



Her Majesty Queen Elizabeth II

# HISTORY

OF THE

## CORPS OF ROYAL ENGINEERS

VOLUME X  
1945 TO 1960

### THE YEARS OF COLONIAL INSURGENCY

ACTIVITIES OF THE CORPS OF ROYAL ENGINEERS IN POST WAR OVERSEAS GARRISONS, IN THE WAR IN KOREA, THE INSURGENCY CAMPAIGNS IN PALESTINE, MALAYA, KENYA, CYPRUS, JORDAN AND SOUTH ARABIA, THE EMERGENCY IN EGYPT AND INTERVENTION IN THE SUEZ CANAL DISPUTE; THE TRANSITION OF BACKGROUND SUPPORT IN THE UNITED KINGDOM TO MEET THE DWINDLING OVERSEAS COMMITMENT AND THE DEVELOPING ROLE IN THE CENTRAL REGION OF THE NORTH ATLANTIC TREATY ORGANISATION.

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## FOREWORD

THE period which Volume X of the *History of the Corps of Royal Engineers* chronicles, was one of great change for the British Army. In 1945 the Army was deployed world wide helping, in concert with our wartime allies, to cope with the aftermath of the most destructive war the world has ever seen. By 1960 the United Kingdom's world wide responsibilities had shrunk and Government policy was moving towards the concentration of our Army in Europe in support of NATO. 1960 saw the end of conscription and, as the National Servicemen departed, a change to an all regular force. In those years of contraction and change the Army had been involved in a full scale war in Korea, a limited war at Suez and in counter insurgency operations almost without respite. Throughout, the Corps in support of the Army and the other two Armed Services, had to meet the challenge and adapt itself to ever changing conditions in a time of expanding technology.

The preparation of this Volume is a sequel to those histories already produced and is the work of a number of authors; it has been written, revised and edited over a period of some fifteen years. It is never an easy task to condense the activities of many units, some deserving a history of their own, into one readable account. This Volume seeks to do just this and I believe it has succeeded in large measure. I believe it will prove to be of value and interest both within and beyond the confines of the Corps.

December, 1986

GENERAL SIR W G HUGH BEACH  
GBE KCB MC DL  
CHIEF ROYAL ENGINEER



## PREFACE

THERE are well established precedents to a historian of the Royal Engineers in the Volumes of History already published. But each is different in its approach as appropriate to the particular requirements of the period and subject matter. This Volume is the product of a number of different authors, virtually every chapter being written by a distinguished Sapper with personal experience and first hand knowledge of the events. In addition, a large number of correspondents have contributed, some at considerable length, to the drafting of sections of the history as well as in reading and commenting on the drafts.

The main authors have been:

Colonel F W B Carter	Brigadier R B Muir
Lieut Colonel J N Cormack	Brigadier C R Nicholls
Lieut Colonel M J K Davies	Major General L E C M
Lieut Colonel J M Guyon	Perowne
Brigadier Sir Mark C A	Colonel E T Vallance
Henniker	Colonel R L White
Colonel J H Joiner	Colonel G Williams

To these, and to many officers of the Corps as well as to other contributors who have helped with detail on which they had personal knowledge, the Corps owes a debt of warm gratitude.

The task of the editors has been to assemble the work of many authors, to attempt to present it as one cohesive account and to cross reference and index their work. Inevitably there are differences in style but to some extent this serves to add variety to the reading. Perhaps the most difficult part of the task was in limitation of the subject matter to produce a volume of acceptable size. In this we took guidance from Major General Pakenham-Walsh's categorisation in Volumes VIII and IX of the four types of reader of a Corps History: one with a general interest in military history; the senior RE officers who may seek a precedent to guide their approach to a modern problem; the future generations who wish to know of the deeds of their forbears; and those who took part in the events recorded and want to read of their own and their units' achievements. It is the latter reader who may be critical of historical accuracy despite every effort to ensure that dates and units mentioned are correct. There is, we suggest, a fifth category of reader: the unit historian, who should be able to use a Corps History to follow the activities of a particular unit. Detail to cover his needs has been included, even though in places it may tend to diffuse the story in a manner perhaps reminiscent of those Bible

## PREFACE

chapters on genealogy but, at a time when the Corps went through a state of flux and change of unit designations, a record of unit connections seemed to be necessary.

There were many changes of nomenclature in the immediate post war years, and in some cases, the exact dates of change are no longer readily available. The text of this Volume therefore tries to introduce units by the title by which they were known at the time, and subsequently by their main designation of regiment, squadron or other title, without recording in detail the changes in every case. In similar vein, Reserve Army units are not generally given their full honorary titles and Commonwealth and colonial units are mentioned without their full title at all times, and only when their activities correlate to Royal Engineer activities. This is primarily a history of the Royal Engineers and not of other countries' Sappers no matter how close the ties. It is largely for this reason that there is no chapter on the withdrawal from India.

The brief for the time frame of the Volume was from 1948 to 1958. It became obvious, however, that an explanation or run-in was needed in most chapters to introduce the beginning of the period, even though the previous Volume of History included a summary of activities in the immediate post-war years; because its date of writing and publication in 1958 saw perspectives and some events entirely overshadowed by the war. This Volume has therefore a sliding start. Similarly at the end of the period, 1958 was not always a good time to end the story in every part of the world and a suitable break-point has been sought which varies from chapter to chapter. The overall period of history covered is 1945 to 1960 but the openings really require reference to the previous Volume, and there will be a requirement for a next Volume to take up where this one ends.

As customary, we should like to take the opportunity to acknowledge many organisations who have assisted in the production of this Volume; Blackwoods Magazine, Gale and Polden, the Imperial War Museum, the libraries in the Ministry of Defence, the Ogilby Trust, the Public Record Office and the Royal United Services Institute. Of the many individuals who have helped we should like particularly to mention; Mr Davey of the Office Services Branch of the Ministry of Defence at Hayes, Miss Ward of the Army Historical Branch and Sergeant F W Woodall RE who spent his last six months of military service in research, mostly into unit histories. Few publications have been mentioned but many were read as background, ranging from the Defence White Papers, through Public Records, Engineer-in-Chief's Liaison

## PREFACE

letters, a variety of published histories, and the *Sapper* and *Soldier* magazine. The greatest single source of information was *The Royal Engineers Journal* which together with records in the Corps Library and Museum provided material from articles and reports whose authors are too numerous to mention individually. Maps were produced by the Ministry of Defence Cartographic Section by Mr Manning and Mr Inch, and with the blessing of the Directorate of Military Survey. Much of the typing was carried out in the Old War Office Building and we are very grateful to those anonymous typists who have coped so admirably with manuscripts which have not always been easy to read.

In Volumes VIII and IX of the *History of the Corps of Royal Engineers* the rank and decorations of any Sapper officer mentioned in the text is shown in a footnote. This procedure has not been followed here, individuals named have been shown by their rank as it occurs in the text and their eventual rank and decorations are given in the Index.

We hope this Volume is an accurate and comprehensive record of activities of the Royal Engineers in its world-wide role of support to the Armed Forces; presented in a readable form, with sufficient background to give reason for their activities. It has not been possible to mention every unit and every event. We can only apologise to those who feel that justice has not been done in the case of certain actions of their personal knowledge.

I T C WILSON  
H W B MACKINTOSH  
R A BLOMFIELD  
E E PEEL

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## CHAPTER I

### THE HUB OF THE WHEEL

BACKGROUND TO EVENTS—Defence Policy—National Service—Reserve Army—Changing Commitment. POST-WAR DEPLOYMENT—Regimental System—Overseas Units—Reinforcement. ENGINEER HIGHER COMMAND ORGANISATION—Engineer-in-Chief—Military Survey—Works Services—United Kingdom Engineer Command Structure. THE HOME BASE—United Kingdom Strategic Reserve—The School of Military Engineering—Officer Training—Sapper Training—Records—Corps Affairs.

### BACKGROUND TO EVENTS

VICTORY in 1945 had left the British Army, whose combined strength with Dominion and Colonial Forces totalled nearly 3,000,000 men and women, spread more widely around the world than ever before. In addition to its traditional pre-war role of Imperial policing, the Army was involved in the duties of an occupying power both in the territories of defeated enemies and those of overrun allies until such time as they were able to reassume their own responsibilities. Early expectations of a rapid reduction of the Army's commitment and a consequent withdrawal of troops were frustrated as trouble flared up in one country after another within areas of British responsibility. British foreign policy entered an era of rapid change and evolution set against a backcloth of economies, forced by financial and manpower stringency as Britain sought to recover from the burden of war. For the Army such changes meant quick reaction to events, hasty operational moves, unaccompanied overseas tours, temporary camps and variety of employment. Inevitably there were abortive capital projects as military garrisons had to be moved. For most it was a period of adventurous and demanding soldiering, frequently spiced with danger.

### DEFENCE POLICY

British defence policy immediately after the war had followed traditional lines. The priority role, after defence of the United Kingdom, was the security of the Commonwealth and Colonial Empire, based on Imperial Forces maintaining command of the sea and air approaches and of the lines of communication between the different parts of the Empire.<sup>1</sup> As the post-war decade wore on, defence policies and planning

became increasingly dominated by the threat of communist expansion both in Europe and Asia, and by nuclear weapons. In 1948, when the Western powers were forced to supply West Berlin by air as a result of a Soviet blockade of the land routes, the last hopes of effective agreement with the communist powers were abandoned and a network of regional pacts came into being. The Brussels Treaty in March 1948, founding the Western European Union, was followed by the Atlantic Alliance; and the North Atlantic Treaty Organisation (NATO) was established in April 1949. Other defence pacts followed. The Manila Pact signed in September 1954 founded the South East Asia Treaty Organisation (SEATO), the Baghdad Pact in the autumn of 1955 led to the Central Treaty Organisation (CENTO). SEATO and CENTO had certain inherent weaknesses since some strategically placed countries, notably India, were not included, nor were there specific commitments of national forces such as there were in NATO; nevertheless they formed a chain of resistance to communist expansion.

The dominant military power in all these alliances was the United States of America and their nuclear capability so predominated as to provide an unequalled deterrent to Soviet speculations. It was under the umbrella of this deterrent that the British Army in Germany had been run down in strength in the immediate post-war years. As the threat of war in Europe intensified and Germany was reinforced, a conflict developed between the calls on the British Army in other parts of the world and the sanctity of the size of the British contribution to NATO. It was a paradox that the USA, while expecting full support from Britain in the international defence pacts, was a leading advocate in the Trusteeship Council of the United Nations demanding dates for the liberation of colonies and indirectly encouraging activities which would require the deployment of British troops to other regions.

For many years India had been a keystone in the structure of Imperial defence but India and Pakistan had become independent countries on 14 August 1947. The old Indian Army, which had been deployed throughout South East Asia, parts of the Middle East and Italy at the end of the war, was now no longer available. There was no comparable replacement for the Indian Army even though West African troops contributed to the post-war garrisons of both Burma and Tripolitania. Many colonies acquired independence during the period of this Volume; for the majority the transition was achieved peacefully. But the urge for national freedom and identity was not confined to colonies; the Middle East in particular was a volatile area with the Army deeply involved as succeeding British foreign secretaries

sought to establish a policy in an ever changing climate of rising national aspirations, coups d'état, shifts of alliance and the smouldering Arab/Israeli conflict. The traditional importance of the Suez Canal to imperial strategy weighed heavily on Britain's sense of responsibility for the Middle East and the continuing British presence in the area is believed by many to have prevented a "blood bath" similar to that which followed the Partition of India. In justification of this belief it is perhaps significant that in some places the departing British troops had to be replaced by a UN peace keeping force.

British military support of the UN was a principle established as a long term commitment from 1947 onwards which first became a reality in the Korean War. Commonwealth military co-operation continued throughout this decade with worldwide examples such as the formation of the British Commonwealth Division in Korea, the Commonwealth Brigade in Malaya as part of the South East Asia Reserve, and the Canadian Brigade serving with the British Corps in Germany. Even with such Commonwealth co-operation the main burden of imperial defence fell on the British Army.

#### NATIONAL SERVICE

As usual after a war, there was little enthusiasm for voluntary service in the Armed Forces. The wartime powers of conscription to provide manpower continued after the war had ended in conjunction with a repatriation and release programme, started in 1945, which had returned over four million servicemen and women to civilian life by the beginning of 1947. As a result there was considerable turbulence and a shortage of manpower in Army units, particularly in those with years of unrelieved overseas service. In one Sapper field company a sergeant major had been promoted from lance corporal within a year. To provide men for the peacetime Army the National Service Act was passed by Parliament and received Royal Assent in June 1947 to come into force on 1 January 1949. The Act provided for twelve months full time service followed by five years reserve service during which some training was mandatory. It was based on the vain assumption that British overseas commitments would be liquidated by the date of implementation, since a twelve month soldier could have little value overseas. However, in June 1948 the Soviet threat caused the full time service to be extended to eighteen months and in 1950 it was further extended to two years. National Service was to continue for fourteen years until finally ending in 1962.

Throughout the decade covered by this Volume the Army relied on

conscript soldiers for the first time outside a major war. It is a tribute to the organisation, methods of training and leadership that they acquitted themselves so well. In turn, most national servicemen enhanced the Army's capabilities and some brought with them valuable professional skills. For example in a CRE Works at one stage, the junior officer was a graduate civil engineer, the drawing office corporal an ARIBA, another corporal qualified as ARICS during his service and the pay NCO held an honours degree in mathematics. National Service also provided essential manpower for the Reserve Army.

### RESERVE ARMY

Defence policy relied heavily upon a Reserve Army and ample reserve forces were needed. The Territorial Army was reconstituted in 1947 and the Supplementary Reserve (subsequently the Army Emergency Reserve) was raised in the following year. Both categories, as well as individual Regular Army Reservists saw active service during the years that followed. Such was the international tension that in two years, 1950 and 1951, selected wartime soldiers, Z Reservists, were recalled for two weeks refresher training. The earlier thoughts on nuclear warfare envisaged a war beginning with a bombardment of atomic weapons from a limited stockpile, followed by a period of "broken back" warfare, requiring ample reserve forces who could be rapidly mobilised to restore the situation.

It gradually became obvious that use of nuclear weapons as the immediate military response by the Western Allies to a communist attack could not be an automatic reaction; there were political considerations. The advent of the even more destructive hydrogen bomb, first exploded experimentally by the USA at Eniwetok in 1952 and later tested in the Marshall Islands in 1954, confirmed the need for an initial, non-nuclear, conventional resistance, both to prevent any type of limited objective, "nibbling away" military adventure by the Eastern Bloc countries and also to "buy time" for political authority to be given for use of a nuclear counterstroke. This so called "trip-wire" philosophy of defence required British troops to be stationed in Germany for the foreseeable future. The concept for the duration of a war in Europe grew shorter as the nuclear stockpile of weapons increased on both sides of the Iron Curtain, and brought revision of the need for massive reserves; speed of deployment became more important. At the same time the cost of equipping thoroughly modern forces to increasingly sophisticated standards, was escalating. It became obvious that economic strength, as an element to resist covert aggression

in the Cold War, was as much a national priority as military expenditure; the size of the forces, regular and reserve, was progressively reduced towards the end of the period of this history, and every military commitment had to be justified under detailed scrutiny.

#### CHANGING COMMITMENT

The main theme of military study and planning in the UK was nuclear warfare in a European setting with new concepts of fluid lines of communication based on an overall mobility. At the same time operations were being conducted in almost every corner of the world in hard, realistic circumstances with conventional forces and logistic problems which had to be solved using existing resources. However, the overseas defence commitments slowly reduced as the British responsibilities were given up, and, in April 1957, the Defence Minister, Mr Duncan Sandys announced the forthcoming end to National Service. A five year defence plan for modernising and re-equipping a streamlined Army was set in hand, the last National Service call-up was in 1960 so that the forces would be all volunteer by the end of 1962, and a major reorganisation of reserve Army units was included. Simultaneously a significant change for the Royal Engineers was presaged by the report of the Weeks Committee in 1957 which recommended the civilianisation of the Works Services, a task which was the biggest RE peacetime responsibility, certainly in financial terms. Construction of new facilities overseas had absorbed much engineer effort as garrisons had deployed and redeployed; a major barracks rebuild programme for the Army at home was in planning. The handover of the works responsibilities was implemented during 1959 and 1960.

In 1960, the emergencies which had been declared in Kenya and Malaya came to their formal ends. The only remaining colony in eastern Asia was Hong Kong. In Africa, the Gold Coast had received independence as Ghana in 1957, Nigeria followed suit in 1960, Sierra Leone and North Cameroons the following year; in East Africa only the British colonies remained for a few more years. Cyprus became independent in 1960, save for two small areas known as the British Sovereign Base Areas, but the strategic importance of the Mediterranean had changed and the strategic value of Cyprus had diminished. The main military events of the era are covered by separate chapters in this Volume dealing with different countries.

It was a busy period in the history of the British Army. Whether it was to help the Army to live, to move or to fight, there was no shortage of sapper tasks.

## THE POST-WAR DEPLOYMENT

The Royal Engineers whose strength in 1945 numbered 280,600 (9.54% of the Army) reduced to 36,650 (8.21%) by the time that the National Service Act had come fully into effect in 1952. In 1958, the planning for the all volunteer Army of the 1960s allocated to the Corps a proportion of 8.6% to give a strength of 14,600 all ranks, one twentieth of the 1945 size. The effects of the decrease in strength were, however, less traumatic on the Corps than that of imposing a Group system on the Infantry which forced the amalgamations of numbers of regiments, since many war-time sapper responsibilities included tasks normally undertaken by civil authorities and these could be handed back with comparative ease. Certain branches of the Corps contracted rapidly, principally those with a civil counterpart, in many cases manned in war by the same individuals who, on demobilisation reassumed the same job in a civilian capacity; even so some of the roles acquired in war had to be retained, either because of Army deployment overseas, or of operations or simple urgency. In particular one such, bomb disposal, remained a sapper responsibility notwithstanding a proposal in 1952 to hand it over to the Home Office except on military premises or overseas.

Within the Corps the various regular, reserve and newly-formed wartime units had all become confusingly intermingled. A redesignation of all Engineer units had begun at the beginning of 1947 when the traditional TA unit titles were needed for the reforming of the TA.

## REGIMENTAL SYSTEM

His Majesty The King's approval to the adoption by the Royal Engineers of a regimental system was notified in March 1947.<sup>2</sup> It was considered that the regiment would be more efficient than field companies for the support of major formations as well as for meeting training standards in a National Service Army. Sub-units were designated squadrons and troops. Other changes in nomenclature were also introduced: "mechanical equipment" became "plant"; the rank of Driver RE was abolished; Airfield Construction Groups, GHQ Troops Engineers, Army Troops Engineers and Artisan Works units ceased to exist and were replaced by Construction and Plant Squadrons and an Army Group RE became an Engineer Group. The war time proliferation of new units had resulted in duplication of unit numbers, particularly in specialist units and a policy for the numbering of RE units was put into effect from 1947. It meant that many squadrons



changed their designations two or three times during the following three years.

The first regiments to be formed were those in the Home Depot and Training Organisation and the TA. Manpower planning in 1946 authorised a Royal Engineers Peace Establishment of twenty three Regular regiments or equivalent minor units, thirty seven TA regiments, fifteen Supplementary Reserve (SR) regiments and a number of independent TA squadrons. In 1947, eleven Depot and Training regiments were formed. Thirty-four TA regiments and one independent squadron featured in the initial TA order of battle. Four SR regiments were formed in 1948 together with eight regiments in the regular field army; three at home, one in Germany and four in MELF. In addition the Fortress Engineer Regiment was formed from the Engineer units in Gibraltar. The succeeding years brought changes in both the Regular and Reserve Armies which are referred to in the appropriate detailed chapters of this Volume. They are summarised in Annexes B and C which show the genealogy of units. Incorporation of plant within field units, an innovation announced in November 1950 as a basis for using machinery instead of men, reflected a trend started in wartime and developed in civil industry. It was in this era that military plant came into its own and the old "pick and shovel" sapper disappeared. However, the provision of sufficient manpower remained an ever present problem and reservists had to be called up to help in times of crisis both for their specialist skills and to bring units up to strength.

#### OVERSEAS UNITS

The Indian Army Engineers had provided the bulk of military engineer support for operations during the war and in the immediate post-war period in Burma, Japan, Hong Kong, Indo-China, Indonesia, Malaya, Siam and Singapore as well as the garrisons in Iraq, the Levant and Persia. It was fortunate that withdrawal from the majority of those countries was completed before the effects of the Partition of India. A number of RE officers had remained with the old Indian Army to the end and indeed some continued to hold senior posts in both the Indian and Pakistan Armies for a number of years after independence.<sup>3</sup> The Gurkha Engineers raised in 1948 proved themselves worthy successors to the Sappers and Miners of the old Indian Army. There were however Sapper units in most Commonwealth countries, and RE Officers, WOs and NCOs continued to serve with many of them. The Burma Army Engineers quickly shed their dependence on the British

Army. West African Sapper squadrons survived until independence but the East African Engineers were a casualty to economic policy and did not survive the reduction in strength and subsequent fragmentation of the Kings African Rifles. In Jamaica, Malaya, Singapore and West Africa the Sapper element of locally raised forces went on to form part of their new country's defence force. In Malta, the locally enlisted members of RE units were concentrated into the Malta Fortress Squadron, while in Hong Kong some of the pre-war locally enlisted Chinese Sappers provided a link with the past when the Hong Kong Engineer Squadron was founded in 1952. RE assistance was also given to the Sudan Defence Force and to the formation of the Arab Legion Engineers as well as in a number of military training teams in various countries. Several units and detachments of the Royal Australian, Canadian and New Zealand Engineers worked closely with British Sappers in Korea, South East Asia, Germany or on nuclear test sites strengthening bonds of association and friendship. It is also appropriate to record the work carried out under RE supervision by Austrian, German and Italian prisoners of war both on construction tasks and on bomb and mine clearance. Poles, Yugoslavs and other nationalities displaced by the war, also contributed to the manning of Lines of Communication Groups and Depots of the Corps. Some of the ex-POWs, mostly Ukrainians recruited by the Germans, who volunteered for mine clearance duties in Britain were still serving with RE Bomb Disposal thirty years later.

#### REINFORCEMENT

Six more regiments were formed between 1949 and 1951 but the demands of overseas commitments were such that, in 1952, two of the three field engineer regiments in UK were no longer operational; one was reorganising and one was only at cadre strength.<sup>4</sup> War Office approval was given for the introduction of a three year overseas tour for engineer regiments and for regimental trooping, as part of the annual arms plot, starting in 1955. At the end of that year three regiments were rotated, one from the UK to Germany, one from Germany to the Middle East and one from the Middle East came home. But the following year all such moves were cancelled because of the RE organisation in Germany which adopted the old system whereby engineer support was provided by the brigade field squadron. Never again did the Corps undertake regimental trooping complete with dependants although regimental reliefs were carried out for units serving on Christmas Island.

