless and loyal Secretary of the Institution. EEP writes, "He brought the Institution through a difficult period as during his time our charitable status came under fire and indeed we lost it for a while. His work in briefing our QC for the appeal was a masterpiece of staff work which produced the right result. His logical and brilliant mind were obvious to most people once they accepted that he was naturally a quiet unassuming man. His love of the Corps transcended all problems. The Corps has lost a great friend."

To his widow, Clem, their three sons, of whom one is currently serving in the Corps, and all their families we extend our deep sympathy.

EEP, JAC, ECWM

MAJOR GENERAL N A COXWELL-ROGERS CB CBE DSO

Born 29 May 1896, died 13 January 1985, aged 88

NORMAN ANNESLEY COXWELL-ROGERS was commissioned into the Corps in April 1915 having been educated at Cheltenham College and The Shop.

On commissioning he was sent to France and remained there until 1919 except for a period in 1917 recovering from wounds received in March of that year. He was promoted Captain in 1922 and after a tour in Gibraltar was posted to the Mounted Depot at Aldershot. He was Second-in-Command 1 Field Squadron from 1928 to 1933, also in Aldershot. This was the only field squadron in the Regular Army at home, affiliated to the Cavalry and fully mounted. Of this time ECWM writes: "Coxwell was a strict but invariably fair disciplinarian and his standards of horsemanship were sky-high. Woe betide any Sapper—and his Troop Leader—found grooming his horse with inadequate energy during "morning stables". Lean and lithe, he was an accomplished horseman, especially at show-jumping. One of his Government charges was called Maid Marion. He was outstandingly successful with her, winning show-jumping prizes at Aldershot, Tidworth and Olympia, and at numerous high class civilian shows against all comers."



In 1933, now a major, he was posted to India where he was Field Engineer, in charge of road construction, with the Mohmand Force under Brigadier (later Field Marshal Sir Claude) Auchinleck. BMA writes: "The road was built deep into Mohmand tribal territory, over the Karappa Pass. It was then that I learned the value of his quiet manner and his understanding encouragement and support. And on one occasion, when I had kept a party out late to finish a concrete culvert, he gave me a rocket in an unforgettable way."

He returned to the Mounted Depot in 1938, as Officer Commanding. In 1939 he went to the War Office as GSO2 in MI branch. He had been promoted Brevet Lieut Colonel in 1936 and became substantive in June 1939.

In August of that year he was appointed CRE 4th Division and went as such to France in September, being evacuated from the Dunkirk area on 1 June 1940.

Major General N A Coxwell Rodgers CB CBE DSO

AW-W remembers him during the "phoney war" having "the difficult task of trying to turn us into useful officers. We particularly remembered one day when, after trying to visit a seemingly impossible number of bridges and prepare schemes for their demolition in the time allotted we all sat on the edges of our chairs and stopped a not inconsiderable racket for our pains. However, he always commanded respect and affection as our CRE and we could not have wanted anyone else." He was noted for his immaculate dress in breeches and riding boots. On the beach at Dunkirk when he ordered his batman to get on a boat, Spr Drew insisted first on him changing his boots so as to ensure that his new ones did not fall into the hands of the Germans. Alas, they were ruined anyway when he waded out to sea.

Two brief tours followed, first as Chief Engineer 3 Corps, then as Commandant SME until in August 1942 he was appointed Chief Engineer 1st Army and went as such to North Africa. Then in 1943 he was Chief Engineer 15th Army Group during the invasion of Sicily. In October 1943 he was appointed Chief Engineer Allied Armies in Italy with the temporary rank of Major General and in March 1945 became Chief Engineer Allied Forces Headquarters (Mediterranean). He was promoted substantive Major General in February 1945 with seniority December 1943 and retired in December 1946. He was awarded the DSO in 1940, CBE in 1943 and CB in 1944.

On retirement from the Army General Coxwell-Rogers continued to lead an active life. He managed the Country Club and estate at Rossley Manor, Dowdeswell, on behalf of his son until the Club closed in 1965. He maintained his interest in hunting which he and his wife Diana, South Berks born and bred, had enjoyed in their early married life, hunting regularly with the Cotswold Hounds and serving on their committee for many years. In the words of IDN: "As Chairman of the local Royal British Legion, he infused it with new life. He was wholeheartedly involved in every worthwhile local activity. He remained fearless and at the age of seventy or more he could encounter a burglar in his home with such wrathful dignity as to make the burglar remove his shoes and sit before him on the stairway until encircled by the arm of the law" and again, summing up his career: "He had gifts of outstanding leadership and professional expertise. Whatever he commanded that command excelled in quality. He won and earned the trust and admiration of all he commanded; his friendship enriched all who were privileged to know him as a friend."

Of recent years ECWM writes: "Until three years ago he and Diana regularly attended the Colonels Commandant "At Home" as host to his Sapper contemporaries and friends. More recently, with failing memory but physically incredibly active for his years, he has been watched over by his ever loyal wife, Diana. It was no easy task to control him. More than once he fell and got lost on a long walk by himself. His ultimate death directly resulted from the shock of such a fall and a very bad break of his leg."

ECWM, AW-W, IDN, BMA. CDS

COLONEL J O M ALEXANDER DSO MC TD DL

Born 29 March 1916 died 2 July 1984, aged 68

JOHN OSMOND MACDONALD ALEXANDER (ALEX) was educated at Rugby and Clare College, Cambridge, where he read for the Mechanical Science Tripos, and later went to work with Thomas Hedley & Co in Manchester. In 1938 he joined 42 (East Lancashire) Division Engineers (TA) and served first in 201 Field Company, later joining HQRE as IO when the Division went to France in 1939. He took part in the Dunkirk campaign and was awarded the MC. He became Adjutant on returning to England in 1940. Later he commanded 203 Field Park Company and then 617 Field Squadron (the former 201 Field Company) after the 42 Division was reorganized as an armoured division, commanded by Major General Dempsey.

In the autumn of 1943, the Division was disbanded, the Divisional Engineers were

converted to an Assault Regiment RE and equipped with Churchill AVREs. In command of 617 Assault Squadron, Alex took part in the attack on the fixed defences of Le Havre. It was here that he distinguished himself, after the initial attack on the left had been checked, by leading one of his troops on foot and in darkness down a steep mine-infested escarpment to destroy two road blocks and cross the river Fontaine. Further operations throughout the campaign followed, notably those at Overloom and Geilenkirchen. In December 1944 he was appointed second-in-command of 42 Assault Regiment, and served in the Reichswald, the Rhine Crossing and the final advance which included the capture of Brethen. At the end of the campaign he was awarded the DSO.

After the war, he moved to Tyneside and became managing director of Procter & Gamble. He remained with the TA, and in 1950 commanded 50 (Northumbrian) Division RE, later continuing as their Honorary Colonel. He was active in other local affairs, both on the hunting field with the Tynedale Hunt and on the council of Newcastle University and was a Deputy Lieutenant of Northumberland.

He was a regular attender at the Assault Engineer reunions, becoming President four years ago. In 1947 he married Bunje Poole and they had two daughters.

Alex was a splendid example of the best type of TA officer to whom the Army, and the Corps in particular, owes so much. He was a deep thinking man whose opinions were always well thought out and clearly expressed, and his personal comments expressed in his War Diary were extremely penetrating. As a commander he was considerate and decisive, planning well ahead and inspiring confidence by his competence and personal bravery. He was active in many fields, but always kept in touch with the Corps and his comrades, by whom he will be sorely missed.

JCW REW KDF

LIEUT COLONEL R N B HOLMES, BA

Born 8 July 1918, died 26 September 1984, aged 66

ROBERT NIGEL BLAKE HOLMES was commissioned into the Corps in August 1938 after attending the Shop and a Cambridge University course which was cut short by the war. In 1941 he went to India to serve with the Bengal Sappers. In 1943 he spent a year with the British military Mission in China before returning to the more active field company life in India and Burma. The end of the war found him in command of 71 Field Company in Malaya and later in Surabaya where "they had to defend themselves against much more numerous and better armed Indonesian insurgents".