## ENGINEER HIGHER COMMAND ORGANISATION

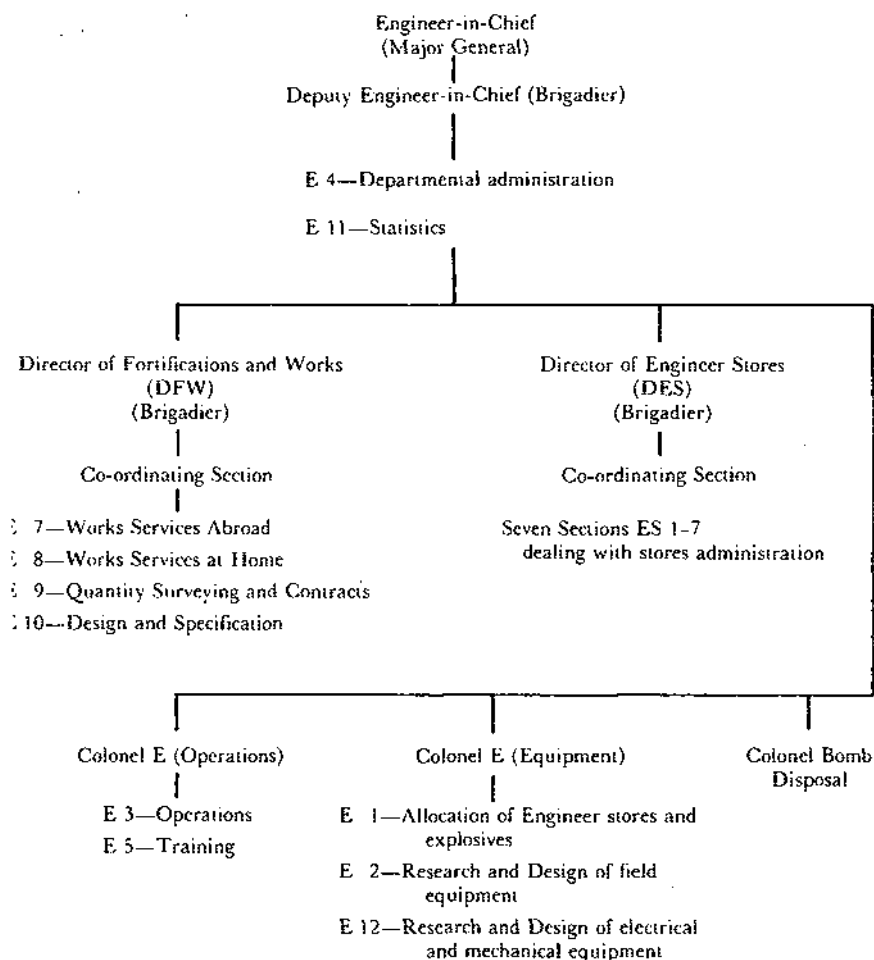
## ENGINEER-IN-CHIEF

During the war the major overseas commands had considerable autonomy and most had their own Engineer-in-Chief. The appointment of E-in-C in the War Office had been created in 1941 as recorded in the Corps History; his responsibilities were to both the CIGS and to the QMG and he was supported by a deputy, also of major general rank at that time, and three brigadiers. However, although policy matters were directed by the E-in-C in the War Office, the overseas E-in-Cs retained considerable independence in deployment of troops, training, works services and stores. The extension of more direct control of RE matters by HQ E-in-C in overseas theatres as the commands began to lose their status is reflected in the amount of detail of overseas units recorded in the E-in-C's Liaison Letters of the period. The E-in-C organisation of 1947, shown in Figure 1/I, required continual modification as the structure of the Army and its commitments changed. One of the first developments was to remove the Bomb Disposal Branch in 1948, from the E-in-C's Directorate to a new HQ Bomb Disposal Units (UK) in direct command of nine BD Squadrons. The next major change was to re-establish a Director of Transportation in the War Office in 1949. Transportation had been a directorate under the QMG but after the war the Director had been moved to Longmoor; he was reinstated within the E-in-C's Directorate. At the same time the whole equipment branch under the Colonel E (Equipment) was abolished, its duties being absorbed between the Director of Engineer Stores (DES) and the remaining Colonel E. The Engineer Stores Directorate was reduced and an Engineer Stores Establishment and Inspectorate was formed in London.

In 1950 due to the size of the Works programme, the post of Director of Fortifications and Works (DFW) was upgraded to major general with two subordinate brigadiers, one responsible for co-ordination and the other supervising the technical aspects. DFW remained a major general's post until the loss of the Works Services responsibility. It was an era of readjustments during which various studies and agreements over responsibilities were undertaken. In mid 1953 the Army and Air Councils agreed joint responsibilities for airfield construction resulting in permission for the Corps to raise two plant squadrons. In the same year the RE Advisory Board, which had been promulgated by Royal Warrant in 1782, was reconstituted by the Army Council as the Engineer Advisory Committee with special responsibilities for advice on research and development in the field of

*Figure 1/1*

## ORGANISATION OF HEADQUARTERS ENGINEER-IN-CHIEF, 1947



military engineering. The E-in-C was chairman and the members of the committee came from the civilian engineering institutions, Cambridge research groups, the Department of Scientific and Industrial Research and the Ministry of Supply as well as from other War Office establishments. A Mechanical Handling Committee under the DES was set up and plant and engineer stores census were held in 1955, 1956 and 1957 to confirm the holdings. The Hull Committee Report<sup>5</sup> presaged another series of reorganisations of HQ E-in-C and the DES post was abolished in 1958. Reorganisation of the Military Training Directorate in 1959 brought MT7 into HQ E-in-C as E Training. In 1959, following the abolition of both the Works and Transportation Directorates a Brigadier E (Q Services) was established with three branches, E3 Resources, E4 Transportation and E5 Works to supervise those engineer responsibilities remaining to the QMG. The post of Deputy E-in-C was abolished but a BGS RE was appointed to supervise other functions of the directorate.

#### MILITARY SURVEY

The Directorate of Military Survey was situated at Bushy Park in Teddington in 1948 but moved to Tolworth in 1950 where it remained until occupying its present accommodation in Feltham in 1962. Although administered by the War Office, the Directorate's services were equally available to the Army Council and to the Air Council for carrying out topographical surveys and for the production, supply and holding of maps, aeronautical charts and associated geographic data. In addition, it had the responsibility of providing land maps and aeronautical charts for the Royal Navy and Royal Marines.

In 1948 the Directorate consisted of the Director of Military Survey (brigadier), a Deputy Director (colonel) with special responsibility for Air Ministry matters, and staff branches. During this decade there were several changes in these branches. By 1956, the situation had stabilised and the Directorate had four branches:

Survey 1	Staff duties and equipment
Survey 2	Production and distribution of maps and aeronautical charts
Survey 3	Survey intelligence
Survey 4	Research and development

The overall control of survey was through the Joint Survey Advisory Board which had been formed in 1947 to co-ordinate tri-service interests, Colonial Survey and the Ordnance Survey.

*Ordnance Survey.* The Director General of Ordnance Survey, a major general, had a mixed military and civilian staff. After the war it became difficult to find junior ranks to fill the military technical vacancies and so the technical staff became entirely civilian, albeit many of them ex-survey servicemen. In 1948 following recommendations of an inter-departmental committee, the number of higher posts in Ordnance Survey held by RE officers was limited to thirty-five and the Civil Service examination became the method of recruitment of technical surveyors and draughtsmen. During the succeeding years the number of military officers increased from the immediate post war figure of sixteen to a maximum of twenty-seven in 1960. The significance of these figures to the Corps is indicated by the fact that Ordnance Survey posts included one major general and two brigadiers, compared with two brigadier posts in the remainder of Military Survey.

#### WORKS SERVICES

The history of barracks construction for the Army shows an alternating military and civilian responsibility. The earlier barracks in Scotland and Ireland were built under RE direction but a civilian barracks department had been formed in 1792 to provide barracks in England during the Napoleonic War. It was abolished thirty years later and the task was given to the RE, supplementing their traditional role of constructing military fortifications. The Barracks Department had again been revived in 1904 but only for accommodation at home. The RE retained Works abroad and in 1917 reassumed entire responsibility. This system ensured a close liaison with military occupants and it kept in training a military capability for engineer works.

However there were deficiencies in the procedures for initiating work. The responsibility was divided between the QMG, to whom the DFW was responsible, D Quartering who controlled accommodation scales, and the Permanent Under Secretary of State through the Works Finance Branches. Duplication was inherent in this relationship yet no one branch was responsible for any final decision. It was inevitable that financial control tended to be exercised in a negative manner. After 1946 demand for new permanent accommodation to modern standards of housing both at home and overseas brought increasing dissatisfaction with the procedures. Attempts were made to reduce delays<sup>6</sup> which were frequently so long that the requirement changed or even evaporated in the time taken to obtain authorisation. The policy of tailoring the design of buildings to unit establishment meant

that every time the establishment changed so did the design thus causing further delays and extra costs. In a period of continual strength reductions for the Army tied to an annual Works vote it was difficult to prepare a long term building programme. It was perhaps hardly surprising that the Corps, being responsible for the actual construction, found itself carrying the blame for faults which were not of its own making.

The shape and deployment of the Army was in such a state of flux that Brigadier L D Grand on appointment as DFW in 1949 commented on the "complacent frustration" in the Directorate. He introduced a War Office Planning Team (WOPT), with freedom to engage civilian consultants, as a means of increasing the project design capability. He became Major General Grand in 1950 when the post of DFW was upgraded. A number of prestigious projects including Knightsbridge and Chelsea barracks at home, Rheindahlen in Germany, Dhekelia in Cyprus, Bukit Terendak and Dharan in the Far East were started at this time. Liaison was established with other government departments who had similar problems. Brigadier M Champion-Jones, the DDFW, paid a visit in 1956 with his chief architect to the building branch of the Ministry of Education. He found that alleged economies arose not from revolutionary building methods but from reduced accommodation scales. However, their novel organisation was of great interest with an architect and an administrator established as joint decision makers.

Events overtook the process of evolution. The Weeks Committee Report was published in May 1957.<sup>7</sup> It recommended a new organisation charged with technical, financial and administrative responsibility for Works Services jointly led by a Chief Architect and an Assistant Under Secretary. A continuing responsibility for the RE to provide Works Services in an emergency and in overseas operational areas was recognised but a proposal in the draft report that civilian works officers in overseas appointments must accept an Army Reserve liability was finally omitted. The report was accepted and Works Services were handed over to a civilian organisation during 1959 and 1960, starting with Western Command in March to May and MELF in April to September 1959.

Much of the dissatisfaction with the handling of Works had centred around new constructions, but little had been said about the maintenance aspects. The Weeks Committee commented on lack of continuity in post of military staff and on the need for a career structure for civilian employees even though a process of civilianisation of a number

of more static posts was well under way. A number of senior Sapper officers at the time felt that the subject had not been studied to the depth it deserved; that routine works were being handled with competence and that more credit should have been given for the major projects successfully completed. In Germany, with the less stringent financial procedures of occupation funding, the quantity and quality of Army accommodation was better than elsewhere. It must be admitted that attempts by the Corps to meet the Army's needs by short circuiting the system may have influenced the War Office Works Finance Branches to subject every proposal to meticulous scrutiny unlike the procedures of the Air Ministry Works Department. The Corps' view of Works had been that it was merely one of a number of its duties, not generally the first choice of the more ambitious officers, and within the Corps the loss of Works was by no means a universal disappointment. Many officers felt relief, perhaps short sightedly, that the prospect of a works tour no longer dangled over their heads. Redundancies in the Corps, further to those which followed the streamlining of the Army announced in 1957, were inevitable particularly in the Quartermaster Technical and Clerks of Works categories, as well as amongst those officers who had specialised in civil engineering. The Engineer Services Special Establishment (ESSE) was then created to maintain a capability for meeting the residual Works commitment.

In retrospect it seems that the Weeks Committee may have been under some pressure to make savings in military manpower and to anticipate the combining of administration for all the armed forces. It was not long before the civilian works organisation was absorbed, together with the Admiralty and Air Ministry Works Departments, into the Ministry of Public Buildings and Works.

#### UNITED KINGDOM ENGINEER COMMAND STRUCTURE

The five major UK Commands, Eastern at Hounslow, Northern at York, Scottish at Edinburgh, Southern at Salisbury and Western at Chester all had Chief Engineers (CEs) with the rank of brigadier whose main responsibilities were for Works Services in their commands. The CE appointment continued throughout this period but the Weeks Committee Report foreshadowed more changes. CEs also existed at each of ten district HQs. Six of these were of brigadier rank which reflected the extent of their involvement in Works Services. Each CE also supervised and directed the Regular and Reserve RE units in his district, either directly or through a subordinate HQ. Each was also responsible for the administration of War Office controlled



units within his boundaries such as the training regiments, schools and RE stores depots. In Northern Ireland the CRE performed a similar function.

### THE HOME BASE

AS most of the Field Army was deployed overseas the Home Commands were very active. The return of Regular Army standards of training together with the continual turnover of national servicemen made formidable demands on the training organisation. A variety of additional commitments also had to be met because of the absence of field units. The Reserve Army was large, enthusiastic and at full strength due to the national service reserve liability. It also had demanding training requirements. The general clearing of wartime defences and structures also exercised the RE staffs of the Home Commands. The majority of line of communications engineer units had been disbanded from the active Army but many reappeared in the Territorial Army and the Supplementary Reserve. Bomb Disposal was busy with the post war clearance of beach mines and enemy bombs as described later in Chapter XI.

Life was not uneventful. Sapper skills proved invaluable in times of natural disaster but were more frequently called upon by public authorities to provide assistance at local events. A wide variety of these tasks were carried out ranging from assistance for local shows, to the layout and floating structures for a 2000 metre rowing course for the Commonwealth Games in 1958 by 50 Field Squadron and, in the same year, the erection in Windsor Great Park by 3 Field Squadron of a 100 foot tall totem pole presented to HM The Queen by British Columbia in commemoration of its centenary. In particular temporary bridging was much in demand for military tattoos, shows and festivals as well as for repairs and road diversions. The bridge most in the public eye, particularly when a span under construction fell into the river, was that built by 36 Army Engineer Regiment across the River Thames adjacent to Hungerford Bridge for use as a footbridge during the Festival of Britain in 1951. It was made of Bailey bridging which continued to be used with a versatility hardly equalled during the war.

Flood disasters made a particular call on sapper expertise. Perhaps the greatest natural disaster in this decade occurred in the valley of the River Lyn. Exceptional rainfall on Exmoor in August 1952 caused a sudden torrential flood which carried a mass of debris, including boulders of up to 10 tons in weight, smashing bridges, houses and other structures in its course. Elsewhere flood damage although less

spectacular extended over a wide area in Somerset and Devon. It was perhaps fortunate that a number of Reserve Army units, some including Z Reservists, were in training at the time. The Army in general and the Corps in particular were able to demonstrate how much emergency aid could be provided quickly and effectively. Another major disaster relief task arose in 1953 following exceptional weather in the North Sea which caused widespread flooding on the East Coast of England and Sappers were called to assist from Hull to Ramsgate (and also in Holland). 32, 36 and 39 Regiments were involved together with task forces from the SME, BD Unit, and several RE TA units; university students from Cambridge including Sapper officer undergraduates filled sandbags. The principal role was that of repairing breaches in the sea walls and many sandbags were laid. 36 Army Engineer Regiment claimed over two million of them. Other emergency tasks arose in connection with industrial strikes and Sappers were deployed to the London docks in 1949 and to drive tanker lorries in 1953.

A task of more conventional note was at Sandhurst. The RMA Woolwich had closed, after 194 years, in 1939; it never reopened. RMC Sandhurst, which was renamed RMA Sandhurst in 1948, needed a third college to accommodate the increased number of cadets who started training there in 1947. Brigadier J S W Stone, CE Southern Command had studied the difficulties of civil contractors completing the task in time and in consequence 30 Army Troops Engineers were brought back from Germany for the task. Victory College was built on a Nissen hut basis and provided adequate cadet accommodation for twenty years.

30 Army Troops Engineers reformed as 36 Army Engineer Regiment at Maidstone in January 1949 under Lieut Colonel P A Easton. Lieut Colonel J F D Savage brought 32 Assault Engineer Regiment back from Germany in 1948 to Perham Down reforming at full regimental strength. In the following years it endured many changes; it provided 50 Field Squadron to Hong Kong in June 1949 and 55 Field Squadron for Korea in 1951. Responsibility for operating flail tanks was taken over from the RAC in June 1951 and the Regiment then consisted of 26 Assault Squadron (AVRE), 31 Assault Park Squadron, 59 Assault Squadron (Flail) and 81 HQ Assault Squadron, an all armoured unit. In 1954, 31 Squadron disbanded and 59 reorganised as the first of the new Airfield Construction Squadrons, moving to Chatham in 1956 and then to Christmas Island in 1957. 32 Regiment disbanded in 1957 when 26 Assault Squadron moved back to Germany with an establishment of both AVRE and flail tanks.

Other field units were deployed as fast as they were formed; 24 Field Engineer Regiment formed in Ripon under Lieut Colonel E F R Stack in 1948 was sent to Hong Kong in 1949; 37 Army Engineer Regiment also formed in 1948 under Lieut Colonel B S Armitage, moved to Germany as part of the reinforcement of BAOR in 1950. 29 Army Troops Engineers, brought back from Germany to reform as 35 Army Engineer Regiment at Crowborough under Lieut Colonel J E T Nelson in 1948, left the UK again for the Middle East almost immediately. The plans for increasing the strength of BAOR included the formation of three more regiments in Britain and two in Germany. 25 Field Engineer Regiment under Lieut Colonel E F Parker was formed at Maidstone, 27 Field Engineer Regiment under Lieut Colonel J K Shephard at Devizes late in 1950 and 39 Army Engineer Regiment under Lieut Colonel G P H Boycott was raised at Crickhowell on the departure of 37 Army Engineer Regiment for BAOR. A test of the new Army formations for Germany was held in the autumn of 1951 in a major exercise called SURPRISE PACKET which involved an approach march and an assault crossing of the River Thames to the West of Reading. Thames Valley farmers were still talking about SURPRISE PACKET a decade afterwards. Later 25 Regiment went to the Canal Zone with 3 Infantry Division; 27 Regiment moved to Germany with 6 Armoured Division and 39 Regiment having survived reduction to cadre strength during a manpower crisis in 1952 went to Kenya at the end of 1953 but returned to the UK to disband two years later.

The Corps was represented at the funeral of His Majesty King George VI in February 1952. In accordance with tradition an officer of the War Office Movement Control Staff, Major H Hobley RE led the funeral procession from Westminster Hall. A representative detachment of one officer and eighteen other ranks marched in the procession, which included the RE Band Chatham. Detachments from 101, 114, 122 and 133 Regiments TA formed part of the route lining contingent.

In 1953 the Royal Engineers provided two contingents for the Coronation of Her Majesty Queen Elizabeth II. A party of 304 all ranks under Brigadier R P G Anderson drawn from eighty-five RE units, including two men from the Malta Fortress Squadron, took part in the Coronation Parade supported by the RE Band Chatham. A route lining contingent of 664 all ranks under Colonel R N Foster, including the RE Band Aldershot, was provided from seventy-two units to line 400 yards of Piccadilly from Bolton Street to Down Street. There was also engineer representation in the Dominion contingents

as well as in the Gurkha and West African forces on parade. A less spectacular but possibly even more valuable contribution to the Coronation ceremony was the preparation of the Coronation Camps to provide accommodation for 31,750 servicemen and police within easy range of the Coronation route. Planned by the CE London District, Colonel R N Foster and constructed by 36 Army Engineer Regiment, the camps were erected between 11 and 23 May and completely cleared between 6 and 8 June. Such was the speed of clearance that a storeman unloading at Osterley found a Soyer stove containing a still bubbling stockpot!

#### UNITED KINGDOM STRATEGIC RESERVE

It was hoped to re-establish engineer regiments at home once British forces had withdrawn from Egypt but the Suez Canal operation in 1956 and work on Christmas Island prevented this. It was not until 1957 that real stability began to emerge. The major units stationed in the UK by the end of this period of history were:

22 Field Engineer Regiment (3, 17, 23 Field Squadrons, 6 Field Park Squadron) at Chisleton having returned from MELF in December 1957. In 1959, 17 Field Squadron was made independent and transferred to Christmas Island and 22 Regiment became 3 Division Engineers.

36 Corps Engineer Regiment (20, 24 Field Squadrons) at Maidstone on return from Christmas Island in December 1959.

38 Corps Engineer Regiment (48, 63 Field Squadrons, 15 Field Park Squadron) at Ripon on return from Christmas Island in December 1958. 12 Field Squadron joined the Regiment in 1959.

Mention should also be made of 25 Field Engineer Regiment, raised as 3 Division RE, whose base was at Maidstone for much of this period; it came home from Egypt in 1955, returned there briefly in 1956, went to Christmas Island in 1957 and eventually settled in Germany in 1958. 35 Army Engineer Regiment also spent a brief period in Ripon in 1956, interrupted by the Suez Canal operation and transferred to BAOR in 1957. 28 Field Engineer Regiment which returned from Korea to Devizes in April 1955 as 1 Division Engineers, was sent to Christmas Island in the summer of 1956 and disbanded the following year. 9 Independent Parachute Squadron, of 16 Parachute Brigade Group, formed part of the UK based strategic reserve forces but spent little time at their base. Two other units, 8 Railway and 51 Port Squadrons, were given a strategic reserve role in a

reorganisation of transportation units in 1954. All Survey field units were serving continuously overseas during the period.

#### THE SCHOOL OF MILITARY ENGINEERING

Despite a post war proposal to locate the School of Military Engineering at a new site close to the other Arms Schools, it transpired that there was no practical alternative to returning from Ripon to its traditional home at Chatham. A rather protracted move was necessary to allow reconstruction and repair of Brompton Barracks and refurbishing of the wartime military detention centre at Darland, Gillingham, renamed Gordon Barracks. Besides the improvement to accommodation, a new wet bridging site was created at Gundulph Pool, Upnor. A dry bridging gap was excavated on the Darland fieldworks ground and a plant training area developed north of the Medway based on Kingshill Camp and Chattenden. The SME started its move in October 1948 after eight years in Ripon. However before leaving, the Corps was honoured by receiving the first Freedom in its history when it was granted the Freedom of Ripon at a ceremony on 27 July 1949. Ripon remained a Sapper stronghold. An Engineer Training Centre was established there and it became the permanent home of a regular regiment.

By March 1950 the new layout of the SME under its Commandant, Brigadier B C Davey, was:

HQ SME together with the Tactics School, Publications Section, and the Institution of RE were in the Institute Building at Brompton Barracks. Also in Brompton Barracks was 12 SME Regiment, a new unit, together with the Civil Engineer and the E&M Schools, the latter retaining its traditional building, the Electrical School.

10 Trades Training Regiment, which also commanded the Workshops, occupied Kitchener Barracks. This trades training element had not moved away during the war years but had remained at Chatham as 10 Chatham Depot Battalion. In Gordon Barracks was 11 SME Regiment formed from 1 (SME) Depot Battalion, Ripon together with the Field Engineer School and the Officer Cadet Squadron which had become part of the SME Ripon on the disbandment of 2 (Officer) Training Regiment at Newark in 1948.

The Plant, Roads and Airfield School was based on the Plant Squadron at Kingshill Camp.

11 and 12 Regiments amalgamated in December 1955 as 11/12 Regiment which became 12 SME Regiment in July 1957. In January

1959, 103 years after the original Depot of the Royal Sappers and Miners came to Chatham, the RE Depot closed at Barton Stacey and joined 10 Regiment to become 10 Depot Regiment; it had moved from Halifax to Barton Stacey in 1946 and had formed 12 Drafting and 13 Holding Regiments in 1947. These two regiments amalgamated in 1949 under the title of the RE Depot. Meanwhile other noteworthy events had been occurring at the SME. In September 1953, the Freedom of the Borough of Gillingham had been bestowed on the Corps in a ceremony at Brompton Barracks which was shown on television. The City of Rochester similarly honoured the Corps in May 1954 in the grounds of Rochester Castle, shortly after a visit to Rochester by HM Queen Elizabeth The Queen Mother on 18 May when RE troops lined the streets. HM The Queen herself visited the SME as Colonel-in-Chief in October 1956 to celebrate the Centenary of the amalgamation of the Royal Sappers and Miners with the Corps of Royal Engineers. She was received in Brompton Barracks, entertained to luncheon in the Headquarters Mess and afterwards watched a demonstration at Gordon Barracks.

One result of the concentration of Sappers at Chatham was a revival of Corps sporting activities. Sailing and rowing came to the fore. RE crews from Chatham won the Wyfold Cup at Henley in 1950 and 1954. The RE Drag was reborn and the first post-war RE Horse Show was held at Gordon Barracks in July 1950. A new event was an Annual RE Air Day first held in 1950 at Detling airfield and in subsequent years at Rochester airfield. In addition to purely Corps activities, the United Services Chatham Rugby Team was revived and quickly acquired a high reputation in Kent and South London. A Nuffield Grant enabled the United Services Tennis Club and gardens to be restored. The annual Warren Shield Cutter race on the Medway started again in 1950. The RE Museum had reopened in 1946, and the Corps Library opened in the converted lecture hall of the Institute Building in 1954.

#### OFFICER TRAINING

Relocation was accompanied by major changes in the pattern of training, reflecting the greater scope of tasks that had been carried out in war and the greater breadth of training required in peace. In particular there was a backlog of training to be caught up by the war entry. Cambridge University had reduced drastically the number of vacancies which they had allotted to the Army pre-war and the RE share fell to around fifteen a year. The first post-war officers to be

sant there were personally selected by the E-in-C. Those officers who had completed one year at Cambridge before the war became eligible for a wartime degree and attended a short backlog course in 1947, others of wartime entry returned to their own universities to complete their degree studies. The pattern of officers' education at that time involved one of three alternatives.

Cambridge University, where a small number were accepted from those who were qualified and selected to attend.

The Military College of Science at Shrivenham, which started degree training leading to a London external degree. Officers who were given preliminary training to reach the Inter BSc standard on special courses at the SME, were accepted at Shrivenham.

Supplementary courses of fourteen months duration, held at Chatham to include work in the Civil Engineering and E&M Schools, the Survey and Transportation Training Centres.

Supplementary courses continued until 1950 when two courses had to be cancelled because of shortages of officers in regiments. By then, the backlog training had become merged with the specialist engineer training for younger officers converting to regular commissions and, shortly afterwards, with the Sandhurst entry. Sandhurst had reopened in January 1947<sup>8</sup> though all cadets had to serve a preliminary period in the ranks. The first batch was commissioned in July 1948 and started on the first Young Officer (YO) Course at the SME. YO training was planned in three stages; the first being eighteen weeks training in basic field engineering designed to teach a YO to take his place as a troop officer in a field squadron; the next was regimental duty to acquire a background of practical experience; the third stage was similar to that of the backlog training leading to a BA (Cantab), BSc (Eng) or a twelve month course of the same nature as the supplementary courses.

A major modification was the introduction in February 1953 of an extra stage of technical training immediately following the first stage so that no YO missed this aspect of his education. In this system, the third stage was extended to include a diploma course at the Medway College of Technology for most of those who did not qualify for university degree training; regimental duty had to wait until a fourth stage. At about this time the title of Supplementary Course was changed to Junior Officer (JO) training. 10 Batch was the first to receive the revised programme of training, but 13 and 14 Batches were the first to send members on 1 Diploma Course in 1955. The system

was not wholly a success and was discontinued after No 5 Course, attended by members of 21, 23 and 24 Batches, ending in 1961. By 1959 the system of YO training had reverted to its original three stage sequence. The Long Courses in Civil Engineering, Survey, Transportation and E&M restarted in 1947. The Survey Training Centre became the School of Military Survey in 1949 and several officers on Civil Engineering courses supplemented the surveying part of their study with extra tuition there.

### SAPPER TRAINING

The wartime system of basic military training in the General Service Corps for all recruits ended in April 1948. Thereafter recruits joined directly their Corps and Regimental training units. Sapper recruit training was carried out in the Training Regiments of which there were five at the end of 1947:

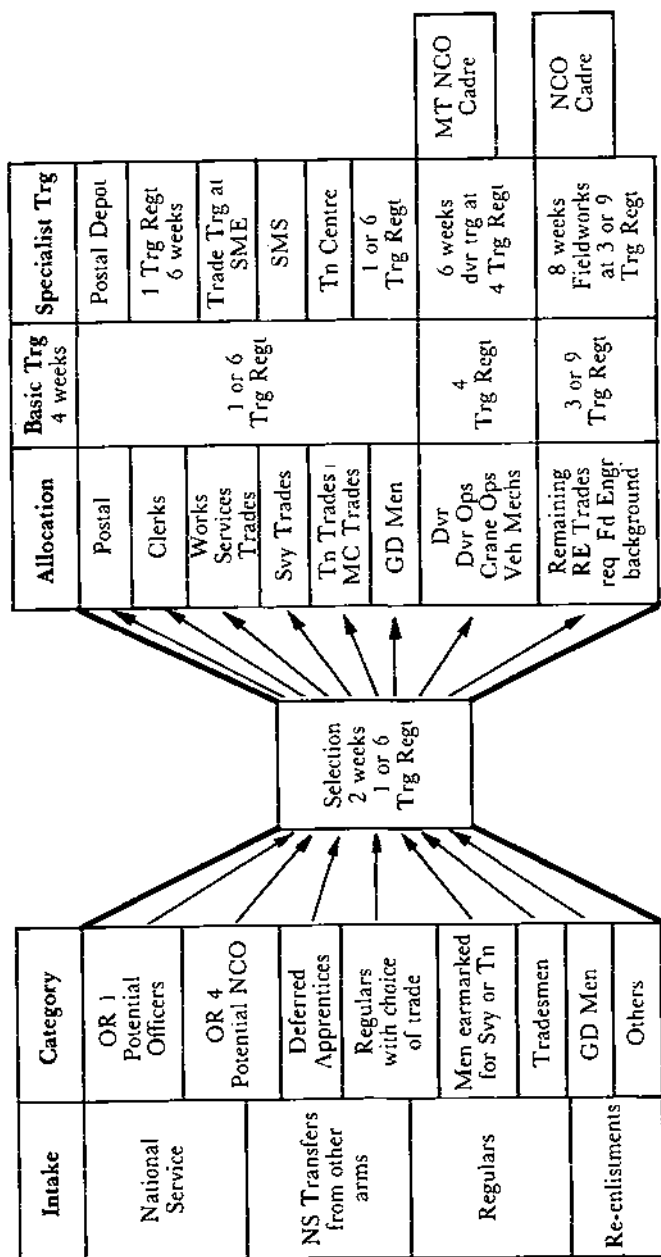
- 1 Training Regiment, Malvern (Lieut-Colonel R N Foster)
- 3 Training Regiment, Cove (Lieut-Colonel G O N Thompson)
- 4 (MT & Signals) Training Regiment, Aldershot (Lieut-Colonel K W de Watteville)
- 8 Training Regiment, Elgin (Lieut-Colonel E L Marsh-Kellett)
- 9 Training Regiment, Cove (Lieut-Colonel W J Cardale)

Like the SME and the specialist training centres, these were War Office controlled units under the Director of Military Training. All recruits (including R Cadets destined for Sandhurst) entered through 1 Training Regiment for reception, documentation and assignment of future trade or employment and elementary military training. On completion of this two week phase they were sent to one of the other training regiments for basic military training for six weeks, after which those assigned for survey, transportation or driver training were sent to their respective establishments. The remainder stayed in a training regiment to complete training as field engineers. The system of control of the training regiments was not entirely satisfactory. In February 1949 an Engineer Training Brigade Headquarters commanded by Brigadier L F Heard was established at Aldershot to command the three training regiments in Southern Command<sup>9</sup> and also to establish close liaison with 1 and 8 Training Regiments to ensure uniformity of standards. The Brigade included the RE Band Aldershot which started to form in early 1950 and also fifty regimental boys, successors to the boy trumpeters who trained in 4 MT Depot throughout the war, their training included an emphasis on RE works services. Thirty boys from Chatham joined those in Aldershot in 1950 to form a unit



# TRAINING ROYAL ENGINEERS RECRUITS 1953

Figure 2/1



Transfers from  
other arms and  
Ex-Boys

given a quota of 100 boys. The quota was raised to 150 in 1953 and to 280 in 1957 when a separate squadron was established at Malta Barracks, Aldershot. By then the aim was to produce potential training instructors.

As an incentive to quality the Haynes Medal<sup>10</sup> was presented annually from 1951 to the NCO who came top of the Cadre Course run by the Training Brigade.

The introduction of a three year term of regular service without a part time reserve training commitment, produced a sudden increase of volunteers. A new unit, 6 Training Regiment, was formed in Worcester in August 1952 to take over the selection role from 1 Training Regiment allowing it to concentrate upon the training of regular Sappers. The allocation of duties of the training regiments were rationalised in 1953. Recruit reception, selection and testing together with elementary military training was carried out at both 1 and 6 Training Regiments. All Regular recruits went to 6 Training Regiment; all clerical training was completed at 1 Training Regiment. 6 Regiment subsequently moved in 1957 from Worcester to Cove. Field engineer training took place at 3 Training Regiment which also took the R Cadets destined for Sandhurst and potential National Service officers. Field engineering was also taught at 8 and 9 Training Regiments while 4 Training Regiment continued to train drivers and driver/operators. During all this period artisan trade training continued to be carried out at Chatham. The next change was in August 1954; 8 Training Regiment was disbanded and 9 Training Regiment was allotted the responsibility for ex-boys graduating to man service. Many of the Corps' finest long term entry had come in through the Army Technical School (Boys) at Chepstow. The name had been changed to Army Apprentices School in 1947 and two new schools at Harrogate and Taunton were opened. Building and survey trades were transferred to Taunton which was commanded by a Sapper, Colonel J H Boyd, but in 1949 returned to Harrogate, where another Sapper, Lieut Colonel W M S Lillie was Chief Instructor. In Chepstow the emphasis was on the electrical and fitting trades and by 1951 the school was providing ex-apprentices for virtually RE and REME only. In that year an experiment to send the Apprentice Schools' output direct to units, cutting out the Training Brigade was tried. Although a close liaison had been established by the Training Brigade to co-ordinate with the schools so that an uneventful transition to man service should be achieved, the experiment was not repeated. By 1957 other changes required the REME training to move to Arborfield and

in 1959 the building trades returned to Chepstow. In the same year the first post war RE Deputy Commandant, Lieut Colonel J R E. Hamilton-Baillie was sent to Chepstow, which had by then established close ties with the Corps even though the two commandants there for most of the 1950s were both ex-Gunners. The ties between Chepstow and the Corps developed as more ex-apprentices joined the Corps. The liaison initiated in the early part of the decade grew to a strong association, but it was not until 1961 that the survey trades also moved back to Chepstow from Harrogate. Meanwhile the demand for places as Regimental Boys had also grown and the squadron was authorised in 1957 to be expanded to a Junior Leaders Regiment which was established at Dover in 1959, commanded by Lieut Colonel R L. France.

The trade of Field Engineer, later changed to Combat Engineer, had been introduced as the basis of training for all Sappers. Upgrading courses were run in units for Class 2 and at the SME for Class 1. There was pressure to retain artisan training for all regular soldiers in addition to their field engineer skills but the national servicemen had little time to learn more than one trade. Those that had already acquired artisan skills before coming into the Corps were tested in their trade.

As the end of national service approached further changes were necessary in the training organisation. 1 Training Regiment moved from Malvern to Cove at the beginning of 1959, amalgamated with 6 Training Regiment in February and with 9 Training Regiment in May the same year, retaining the title of 1 Training Regiment. The Training Brigade then commanded 1 and 3 Training Regiments at Cove, 4 Training Regiment in Aldershot and the Junior Leaders Regiment at Dover.

## RECORDS

The RE Record and Pay Office had moved from Chatham to Brighton in 1939, where it had been housed in a former Ladies Diocesan Training College. The Pay Office broke away and moved to Manchester the following year leaving the RE Record Office on its own. Peacetime saw RE Records remaining in Ditchling Road, Brighton controlling its affairs by means of full manual records supplemented by abbreviated duplicate punch cards of a War Office Central Card Index (WOCCI). The WOCCI had proved to be of value and RE Records was selected to carry out a trial scheme for punch card records in 1948 based on Holcrith and later Powers Samas machines. The

trials proved to be successful and subsequently machines were introduced to all record offices; eventually being replaced by De La Rue Bull equipment. Once again, Sappers had pioneered the way.

### CORPS AFFAIRS

*Dress.* Army uniform of the 1940s was battledress with that hybrid headgear the Cap GS, replaced in peace as soon as possible by a khaki beret. A blue uniform with a high collar jacket and known as No 1 dress was introduced in 1950 as the formal uniform but never became an all ranks issue. Approval for the SD cap for officers was restored by popular demand after Field Marshal Montgomery's tour of duty as CIGS and the wearing of khaki service dress on official occasions was restored. The RE had adopted a blue lanyard in 1951 and changed their bronze cap badge for one in silver and gold in 1952. Mess kit, reintroduced on a concession basis in 1954, became official for officers in 1960 and was subsequently introduced for the Warrant Officers and Sergeants Messes. A Corps stable belt was approved by the E-in-C in 1958. In 1957, a combat dress was developed. Battledress, which by then had become the parade and smart uniform, was replaced over the next few years by service dress (No 2 dress) for all ranks.

*Presentation.* A unique distinction was the presentation by General "Boy" Browning (Lieutenant General Sir Frederick A M Browning, GCVO KBE CB DSO) of a Scroll of Honour to 9 Independent Airborne Squadron at a formal parade in Aldershot in March 1951, jointly inspected by General Browning and Lieutenant General Sir Charles J S King, the Representative Colonel Commandant RE. It commemorated the action of 9 Field Company RE (Airborne) at the Primesole Bridge in Sicily in July 1943. The two infantry battalions (2nd Battalion South Staffordshire Regiment and 1st Battalion The Border Regiment) present were awarded the action as a battle honour and entitled to wear a glider symbol on their uniform, but since the Corps does not accept battle honours, a unique scroll records the episode in 9 Squadron's history.

*RE Rally at The Royal Albert Hall.* An RE Rally was held in The Royal Albert Hall in April 1951 as part of the Festival of Britain celebrations. Tickets, which were much in demand, were supplied only through the RE Old Comrades Association but the function was run by the Corps as a whole. It took the form of a pageant of Corps history through the ages written by a BBC producer and narrated by John Snagge an ex-Sapper BBC commentator. After an interval for refreshment the rally went on to a social phase with dancing and ended with

the traditional *Hurrah for the CRE*. It was accounted a great success. *Corps Associations*. The various instruments of the corporate life of the Corps were employed to help its members return to normality after their wartime upheavals. Efforts were made both by the Institution of RE and the RE Old Comrades Association to help to find employment for those returning to civilian life as well as to assist those who had suffered because of the war. The title *Old Comrades* was dropped as being no longer appropriate at the Annual General Meeting of the RE Association in 1952. The RE Benevolent Fund was formed into a limited company under the Companies Act of 1949 so that it could invest contributions to the best advantage of the Corps. A Memorial to all members of the Corps who fell in the Second World War took the form of thirty-three RE War Memorial Homes built in various locations throughout the country from funds raised by appeal, and administered by the Douglas Haig Memorial Homes.

## FOOTNOTES TO CHAPTER I

1. Central Organisation for Defence, White Paper October 1946.
2. Army Council Instruction 209 dated 12 March 1947, changes to take effect 1 May 1947.
3. Major General H Williams—E-in-C Army HQ India  
Major General Sir Millis Jefferis—E-in-C Army HQ Pakistan  
Brigadier R E Holloway—Commandant School of Military Engineering India  
Brigadier J R Connor—Commandant Royal Pakistan Engineer Centre
4. The White Paper Statement on Defence, February 1953, reported "Nearly all combatant (Army) units are serving overseas and two thirds of the married personnel are separated."
5. Hull Committee 1956. Charged with the task of reviewing the organisation of the Army and making recommendations for saving military manpower. The Report was completed in September 1956 resulting in a number of amalgamations and redundancies commencing in the next but one financial year. The Weeks Committee stemmed from this Report.
6. The Holland Committee (Major General J F C Holland late RE) made recommendations in 1954 to speed up procedures without sacrifice of financial control. A main feature of the recommendations was that "Approval in Principle" and the allotment of funds should be the preserve of a central authority (normally the War Office) but that subsequent detailed planning and sub-allotments of funds should be delegated. In this way overall control would be retained without immersion in detail. The recommendations were not implemented.
7. Following the Hull Committee (5), a committee was convened under Lieut General Lord Weeks with terms of reference "To review the whole arrangements for deciding on and carrying out Army Works Services at home and abroad; and to make recommendations." The committee did not include Army members with notable experience of either Quartering or Works and its evidence was not made public.

8. The first post war Sapper to win the double award of Sword of Honour and Queen's Medal on commissioning from Sandhurst was A C D Lloyd, the son of a Sapper, Brigadier T I Lloyd, in 1956.

9. The opening sentence of a proposal made by HQ Southern Command to the War Office in October 1948 read: "There is an urgent need for an Engineer Training Brigade Headquarters to supervise and co-ordinate training, administration and regimental matters in the three training regiments in the Aldershot-Farnborough area."

10. Captain A E Haynes had been killed putting down a rising in Mashonaland in 1896 and the award, which had been in abeyance for several years, had been founded to commemorate his action.

## CHAPTER II

### GERMANY

A GENERAL SURVEY—Rehabilitation—Reorganisation—Readjustment. BERLIN—Airlift—Demolitions—RE Troops Berlin. FIELD ENGINEERS—Pattern of Life—Dutch Floods—Queens' Bridge—Continuation Training—Recreation—Redeployments—Royal Canadian Engineers—Survey. WORKS SERVICES—The New Headquarters—The Changed Status—The Belgian Base—Procedures. RESOURCES. MOVEMENT CONTROL AND TRANSPORTATION. POSTAL IN GERMANY

#### A GENERAL SURVEY

THE fortunes of the Sappers in Germany are so intimately linked with the emergence of Germany from defeat and occupation to the status of sovereignty and membership of the North Atlantic Treaty Organization, that the process deserves explanation. When the Third Reich collapsed in May 1945 Germany was occupied by the Allies; there were no recognised central or provincial governments; communications (road, rail, and telephone) were disrupted; food was hard to get; and whole populations had been uprooted from their homes to sink exhausted where they stood when the cease fire sounded. Under the Potsdam Agreement, signed in August 1945, the country was divided into four Zones; American, British, French and Russian; and the Commanders-in-Chief of the occupation Armies in each zone were made individually responsible for the government of their zones; while the four Cs-in-C collectively formed a Control Council to regulate overall policy. Reduced to its simplest terms the policy dictated at Potsdam was summarized in the words "Denazification, Demilitarization, Disarmament and Reparation".

There was a short period when the victorious armies seemed more disposed to enjoy the fruits of victory than to consider the problems of peace; but it was short lived. The problems were numerous and pressing, and the Allies approached them from different standpoints. The Russian attitude was an absolute adherence to denazification and reparation; and, as seen through Western eyes, an absolute indifference to the sufferings of the Germans. The Russians appeared determined to keep Germany a subject nation forever; and they watched with suspicion any attempt by the Western Powers to sustain her. It is difficult to blame the Russians after their sufferings at German hands in two World Wars, but it was also difficult, living in Germany, not

to have some compassion for the Germans too. It was in this soil of distrust that the seeds of the Cold War were sown.

As part of the rehabilitation of Germany, the German armed forces had to be dispersed and demobilized; public utility services had to be restarted; roads and railways had to be reconstructed, bridges had been demolished and in places railways tracks uprooted during the fighting; postal and telegraph services had to be reorganised; and basic industries such as agriculture and coal mining had to be made productive so that the people could live. All this had to be done, initially without local or central government. In addition the occupation forces had to be accommodated.

### REHABILITATION

In the British Zone it was the Sappers to whom the Army turned to accomplish many of the rehabilitation tasks, and the Sappers benefited from the plan of putting the Germans sufficiently on their feet to share the burden of reconstruction; a brief description of the magnitude of the rehabilitation task is given in Volume IX of the Corps History.

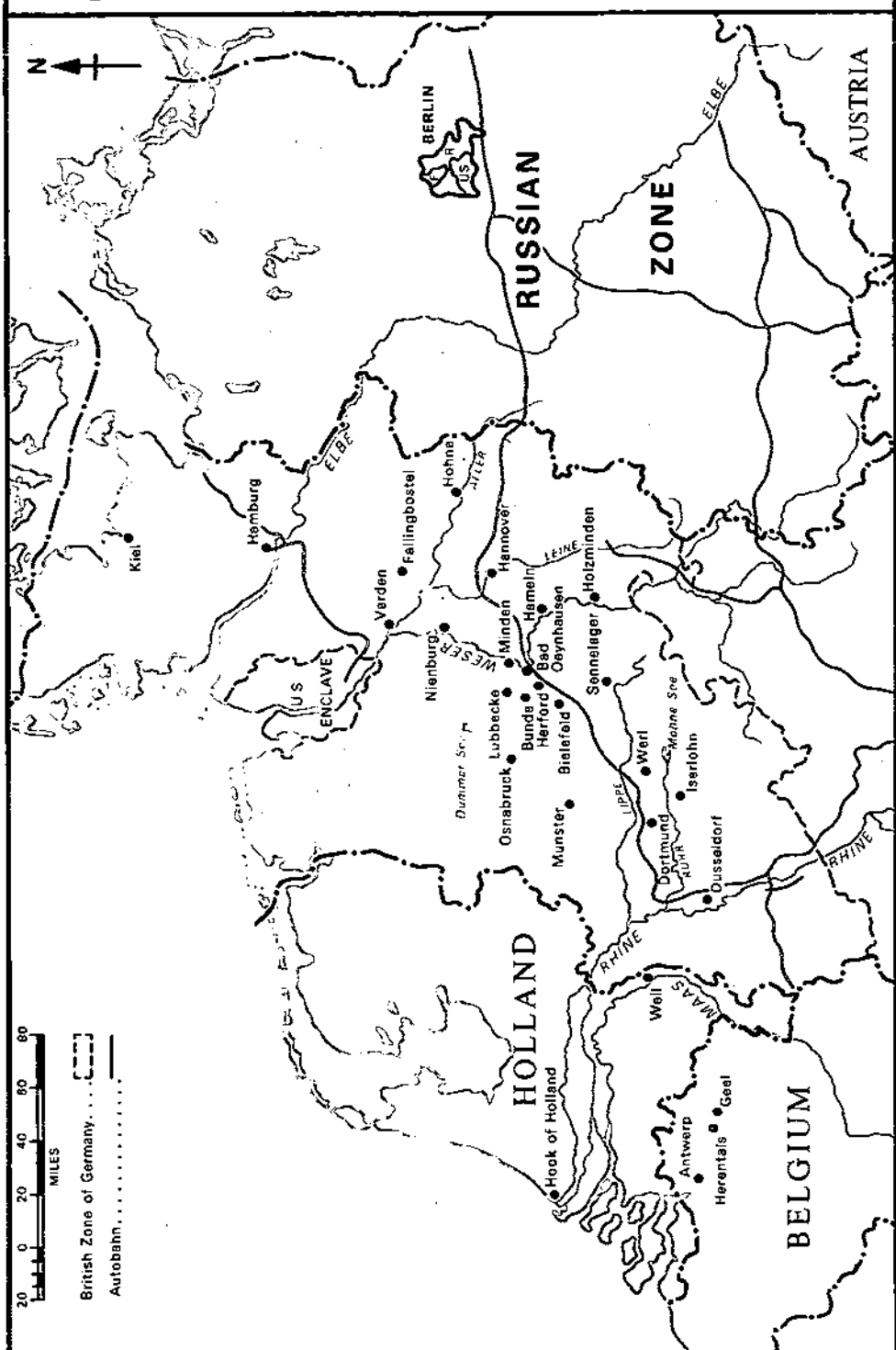
One of the first steps was to utilize German engineer and transport units. The British naturally viewed it as the obvious way to get the work done quickly and cheaply; the Russians viewed it as a poorly concealed attempt to maintain an embryo German Army for use against them. Simultaneously, steps were taken to resuscitate the local government authorities. Considerable latitude was left to local CsRE in the early stages; and it was not long before municipal engineers were maintaining the many Bailey bridges surviving from the war and replacing them with permanent structures. Rehabilitation of the German mapping had started because of urgent need for mapping and survey data, and by 1948 the German civilian survey and mapping service was working essentially under their own management even in Berlin where it functioned under tripartite control.