He returned to England in 1946 to attend No 2 Supplementary Course, but maintained loyal contact with the Bengal Sappers as a regular attender at post-war functions. He was in the Middle East and East Africa from 1947 to 1949, with 423 RE Works Services before returning to a spell at Chatham on the Long Civil Course. After a short tour in Germany he was appointed to command the Sapper force for the second atomic tests at Monteblello, an account of which he wrote in the *Journal* of Dec 57. Tours then followed in Eastern command and Aldershot (as CRE) before he retired in 1960 to take up an appointment with Wimpey's.

Nigel Holmes will be particularly remembered for his great sporting ability. An



Lieut Colonel R N B Holmes BA

outstanding rugby player, representing the Corps on many occasions and playing at full back for Sussex on one occasion before the war, he also played cricket and golf for the Corps. He was a brilliant shot, his most notable achievement being, perhaps, to shoot a tigress within twenty-four hours of reaching the jungle for the first time shortly after arriving in India.

His first marriage ended tragically with the death of his wife Norinne. He himself suffered from cancer for some time before his own death, bearing his illness without complaint and typical courage, and sustained by his second wife Maggie. We share with her and his son and daughter, the memory of someone who radiated a special air of charm and good fellowship, and who with his kindly willingness to help others made a delightful companion and colleague.

ADEC, RFP, WAL, MBA, JHF

COLONEL A P SMITH OBE BA FICE FI Mech E

Born 26 May 1914, died 15 January 1985, aged 70

ALAN PATRICK SMITH was commissioned into the Corps in 1934 and spent all his early career in India initially with 19 Field Company. He became Adjutant of a training battalion of the Royal Bombay Sappers and Miners in 1941. He then spent some three years with the Indian State Forces and later wrote an account of his experiences with them which remains unpublished, however. He finished the war as CRE 456 Indian Forward Airfield Engineers in Burma.

In 1946 he returned to England, attending the Long Civil Engineering Course in 1948 and in 1951 was appointed CRE to Operation *HURRICANE*, the first British atomic trials, in the Montebello Islands.

This was a particularly testing assignment in which an initial misappreciation of the size of the task left him with great difficulties. JHF writes: "Nevertheless, with great determination and almost uncanny foresight he succeeded in completing his designs, raising and training 180 Engineer Regiment and embarking with most of the stores in conditions which should not, perhaps, have been demanded of soldiers living afloat for eleven months in peacetime." That the success of the operation, and of the subsequent Operation *MOSAIC*, owes much to his drive is apparent from many personal accounts.

As a man he did not suffer fools gladly. He was a master of the pithy saying which may have alienated some. Nevertheless, he inspired great loyalty, shouldering the heavy responsibilities and giving loyalty himself to his subordinates. PS writes: "He pressed us to the limit but he cared for us. Sometimes I felt he overcares, fussing too much with my command. On reflection it has to be said that during the course of the whole operation we only suffered one casualty. However, I was never more stretched nor had a greater sense of achievement than when serving under Pat's command."

In 1953 he spent two years in the Middle East as a CRE, returning to England in 1955 to command 12 SME Regiment. After a tour in Headquarters Southern Command he commanded 27 Engineer Regiment (TA) before retiring early from the Army in 1962.

In 1952 he had married Priscilla Tod and they now settled down with their two sons and two daughters to the challenges of civilian life. He became Chief Engineer (E&M) with the Newcastle Health Authority and remained with them for seventeen



Colonel A P Smith OBE BA FICE Mech E.

years. He was responsible for new construction and major alterations to hospitals in the North of England controlling a budget of some £6 million.

His death after considerable suffering from bad asthma throughout which he never lost his sense of humour, leaves us with a memory of a real professional Sapper who willingly shouldered great responsibility and was held in respect and admiration by those with whom he served.

PS, EMH, JHF

LIEUT COLONEL S G TOWNSEND MBE

Born 25 April 1913, died 27 January 1985

STANLEY GEORGE TOWNSEND joined the Corps as an apprentice tradesman at Chatham in 1928 and trained as an Engineer Draughtsman (Architectural). He served in various UK postings and in Singapore before being posted to Chepstow as a Staff Sergeant Draughtsman Instructor in 1941. Thus began his long association with the College which was, after some turns of fortune, to become his final home. He spent the latter part of World War 2 in Madrid on the Military Attaché's staff. He was a fluent Spanish speaker and the nature of his duties in wartime Spain can only be guessed although he promised his closer friends he would tell more 'forty years on'.