In Germany money was virtually valueless; a packet of cigarettes or an electric light bulb was better currency than German marks. Currency reform was essential. The Western Allies appreciated that little progress could be made in Germany without economic revival and it was thought that the best way would be to extend the European Recovery programme, otherwise called Marshall Aid, to Germany. In 1948 Marshall Aid was made available for Germany and the wheels of German industry were successfully set in motion again. The Soviet authorities objected to Marshall Aid and they objected to currency reform too but, finding the Americans determined upon both, they



# NORTH WEST EUROPE

# MAP 1



proposed an alternative currency reform for the Eastern Zone and insisted that it should also take effect in Berlin. The Western Allies could not accept this; nor would they forego currency reform in their own zones. Both sides went ahead with their own plans. The piqued Russians blockaded Berlin in the Summer of 1948 and refused land access from the Western Zones. The maintenance of Berlin was accomplished solely by air in what was termed the Berlin Airlift. The Cold War had openly begun.

In 1949 elections for a German Federal Parliament were held and Dr Adenauer became Chancellor. The *Bundestag*, as it was called, was located at Bonn; as was the British Military Government, which was converted to a Civil Control Commission on 21 September 1949. The C-in-C of the British Forces in Germany and Military Governor of the British Zone was General Sir Brian H Robertson (late RE) who became the British High Commissioner for Germany. The Federal Government grew in confidence and sureness of touch. Whereas a Germany without a government was a helpless monster, relying entirely upon Allied effort, the emerging West German Government became, as it were, a willing beast of burden capable of carrying the administrative load. Even before then, granting of increased powers to the Germans had saved British military effort and the British occupation forces were allowed to run down. By the middle of 1948 the only British division remaining in Germany was 2 Infantry Division; works services and other supporting services were correspondingly reduced.

#### REORGANISATION

In June 1950, the Communist forces of North Korea marched across the border into South Korea driving the South Korean Army, which was little more than a gendarmerie, and the American garrison before them. A "limited war" in Korea was begun and many people in Germany thought the same would happen there. It was known that a considerable force of paramilitary East German police existed in the Russian Zone, and there seemed little to prevent this force from attempting to march into West Germany and driving the reduced Western forces before them. Thousands of Germans flocked to the Rhine and something approaching panic seized them. The Federal Government asked permission to raise, train and arm a West German gendarmerie to resist aggression from East Germany, but politically it was not acceptable so soon after the war. The diminution of Western Allied Forces had to be reversed; from one division in 1948 the British

Army of the Rhine grew to a corps of four divisions (one infantry and three armoured) in 1954 with supporting arms and services to match. HQ 21 Army Group which was in the town of Bad Oeynhausen when the war ended became HQ British Forces Germany and then was renamed HQ British Army of the Rhine (BAOR); but although the location was administratively good, it could hardly have been worse from a tactical viewpoint, and plans were laid to move further west.

Meanwhile, political opinion about German rearmament was also shifting. NATO had established its HQ near Paris for the defence of the West against Communist aggression; yet many thousands of able bodied Germans, comprising some of the best military material in Europe, made no contribution. This was clearly absurd, and under the Pleven Plan it was agreed that when Germany was granted sovereignty in 1954 she should be given leave to raise twelve divisions of soldiers to supplement the NATO forces in North West Europe.

BAOR became part of the Northern Army Group (NORTHAG) in 1953 and the British C-in-C became the Army Group Commander. A Joint HQ of NORTHAG and 2 ATAF was set up at Rheindahlen near Mönchen-Gladbach west of the Rhine. The CE BAOR, Brigadier D C T Swan became the first CE NORTHAG, with the rank of Major General. Officers from the Canadian, Belgian and Netherlands engineers joined the CE's staff in 1953, and in 1957 the first German Sapper officers arrived. Similarly the AD Survey, Lieut Colonel C J P Thompson assumed NORTHAG duties with a Netherlands officer on his staff. The multi-national staff prompted Major General H H C Sugden, when he was CE in 1953, to institute an annual engineer liaison meeting for NORTHAG Sappers, called Exercise MAKEFAST. The first Exercise MAKEFAST was held at Sennelager in 1953 and hosted by the Corps in BAOR. Subsequently this exercise was held every year, run in turn by Belgian, Dutch, German and British Sappers. It provided an opportunity to strengthen associations and co-operation as well as to discuss current engineer problems.

On the other side of the Iron Curtain, the Soviet and satellite forces showed every evidence of large numbers ready for instant action. Readiness became the watchword of BAOR, and the imminence of the threat made the grouping of NATO forces a pressing necessity. While the USA alone possessed the nuclear bomb it was reasonable to assume that the USSR would refrain from aggression, as the consequence would be her nuclear devastation by the West, against which the Soviets were powerless. However, as the Soviet strategic nuclear capability developed, the situation changed; under the cover of a threat

to devastate the major cities of the Western Powers an attempt to overcome the Western forces by conventional means might be made. Concurrently tactical nuclear weapons were being developed.

#### READJUSTMENT

The use of tactical nuclear weapons was an essential part of the NATO deterrent to redress the balance against the communist forces whose conventional strength greatly exceeded that of NATO, and it had to be accepted that a nuclear response might be expected. The increase in military firepower was accompanied by a trend towards greater mobility of all arms, together increasing the size of the battlefield. The Sapper battlefield tasks to create better barriers in support of a tactical plan at ever faster speeds and to maintain and restore mobility for our own increasingly mechanised troops, grew more complex. The introduction of the Centurion and Conqueror tanks, exceeding earlier tanks in both width and weight, which came into service in BAOR in the 1950s, intensified the problems both of equipment and organisations of RE units. The well proven Bailey Bridge had been modified to accommodate the wider loads, but this meant extra quantities and weights to be handled in the process of bridging. Even with a regimental organisation to provide manpower, the existing range of Sapper equipments could not meet the modern requirements for speed, and greater mechanisation was the answer. A new family of bridging equipment was starting to appear in BAOR in 1955, which by use of lighter materials and new building techniques to take advantage of the use of cranes, could be constructed with fewer men. The laying of minefields was mechanised, the greater availability of plant began to replace sheer manpower and an attitude of machine-mindedness was being reinforced in the Corps.

The ability to react instantly to an incursion, to fight a conventional battle against a numerically superior enemy, developing into a nuclear conflict, with preparedness at all stages for any form of warfare, caused changes in the military concepts for BAOR. A major reorganisation was under trial when the deployment of British troops to Port Said in 1956 showed up the lack of troops in Britain for an operation of that type. Changes followed in British defence policies with reliance on national security being placed more and more on NATO. The field formations in BAOR were reorganised from four to three divisions with a concept of operations based on brigade groups. The divisional engineer regiments were disbanded and the field squadrons, with their

enhanced capabilities, were included in the brigade groups. The reorganisation was completed in April 1958.

### BERLIN

THE Allied concept for the government of Berlin had been decided upon at the Yalta and Potsdam Conferences. The Russians, who had fought for and captured Berlin in April 1945, evacuated the Western Allies' sectors in June 1945 in accordance with the decisions of those conferences. The government of Berlin was to be by a *Kommandantura*, comprising the American, British, French and Russian military commanders. Their decisions, including matters to control the population such as allocation of food and fuel, were effected through their staffs and a reconstituted civic authority termed the *Senat*.

The build up of tension, which finally led to the blockade of the Western sectors by the Russians, however split the original *Senat*, and a new *Senat* was established under the Western Military Commandants with authority in West Berlin only. This *Senat* gradually absorbed all the functions and authority of the City's government in the Western sectors. The power of the Western commandants was kept in the background; but in the last resort it was supreme.

West Berlin was like an island approached by a number of 120 mile causeways through East Germany. All reinforcements, and the maintenance traffic of Western garrisons, were either routed by autobahn or by railway. The third means of access was by the air corridors which during the blockade in 1948/49 were the only access into the city.

Movement within the three Western sectors was free, and, with very small formalities members of the Western occupying forces and their families could move without restrictions into the Russian Sector also. The free movement into the Russian Sector provided a unique opportunity for the Western forces to see something of communist dominated territory and to compare prosperity, atmosphere and achievements. Movement beyond the city limit into East Germany was however prohibited and physical barriers were placed around the city; there were no such constraints within the city until the building of the Berlin Wall in 1962. The Western sectors of Berlin enclosed a considerable area of forest and lake, beside the main built-up areas of the city and its suburbs. The perimeter around the three sectors measured some ninety miles and it was possible to drive nearly thirty miles in a direct line from the extreme north of the French Sector to the south of the American Sector. The Havel presented a magnificent stretch of water,

nearly ten miles long and a minimum of a quarter mile wide; it was a barge thoroughfare and unsuitable for bridging. Watermanship and rafting training could be obtained from a hard and prepared bankseat at Dachsberg. There was also a demolition range in the Spandau Forest with a 1,000 yard safety area.

In 1948 the Royal Engineers in Berlin comprised 159 CRE (Works) under Lieut Colonel D Bathe, 398 and 402 DCRE and 338 Construction Squadron. RE tasks consisted mainly of works services for the occupation force, demolition of military targets and the improvement of communications within the British Sector.

#### AIRLIFT

The deterioration of East-West relations, which led to the blockade and then to the Berlin Airlift, created many Sapper tasks including repairs and extensions to the airfield at Gatow and the construction of areas for unloading aircraft. Frequent repairs to the main runways and taxi-tracks were necessary. Fortunately it was not until the airlift had been operating for some months that the Russians cut the power supply to Gatow airport, which was generated in their sector. This eventuality had happily been foreseen; generators had been installed under RE supervision and operations were not disrupted. Flying and movement of stores were never held up for lack of any facility the Sappers could provide and the flow of supplies to meet the essential needs of Berlin continued by air until the Russians eased the controls on the land routes in 1949.

#### DEMOLITIONS

There were other interesting Sapper tasks. At 1220 hours on Friday 30 July 1948, a lance corporal of No 1 Troop 338 Construction Squadron RE pressed the handle of a Mark VII exploder and a thunderous roar shook Berlin as thirty-five tons of explosive detonated in the Tiergarten Flak Tower. Four great columns of smoke shot vertically up and a gigantic wave of smoke and dust eighty feet high burst outwards in all directions from the walls, concealing the tower as the smoke and dust spreading upwards started to form a great cloud in the hitherto cloudless sky. Gradually the smoke cleared and revealed a fallen bastion: the Flak Tower, once the pride of Berlin, had at last been totally destroyed. This demolition was a great achievement because there was a myth that it was indestructible. The Flak Tower which had been built in 1941 and 1942 was a massive six storied reinforced concrete building, 120 feet high by 232 feet square with an

estimated weight of nearly 200,000 tons. The walls were nearly nine feet thick and were strengthened by internal buttresses, the gun platforms at each corner on which a heavy anti-aircraft gun had been mounted were twelve feet thick and the floors were supported by beams ten feet wide and three feet three inches deep. The first attempt to destroy this building had been to use concussion charges of a total weight of 50,000 pounds but unfortunately insufficient explosives of a lower detonation rate were available and although the building was severely damaged it remained standing after the explosion. The demolition problem was therefore aggravated since the entrances had been severely damaged in the first explosion. Final demolition was carried out with bore hole charges placed in the walls, the bore holes being drilled by the use of oxy-thermic equipment where the heat generated was so intense that the concrete literally melted and mixed with molten iron from the lance and ran out of a bore-hole as liquid slag. The resulting explosion collapsed the walls of the tower and dropped the roof down to the first floor level.

#### RE TROOPS BERLIN

In October 1948 the Sappers in Berlin were reorganized as CRE Berlin under Lieut Colonel R C Graham, with DCRE Berlin, and a field troop designated RE Detachment Berlin. RE plant was busily engaged during that winter in keeping the airfields clear of snow. However a partial lifting of the blockade in Spring 1949 allowed 38 Field Squadron to come from the British Zone to give a demonstration of assault river crossing equipment to British Troops Berlin. In April 1950, a further reorganization took place, the CRE, DCRE and the RE Detachment becoming RE Troops Berlin in a combined unit with 8 officers, 86 other ranks and some 300 civilians. It comprised a works services element, E&M detachment, plant unit, engineer stores depot and a field troop and also administered movement, postal and transportation detachments in Berlin. Accommodation was in Smuts Barracks, next door to Spandau Prison which housed the Nuremberg war criminals. The field troop provided engineer support for the Berlin Brigade, and also took its share of internal security duties. In 1951 the works services element became responsible for works for the Civil Control Commission for Germany; thereafter their responsibilities extended to such properties as the British Consul General's house, the British Council Centre, the Norwegian and Commonwealth Heads of Military Missions houses. In 1953 a new deployment plan for British Troops Berlin was drawn up with works estimated at some 4½ million

Deutschemarks. Major works during the whole period included the rebuilding of the Sporthalle beside the Olympic Stadium, to house the combined Military and Control Commission HQ; Smuts Barracks was also rehabilitated.

Two of the main events held each year in Berlin were the Queen's Birthday Parade and the Military Band Display, held at the end of the Berlin Industries Fair. The RE Troops frequently participated in the parade, both in vehicles and on foot, in addition to assisting with the erection of stands and decorations. The band display was held at night and the Sappers provided and manned the floodlights and spotlights for the occasion.

On 1 October 1957, RE Troops Berlin was renamed 38 (Berlin) Field Squadron at a ceremonial parade at Smuts Barracks, attended by the Commander of the Berlin Independent Infantry Brigade. 38 Field Squadron which was in 23 Field Engineer Regiment had been run down as part of the reorganisation of BAOR units and the remaining cadre of one officer and ten other ranks moved, with the squadron trophies, to Berlin to provide continuity for the new unit.

## FIELD ENGINEERS

THE Army strength in Germany ran down from three corps of thirteen divisions in December 1945 to three divisions in 1947 and, by January 1948, 2 Infantry Division remained the only full field formation in BAOR. For the RE this meant that the squadrons in those divisions which disbanded were mostly placed into suspended animation and their manpower absorbed elsewhere. 7 Armoured Division RE provided the basis for the newly formed 1 Engineer Training Establishment at Hameln on the banks of the River Weser while 5 Infantry Division RE reorganised as 23 Field Engineer Regiment; the first, and at the time, only field engineer regiment in Germany, which originated from and remained as 2 Infantry Division RE (2, 5, 38 Fd Sqns, 21 Fd Pk Sqn) with almost the same squadrons as the 2 Division RE in Aldershot in 1939 (5, 11, 38 Fd Coys, 21 Fd Pk Coy). Other field engineers from Germany had returned home, 30 Army Troops Engineers in 1947 followed by 32 Assault Engineer Regiment and 29 Army Troops Engineers in 1948. On formation 23 Field Engineer Regiment found itself dispersed throughout the British Zone but it assembled under its new CO Lieut Colonel A H M Morris at Hameln in December 1948.

2 Parachute Brigade arrived in Germany from the UK in the spring



of 1948 together with 3 Airborne Squadron which went to Hameln. On withdrawal from Palestine, 6 Airborne Division reformed in Germany and was reduced to one brigade group which took the title 16 Parachute Brigade commemorating the numbers of 1 and 6 Airborne Divisions. 9 Airborne Squadron became the brigade Sappers and reformed based on 3 Squadron and the other airborne Sapper units. 9 Squadron's stay in Germany was short; it returned to the UK in 1949 but before then had won the BAOR Rugby Football Cup beating 1 Royal Tank Regiment by 11 points to 3 in the final.

The immediate post war engineer tasks of demolition, disarmament and repair of communications began to give way to a growing need for training as younger reinforcements arrived to replace the older men released on demobilisation, and as emphasis on operational tasks became necessary. The operational role had been neglected under pressure of other priorities; in 1947 a major preoccupation had been forestry when under Operation WOODPECKER large working parties of all arms had been employed, under Sapper direction, to fell timber from the German forests for use by the British building industry. The increasing threat of the Cold War in June 1949 saw the start of a rebuild of strength of BAOR and the first step was the resuscitation of 7 Armoured Division, which was commanded by Major General C P Jones (late RE) from 1951 to 1953. 21 Field Engineer Regiment was raised at Holzminden as the Division's Sappers in June 1949 under Lieut Colonel W C O Phibbs; appropriately the manpower came largely from the closure of the Engineer Training Establishment and its duties were absorbed by 21 Regiment. By the end of 1949, 23 Regiment had moved to the old German Air Force Barracks at Dortmund and 21 Regiment concentrated at Hameln.

The year 1949 saw the first real field training which culminated in a NATO Exercise in 1950 involving the whole Allied Army Group. These were the first large scale peace time manoeuvres which were carried out in occupied Germany with great realism, relying on the traditional acceptance by the German population of military manoeuvres and the good sense and good nature of British regimental officers and men to ensure that no real hardship was caused to local people. The nature of the exercises naturally varied but all had one thing in common: they were designed to train for the one task that would have to be performed if the Cold War turned into a shooting match, that of halting and repelling invasion. Usually training is planned to cover all phases of military operations, but in Germany

training was directed towards military efficiency in one prescribed set of circumstances. Training there brought a paradox: great freedom from physical restraints, but a lack of variety in this overall concept of operation. There was however a wide variety of ideas within this limited plan as to the conduct of operations under nuclear conditions.

With the increased importance of the active role, district HQs with administrative responsibility were set up so that divisional HQs could concentrate on operations and training. 11 Armoured Division was reformed during the autumn of 1950; for Sapper support 26 Field Engineer Regiment was formed at Hameln in November 1950, with Lieut Colonel W H Aylwin as its first commanding officer, and to make room in Hameln 21 Field Engineer Regiment moved to Nienburg. The three divisions in Germany, 7 and 11 Armoured Divisions and 2 Infantry Division, later combined as 1 British (BR) Corps. To provide engineer support at corps level, 11 Engineer Group, was formed at Osnabrück on 1 April 1951, commanded by Colonel F W Houghton and consisting of 37 Army Engineer Regiment (Lieut Colonel B S Armitage) from UK and 38 Corps Engineer Regiment (Lieut Colonel P A Wood) which was raised in Osnabrück. At first 11 Engineer Group came under command of 11 Armoured Division for convenience, but reverted to HQ 1 (BR) Corps after the latter's formation in the summer of 1951. Brigadier H E Pike was the first Commander Corps Royal Engineers (CCRE). It is of interest that his title was CCRE not CE and was in keeping with the theme followed when divisional engineers were organized as regiments. Whereas in the past the CE of a Corps was the engineer adviser to the Corps Commander, the CCRE was a commander in his own right and flew a flag on his car, incidentally, drawing an entertainment allowance for which his predecessors had never been eligible!

In the autumn of 1951 a Canadian brigade group also arrived in Germany to strengthen the NATO forces, under operational control of 1 (BR) Corps. It contained 58 Independent Field Squadron RCE which was accommodated at Hameln with 26 Field Engineer Regiment. Later the Canadian squadron moved to the Canadian Brigade Group area and was stationed in Werl.

During the winter of 1951/52 while the Korean war was in full swing, international tension in Europe increased and a fourth division was added to BAOR. 6 Armoured Division arrived in Germany with 27 Field Engineer Regiment under the command of Lieut Colonel J K Shepherd which occupied a new barracks just outside Minden. Thus by the spring of 1952 1 (BR) Corps had built up to a strength

of three armoured and one infantry division with a strong Canadian Brigade Group under command. The locations of field engineers were:

<u>Formation</u>	<u>Engineers</u>	<u>Location</u>
HQ 1 (BR) Corps	11 Engineer Group 37 Army Engineer Regiment (33, 34, 40 Field Squadrons, 41 Field Park Squadron) 38 Corps Engineer Regiment (61, 62, 63, Field Squadrons, 27 Plant Training Troop)	Osnabrück
2 Infantry Division	23 Field Engineer Regiment (2, 5, 38 Field Squadrons, 21 Field Park Squadron)	Dortmund
6 Armoured Division	27 Field Engineer Regiment (1, 25, 28 Field Squadrons, 44 Field Park Squadron)	Minden
7 Armoured Division	21 Field Engineer Regiment (4, 27, 48 Field Squadrons, 45 Field Park Squadron)	Nienburg
11 Armoured Division	26 Field Engineer Regiment (7, 29, 60 Field Squadrons, 43 Field Park Squadron)	Hameln
Canadian Brigade Group	58 Independent Field Squadron	Hameln

*Notes:* 7 Squadron reformed in 21 Regiment in 1949, transferred to 26 Regiment when the latter was formed in 1950; and 48 Squadron formed in 21 Regiment in replacement.

27 and 29 Squadrons were formed as independent squadrons in 1948 prior to formation of their parent regiments.

38 Squadron joined 2 Division from 5 Division on formation of 23 Regiment.

### PATTERN OF LIFE

From 1952 a regular pattern life in an engineer regiment in Germany began to emerge. The training year could be said to start when the exercise season ended in late October. There followed a general tidy up and the annual administrative inspection, which would include a parade of the regiment and a rigorous inspection of the barracks, and regimental administration. The four BAOR divisions formed a very large proportion of the Field Army and command appointments in BAOR were highly regarded. Partially as a result, and no doubt due to the proximity of other units and formations, service in BAOR tended to become competitive, leading on occasion to excesses. At times the administrative inspection was an ordeal, but most regiments were able to take it in their stride with comparatively little interference to their

other activities. The winter was also the time for individual training with regimental courses for radio operators, drivers, various trades and NCO's cadres. There was opportunity for formal officer training with TEWTs, study periods and signal exercises.

Signal exercises were a popular and effective means of training for HQs. Ostensibly they only employed units and formations in skeleton, but there were, nevertheless, a great many troops on the ground; the lighting detachments of the field park squadrons were invariably required. A divisional HQ might be located in a number of farmhouses on the outskirts of a village, dispersed in the outhouses and cow sheds and heavily camouflaged. In the winter it was frequently cold; sometimes with snow and sometimes with hard frost and clear skies. Blackout and operational conditions were scrupulously observed. In general troops enjoyed these exercises; and preferred the rough and tumble of open air life, in even the worst weather, to the more sophisticated military disciplines of spit and polish in barracks. On the whole, cordial relations were preserved between the British Army and the German farmers even though successions of exercises would use the same buildings. It is recorded that some farmers said that whereas in the days of the Third Reich it was necessary to shut up their girls, it was now only necessary to shut up their geese when the troops arrived. A familiar memory to those who soldiered in BAOR at this time would be the roar of a petrol cooker in a German barn and the homely smell of stew mingling with the smells of the farm yard.