He returned to the UK as a WO1, had a further tour in the Far East before returning as Superintending Draughtsman in the RE Park at Chatham and was commissioned in 1956.

He then went to BAOR, initially as a Garrison Engineer in Hamburg. However, he had taken up sailing earlier in life, particularly in Changi pre-war and now began his long association with the Kiel Training Centre with which so many in the Corps will connect him. During his thirteen years there he became a legend in his own lifetime. The prosperity and development of the British Kiel Yacht Club and the Royal Engineer Yacht Club and Sailing Association in Germany and the fostering of adventure training at sea owes much to Stan's stewardship. He set and maintained the highest standards of boat husbandry, seamanship and behaviour. These standards he passed on to hundreds if not thousands of young people who were trained at Kiel. Many have felt the lash of his tongue as they attempted to manoeuvre the engineless yachts between the piles feeling quite elated if a mooring completed under his eagle eye passed without comment, or a word of praise. All are deeply grateful for the standards they drew from him. Many more will not realise that they are the inheritors of the standards he set.

On retirement from the Army Stan made his home at Chepstow travelling every year to the Baltic to sail in his yacht *Ragna R*, taking numerous crews of apprentices adventure training each season. But his contribution to Chepstow extended far beyond sailing. He entered into many college activities giving life to the annual productions of Gilbert and Sullivan operas. He also ran the photographic club providing much encouragement to the apprentices. His faithful support of the Beachley Old Boys Association led to his eventual appointment as a Vice-President, an honour normally accorded only ex-officio to past commandants.



Lieut Colonel S G Townsend MBE

More recently his Baltic cruises became a strenuous task and on more than one occasion Stan was taken ill at sea. Realising the need to make some suitable arrangement he generously made over his immaculate yacht Ragna R to the Royal Engineer Yacht Club, evidence of his great love for the Corps and of adventure sailing. Those who sail her will be hard pressed to maintain the high standards Stan insisted on. If they don't, they will surely feel his presence very close at hand.

JPG MWBB KJH KJJ PGR GWAN

LIEUT COLONEL P J D GROVES MC MA

Born 13 January 1909, died 16 January 1985 aged 76

JOCELYN JAMES DOUGLAS (JIM) GROVES was born in Lincolnshire but most of his education took place in Canada after his family had emigrated. The life that he lived in the wilds of Vancouver Island did much to develop the adventuresome and bold characteristics which distinguished him in later life. Chasing racoons and hunting cougar with a rag-tag pack of hounds gave him his love of sport. His rough and ready spartan life in Shawnigan Lake School, where the boys did all the chores as well as book learning, prepared him to show initiative and resourcefulness, and his being Head Prefect for two years provided some early leadership experience. He was Captain of both the cricket and the soccer teams, and never lost a boxing match.



He entered the RMC of Canada of Kingston in 1926 where he represented the College at soccer and cross-country, and was commissioned into the Royal Engineers in 1929. After YO training he spent two years at Christ's College Cambridge where he obtained an MA and won blues for boxing and athletics.

Throughout his Army career Jim was reported on as having a strong character and considerable moral and physical courage; that he was diligent and hard working and never spared himself; that he was keen, interested and thorough; that he was sociable with charming manners and personality; that he was a good leader and disciplinarian, always getting the best out of the men under his command; that he was loyal and punctilious in his duties and carried responsibility well; that he was determined and independent in thought, cultured and intelligent in a wide selection of subjects; and that he was fit, strong and a good athlete.

After a year with 55 Field Company he was posted to 4 Fortress Company in Gosport. Here he was able to take part in his real hobbies in life, which were hunting, shooting and fishing, pretty well in that order. While hunting with the Hambleton he met Nancy Blake, whose father was Master of the Hunt. They were married early in 1937, but Jim was almost immediately posted away to Singapore, as a Garrison Engineer supervising the building of Alexandra Military Hospital, the School and some Officers' Quarters and later as GSO2 on the Chief Engineer's Staff. In 1940 he contracted typhus while hunting in Pahang, became very ill and was invalided home.

In 1941 he was posted to command 147 Field Park Squadron in the newly formed 11 Armoured Division. The next year he took over command of 13 Field Squadron, but was invalided out with jaundice and became Chief Instructor 3 Training Regiment at Aldershot. He turned down a Staff College vacancy to take command of 268 Field Company in 61 Infantry Division in Southern Command. Then, in order to gain him further active service experience, he was transferred to command 84 Field Company in France. In due course they were put under command of 1 Commando Brigade for

Lieut Colonel P J D Groves MC MA

the Rhine crossing with Jim as CRE in command of all engineers supporting the brigade. His article "The Assault upon Wesel on the Rhine" (*RE Journal Mar 1948*) describes the action. In 1946 he was awarded the MC for gallant and distinguished service in NW Europe.

After VE Day he volunteered for service in Burma and was posted to HQ RE 7 Indian Division. He took part in the final stages of the Japanese War in the Pegu Yomas area. In May 1946 he became CRE 4 Corps Troops Engineers, who were repairing and rebuilding the large road and railway bridges at Myitnge, which has to carry all the traffic between North and South Burma and also assumed command of 471 Army Group Indian Engineers, in the absence of their commanding officer, responsible for the rehabilitation of all the Burma railways from Myitkyina to Katha in North Burma, some fifty smaller bridges. His articles in the *RE Journals* of 1953 "Moti Ram" and 1954 "The Myitnge Project 1946" give a good insight into this work.

After a tour in Malaya as CRE 178 Works he returned to UK to join the Senior Officers' Combined Operations Course. Postings then followed to 3 Training Regiment as Senior Instructor, to the Senior Officers' Tactical School at Erlestoke Park as an Instructor and in 1950 as Deputy President of the Regular Commissions Board.

He left the Army in September 1952 to live and farm at Cole Henley Manor near Whitchurch. As well as following his interest in field sports and pursuing his hobby as a naturalist he was an active supporter of the local community. He was President of the Whitchurch Royal British Legion for fourteen years, President of the District Agricultural Society and President of the Salford Lads' Club, a charity established by his grandfather. As a churchman meanwhile, he and his family worshipped for thirty-two years at the church of St Peter's in the neighbouring village of St Marybourne. Here he was a church warden for some twenty-five years, and was a member of the Parochial Council for ten years. His special interest lay with the maintenance of the building itself, and it was his wish that on his death a Fabric Fund should be established. When, following a year of declining health he died, this was duly achieved.

At Jim's funeral, much of what he stood for was summed up in the words of the address: "A noble and worthy successor to Mr Valiant for Truth, and . . . for him, too, all the trumpets will be sounded on the other side."

He is survived by his wife Nancy, their son Major Jeremy Groves, who has retired from the 17/21 Lancers to run the farm at Cole Henley, a daughter, Mrs Penelope Gage and five grand-children.

HRG RHB

Correspondence

Brigadier D J N Genet (Ret)
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Devon

MEMOIRS

Sir,—I entirely support the views on memoirs expressed by General Garrett in his letter published in the March 1985 *Journal*. Fitting tributes are not only comfort to the bereaved; they are also an important part of our history. There must be many retired officers who would be willing to help the Secretary with research and drafting if he requires assistance.

I wish to raise another suggestion about the *Journal's* portrayal of senior serving officers. Some years ago, at the instigation of the E-in-C of the day, a brief career summary and photograph of each newly promoted Sapper Brigadier was published

in the *Journal* in rather the same way as has always been done for Colonels Commandant in the Supplement. For some reason the system was discontinued. Perhaps the current generation of senior Sappers simply did not want to focus this sort of attention on themselves. Nevertheless, I suggest there are four important categories of your readers who would welcome and be better informed by a regular system of this sort:

- (a) Very young serving officers who have not been in the Army long enough to know much about their seniors.
- (b) Territorial Officers who are all much more closely involved with the Regular hierarchy than used to be the case.
- (c) Officers in Commonwealth and Allied Engineer Corps.
- (d) Retired officers whose pride and duty it is to keep in touch and speak up for the Corps. It is surprising how quickly one gets out of date especially on retirement to the West Country or other places remote from the Medway.—Yours sincerely,
D J N Genet

Brigadier E C W Myers, CBE, DSO
Wheatshaf House,
Broadwell,
Moreton-in-Marsh, Glos.