Also during the winter each division staged a study period, conducted indoors at the HQ and attended by senior officers from other divisions and HQ. Great lengths were gone to in stage management and showmanship to produce a worthwhile divisional study period. It could become a personal test of a commanding officer; but generally from a unit commander's viewpoint, attending a study period helped to get to know the staff and other commanding officers, it also gave seconds-in-command an opportunity to run things on their own.

Troop training followed in February and March building up in April and May to squadron collective training in preparation for regimental and formation exercises. But a number of events had to be superimposed by force of circumstances, such as annual bridging camp at Hameln, and the first units had to go to bridging camp in the early spring, when frost and snow were not uncommon. Sometimes the weather was very bad indeed, but the men, working hard and living hard, seemed all the better for, and bore every outward sign of enjoying, it. Bridging camp was usually followed by a bridging gallop which

consisted of a course set so as to cross a number of rivers in succession in a week or ten days. Behind the line of advance there remained the tedious business of dismantling the bridges, cleaning the equipment and sending it back to the depot where it would be required again almost immediately. A high degree of realism was invariably maintained with dimmed lights, blackout and warlike conditions.

Towards the end of summer, manoeuvres were held which were the climax to the year's training. For a national service army some of the operations were most complex; on at least one occasion the River Rhine was crossed by night. The training was on a grand scale and paid for by the Germans out of support costs—a term that covered the German contribution to the maintenance of the forces that defended them from the Russians. Elaborate arrangements were made on these exercises for directing staff, spectators, and the press. Villages of tents and huts were erected and semi-permanent tracks were built by the field units and works services who were reinforced by German works units and direct labour. Realism in training was possible; columns of vehicles proceeded across Germany by night without lights; rivers were bridged; tanks attacked and counter-attacked one another over the rolling plains of Niedersachsen; or, as in 1955, charged in single file into the marshlands skirting the River Elbe where several sank. A spectacular finish was usually made on the last day, often involving a major armoured attack. Sometimes the Soviet Military Mission managed to turn up to witness part of the exercise; they always tried.

After the manoeuvres the C-in-C would conduct a post mortem, addressing all officers in some suitable public building. Praise and blame were meted out to those concerned, who knew thence forward that their military careers were made or marred accordingly. Thus ended a military year in BAOR; but the pace in Germany was great, and a new cycle of training started as soon as the old one finished. It had to: the units were largely composed of national servicemen and the turnover was rapid. At least there were few problems with military dependents. It was particularly in training that the regimental organisation was of value, in being big and having sufficient facilities to run courses properly. An individual field squadron manned by national servicemen always faced difficulties in replenishing itself. Perhaps a snag of the regimental system was the lack of a permanent RE presence at divisional HQ, and to overcome this to some extent, an appointment of GSO2 RE was established in the staff of all divisions, in 1954. However when the regiments broke up in 1958 CsRE were re-established at divisional HQs.

### DUTCH FLOODS

The general pattern of life depicted above was occasionally interrupted. In the early morning of Sunday 1 February 1953, a northerly gale in the North Sea overwhelmed the Dutch dykes and the sea flooded the land behind. Barns, sheds, cottages and even houses of good brick construction were swept away. Many people lost their lives; some by drowning, some by falling ceilings and walls; cattle were drowned in their stalls and many people who escaped died of cold and exposure later. In one village the church bells rang to warn the people, who fled from their houses only to be overwhelmed by the advancing water.

During the night of 2 February 1953, HQ 38 Corps Engineer Regiment was ordered to Holland and by next morning a composite squadron, made up of HQ and one troop of 61 Field Squadron, two troops from 37 Army Engineer Regiment and one troop from 58 Independent Field Squadron RCE, was on the way bringing with them motor tugs from the bridging camp at Hameln. Valuable rescue work was done. Not only were people rescued from their flooded dwellings, but large numbers of horses and cattle were saved. When the water began to subside the stores troop of 41 Field Park Squadron, established an engineer depot at the Hook of Holland with stores made available for both British and Dutch troops. A quantity of Bailey bridging equipment was used as a rapid reinforcement in rebuilding the dykes; and a number of small Bailey bridges were constructed to restore communications.

The danger had passed by 14 February and on 18 February Lieut Colonel P A Wood, CO of 38 Corps Engineer Regiment, with those from units of other countries which had helped during the emergency, had the honour of being received by Queen Juliana to be thanked for the work of the troops who had taken part. The CE BAOR, Major General H H C Sugden who had been appointed Senior British Officer for the emergency was later awarded the Netherlands Order of Orange Nassau.

### QUEENS' BRIDGE

In 1954, 37 Corps Engineer Regiment, which had changed its title from Army Engineer Regiment, commanded by Lieut Colonel A C Lewis, and a battalion of the Dutch Army Engineers constructed a bridge across the River Maas at Well about half way between Grave and Roermond on the site of a bridge built by 7 Army Troops Engineers in 1945. The new bridge was of a semi-permanent military construction of Bailey bridge supported on piles and designed to take

eighty-ton loads. Work had started on the foundations early in 1954 under contract supervised by the Netherlands Public Works Department. 37 Corps Engineer Regiment and A Company 12 Pontoneer Battalion of the Dutch Army moved to the site of the bridge in May 1954, where they were joined by a detachment of 19 L of C Signal Regiment and D Platoon of 121 Company RASC. Each approach was built as a continuous span and was launched up a 1 in 30 gradient into position. In the middle of the river there were two navigation spans each 160 ft in length, both of which were launched, one behind the other, over the top of the west side approach. On 17 July the central spans were across the gap and then jacked down some ten feet into position.

The completed bridge, 1,385 feet long, was opened to traffic by General Sir Richard Gale, C-in-C Northern Army Group, on 3 September 1954, and was named Queens' Bridge as a tribute to their Majesties Queen Elizabeth II and Queen Juliana. Queens' Bridge was dismantled on 8/9 December 1980 after twenty-six years of use having been replaced by a permanent "double cell" concrete bridge opened on 12 November 1980.

#### CONTINUATION TRAINING

The Sappers built a number of other lasting memorials as part of their trades training. These included the porch of the garrison church in Bielefeld, built by troops under instruction in bricklaying and masonry in 11 Engineer Group; and the Napier Cinema, built by 23 Field Engineer Regiment in the barracks at Dortmund. Another task was the lengthening, by means of a plant training exercise, of the glider field at Oerlinghausen to international competition standard. The Sappers involved were provided with all the beer they could drink by the gliding club!

#### RECREATION

There were lighter sides to life and BAOR gave tremendous opportunities for both sport and travel. An annual event was held from 1951 onwards known as "The Osnabrück Games". Two or three days were devoted to a series of knock-out competitions between Sapper units in rugby football, soccer, hockey, tug of war, basketball and cross country. Besides being a great athletic occasion, it also became a social one, culminating in a ball to which distinguished visitors were invited. The Representative Colonel Commandant of the Corps was often amongst the guests, and his attendance was much appreciated.

The regimental organization certainly gave the Sappers a strong position in sports and games and many achievements were recorded. In 1956 for instance, the BAOR swimming and water polo tournament ended with four Sapper teams in the first six; and at Bisley in the same year 36 Corps Engineer Regiment was fourth in the Unit Championships. Several teams reached the finals in BAOR league matches and occasionally a regimental team, having won the championship in Germany, would go to Britain to compete for the Army championship final. In 1956 and 1957, 21 Field Engineer Regiment won the BAOR hockey tournament, and in 1957, 23 Field Engineer Regiment beat the Royals in the association football final in Germany by 4 goals to 3. There was also keen interest shown in other forms of recreation, cycling, skiing, yachting, mountaineering and equitational pursuits including a pack of hounds at Osnabrück; the BAOR Cycling Cup was won by 23 Field Engineer Regiment in 1958. Every year teams of Sappers took part in winter sports at the various Army centres. During the summer months there were frequent cruises and races in the RE yachts in the Baltic or sailing in dinghies on the Dummersee or Möhnesee and there was an annual triangular dinghy sailing match between the Gunners, Sappers and Signals. The British Kiel Yacht Club deserves special mention because it is perhaps unique in owning its own yachts. It was started by RE officers with confiscated German yachts shortly after the war and has been run as a joint service club by RE officers ever since; the appointment of CE BAOR always carried the ex-officio appointment of Commodore British Kiel Yacht Club. Over the years it provided a most important amenity for many thousands of servicemen of all ranks from both BAOR and RAF Germany who have learnt to sail and enjoyed the Baltic from Kiel: the chief instructor for many years was Major Stan Townsend.

In July 1957 a tragic event occurred on a mountaineering expedition when 2nd Lieutenant M P Benner, a national service officer and the son of Brigadier P K Benner (late RE) lost his life in an accident on the Grossglockner Pass in the Austrian Alps. Sapper Philips, who was with him, slipped and was falling; Benner leapt to his aid regardless of his own safety, but was unable to save him; both men were killed and 2nd Lieutenant Benner was awarded a posthumous George Cross.

Another feature was the Nijmegen Marches, an international event held each year in July which attracted participants from many countries. The event was to become an enjoyable means of spreading international goodwill, it was not a competition but the individuals or groups who completed the series of marches received a medal. The



first British Army team to participate was entered by CRE Düsseldorf in 1953, and consisted of a detachment from engineer regiments organised, trained and led by the CRE, Lieut Colonel H R Greenwood, who also won the BAOR High Diving competition in 1953 at the age of forty-three. A number of Sapper teams took part in Nijmegen marches subsequently and some individuals went on to win more than one medal.

#### REDEPLOYMENTS

In the Autumn of 1955, 37 Corps Engineer Regiment went to Cyprus on an arms plot move replacing 35 Army Engineer Regiment which returned to Ripon and was replaced in Osnabrück by 36 Corps Engineer Regiment commanded by Lieut Colonel J H Gillington. The departing regiment marched to the station and the salute was taken by the Bürgermeister of Osnabrück supported by the Chief of Staff and the CCRE of 1 (BR) Corps.

In the following year the Suez Canal was nationalised by the Egyptians and the British Army was ordered to take precautionary measures. A number of units in BAOR were warned for incorporation in an expeditionary force, designated 2 (BR) Corps, under Lieut General Sir Hugh Stockwell, then commanding 1 (BR) Corps. He appropriated a number of his staff including the CCRE, Brigadier M C A Henniker. The Sappers nominated were the Corps Engineers and they were brought up to war establishment strength with reservists in August 1956. The subsequent activities in Egypt are mentioned in Chapter IV of this history but only 36 Corps Engineer Regiment actually left Germany, while HQ 11 Engineer Group and 38 Corps Engineer Regiment suffered a number of false starts and the problems of receiving and training reservists and returning them to civil life; it was a period which was testing for morale. At the same time the Hungarian revolution took place with its vicious Soviet reaction and the combined events caused a much heightened tension in BAOR. In the absence of Brigadier Henniker, Brigadier T H F Foulkes acted for five months as CCRE in Germany.

Because of the Suez Canal intervention there were no Corps or Army manoeuvres in Germany in 1956. Next year 38 Corps Engineer Regiment went to the UK en route for Christmas Island and was relieved by 35 Army Engineer Regiment under Lieut Colonel J D Sturrock which became a corps engineer regiment. 26 Assault Engineer Squadron, by then equipped with both AVRE and flail tanks returned

to Germany in 1957 and was based at Hohn. Its services were in constant demand for exercises and training of all kinds.

The requirement of a capability for sustained resistance to conventional attack before resorting to nuclear weapons called for more infantry. In April 1956, as a result of experiments tested on exercises in 1955 which even the CIGS attended, 11 Armoured Division became 4 Infantry Division by absorbing an infantry brigade from both 6 and 7 Armoured Divisions. In effect it reduced each armoured division to a strength of three armoured regiments and one infantry battalion in wheeled armoured personnel carriers and, under pressure to reduce the total strength in BAOR, another reorganisation was necessary. Opinion at the time favoured a brigade group concept of operations. In the Summer of 1957, 2 Division amalgamated with 6 Armoured Division and in April 1958, 7 Armoured Division became 5 Division. The new Order of Battle of 1 (BR) Corps was (apart from the Canadian Brigade Group) 2, 4 and 5 Divisions with seven brigade groups between them. The divisions were not termed either infantry or armoured; but simply divisions regardless of composition. The effect on the Corps was to break up the field engineer regiments over which much effort had been expended. The regimental HQs were absorbed into the divisional staff with the CRE reverting largely to an advisory capacity. Each brigade group was given its own integral field squadron, and the field park squadrons became divisional troops. The last engineer regiment to be dismembered was 23 Field Engineer Regiment with 2 Division. As has been recorded this was the first to be formed, it had lasted ten years and for six of those years had been commanded by two consecutive Canadian COs who had been commissioned into the Corps from the RMC Kingston, Lieut Colonel J G Carr and Lieut Colonel K H Stevens.

The locations of engineer units in BAOR in 1958 were:

*2 Division—Lübbecke*

CRE—Lieut Colonel E F Kyte  
2 Field Squadron—Münster  
(6 Infantry Brigade)  
25 Field Squadron—Minden  
(11 Infantry Brigade)  
43 Field Park Squadron—Hameln

*4 Division—Herford*

CRE—Lieut Colonel GCS Montanaro  
1 Field Squadron—Sennelager  
(20 Armoured Brigade)  
5 Field Squadron—Iserlohn  
(5 Infantry Brigade)  
29 Field Squadron—Hameln  
(4 Guards Brigade)  
44 Field Park Squadron—Sennelager

*5 Division—Verden*

CRE—Lieut Colonel J R Cave-Browne  
 4 Field Squadron—Fallingb. (7 Armoured Brigade)  
 7 Field Squadron—Osnabrück (12 Infantry Brigade)  
 45 Field Park Squadron—Nienburg

*Corps Troops RE—Osnabrück*

11 Engineer Group  
 Commander—Colonel J M L. Gavin  
 25 Corps Engineer Regiment  
 CO—Lieut Colonel H J H. Galford  
 37, 39, 50 Field Squadrons  
 35 Corps Engineer Regiment  
 CO—Lieut Colonel J D. Sturrock  
 16, 30, 42 Field Squadrons  
 65 Corps Field Park Squadron

*Corps Troops RE—Hohne*

26 Assault Engineer Squadron

## ROYAL CANADIAN ENGINEERS

The Royal Canadian Engineers worked in such close cooperation with the Corps in Germany that a short account of them must be given here. From the end of hostilities until it was withdrawn in June 1946 a Canadian Army Occupation Force remained in Germany. In December 1951, as part of Canada's commitment to NATO, a Canadian brigade group returned and was placed under command of BAOR. 58 Independent Field Squadron RCE was sent to Hameln and was relieved in 1953 by 2 Field Squadron RCE which later moved into newly constructed accommodation in Werl and was replaced by 1 Field Squadron RCE in 1955, who in their turn was replaced by 4 Field Squadron RCE in October 1957.

In the early days of Canadian participation in Northern Army Group, works services were carried out by the RE, but when the Canadian Brigade Group occupied their permanent area, a Canadian works section assumed control and 31 Canadian Works Section was established in Soest in May 1952 under the CRE Paderborn. In 1957 work on the Canadian camp was reduced to maintenance only, the works section "was reduced to nil strength" and maintenance personnel were absorbed into 2 Canadian Independent Brigade Group.

## SURVEY

The monumental task of keeping the fast moving Armies supplied with survey data and maps from Normandy to the Baltic had required a large effort by the Survey branch of the Corps. At the end of the war, there were four field survey companies, six general survey sections, five map reproduction sections and four field survey depots.

By 1948, these had been reduced to two units, 14 Field Survey Squadron at Minden and 3 Army Field Survey Depot at Bielefeld under the technical control of AD Survey HQ, BAOR, Lieut Colonel J F F. Lathbury. Both units were considerably under strength and,



General Sir Edwin L Morris KCB OBE MC, Chief Royal Engineer  
1951-1958



RE Officer cadets undergoing fieldworks training using hairpin shelters designed for protection in nuclear conditions

RE Officer cadets on platelaying instruction at Longmoor



RE Officer cadets



South face before the blow

#### The Berlin Flak Tower demolition

South face after the blow (note how the whole building has dropped as a result of the collapse of the bottom floors)

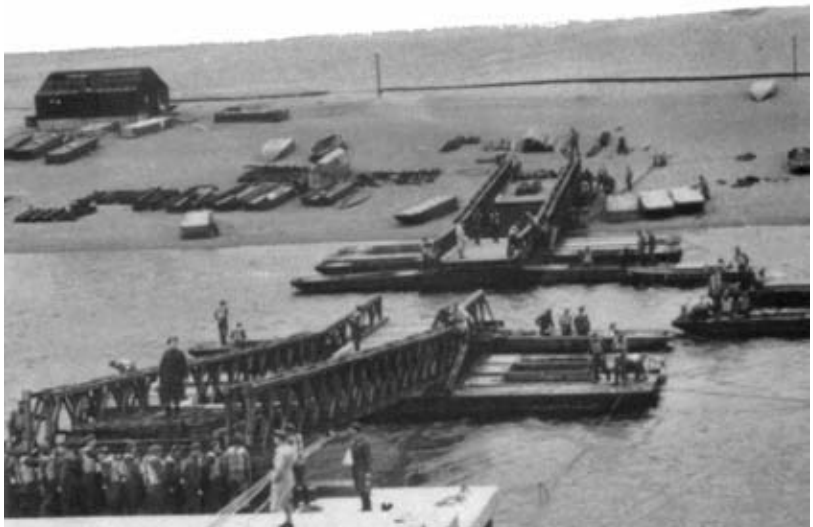


The Berlin Flak Tower demolition



**Flood - Netherlands in 1953**

**Chesil Beach 1947**



partially to offset this, a number of German civilians were employed; some on administrative duties in both units, but the majority were employed in operating the German printing press of J C Meyer in Bad Oeynhausen. Initially this was a detachment of 14 Field Survey Squadron but in 1951 it emerged as an independent unit, as Survey Production Centre RE (BAOR). The British staff comprised the OC and a WO2; by 1952, there were some 100 German civilians, most of whom were technicians. Both 14 Field Survey Squadron and 3 Army Field Survey Depot were under strength for all the period covered by this Volume, and the introduction of peacetime establishments in 1951 had no effect on this. Due to restrictions in manpower ceilings, the strength of the squadron averaged some eighty all ranks, the depot fared little better, operating on a military strength of some thirty all ranks, until 1958 when it was increased to forty-five.

14 Field Survey Squadron undertook a series of moves during this decade and without its mobile printing it would have been hard pressed to maintain any reproduction capability. In 1949, it moved to Bielefeld; in 1950, to Lemgo; in 1953 to Dortmund, where it shared Napier Barracks with 23 Field Engineer Regiment, and in 1958 to Mönchen-Gladbach. Bearing in mind the reduced strength, it was an achievement even to keep its equipment and vehicles in running order let alone to achieve production and survey work. The Squadron carried out a wide range of field survey tasks including large scale surveys of barrack areas and ranges, revision of mapping and support tasks for the Royal Artillery and the Royal Air Force. With the Survey Production Centre carrying out bulk printing, the Squadron undertook the majority of requirements for exercise maps and overprinting and other special printing.

3 Army Field Survey Depot remained in Bielefeld throughout the period covered by this volume. Although the main depot was in Bielefeld, East of the Rhine, there were sub-depots to the West at Willich and Herentals. The former was closed in December 1956, and in 1958, a Northern Army Group Depot was established in Belgium. Over 50 million maps were stored at any one time. In the early years, turnover averaged some half a million sheets a month but from 1951 to 1954 the figure rose to 1.3 million as a result of the Universal Transverse Mercator (UTM) conversion programme. During 1952 and 1953 some 700 tons of maps were sent for salvage and by the end of 1958 the turnover had reduced to 600,000 maps per month.

Active participation of survey units in BAOR exercises started in



1950 involving provision of reproduction facilities in the field, map distribution and, to a lesser extent, field survey support. The DOMINATE series of NORTHAG exercises started in 1956 and were held annually during the remainder of the period covered by this Volume, these were designed specifically for survey units and involved other arms only in a supporting role.

The function of the Survey Production Centre RE (BAOR), with its largely German civilian staff, was to produce bulk stocks of maps for the Command and during the period 1948-58 over 247 million impressions were printed. The unit remained in the printing works of J C Meyer in Bad Oeynhausen until October 1956 when it moved into specially built accommodation at Mönchen-Gladbach. There were teething troubles in the new location: machines would not work through faulty installation, the air conditioning systems sometimes produced sub-tropical heat and sometimes arctic cold, and the acid fumes from the plate making department were apt to be recirculated throughout the building. Nonetheless, when the organisation was "costed" by the Royal Army Pay Corps and inspected by the Establishment Branch of the War Office in 1958 it was found to be remarkably efficient and the cost of reproduction was deemed extremely low. Because the unit was manned mainly by German civilians, it presented unusual problems in labour relations, but the fact that a high proportion of the employees elected to move with the depot in 1956 to the new location at Mönchen-Gladbach testifies to the successful solution of these problems.

During the period, two major printing operations were undertaken. One was the change of the grid systems used in the maps of Central Europe from Gauss-Kruger to UTM and the other was the production of Going, and Road and Bridge maps for the BAOR area. Other tasks of note included the production of the maps for Field Marshal Montgomery's two books "From Alamein to the Sangro" and "From Normandy to the Baltic" and 40 million German civilian identity cards. During 1958, printing was undertaken for both the War Office and the German Military Survey Service.

#### WORKS SERVICES

THE static command structure of BAOR suffered a number of changes in the immediate post-war years. In 1946 the logistic support was administered by three corps HQs who also had responsibilities within their territorial boundaries. On disbandment of the one remaining corps HQ in January 1948, divisional district HQs were established,

causing a temporary controversy between the responsibilities of the district CE and the divisional CRE. By 1949 administrative district HQs each with a CE responsible for works services had been established on a geographical basis; however, 2 Division District retained its function until 1950.

At this stage the works organisation was headed by Brigadier D C T Swan as CE BAOR assisted by Brigadier P F Foley as DDW. There were three district HQs, Hamburg (which had absorbed Schleswig early in 1949) CE—Colonel F H T Gayer, Hannover (renamed from Niedersachsen) CE—Colonel A MacG Stewart, and 2 Division District CE—Colonel C D Reed. There were CsRE works in Berlin, Schleswig, Minden, Düsseldorf, Hannover, Dortmund and Hamburg, with seventeen subordinate DCsRE and one independent garrison engineer for the Hook of Holland. They controlled fourteen German artizan groups and three plant groups. These groups were organised on military lines and consisted mostly of ex-servicemen who were dressed in green battledress.

The initial works task centred on the redeployment of the British forces, and the majority of the commitment was met by the rehabilitation of German barracks, but the responsibility extended to the areas occupied by Belgian, Danish and Norwegian occupation forces as well as to services required by the Control Commission. Many diverse enterprises were undertaken; a typical example being the provision in Hamburg of office and storage accommodation for twenty consulates and fifty sponsored industrial firms.

The Berlin Airlift brought additional tasks including work on airfields in the British Zone and arrangements to fly in coal. Other work carried out included building roads, temporary camps and store sheds, laying railway track, providing light for shift working and a variety of ancillary tasks which were mostly undertaken by employing directly enlisted labour at a cost of some £860,000: all projects in connection with the airlift had an operational priority which meant little time for detailed planning.