SAPPER SUPPORT

Sir,—In your first Editorial you refer to the paradox about the need for Sappers. Even senior ex-Sappers can fail to anticipate the need for them, as is borne out by the following, albeit slightly unusual, experience.

Shortly before the outbreak of World War II, a Mobile Force was sent out from Cairo to the Western Desert to protect the Egyptian Frontier, a hundred miles west of our garrison in Mersa Matruh, from the Italian Army in Libya. It consisted of the only three cavalry regiments in light tanks then available in Egypt, the 11th Hussars in armoured cars, and a regiment of mechanically propelled Horse Gunners. It faced, numerically, a vastly larger force of lorry mounted Italian Infantry divisions.

This force of ours was initially known as the Western Desert Mobile Force. A few months later it was reinforced to become 7th Armoured Division. It was commanded by a fiery and outspoken Major General called Hobart, known as "Hobo", who was shortly to be retired on account of his age, only to be recalled and in due course to be knighted for his great pioneering work at home in the development of the equipments of 79th Specialised Armoured Division for breaching the German heavy coastal defences. Hobo was commissioned as a Sapper in 1904 and later transferred to the RTR.

On arrival in the desert, Hobo ordered his light tanks to gallivant offensively along and over the Libyan frontier to such an extent that the Italians withdrew several miles. But sadly his meritorious gallivanting soon resulted in the consumption of all our reserves of spare parts for light tanks in the Middle East. Hobo received orders from GHQ to conserve his track mileage and only to carry out essential sorties against the Italians should they show signs of taking the offensive. His Mobile Force was thus brought to a virtual standstill and, much to his fury, it became known locally as our "Mobile Farce". Before he had left Cairo Hobo had been offered some Sappers. "What the 'something' good would 'something' Sappers be to me in the Desert?", he is reputed to have replied, and he took not one single Sapper with him into the Desert.

But now, with his tanks ground to a halt, with individual squadrons scattered over a wide area of the desert in scrub covered dells, so as not to present attractive targets to enemy aircraft, his troops began to go sick with dysentery in unacceptable numbers. The Army doctors said that this was due to the hordes of flies sculling between latrines and uncovered food. They insisted on fly-proofed cookhouses and larders being constructed for each Squadron. So young Myers, with a handful of Clerks of Works

and some Bedouin carpenters, was sent forward to erect prefabricated little fly-proofed cookhouse shelters, which, scattered all over the desert, looked, even when camouflaged, most incongruous and, much to Hobo's increasing fury, further justified his Force's nickname.

A few months later, by which time 7th Armoured Division had been formed, more tank spares had arrived in Egypt, Hobo had been sent home to temporary retirement; his successor, General Dickie Creagh, had insisted on having some Sappers, and I had joined the Division in command of the, then 2nd (Cheshire) Field Squadron, RE(TA) which included a field park troop. Needless to say from morning to night and many a night too, we were kept fully occupied in support of the Division's two tank brigades and its Infantry Support Group. Developing Roman water sources, marking supply routes across the desert, mining and booby trapping the (only) coastal road until we turned over to the offensive, neutralising the nasty Italian "Thermos" anti-personnel bombs, similar to the German "Butterfly" bombs, scattered over the desert by enemy aircraft, were but a few of the tasks which readily come to my mind. I cannot remember what happened to Hobo's cookhouses. I am certain I was never called upon to dismantle them. I presume that in due course they became useful firewood for nomadic Bedouin.— Yours sincerely, E C W Myers.

Lieut Colonel J W R Mizen
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Trotts Lane
Westerham
Kent TN16 1SD

PROFESSIONAL ENGINEERING IN THE CORPS

Sir,—Few would disagree that radical thinking, as suggested in your provocative March editorial, is required on the professional engineering structure of the Corps.