One of the largest items in the redeployment plan was the construction of the Hohn Barracks at Lüneburg Heath, famous as the place where Field Marshal Montgomery accepted the German surrender, and a former German Army Training area. The village of Belsen, which gave its name to the Nazi Concentration Camp, is adjacent. The accommodation to be provided included four officers' and sergeants' messes, four other ranks' cookhouses, fifteen office blocks and 200 married quarters, in addition there were to be four NAAFI

canteens, workshops, garages, sports grounds, schools, cinemas and the necessary churches. Access to the field firing area had to be provided for tanks by construction of two miles of concrete road. A high pressure hot water system, of considerable technical interest, was installed which served an area  $1\frac{1}{2}$  miles square from one central boiler house with distribution by a three-pipe system laid in concrete ducting. The system catered for two different temperatures, one for cooking and hot water supply; the other, at a lower temperature, for space heating. The size of the project may be judged from the final cost of nearly £2m.

Provision of married quarters was a continually increasing commitment. By the middle of 1950 some 1100 quarters had been provided by the German authorities under RE supervision and 250 quarters were actually under construction but many more were still required. At this time the Germans were persuaded to embark upon a new project known as Operation BUILD. This operation was to provide married quarters planned and built by the Germans themselves on the understanding that if and when they were not required for British families they would be de-requisitioned and handed over to the local German authorities; by the end of 1950 nearly 1200 married quarters had been provided by the German authorities under RE supervision.

The formation of 11 Armoured Division and the build up of corps troops provided a fresh development for works in August 1950. The operation was given the code name "HABITAT". The initial budget allocation was £2½m which was required for priority work to make existing German barracks habitable at austerity standards. At the same time a new works service unit was formed under Colonel R H Havers, known as DCE Niedersachsen, which combined the duties of the CE Hannover and Hamburg Districts. Soon after these arrangements had been made for 11 Armoured Division, warning was given that 6 Armoured Division would be sent to Germany in late 1951. New buildings would have to be provided as few existing German barracks were available. Planning and control for this project was assumed by the CE BAOR with the German authorities being given responsibility. New barracks for twelve major and eight minor units were the first to be built in Germany at post-war scales for accommodation; they consisted of centrally heated hutted camps of standard layout and design. Sketch designs were prepared by the CE's branch and issued to the German authorities who supervised detailed design and all contract procedure.

In September 1951 a further new project was introduced to provide

accommodation for the Canadian Brigade and a Canadian works section was formed to assist. There was one problem unusual to European military scales, the provision of ice-rinks.

#### THE NEW HEADQUARTERS

In 1952 work began on the British Forces Maintenance Area West of the Rhine and project planning also started in July for a new combined Army/RAF HQ. Colonel H Grattan was appointed CE (Special) for this project in August 1952, and preliminary work began in October. A full account of the planning and building of this large HQ complex appeared in the *RE Journals* of March and June 1956, but it would be appropriate to give some record of the extent of the work. There was a main office block 300 yards long by 180 yards wide with three storeys to provide nearly 2,000 offices. There were sixty-five barrack blocks for British military and German civilians, and over 1,100 married quarters, all heated by district heating. There were schools for 720 infants and 400 secondary school children; three churches, two cinemas and a swimming pool to Olympic standards. Playing fields with pavilions were laid down to grass and some 7 million tree roots were grubbed out for these and for open spaces and roads. There were NAAFI buildings, shops, stores and officers' messes with single quarters, five dining halls, an officers' club, clubs for warrant officers and sergeants and for other ranks. The complex was designed to accommodate over 7,000 British and Allied servicemen and a civilian population (mostly German) of about 2,500 for ancillary services; a township of approaching 10,000. The site was the Rheinlandener Wald, a forest of about 1,000 acres without access roads; and great care was taken to preserve trees where possible and to provide a layout of scenic attraction.

The first priority was to lay the permanent roads, water supply mains and to provide electricity to give access and services for building contractors. Twenty kilometres of road had to be built and 1,000 miles of pipes laid for water supply, heating, gas, electricity, sewage disposal and all that goes therewith. All buildings were heated from two large boiler houses supplying district heating through seventeen calorifier stations. The exploitation and development of the water supply was described in the *RE Journal* of March 1957. Colonel Grattan had the gift of water divining and was able to find an ample source of good water for the camp, independent of existing German supplies. Four wells were bored and a water-works erected on site.

An important feature of the project was that it had to be built

quickly since it had to be finished before Germany achieved sovereign status. This was the condition upon which financial approval had been accorded because, after that date, the cost would fall upon the British taxpayer and not on the German support costs. In the event, two years covered the period from the inception of the plan to the completion of the buildings; by any standards this must be judged a creditable achievement. HQ BAOR moved from Bad Oeynhausen to its new HQ at Rheindahlen in October 1954 and established HQ Northern Army Group there.

#### THE CHANGED STATUS

The status of Germany changed in 1954 from that of an occupied country to a sovereign state. Consequently, the nine months between April and December of 1953 saw a number of new works being put in hand. Amongst these were accommodation for a signals regiment at Birgelen, a base workshop at Witter and two more phases of Operation BUILD whereby 11,000 quarters were constructed. In addition NATO funds were used to finance projects for the infrastructure giving facilities to NATO forces: projects approved towards the end of 1953 included anti-aircraft and artillery ranges and tank ranges.

#### THE BELGIAN BASE

Further back in the lines of communication, the advanced base in Belgium had been designed and constructed under Operation GONDOLA. The *Deuxieme Direction des Batiment Militaires* had carried out the work with assistance from a British Engineer Services Liaison Staff, commanded by Lieut Colonel L. I. Jacques. In May 1954, the first CRE Low Countries, Lieut Colonel K. R. Hasildon set up office in Antwerp when the base became operational as part of BAOR. The new post included normal works services while continuing the liaison function during the final stage of construction of the base, consisting mainly of new married quarters. An interesting technical problem arose over the strengthening of the Belgian designed *Maugoy* store sheds following a structural collapse in a Belgian depot. The store shed roof was supported by prestressed bow-string arched girders and these were vulnerable to damage when using fork lift trucks.

#### PROCEDURES

The effective and speedy work done by the works services was a product of financial regulations simplified to a minimum. When

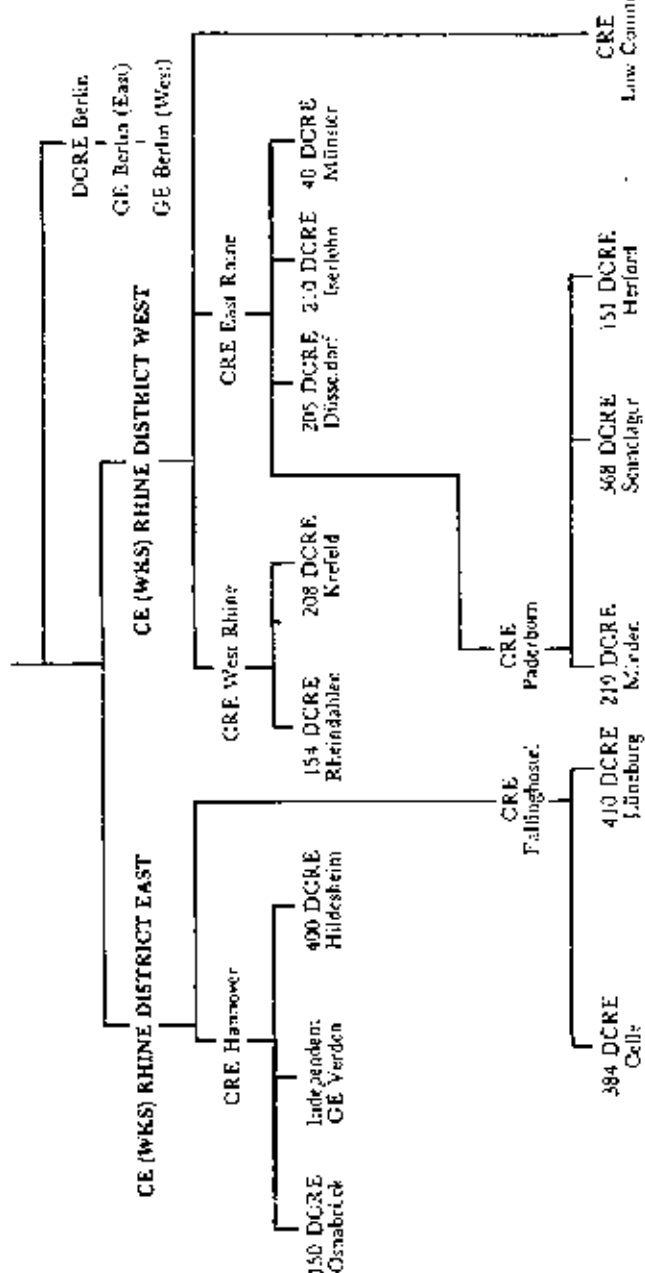
sovereignty was granted to Germany in 1954, the War Office assumed control and standard procedures for accounting for works services began in 1955. The actual date of German Sovereignty was 5 May 1955; a period of eighteen months was then allowed to complete projects financed from occupation costs. The load on the works services in 1954/55 may be gauged from the following figures:

Expenditure 1954/55	£27.7m
Commitments 1954/55	£60.2m
Still to be undertaken	£46.0m

From 1956 a shortage of skilled labour began to make itself felt. Projects previously taking only one year to complete began to take longer and as the new German Army was beginning to form, it too required accommodation. A general slowing up of new projects was evident and due to rising costs some construction of married quarters had to be abandoned to meet the increased costs of those already started. At the end of 1956 the works services were reorganised yet again with a CE (Works) Hannover District, Colonel D W Reid, being responsible for Niedersachsen, Schleswig Holstein and the City of Hamburg, and the CE (Works) Rhine District, Colonel J A B Grylls, being responsible for North Rhine Westphalia. The organisation of RE Works Services in Germany in 1958 is as shown in Figure 1/11.

The reorganisation of the field formations of BAOR started in 1957. Discussions on ways and means proceeded during the Summer and Autumn of that year and preliminary moves began during the Winter; in theory a contraction of forces should involve no extra works services, but in practice operational requirements dictate locations of units and suitable accommodation might not be available there for them. During reorganisation some property was returned to the German authorities, who in return gave financial assistance to relocate British units. By the end of 1958 the majority of moves had been made and the essential works services had been taken in hand. During this period RE Works Services had undertaken projects the like of which, both in size and scope, can seldom have been accomplished previously by military engineers in peacetime. It would be freely admitted by most British soldiers who served in Germany during these years, that they seldom had better conditions for accommodation, training or recreation.

CE COMD (MAJ GEN)  
DEPUTY DIRECTOR OF WORKS (BRIG)



## RESOURCES

DURING most of the period covered by this Volume, engineer resources in BAOR were handled by 40 Advanced Engineer Stores Regiment stationed at Willich near Krefeld on the Rhine. This regiment was formed in January 1952 under Lieut Colonel R R Gregory to bring together the engineer resources and repair units in BAOR which were in various locations from Hannover to Dortmund. The original composition was:

80 Advanced Workshop and Park Squadron	
339 Plant Park Squadron	
1254 Independent Workshop and Park Squadron	
1255 Independent Workshop and Park Squadron	
267 Stores Unit	} both manned by Germans
721 Workshop Unit	

In 1958, when BAOR was reorganised on a brigade group basis, and engineer regiments were broken up, 41 Field Park Squadron was disbanded and its number was given to 339 Plant Park. At the same time 1254 and 1255 Workshop and Park Squadrons amalgamated as 21 Workshop and Park Squadron taking the number from 21 Field Park Squadron transferred from 2 Division. By then the RE Bridging Camp at Hameln had become a responsibility of 40 Advanced Engineer Stores Regiment and its establishment included a RE Bridging Camp Staff and an RE Stores and Bridging Inspection Unit. A "C" Vehicle Workshops REME was in support.

Forward of 40 Advanced Engineer Stores Regiment the engineer resources for corps and divisions were handled through the field park squadrons. Divisional engineer regiments had integral field park squadrons as also did 37 Field Engineer Regiment, but 38 Corps Engineer Regiment was formed without one. In 1953, 65 Corps Field Park Squadron was formed at Hannover from 1250 Workshop and Park Squadron and moved to Osnabrück at the end of the year to support the corps engineers.

## MOVEMENT CONTROL AND TRANSPORTATION

ALL Movements staff and detachments in Germany, Berlin, Austria and Trieste came under the control of HQ BAOR, where there was an AQMG (Movements), Lieut Colonel E C Easter. During the period covered by this Volume virtually all movement of troops and freight was by surface means, air travel was little used. The troop



route was by sea from Harwich to the Hook of Holland and then by rail across Europe. Up to 1955 the main port for freight was Hamburg after which Antwerp was used. In 1952 the British advanced base had been set up in Belgium and movements personnel were allocated there. Movement control detachments were disbanded when the British troops were evacuated from Trieste in 1954 and from Austria in 1955.

After IIQ BAOR moved to Rheindahlen in 1954, the appointment of Colonel Q Movements was upgraded, in 1955, to that of Brigadier Q Movements; which became DQMG (Movements) the following year.

Each administrative district as well as the subordinate IIQs in other countries had its own movements staff and movement control detachment responsible for the administration and co-ordination of rail movement, in their own areas, under control of the movements staff at HQ BAOR. In early 1958, the system was reorganised to be administered direct from HQ BAOR, through movement control areas. The movements organisation at the Hook of Holland, Antwerp and Berlin was not disturbed, nor was the movements liaison staff (civilian) which continued to work alongside the Dutch and German railways. A particular movements responsibility was the military train which was run nightly, in each direction, between Berlin and Hannover, and had a permanent staff comprising: an officer commanding the train, an interpreter, a signaller for the radio which was carried, and a military train guard. A special military freight train was also run to Berlin, every three weeks or so, and transported the general maintenance requirements of the Berlin garrison.

The general run-down of forces in Europe reflected on the movements organisation which reduced to six area HQs and seventeen movement control detachments as well as one military forwarding organisation depot. Troop movements to and from BAOR had reduced from an average of twenty-one sailings per month in 1956 to twelve in 1958.

Transportation Sappers had been employed re-establishing German railways and ports as well as running them. It was, however, not difficult to hand over the responsibilities to the local authorities and to recruit German labour to man the military units. A rapid rundown of British troops had reduced, by the end of 1947, the RE Tn units in BAOR to 2 Railway Construction and Maintenance Group, 3 Railway Operating Group and 250 Port Operating Group; all under the technical direction of a DD Tn, Colonel J H Anderson, on the staff of CE BAOR. By then a number of the Tn minor units were

manned by either German ex-servicemen, the German Civil Labour Organisation (GCLO) or the Civil Mixed Labour Organisation (CMLO). In March 1948, 2 Group disbanded, and the remaining 3 Group commanded by Lieut Colonel P D G Buchanan had under command, 254 Railway Operating Squadron running military trains to Berlin, 348 Railway Operating Squadron running the Himminghausen to Herford railway as well as training railway troops, 253 (Polish) Railway Construction Squadron CMLO organising and constructing railheads on airfields for the Berlin airlift. The port force was reduced to 250 (Polish) Port Operating Squadron CMLO controlling military port operations at Hamburg and running a port workshop, and at one stage they were used to assist in railway construction.

As the emphasis on the defence posture of BAOR changed, Tn were involved in moving the BAOR bases West of the River Rhine and setting up depots for the advanced base in Belgium in 1951 and 1952. The advent of the Chieftain tank required specially widened rail flats which had to be adapted and maintained and the rail movement of out of gauge trains carrying Chieftain tanks had to be coordinated. There was also a special C-in-C's train which was a Tn responsibility as were the ambulance trains. In the early 1950s there was also a need to plan the timetables of troop trains to the Hook of Holland and leave trains to the various leave centres in Germany. In 1952 a new unit 79 Transportation Squadron was raised to replace both the railway group and the residual port operating elements. With the formation of NORTHAG a multi-national Tn staff continued to be controlled by a British AD Tn NORTHAG and BAOR, until 1958 when the Germans accepted responsibility for supervision of military transportation matters. During the period the AD Tn was a member of the NATO Civilian Planning Board for European Inland Service Transport (PBEIST).

The majority of transportation functions was progressively handed over to the German authorities except within military installations until by 1958 only a liaison function remained to the AD Tn BAOR, Lieut Colonel G C L Alexander.

#### POSTAL IN GERMANY

THE character of the BAOR postal services in the immediate post war period was shaped not so much by the changes in Europe as by the need to supply relief for the Home Postal Centre where there were severe staff shortages resulting from demobilisation. The relief took

the form of diverting all correspondence for BAOR from the Home Postal Centre and despatching it unsorted direct from appointed civil post offices to the Zone Postal Depot then accommodated in the Poggenpohl Furniture Factory in Herford Westphalia. At the same time a new system of sorting was introduced at the Zone Depot which was based not on the name and arm of service of units, standard practice since the Army Postal Service first began, but on the "number" of the units. For example a letter addressed to HQ 11 Armoured Division was sorted not to a box labelled "Divisional Headquarters" as hitherto but to a numerically labelled box. The idea was an ingenious one and owed something to its originator's knowledge of the layout of old style manual telephone switchboards. The new arrangement made it possible to employ untrained local labour on sorting duties and to accept unsorted mail from the UK for distribution in Germany. Handling unsorted mail overseas was unusual but not unique; it was attempted but abandoned in World War I although it was a regular feature of the organisation during the Boer War and earlier.

Postal services in North West Europe were organised to meet the needs of occupying troops whose role involved little movement. A postal directorate was set up at Bad Oeynhausen and area postal units established in Hamburg, Osnabrück, Berlin and Düsseldorf which were later backed up by units at Hannover and Lübbecke. The focal point of the mail service was the Herford Depot where the inward air and surface mails were received for unit sorting and subsequent despatch to the field post offices served from the concentration points such as Hamburg and Osnabrück. Air mail was flown from the UK to Bückeburg, an RAF airfield some twenty-five miles from Herford, at first by RAF plane and later by British European Airways. Surface mails came through Harwich to the Hook of Holland where they were taken over by a RE postal port detachment and sent on to Herford by military train. There was a sorting carriage on the train and letter mails were sorted and despatched en route for Herford. When the postal numbering scheme was introduced in which each postal zone in Germany was allotted a number eg BAOR 2-Berlin, BAOR 3-Hamburg, air mail was sorted into these divisions in the UK and flown direct to the various concentration points for distribution. The standard of service was then greatly improved but surface mail continued to go via Herford. Distribution within Germany was generally by road although there was a travelling post office on the train which ran from Düsseldorf through Herford to Hamburg.

Outward air and surface mails were sent from the concentration offices in Germany to a number of civil post offices in the UK and a complete range of correspondence originating in and addressed to places in BAOR was exchanged daily between Herford and the concentration points. Surface mail for Berlin was airlifted in and out of Berlin by military aircraft and the lift was continued throughout the blockade. The postal service was also responsible for the distribution of newspapers and the usual range of counter services was provided.

When NATO was set up, forces were redeployed but this made little difference to the basic mail service. It did however mean that corps and divisional postal units had to be resuscitated and army postal units created to serve the areas in which support troops were stationed. Eventually the reorganisation led to the move of the Postal Directorate from Bad Oeynhausen in the forward area, to Rheindahlen with HQ NORTHAG and HQ BAOR. It also involved the move of the Zone Depot from Herford to Düsseldorf. It is a matter of congratulation that the Poggenpohl factory was returned to its owners in 1957 in such good order that not one penny was claimed for damages.

With the movement of the main distribution point for mails from Herford to Düsseldorf the pattern of the internal services changed somewhat and the travelling post office now ran over the route from Mönchen-Gladbach to Hannover and put off mails at Duisburg, Dortmund, Hamm, Herford and Minden for collection by the postal units of 1 (BR) Corps and the associated divisions, at Herford, Hilden, Lübbecke and Verden. Some stationary offices were also served from the travelling post office. Incoming mails from the UK were little changed except that in 1957 the Home Postal Centre took over the responsibility from the civil post for mails for BAOR. This arrangement made for a slight improvement in standards and the postal service once again became characteristically unobtrusive, unnoticed unless something went wrong.

## CHAPTER III

### AUSTRIA AND TRIESTE

AUSTRIA—RE Troops in British Troops Austria (BTA)—the Rundown.  
TRIESTE British Element Trieste Force (BETFOR)—Evacuation.

IN 1948 there were British Troops stationed in Austria and Trieste. To understand their roles it is necessary to recall the recent history of the area.

Until the end of the First World War the Austro-Hungarian Empire included much of what is now Yugoslavia and some of Northern Italy; in 1919, the Empire was split up. Several independent states were created and Italy received some territory. The peninsula of Istria was claimed both by Italy and the new state of Yugoslavia for geographic and ethnic reasons, the main towns were inhabited by Italians and the hinterland by Slavs. The peace conference awarded Trieste and Pola to Italy but Fiume (Rječka)<sup>1</sup> to Yugoslavia, though Italy subsequently occupied the whole peninsula. Austria, deprived of its empire proved unstable and was occupied by Germany in 1936; the so called *Anschluss*.

In the Second World War, German and Italian armies over-ran Yugoslavia where they were actively opposed by resistance groups and the whole country was eventually liberated by the partisans under Marshal Tito. In May 1945 both the British Eighth Army and the Yugoslav Fourth Army arrived almost simultaneously at Trieste. Marshal Tito was clearly determined to occupy the city and its surroundings as a first step to claiming them for Yugoslavia. However the British and American Governments were unwilling to allow this, or to agree that the future of the area should be prejudiced before the Peace Conference. There followed a confrontation which resulted in the withdrawal of the Yugoslavs in June 1945 from the city of Trieste and the division of the hinterland into a British/US Zone (Zone A) and a Yugoslav Zone (Zone B)<sup>2</sup>. Austria, at much the same time was divided into British, US and Russian Zones, with Vienna jointly occupied. A French Zone was created later.

The British troops in Austria came to be known as BTA; those in Trieste as the British Element Trieste Force or BETFOR.

### AUSTRIA

IN the division of Austria the British occupied the southern provinces of Carinthia and Styria, round Klagenfurt and Graz; the French, the Austrian Tyrol round Innsbrück; the Americans, upper Austria round Salzburg and Linz; and the Russians occupied the remainder. Vienna, like Berlin, was under four power control, an enclave in Russian occupied territory with permitted routes of access. Unlike Berlin, however, there was in Vienna throughout the occupation a single Austrian government for the whole country; a Socialist-Conservative Austrian Coalition was able to present a united front to the four occupying powers—a very considerable patriotic achievement. The city was divided into four national and one international sector, and the chairmanship of the Allied Control Council changed each month with a full-dress guard-changing ceremony and a diplomatic cocktail party given by the outgoing chairman. Local relations with the Russians were surprisingly friendly and they used even to bring their ladies to these official functions.

The western end of Austria is mountainous and forested, except where the Glöckner, Tauern and other big ranges lie above the tree line; towards the East, the mountains give way gradually to the Central European Plain. The climate is continental, hot enough for drill uniform in summer; but snow and ice are continuous from December to March, lakes freeze and the double doors and windows fitted to most houses are necessary. It was the most easterly of the "Western" countries and attracted a continuous stream of refugees from Czechoslovakia, Hungary and Yugoslavia, who had to be rounded up, screened, interrogated, fed and sent on their way avoiding, if possible, swelling the numbers of displaced persons in Austria, already almost more than the country could manage.

In 1948 Vienna was beginning to emerge from the aftermath of war and to reassert herself as the gay city of the Blue Danube once more in spite of shortages of food, clothing and luxuries. The British High Commissioner, Sir Harold Caccia, lived in Vienna, while the British troops were commanded by a GOC with his HQ at Klagenfurt. V Corps of Eighth Army, with 6 Armoured and 78 Infantry Divisions had occupied the British Zone, but all that remained were three brigades left in Styria, some corps troops and the Eighth Army badge which became the BTA badge. BTA was supplied by rail from

Hamburg with troops and mail travelling to and from the UK over the Mediterranean Line of Communication (MEDLOC) route, Harwich-Hook-Cologne-Munich-Villach.

#### RE TROOPS IN BTA

The rundown of troops had left an engineer element for works services maintenance only, not designed for field training or operations, although it was occasionally required to do both. Initially the two divisional CsRE, with responsibilities for works were left accountable to a staff officer at HQ, junior to both. This did not work, and a single CRE BTA was formed in January 1948, Lieut Colonel JAB Grylls being appointed. His units at that time consisted of: 376 Works Section in Vienna, 291 Works Section in Klagenfurt responsible for Carinthia, 373 Works Section in Graz as DCRE Styria; and 980 Engineer Squadron in Villach. There was also an independent stores section in Villach with sub-stores in Vienna and Graz. A Movements Staff under an AQMG consisted of five officers and sixteen other ranks; and the Movement Control Pool (Austria) held a further twenty officers and other ranks. 154 Railway Operating Squadron was located at the key rail junction of Villach, in the northern end of the Tarvis Pass where the lines for Vienna and for Italy divide. An Army Postal Detachment was responsible for the delivery of mails. Survey units had left Austria in 1946 leaving behind a map store under control of G Operations staff in HQ BTA.

The Austrian State Treaty was continually imminent. Works funds were parsimoniously doled out quarterly; no long term works planning was possible, and the state of maintenance of the Army's accommodation went from bad to worse. The RAF for the most part used the airfields at Schwechat, in the Russian Zone outside Vienna, Zeltweg and Thalterhof (Graz). Maintenance of buildings was carried out for them as an agency service by CRE BTA, and in general sufficient funds for this purpose were forthcoming. The maintenance of Allied Military Government buildings in Vienna was carried out by CRE BTA as an agency service on the Foreign Office vote. The bulk of the agency service work fell on 376 Works Section in Vienna.

There was a very comfortable leave hotel for British officers and their families at Maria Worth on the Worthensee in Austria, available to BETFOR as well as to BTA; it was alongside a golf course and not far from the Kanzel Mountain above Sattendorf. The ascent was in three stages: firstly in a cable-drawn sleigh, then on skis, cable assisted, and finally in buckets on a ski lift, a terrifying contraption which

whisked one straight up the steep mountainside three thousand feet in eight minutes. The former SS barracks at Lendorf, just outside Klagenfurt had been converted by the Sappers into a first class base hospital serving both BTA and BETFOR, and did a roaring trade in compound fractures during the skiing seasons,

The closing for financial reasons of the Mountain Warfare School at Mallnitz in 1950 provided an unusual Sapper task, since it became necessary to find a "no cost" alternative school. This was provided by the German Army training centre at Schmeltz in the mountains above Judenberg, served by the longest personnel-carrying cable railway in Europe, over five miles long which became a Sapper responsibility; the works services gave it a thorough overhaul, replaced the moving steel cable that hauled the skips, replaced some of the old wooden pylons with steel ones, and arranged double clutches on all personnel skips. The railway consisted of a double line of fixed load-carrying steel wire rope, strung from T-shaped pylons of timber or steel, on which travelled skips slung from double pulleys running on the fixed cable and hauled by the moving power-driven cable to which they were clutched. Passengers travelled in cable cars like the open tray of a matchbox, up hill and down dale, jolting over the cable supports at the pylons and still more over the main cable joints, hoping that the joints were sound, that the pulley would not jump off and that the main steel wire rope would hold together at least for this one ride, particularly when swinging in the biting wind, looking vertically down through half a mile of clear air on to rocks and sharp pines below. If one were privileged to travel with Wilhelm Kuntner (the Garrison Engineer whose toy it was), one was revived with a good stiff shot of "Cable Railway Water" at the top: the ubiquitous slivovitz (Plum Brandy). Over the next five years this Sapper railway carried thousands of troops of both BTA and BETFOR to Schmeltz for winter warfare training and field firing with many amusing (and some irritating) incidents but no casualties. Judenberg at the summit was a communist stronghold, and local co-operation was only ensured by permitting the railway to carry beer for the hamlets surrounding the summit station.

All this time the Austrian State Treaty remained on the edge of agreement but without being signed. There was growing impatience and hardship for the Austrian house owners whose property was requisitioned, and for the British families who had to live in houses they knew they could only retain from month to month. It was therefore proposed to use the credits from the sales of military equipment to the Austrian Government at the end of the war, which were blocked until



the economic situation should improve, to provide married quarters, thus helping both sides. The quarters were designed to War Office specification, very tight in those years of economy, but also to Austrian building laws and with the help of an Austrian architect; they had double doors, double windows, and parquet flooring, which in Austria, a land of timber, was cheaper than imported linoleum.

In 1950, the allotment of funds for works was changed from a quarterly to a half-yearly basis. It was a step in the right direction but it was scarcely designed to encourage long-term planning, however, advantage was taken to improve the somewhat primitive sanitary facilities in all British troops' barracks. The Austrian Public Works Department, *Bundesgebaudeverwaltung* for short, was induced to take a more active share in the maintenance of what had been Austrian Army barracks; but they would not touch German Army property for fear they might lose it under the terms of an eventual peace settlement with Germany. The funds voted by the Austrian Parliament for this purpose were no more than a token, but helped to eke out the inadequate allotments from the War Office. Extensive repairs were carried out by the Sappers to the runway at Schwechat in order to permit its use by civil airlines of the world. The Russians did not entirely approve, and since the airport was in their zone, they were in a position to make trouble, which they frequently did; and it became necessary for the airport bus to be provided with an armed military escort.

Also in 1950, 980 Engineer Squadron in Villach was redesignated 110 Army Troops Squadron. One of their last tasks as an engineer squadron was to build an observatory on the top of the Gerlitz Mountain near Villach. It was designed by two RE officers and provided excellent training for all ranks; unfortunately one Sapper driving a D8 bulldozer up the mountain was caught in a blizzard and drove off the path to his death. The completed observatory was handed over to the Austrians in the presence of the British High Commissioner and C-in-C, and of Dr Atkinson from Greenwich Observatory.

Two transportation events were of much interest: first, the military rail link from Austria to Trieste was replaced by a road coach and trailer; the second concerned the rolling stock which made up the MEDLOC train to the Hook of Holland and back (about 1,500 miles). Forty coaches were adapted as sleepers for the troops, who were fed enroute in dining cars attached to the train—and fed very well. For the average old soldier, accustomed to the rigours of military travel by rail, the MEDLOC route became equivalent to crossing the Atlantic

in RMS *Queen Mary*, he arrived in Austria or Trieste prepared to go on enjoying himself—a good frame of mind in which to arrive. Conditions had not always been so Rolls-Royce; early in 1948, according to Lieut Colonel H E M Cotton, “there were no dining cars at that time but there were two stops between the Hook of Holland and Villach which were known as bath and meal halts. One of these was in the middle of the night. We leapt out to warm showers installed at the station, had a meal, and entrained again with a haversack ration to last till the next “B and M halt”. Special MEDLOCs were run for the boarding school children coming out to join their parents in Austria, Trieste and Belgrade. The coaches which bore the BTA badge, the old Eighth Army Shield, carried well over a million passengers in their time without a single casualty. Some of the MEDLOC sleepers originally reached the Continent as hospital coaches for the British Liberation Army in Normandy, most of them were subsequently running on British railways in 1959 as cafeteria cars.

The MEDLOC route proper terminated at Villach, Vienna was served by a military night sleeper. Sleep was broken at the Russian checkpoint on the Sammering Pass where the train was boarded by Russian frontier guards armed with tommy guns. This discomfort ceased later on when the passengers obtained “grey cards” from Movement Control and these were shown to the Russians by the Austrian guards without disturbing the passengers. The GOC BTA had a special train which used to belong to King Peter of Yugoslavia. It was well appointed and he made much use of it to get round his extensive command. Major General Sir T John W Winterton (GOC BTA) handed over to Major General M M Alston-Roberts-West in 1951, and became the C-in-C in Trieste.

In April 1951, the field and works troops of 342 Army Troops Squadron from Trieste came to BTA for watermanship training with the better BTA equipment. A bridging camp was established on the shores of the Ossiachersee, a large lake near Villach, but since there was insufficient equipment to bridge right across the lake, training was limited to rowing, rafting and pier construction. 110 Army Troops Squadron at Villach was reduced and redesignated, yet again, Workshop and Park Troop (Austria). It became outstanding at all sports and games in spite of its small size and its ski team was particularly noteworthy. 11 Field Squadron arrived by sea from Hong Kong via UK in June 1951, in response to repeated appeals for a Sapper field unit in the face of the worsening international situation. Having been detached from a regiment, it lacked a park troop and 110 Army Troops

Squadron provided the missing element with evident consideration for athletic ability as well as for trade qualifications. The squadron was located at Zeltweg and at once began operational training. The remnant of Workshop and Park Troop (Austria) was yet again redesignated as Engineer Workshop and Stores (Austria).

Lieut Colonel H L Chesshyre relieved Lieut Colonel J A B Grylls as CRE Austria in 1951 and almost simultaneously for the first time, works funds were allotted annually, a practice that was to continue until the end of the occupation. This enabled a longer view to be taken of the works programme, and although funds remained inadequate to the end, better use could be made of them as planning works was not done under pressure. In addition to the normal works vote in sterling, there were agency services for the RAF and for the Foreign Office to be accounted for annually by 31 March. There was also a "schilling budget" covering the new housing; and a British Government Vote for maintenance of Austrian-owned barracks to be accounted for annually by 31 December. A fluctuating exchange rate would have been the last straw; but the Army was spared this and all transactions involving exchange were carried out at seventy-two schillings to the pound sterling.

On the eve of Remembrance Sunday 1951, an unprecedented storm hit Southern Europe, snow blocked the roads, telegraph wires were broken and the railways of Austria were brought to a standstill. SOS messages went out from many districts, often by means of the railway telegraph system, the other lines being down, asking HQ BTA for help. Remembrance Sunday services and ceremonies were cancelled and for three days troops of all arms were out with shovels and snow ploughs working to reopen communications; much of this work was under RE direction.

376 Works Section in Vienna was disbanded in August 1952. The OC went home, and his 2IC became Independent GE Vienna, responsible direct to CRE BTA for all works and other engineer matters in the British Sector of Vienna. All works in the remaining British Zone of Austria fell to the lot of DCRE 291 Works Section operating from Klagenfurt. Meanwhile 11 Independent Field Squadron had built the Radkersberg International Bridge connecting Austria with Yugoslavia over the River Mur, formally opened by the Austrian Federal Chancellor, Dr Figl, on 6 September 1952, in the presence of the CIGS, Field Marshal Sir William Slim and Lieut Colonel J M Guyon, who had taken over as CRE, with a guard of honour provided appropriately, by the bridge builders.

In November 1952, 11 Squadron took part in Allied manoeuvres with the French and United States forces in the Salzburg area. In seven days there was snow, frost, hail, sleet and much rain. It would be hard to conceive more miserable weather, but the Squadron acquitted itself well under these difficulties and many useful lessons were learned the hard way. On return to Zeltweg the unit had hardly time to turn round before finding itself involved in the BTA winter manoeuvres, where the same lessons were put into effect and some new ones learned. The unit's performance on this occasion drew rare praise from the GOC at the final conference. In July 1953, 11 Squadron went to bridging camp near Trieste on the River Timavo, a very welcome change, since it had borne the burden of all station administrative and security duties as the only combatant unit in Zeltweg for over a year. On return from bridging camp in September it was told that it was to leave for UK in December. It travelled by a special MEDLOC train on 12 December with a Sapper headboard for the engine. the CRE bet the OC that the squadron would not reach Chatham with the same headboard; he received a signal on 16 December to say that it had.

### THE RUNDOWN

About this time the Russians suddenly and unpredictably announced that they were reducing their garrison in Austria, and invited the other occupying powers to do likewise. It was a foregone conclusion that they would agree; nevertheless the instructions to do so arrived with a high security grading. The CRE found himself holding a conference with all his GEs to tell them to stop certain works immediately without being allowed to tell them why. The garrison was to be reduced to one battalion at Zeltweg with one company in Vienna and a minimum of supporting arms and services under a small HQ was to remain in Vienna. On 10 December 1953 Engineer Workshops and Stores (Austria) was disbanded, having outloaded something like 20,000 tons of stores to various destinations nominated by the War Office, and on 29 December the RE Officers' Mess in Villach closed.

In January 1954 the opening ceremony took place of the second block of flats to be completed as married quarters in Klagenfurt bringing the total for Styria and Carinthia to 147, of which sixteen in Spittal had already been handed back to the Austrians, and twelve in Villach would shortly follow. In April the garrison was cut down to its final size of one battalion with minimum support. The Sapper component consisted of DCRE (Austria) with three GEs for Carinthia,

Styria, and Vienna together with a total of about forty other ranks who had to meet the operational commitment as best they could. The DAT's duties were assumed by a staff captain in 1954 with a transportation maintenance troop at Villach to maintain the MED-LOC rolling stock; by 1955 the Movements Staff had shrunk to fifteen all ranks and the Movement Control Pool (Austria) to forty all ranks.

In May 1955, the Austrian State Treaty, which everyone had been awaiting for ten long years, was suddenly signed but was not in fact ratified until 31 July—giving until the end of October for the occupation troops to leave. Graz and Zeltweg were cleared first; the Radkersberg Bridge was sold to the Austrians *in situ* at full "vocab rates". The last troops left Vienna in September, and the last MED-LOC train with the British remnant left for the Hook on 5 October 1955. The Russians evacuated their Zone faster than the Western Allies and it was possible at the end of the occupation to motor freely in what had been the Russian Zone; it was clear they had wasted no money on the maintenance of buildings in the territory occupied by them. Austria regained her independence and freedom from foreign occupation.

### TRIESTE

THE littoral of the Free Territory of Trieste<sup>3</sup> was not unlike that of the French or Italian Rivas, approaching along the coast road from the head of the Adriatic at Monfalcone where white villas were visible scattered across a steep brown and stony hillside, studded with olives and Mediterranean pines above a blue sea, small white villages huddled together as if for protection. The long narrow hinterland of the territory lay mainly on a stony scrub-covered plateau some hundreds of feet above the sea, menaced on two of its three sides by Yugoslav frontier posts, manned by scowling and ill-clad sentries behind barbed wire, on every road and track.

About one third of the boundary of the Trieste enclave consisted of sea, and this fact coloured the lives of the inhabitants and of the occupying forces. All the babies were brown as berries, British and locals alike, and swam like fish from the age of five. The summer was warm and pleasant, sometimes too hot in August, while winter was distinctly chilly with an occasional two or three day spell of the Bora (Boreas of Classical times), a violent and cold north east wind with speeds up to ninety knots.

Lieut Colonel J M Guyon visited Lieut Colonel H E M Cotton,

the CRE in Trieste in 1949, and his description vividly portrays the scene.

"In March I visited Trieste, and joined the military bus in Villach. The skill and élan were marvellous with which the Italian driver swung his heavy coach and trailer down the twisting mountain road through the Tarvis pass, which roughly divides the Dolomites from the Karawanken. As we dropped down the Southern slopes of the Alps towards the head of the Adriatic we passed from winter into spring, stopping for refreshment at a little wayside trattoria, where the food and wine were cheap and good, and finally drove along the fast, coast road from Monfalcone into Trieste. Henry Colton gave me a royal welcome and sent me out next day in a small and agile vehicle with an officer guide to tour the frontier and visit points of interest. At all road and track crossings we encountered scowling and scruffy *fug* guards, whose fingers were never far from the trigger, and I was advised to take no chances. We stopped for *elevesnes* and were served excellent coffee and *panini*, white as snow, whiter than any bread one could buy in England at that time".

#### BRITISH ELEMENT TRIESTE FORCE (BETFOR)

There was an Allied Military Government in Trieste in 1948 with, as Governor and C-in-C a British General, Major General T S Airey, who lived in Duino Castle. The Trieste Force consisted of British and American troops. The American GOC lived in Miramare Castle, which was at one time the home of Emperor Maximilian of Mexico. BETFOR retained as its badge a modified version of the XIII Corps sign and consisted of a brigade group without heavy weapons, all that remained of XIII Corps of the Eighth Army. The Sapper element consisted of a CRE with appropriate staff; there was a stores depot titled 50 RE Dump located on the Scale Legname (or Timber Wharf) and later in the Gasoline Factory, with engineer stores to the value of some £200,000; 342 Army Troops Squadron was responsible for works, maintenance of essential services in the City, as well as for operations. Licut Colonel E W Denison was CRE Trieste in January 1948, his office was in the Villa Necker, once the home of Napoleon's Josephine, and from there he controlled 342 Army Troops Squadron and 50 RE Dump, a title much resented by military purists. There was a small Movements Staff, 26 Army Post Office and a Transportation Element in the Allied Military Government Hq. The broadcasting station was run by Captain E H Wolfe RE. The supply route in Trieste from the UK was partly by sea through the Mediterranean

and partly by land, over the MEDLOC route, to Villach and thence by road to Trieste. The mail route was by RAF Mosquito aircraft from London to Vienna, a journey of three hours which enabled letters to be distributed to the troops in Austria next day and in Trieste on the following morning. The sum allotted by the War Office for maintenance of buildings was only £5,000 though a further unspecified sum was provided by the Allied Military Governments.

In March 1949, the CIGS visited Trieste, including an informal inspection of 342 Army Troops Squadron. In April 1949 a larger allotment for works in the shape of £10,000 for Part II services and £88,000 for Part III became available making it possible for the first time since the beginning of the occupation for the CRE, Lieut Colonel Cotton, who had replaced Lieut Colonel Denison in 1948, to make plans for the future. Another visitor in June 1949 was the Chief Royal Engineer, General Sir Guy Williams, who left this message; "I thought that the Sappers under your command were in good heart and the plans that you have for their training during their stay in Trieste will stand them in good stead. Please tell all ranks under your command that I was well satisfied that the best traditions of the Corps are being maintained in Trieste and that I wish you all the best of luck."

During June 1949, 342 Army Troops Squadron was struck off works in order to train itself and the three infantry battalions' pioneer platoons in field tasks. In September 1949 on the completion of their field training, 342 Squadron went out on an exercise with 24 Infantry Brigade, to practise clearing a withdrawal route. In the same month the landing ship HMS *Dieppe* called and was used for an exercise; she beached high and fast, and dozers of 342 Squadron were used both to make the ramp usable as an exit for the wheeled vehicles on board, and finally to refloat her. In this month also some badly needed plant spares were obtained from BTA, and American generating sets were changed for British, which called for transformers to match them to the town supply. In August, 1949, 50 RE Dump was renamed "Engineer Stores Depot Trieste".

In October a visiting landing ship offered the opportunity for a landing exercise on Sistiana beach where all 24 Brigade vehicles embarked. 342 Squadron acquitted themselves well, and CRE BET-FOR received the following letter from General Airey, "Would you please congratulate Major Butcher and all ranks on the fine work done by the Sapper beach parties during Exercise AJAX. The keen and alert way in which the Sappers tackled their heavy job throughout the nights of the landing was most noticeable. The fact that their work

was not only noticed by me but also by the officers of the Royal Navy, senior American officers and the Press brought considerable credit to the British Army here."

In May 1951 the E-in-C, Major General A D Campbell, visited BETFOR and agreed that 342 Army Troops Squadron should form a proper field squadron for operations, and any surplus manpower should join the CRE (Works) establishment. Since the Italians had granted landing rights on their bank of the river Timavo, which here formed the frontier of the Free Territory with Italy, he also approved the issue of 350 feet of bridging equipment for training. Consequently 66 Independent Field Squadron RE was formed from 342 Army Troops Squadron in October 1951, but in order to keep within the RE slice of the treaty limit of 5,000 men, it was only possible to form two field troops for the squadron instead of the usual three.

Meanwhile NATO had begun to develop and the HQ for Southern Europe had opened in Naples with a Land Forces HQ in Verona. Both BETFOR and BTA, and particularly their engineer staffs, started to become increasingly involved in operational plans for defence and withdrawal from their exposed salients should such a contingency arise. "A Fall Manoeuvre" took place in October 1951 in which the British and American garrison had to become temporarily operational, even though the British Military Governor and C-in-C stood aloof. The American Commanding General formed a joint operational HQ with a mainly American staff known as BRUSTAC (British/US Tactical Army Command). BRUSTAC commanded an American regiment and 24 British Brigade Group while the BRUSTAC Engineer exercised technical control over an American combat company of engineers and over 66 Squadron. Manoeuvres inevitably involved fighting up or down the strip of land between the sea and Yugoslavia and the troops got to know it pretty well.

On 14 November 1951 a warning order was received that the Po Valley was in danger from flooding. The River Po tends to behave like the Yellow River in China, its channel filling with silt above the surrounding flood plain; the villages, with wisdom of experience, are all on high ground and the flood is usually contained within the flood banks. On this occasion however, the river had burst the flood banks and an area the size of the county of Surrey was flooded to an average depth of twenty feet. A reconnaissance was sent off immediately followed by 2 Troop of 66 Squadron. On 18 February a British HQ was established in Rovigo by the CRE, Lieut Colonel A H G Brousson, and was manned until the end of the operations. The immediate task



was saving life, and it was estimated that about 500 lives were saved by military action, the high military vehicles could often get through deep flood water where the civilian transport could not. The next task was restoration of communications, as soon as the falling floodwater made this possible. Tracks, flood banks, and railway lines were used by the vehicles as well as roads. The task was first-class training for the new squadron. An interesting by-product was the collapse of communist prestige locally, in the face of the evident efficiency of the "brutal imperialists" in helping all who needed it. The operation ended in December with the presentation of a statuette of the Lion of St Mark, the emblem of the province of Venezia Giulia, and the Star of Italian Solidarity, Second Class to the CRE as relief force commander, and the publication of the following Special Order of the Day on 22 December 1951<sup>4</sup>:

"On the return of 66 Independent Field Squadron Royal Engineers from Rovigo I wish to congratulate them and all those of other units who worked with them on the excellent work they have done during the past month in helping the Italians to overcome the damage done by the flooding of the River Po. They have had to work long hours in uncomfortable conditions, but they have the satisfaction of knowing that they have saved many lives and much property, and have earned thereby the gratitude of the Italian people."

Gradually the amenities of a peacetime military garrison were acquired; there was plenty to do off duty. For those with an urge to travel, Venice was only 100 miles away and the Dolomites and the Dalmatian coast were not very far distant. Throughout the winter the Sappers ran a bus every weekend to Sappada for skiing and in the summer the British Sailing Club was well patronised. All normal games facilities were available though the football grounds were devoid of grass. Trieste was a lovely station and an exciting place; politics and tempers were apt to run high and the threat of riot, never far below the surface, caused periodic emergencies. The RN paid regular visits to the port of Trieste and inter-service liaison was fostered. The field squadron undertook normal training, taking part in spring and autumn manoeuvres with the British and American forces, and since the GOC BETFOR was also C-in-C, the CRE was liable to be nominated as CE of the combined British and US Army engineers, the latter consisting of a combat company and a maintenance company. Combined engineer training was carried out periodically and 517 Combat Engineer Company was introduced to British wet bridging equipment on the River Timavo after the arrival in May 1953 of the

equipment approved by the E-in-C a year previously; the equipment was off-loaded at sea, formed into a large raft and towed by tug to the mouth of the river where it was split into four smaller rafts and motored up river under its own power. The wherewithal was provided by both CRE BTA and CRE BETFOR to set up a permanent bridging camp for BTA and BETFOR Sappers, for assault pioneers and for demonstrations. Considerable efforts were made to produce an adequate camp even though no one knew at the time that the occupation was drawing to a close and that the camp would only be used once.