For instance are we perhaps the only major league Army which could not take responsibility for engineering project management of a task like RAF Mount Pleasant in the Falklands? Certainly other members of the "Nuclear Club" (Warsaw Pact, French and the United States forces) have recently demonstrated this capability and could probably have carried out the construction as well. The Staff are evidently content that British forces do not need this level of engineering management; however, an increasing commitment to Airfield Damage Repair over the next decade, coupled with an increasing sophistication of facilities required by the RAF to enable them to fight, means that an increased level of professional engineering competence in all ranks within the Corps is quite simply unavoidable.

There is, of course, an attractive soft option whereby the commitment is accepted but the actual engineering involvement is fudged by claiming a lack of money, time, resources etc. As in any other profession, engineering requires to be practised over and over for real to achieve reasonable standards.

How do other countries solve this dilemma? The US Army Corps of Engineers maintain the two disciplines of combat and professional engineering; the difference is that their professional engineers are integrated into a large Government organization, staffed by experienced civilian engineers.

Reorganization on these lines offers a solution to the training of our professional engineers and increased survivability to the RAF during the air battle. The serendipity to QMG is that once trained, these officers are most useful for all those other ingenious projects he has up his sleeve which make for exciting living.—Yours sincerely, J W R Mizen

Major T G Hoddinott, RE
59 Independent Commando Squadron
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EXERCISE WATERLEAP

Sir,—Major Bullocks' letter (Mar 85) indicates that as an exceptionally busy staff officer at Headquarters Engineer Support he is unable to do more than scan the articles published in *The Journal*. He appears to have missed many of the points made by Captain Carter in his article (Dec 84). Perhaps I might be permitted to emphasize the following to him:

"the Squadron had to work very much longer days, extra days and in some cases introduce shift work . . . particularly in the early stages of the project." This was in anticipation of problems such as the effects of heat and the likely down time of the civilian plant. Fortunately we over-estimated the problems, with the result that some aspects of the project were completed ahead of schedule and hence time was available for other activities.

"They had, for example, revised concrete block wall construction at RSME. . . ." Of course pre-project training was undertaken, but there were aspects of some of the skills required which could not have been foreseen and were therefore not covered in that training.

Major Bullock's final paragraph consists of a number of statements taken completely out of context. There is no suggestion in Captain Carter's article that we as a Corps are incapable of successfully executing such projects as *WATERLEAP 83* was. In fact we proved exactly the reverse. And finally I should say that Arctic Warfare Commando Sappers we all are, but we do not all profess to be competent DIY men!—Yours sincerely, T G Hoddinott

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Book Reviews

THE GORDON HERITAGE
LIEUT COLONEL DEREK BOYD RE

(Published by Robert Hale Ltd, 45/47 Clerkenwell Green, London EC1R 0HT. Price £7.95)

THE first part of the sub-title, "The Story of General Charles Gordon and the Gordon Boys School", is very briefly dealt with and is certainly no "warts and all" account. Not for anyone seriously researching his life, it concentrates on those aspects of Gordon's life and character which made him the inspiration for this particular memorial. The book is mainly the story of the school, and catalogues its development from its beginnings as a charitable institution, a home for poor boys, aiming to send them out into the world after a few years equipped with the most basic skills to enable them to earn a living, to its present status as an academic establishment. Not the least interesting aspect is the picture it gives of the evolution from the Victorian style of charity, to today's more enlightened perception of how to turn out young people fitted to compete for a place in society. Although the historical accuracy is at times suspect, Colonel Boyd has produced a very readable account of the first 100 years of the Gordon Boys' School.

EDN

POEMS OF THE SECOND WORLD WAR THE OASIS SELECTION

EDITOR IN CHIEF: VICTOR SELWYN

*(Published by J M Dent and Sons Ltd, London. Price £4.95 (paperback))
(Also available in Everymans Library. Price £12.00)*

THIS is a unique anthology—the most comprehensive and original collection of poems of WW2 that has yet been published. What distinguishes this book from any other collection is that all the poems were written during the war, on active service, not in hindsight years later.

The book is more than a collection of poems—it is history seen with the poet's perceptive eye. The poems are a product of a literate, aware and compassionate generation belonging to a less materialistic world than the one we live in today. Perhaps the poets were naive in their belief that from the war an ideal world would emerge. The men of WW2 were a modest lot but they thought about things.

Of the four hundred poems, from over two hundred poets, some will not appeal—it would be unreasonable to expect otherwise—but this is a very moving anthology and includes something for everyone.

EED

NO PICNIC 3 COMMANDO BRIGADE IN THE SOUTH ATLANTIC 1982 MAJOR GENERAL J THOMPSON

(Published by Leo Cooper/Secker & Warburg. Price £12.95)

WHEN the first rush of Falkland books was published, I recommended that readers kept their money in their pockets to await the more detailed, and better researched, books that would be produced in later years. This account is a 'must' for any serving officer, or senior NCO worth his salt, and is recommended to any rank, either serving or retired.

Major General J Thompson commanded 3 Commando Brigade throughout the campaign. We are fortunate that he also has a 'way with words', which really does give the reader the 'feel' of the campaign and what it was like for the individual

soldier as well as the commanders. He tells the story from the moment he was woken up on the night of 2 April 1982, by an urgent telephone call, to the surrender on 14 June. In doing so he covers all aspects, from planning to individual patrols.

It was a brilliantly successful campaign, but in war there are always mistakes and unforeseen hazards, and often it is the overcoming of these setbacks that is as important as the accounts of success. It is therefore, unfortunate that the author, as a still serving officer, has obviously had to curb any criticisms that he might have wished to make of those both senior and junior to him.

It is interesting to note that although the author and his R Group were only 800 metres from the Secretariat building, where the surrender document was signed, their first firm news of the surrender was a newsflash on the BBC World Service. Keeping everyone up to date and well informed may be a good morale theory, but it always was an impossible task, even on exercise!

JTH

UNITED STATES COAST DEFENSE, 1775-1950—A BIBLIOGRAPHY

DALE E FLOYD

(Published by the Historical Division, US Corps of Engineers Price \$5.50)

THIS is the latest publication by the Historical Division of the US Corps of Engineers. How fortunate they are to have such a division.

It provides comprehensive lists of all aspects of US coast defence—history, historic preservation, architecture, engineering and archaeology. It also includes nearly thirty illustrations of their coast defences.

JTH

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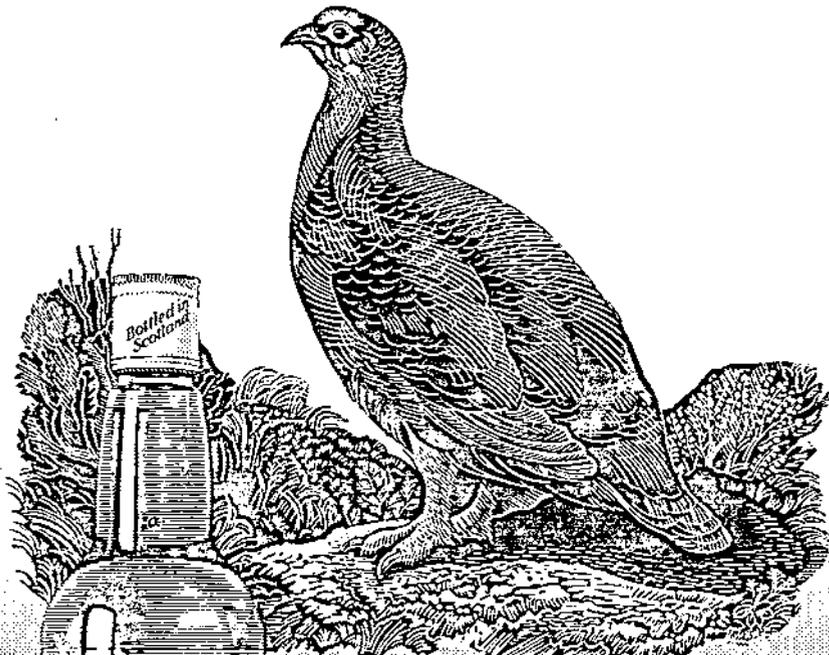
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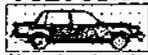
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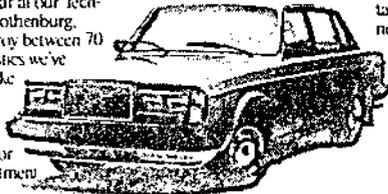
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