The British highlight of events in 1953 was the Coronation and in BETFOR the Sappers took the right of the line at the Coronation Parade on 2 June as all available Gunners were involved in the firing of the salute. During July and August the three infantry battalions, each accompanied by a detachment of 66 Squadron went to Schmelz in Austria for field firing since the BETFOR area was too restricted for such training. An unusual situation arose during September when 66 Squadron was set a bridging exercise across the River Timavo close to the Yugoslav border. Although landing rights had been granted by the Italians, they had not been approved by Yugoslavia, and the far bank party had hardly touched down before they were surrounded by unfriendly Yugoslav soldiery. The officer in charge kept his head and the incident ended in smiles and exchanges of cap badges.

## EVACUATION

On 8 October 1953 it was announced that British and US forces would evacuate the territory as soon as possible. The Yugoslavs immediately announced that they would not accept the handing over of the whole of Zone A to the Italians. In November the threatened rioting occurred and in the course of it a Sapper truck was cornered by a crowd, overturned and set on fire while the occupants took refuge behind the shutters of a flower shop.

The Movement Control Staff of BETFOR and BTA worked overtime to clear the families to UK by rail. The bulk of the stores in the ESD were railed to BAOR. The British Sailing Club boats, after being offered to BTA, were sold. The troops were expecting to depart at any moment when it slowly became clear that another political dispute was developing, and it was not yet safe to go. The garrison settled down, without its families, and without much of its equipment and amenities, to wait with such patience as it could muster, and to continue to work at training and operations. Works Services operated on very restricted finances because of the uncertain tenure of occupation;

most of the work was maintenance, this being particularly heavy after storm damage. Allotments of funds were doled out monthly by the War Office, and were supplemented, unknown to the War Office, from local Allied Military Government grants. Most work was carried out by directly employed labour; some contracts were let, but language and other difficulties did not favour their extensive use.

On the 5 October 1954, the final evacuation was announced and put into operation at once. The OC 66 Field Squadron, Major J P Asher, was detailed to demarcate the new boundary between Italy and Yugoslavia which would remain after evacuation. So within ten years, three boundaries had been drawn by three Sappers—Warth, the original “Morgan Line” between the Yugoslav and Anglo-American Forces; Calvert, the boundary of the Free Territory; and Asher, the final boundary. The garrison was thinned down to two British and two US Battalions. The remainder went by rail to Germany during October 1954. It was appreciated that the last moments of the occupation would not be easy as the Italians and Yugoslavs waited to squeeze out the small wedge of British and US soldiery that held them apart, and surge forward to the new boundary. So it was sensibly decided to pull the wedge out quickly by sea as well as by rail.

On 14 October, 1954, the advance party of 66 Squadron departed to Crickhowell by MEDLOC; on 22 October, the motor transport set off in one of the longest peacetime moves by road on record to BAOR, continuing to Wales by rail and ship; on 23 October the main body of the squadron went home by rail; on 26 October the OC embarked in HMS *Centaur* for Malta, whence he was flown to UK on 30 October followed by 2 Troop on 6 November.

Thus ended a nearly ten year stay by British troops in one of the most enjoyable peacetime stations of those years. The work had been interesting, the climate good, sports and games were plentiful and all were sorry to leave. The local civilian employees of the British remained loyal to the end and there was mutual grief when the last farewells were said.

#### FOOTNOTES TO CHAPTER III

1. The figure of Winged Victory, a fine trophy in the RE Headquarters Mess owes its origin to the dispute over Fiume. It was designed in Italy as a presentation by the Italian Government to American President Wilson, but the Italians were so displeased by his attitude over Fiume that they decided not to present it. In 1985 Lieut General Sir Clarence Bird, then aged 100, was asked about his own memory of this affair. He recalled that Major P C S Hobart heard of its availability through the British Military

Attaché and bought it as a War Memorial trophy for the RE Mess in Roorkee (India). In 1947 at the time of Indian independence the Indian Sappers very generously presented this piece of silver to the Headquarters Mess at Chatham.

2. The original map showing the "Morgan Line" dividing the allied forces occupation zones is in the RE Museum at Chatham. Lieut Colonel C E Warth RE was largely responsible for its demarcation.

3. The international boundary developed from the Morgan Line was largely the work of Lieut Colonel J M Calvert RE when serving on the staff of HQ BETFOR.

4. A less elegantly worded contemporary despatch reads: "Major Chambers distinguished himself on the Po."

## CHAPTER IV

### THE MIDDLE EAST

STRATEGIC CONSIDERATIONS. EGYPT—The Canal Zone—The British Garrison 1948-1951—Utilities—RE Organisation and Units—Abrogation of the Treaty—RE Tasks in the Emergency—Evacuation of the Zone. OPERATION MUSKETEER—The Suez Landing—Engineer Tasks—The Port Said Public Services—Follow up Evacuation. LIBYA Aftermath of War—Geography—Events to 1956—British Army Presence—RE Activities—Training Areas—The Blue Plan—Unit Redeployments—Reactions to MUSKETEER—Effects of MUSKETEER CYPRUS—The New Base—Dhekelia and Episkopi—Kissoua Pipeline—The Troubles Begin—Grivas—Deployment Camps—EOKA Campaign—Cyprus and the Suez Crisis—Final Phase of EOKA—The Jordan Crisis—Tailpiece. JORDAN—Aqaba—The Royal Hashemite Railway—Arab Legion Engineers—Dismissal of Glubb—British Army Exercises in Jordan—1958 Crisis. SOUTH ARABIA—Aden Yemeni Involvement in the Aden Protectorate Growing Importance of Aden Oman—Buraimi Oasis Muscat and Oman British Support—Jebel Akhdar. MALTA GC. GREECE. THE SUDAN. MAPPING THE MIDDLE EAST

#### STRATEGIC CONSIDERATIONS

THE end of the Second World War saw a large Middle East Command consisting of some half million British, Dominion and Colonial troops, in five major and three minor commands in the area of the Mediterranean, Africa and Arabia. The General Headquarters and a major administrative base was in Egypt. Command of the Middle East Forces was vested in the British Defence Committee (Middle East) whose members were the C-in-C Middle East Land Forces, the C-in-C Middle East Air Forces, Flag Officer Middle East and a Political Representative of Ambassador status. The five major commands were: British Troops in Egypt, Palestine and Transjordan; Persia and Iraq; North Levant which included Cyprus; and the Sudan; the minor commands were the Dodecanese, Cyrenaica and Tripolitania. The Imperial garrisons withdrew during 1947 from Persia, Iraq and the North Levant countries except from the RAF Station at Habbaniya in Iraq where treaty rights were retained; Malta came under the Middle East Command in 1947 and was made responsible for the

ex-Italian colonies in Libya. East Africa was also placed under command in 1947 and Ceylon the following year.

The massive military base built up in Egypt held quantities of weapons, ammunition, vehicles and engineer and ordnance stores, estimated to be worth some £100 million, apart from the cost of the infra-structure, and it also had a local labour force, some with technical skills, which had been developed by the Army. A study made in 1947 forecast that complete evacuation from this base would take from six to nine years. The 1936 Anglo-Egyptian Treaty which was due to run until 1956 had allowed the right of full occupation of Egypt in war, but only permitted the stationing of 10,000 troops and an air force of 400 pilots once hostilities had ended, in a zone of occupation along the banks of the Suez Canal. But many of the British installations were outside the Zone laid down in the Anglo-Egyptian Treaty; and what became known as the Canal Zone was not the same as the Treaty Zone.

Shortly after the end of the war the Egyptians started to press the British Government to evacuate the major part of Egypt. As a first step the War Office was instructed to plan for a move out of Cairo and the Delta to the Canal Zone by 1 September 1949 and that the Egypt garrison would be 10,000 troops and the Palestine garrison would be 40,000 troops by that date. The vast quantity of stores could not be returned to the United Kingdom because of lack of storage space and in general they were not of a type which had civil use. Furthermore, it was appreciated that a Middle East base would have to be re-established in time of war and therefore retention of stores would have strategic advantage; additional storage space was also required for the reserve stocks being removed from India. A reconnaissance in East Africa in September 1947 selected Mackinnon Road, some fifty miles inland from Mombasa, as the only site suitable for development in the time available. It was never suggested that East Africa should become an alternative base for the Middle East but a decision taken in the War Office was that it would become a stores holding area. Planning was also started for a new cantonment for 8,000 troops in Libya.

By 1948, when emergency planning for the defence of the Middle East oilfields against attack from Russia became necessary, the military importance of the area had become more generally recognised by the British Government and it was clear that there was no alternative to Egypt as an established base with port facilities, internal communications and available local labour. It would be throwing away the benefits accrued from much expenditure in the Canal Zone if it were

GHQ MSLF

TOTAL RETROGRAD. — 15,110

East-C. M.E.L.F. (M.A. Gen)

D. Mov. and Tr. (Brig)

DDW (Brig)

D. Svy (Brig)

British Troops Egypt

Palestine and Transjordan

CE (Brig)

1 Arm'd Div RE  
1 Inf Div RE  
6 AB Div RE  
62 CRE (Wks) South  
63 CRE (Wks) North  
64 CRE (Wks) South  
65 CRE (Wks) South  
RE: 1st Bn Nabata  
one AW Sqn  
three E and N Sgns  
one Rd Const Sqn

AD Svy (Lt Col)

one E.C. Svy Sqn  
one E.C. Svy Depo.

Canal Postal Sect

one Rly Op Sqn  
one Rly Const Sqn  
one Rly Wharf Sqn

Svy

19 Fd Svy Regt  
Fd Svy Depo  
GHQ Svy Sqn  
one Fd Svy Sqn

Canal Postal Sect

Tr

4 Port Op Group  
three Port Op Sgns  
one 2 Crd Sqn  
one Port Alarm Sqn  
147 Crd Wharf

Rly Wharf  
one Rly Const Sqn

Tr Sgns

CE (Brig)

55 CRE (Wks) Canal  
South  
56 CRE (Wks) Canal  
Central  
57 CRE (Wks) Canal  
Central  
58 CRE (Wks) Canal  
Central  
RE: 1st Bn Nabata  
Eng. Plant Depo  
Quaisstar  
Comd E and M Pool  
CRE Production

one BK, thirteen AW Sgns  
two E and M Sgns  
one Army Eng Sqn  
one Mined Clearance Tp

Cyprus

87 CRE (Wks) Cyprus  
RE Wharf and Sgns  
Cyprus

Crete

20 CRE (Wks) Saboteur  
one AW Coy  
BD increment to BEG

L of C. Canal Unit

Iraq

30 CRE (Wks) Baghdad  
one E and M Sqn

Q. Min. and Tr. Sgns

Sudan

SDF  
SDF Eng. Depo.  
one Fd Sqn SDF

British Forces Admin  
Army one Cdn. Regt RA

Malta

CE (Col)

CRE (Wks) Malta  
one For. Sqn  
Wks Sgns Malta

193 CRE (Wks) Benghazi  
two AW Tps (three four  
Coy)

one Mined Clearance Group  
three Mined Tps  
one Working Coy

Comd Postal Unit

East Africa

CE (Brig)

CE Nabata (Col)  
CRE (Wks) East Africa  
1202 CRE (Wks)  
one Eng. Sqn  
one Fd Coy (E.A.)  
one AW Coy

CE Makhin Road (Leb)  
one Army Tps Sqn



Queens' Bridge over the River Maas at Well under construction, July 1954





Class 9 Folding Boat Equipment Raft



Close support Raft

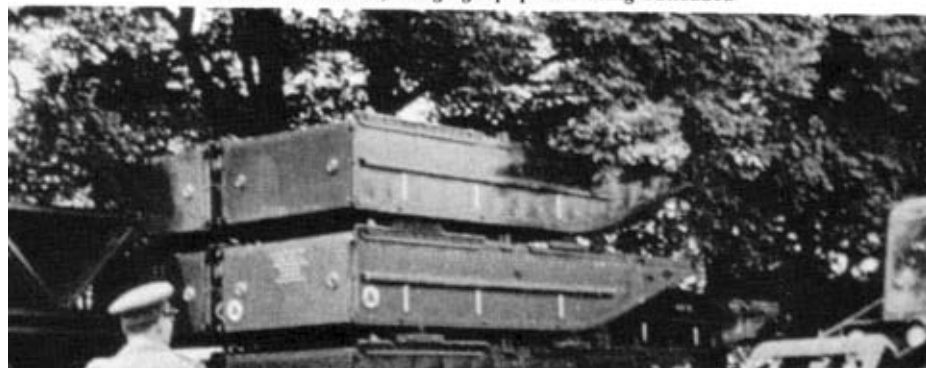
Training at Hameln 1953



**Minelaying train in action, laying Mk VII antitank mines**  
*(Courtesy of the Trustees of the Imperial War Museum)*

1

**Resources in the field, bridging equipment being outloaded**



**Minelaying Train**



Joint Headquarters at Rheindahlen under construction, July 1953

to be evacuated; there was no comparable place to replace the facilities particularly since Palestine was no longer available after the creation of the State of Israel; and it would take an unacceptable length of time to re-establish the Canal Zone base in an emergency, once evacuated. Under the circumstances Mackinnon Road was no longer required.

The state of affairs was, however, unsatisfactory to Egyptian politicians smarting from the results of the 1948-49 Arab-Israeli war; they became disenchanted with the time taken for the British to reduce their forces to Treaty levels. Disagreement over the future of the Sudan provided another abrasive to Egyptian sensitivity and, even though the British troops had withdrawn to the general area of the Canal Zone, negotiations for a new treaty were long drawn out and difficult. During the critical years from 1950 to 1953 the C-in-C MELF was a Sapper, General Sir Brian Robertson.

Eventually after various political adventures there was a total British withdrawal from the Middle East, except Cyprus. In retrospect it might be commented that it would have been cheaper to abandon everything and evacuate the area in the first instance; but it is impossible to judge what the results might have been. Apart from colonial and mandate responsibilities, Britain was the dominant power in that part of the world for a number of years. The effects of a sudden vacuum might have been catastrophic.

## EGYPT

THE area to which GHQ and the British Forces withdrew in 1947 and 1948 was bounded, on the East by the Suez Canal and on the West by the Nile Delta. From Port Said in the North to the southernmost British installation on the Gulf of Suez was approximately 100 miles; the most westerly installation was the huge depot and workshop complex at Tel-el-Kebir, about fifty miles from the Canal. The area was therefore roughly triangular in shape and (a point that had some operational significance) divided the Egyptian Army in the Sinai desert from their bases in the Delta. The area became known as the Canal Zone.

### THE CANAL ZONE

In general the gravel and clay soil in the area was fertile enough when irrigated but barren and waterless parts made up most of the zone; there were considerable areas of sand dunes. The climate was extremely hot in Summer with occasional hot winds (*Khamsins*) and dust storms

which made life unpleasant; but the Winter months were comfortably warm. In the South was a range of barren hills between the British camps and the Delta; the northern part was flat and narrowed to a strip of land, known as the causeway, running between the Canal and Lake Manzala for 25 miles from Kantara to Port Said.

The Suez Canal was a combination of canals and lakes. The northern half was canal and ran from Port Said to a small lake at Ismailia, called Lake Timsah from which another short stretch of canal led into the Great and Little Bitter lakes in the area of Fayid and Kabrit; from there a longer stretch of canal continued down to the gulf at Suez. The lakes provided excellent recreation facilities. The Sweet Water (or Ismailia) Canal was the main support of life in this area. It was constructed by de Lesseps to supply fresh water from the Nile to the workforce on the Suez Canal taking water from the Nile near Cairo, through locks that remained under Egyptian control throughout the period that British forces were in the Zone (another point that had operational significance later). From Ismailia on the Suez Canal, branches of the Sweet Water Canal ran North and South to Port Said and to Suez respectively. This freshwater canal formed a continuous oasis along its length; a green fertile strip with date palms, trees and crops. It was also a busy transport system with feluccas plying between Ismailia and the Delta. The canal was used for drinking, washing and bathing at the numerous villages along the route; regrettably it was also used for waste and sewage disposal. As a result the water was muddy, smelly and contaminated; it also carried the bilharzia snail which caused much sickness to Allied troops during the 1914-1918 War. It was however, the main water source from which to supply a British garrison which eventually rose to about 80,000 troops. The generally low standard of hygiene among local inhabitants coupled with a climate that encouraged fly breeding, made the area prone to disease and one RE task was to provide measures to protect the garrison from infection.

The main towns in the Zone were Port Said, Ismailia, and Suez. Under peaceful conditions the towns were pleasant enough with clubs, pools and other amenities mainly stemming from the Suez Canal Company's organisation. The rail system followed the Sweet Water Canal from the Delta to Ismailia, and thence to Port Said and Suez. There was also a rail system in Sinai along the East bank of the canal and rail crossings had been established at Firdan and Abu Sultan. The public road system generally known as the Canal roads had originally been established by the Canal Company and the Egyptian

Government, and like the railways followed the Sweet Water Canal. In peaceful conditions, British traffic used these roads, however, during the emergency their use by any British vehicle became hazardous unless escorted, and movement was normally confined to the Treaty roads and desert tracks. The Treaty roads had been constructed under the terms of the Anglo-Egyptian Treaty and ran outside the cultivated areas in the open desert. Besides running from the Delta to Ismailia, Port Said and Suez, parallel to the Sweet Water Canal and the Canal roads, there was also a Treaty road from Suez to Cairo which was heavily used by civilian traffic, especially lorries from Suez and the Sinai oil installations. In addition, there was a link from this road up to the Treaty road at Geneifa.

#### THE BRITISH GARRISON 1948-1951

Planning for the move of the British Forces from Cairo and other parts of Egypt had been started in July 1946 under the E-in-C MELF, Major General B E C Dixon, by the DDW at GHQ, Brigadier E S de Brett. The project known as Operation SATIRE was to be complete by the following April, which allowed only three months for planning and six for execution. A scheme was devised to expand existing accommodation, notably at Moascar and Tel-el-Kebir and to build a new cantonment at Fayid for GHQ and its attendant units and families. The CE British Troops Egypt (BTE), Brigadier M Luby, tasked 55 CRE (Works), Lieut Colonel C H R Smith, with the first part and a special CRE (Works), Lieut Colonel A P Lavies, was set up to construct the GHQ accommodation. Much of this work was done by German and Italian prisoners of war, Brigadier Lavies recalls that he had available for the GHQ camps alone, six German artisan works companies and a pool of 3000 German labourers. These provided skilled artisans; later, many of them remained on after their discharge and proved invaluable for the numerous military power stations and waterworks. Italian POWs were mostly employed in workshops; Egyptian contractors and directly employed labourers were also used.

Moascar had been the home of the pre-war garrison, which had included 42 Field Company. It was a large self contained cantonment with stone-built buildings, playing fields, a swimming pool and even a golf course of sorts. Cotton-soil had been laid for gardens and the area had been planted with flame-of-the-forest, jacaranda and blue gum trees as well as grass and garden plants. There was a stone-built church, complete with a tower, and the roads carried nostalgic names such as Bayswater and Old Kent Road, and a number of pre-war

huted bungalows of high quality supplemented the stone-built buildings. There was waterborne sewage, electricity and piped irrigation water to the gardens and even to individual trees. Outside the camp, the town of Ismailia was very close and between these two centres the Army had an attractive club on Lake Timsah where dinghy sailing flourished. It was here that HQ BTE was established. A number of families lived in Ismailia both in private accommodation and in Army hirings, and a large NAAFI shop was opened there. The French and Greek communities each ran clubs which they made open to British officers. Generally it was a pleasant place to be stationed.

GHQ accommodation at Fayid was 20 miles to the South. The area was barren except for a strip of cultivation along the Sweet Water Canal, and the new camps straddled this canal, the two roads and the railway and ran down to the shores of the Great Bitter Lake. Large numbers of huts were constructed for offices, accommodation including married quarters, a hospital, messes, clubs and welfare facilities. A system of channel irrigation was devised and patches of green were established in the camps and quarters with zinnias, oleanders and castor-oil plants; but the lack of established trees, the brown arid ground outside the irrigated patches and the bare hills in the background gave the area a rugged, isolated appearance. A large camp of huted married quarters called Kensington Village (otherwise known as Butlins) was built; even so there was a shortage of quarters. A number of local bungalows in the cultivation along the Sweet Water Canal were rented and many families lived in Ismailia; the husbands travelled to work by a military bus service of converted 3-tonners. A second married quarters village named Gibraltar was also constructed.

There were only a few native shops of low quality, and the Army had to find its own recreation. The Royal Engineers kept on the Great Bitter Lake a yacht, *Meander*<sup>1</sup>, which was extensively used for Mediterranean cruising; sport of many types flourished, and life was by no means unpleasant. When the emergency came in 1951, those living in the more isolated locations found they had a good deal more freedom than had their friends in Moascar.

Similar developments occurred in Port Said, El Ballah, Fanara, Geneifa and Suez. To the West, Tel-el-Kebir and Quassassin were also expanded. The main works in Operation SATIRE were completed on time in April 1947 though a second phase was needed for further development of utilities and additional accommodation. Major General Dixon recorded his satisfaction in a letter to Brigadier Luby. "The task set was a formidable one to say the least of it, and had to be

completed in nine months. This has been achieved. Further, I demanded a very high standard of construction and finish, and this has also been carried out to my great satisfaction".

### UTILITIES

Some of the main problems which faced the RE in the redeployment was adequate provision of water, electricity and waste disposal facilities.

Water had to be drawn from the heavily contaminated Sweet Water Canal, and made potable, besides this irrigation was clearly needed for morale and good living conditions. The filtration facilities were limited, and could not deal with the full load: accordingly, two sorts of water were supplied, "potable" and "irrigation". The latter had no treatment except for passing through a screen to remove the bilharzia-carrying snails, and a discipline to identify irrigation water outlets and to use the water for no other purpose had to be established.

Potable water went through the war-time filtration plants which worked surprisingly well, but which needed shift working and periodic cleaning out. There were a number of these plants, and the labour requirement was large.

Power supply needs were met by installing war-time generators, of which there were a large number in each station; however, small individual stations were not economic. Since there were a number of transformers available it had been decided to construct a central power station of 5000 kilowatt (kW), at 11 kilovolts (kV), to serve the Fayid area. Four rail-mounted 1000kW, at 6.3kV, steam driven sets, originally destined for Russia, were provided from UK, and these were supplemented by four later increased to seven, American Locomotive Company (Alco) 400 kilovoltamp (kVA) sets from local resources. This station was completed in early 1948 and was run by a team of RE, some of whom had received special training at the Metropolitan-Vickers works, ex-POW Germans who ran the Alco station, and a local labour force, including a particularly slim Egyptian whose job was to get inside the steam boiler chambers when retubing was necessary. The four steam sets were housed side by side in a building made up of two Bellman hangars and the Alcos were in an adjoining building, and outside was a tank farm for fuel.

Disposal of sewage presented further problems, and apart from the waterborne sewage disposal at Moascar, processed by a sewage works, many camps had to rely on bucket latrines, while others had trench latrines. Sullage was dealt with in separate plants. However, the health



hazards attending on bucket latrines coupled with the labour problem made it unacceptable, and deep-trench latrines had to be provided in all camps. The medical requirement called for trenches ten to twelve feet deep since newly-hatched flies can bore their way up to the surface through many feet of soil, and each structure had to be robust, lids had to be fly-proof and self closing, and the surround had to be impervious. The trenches had a limited life, and had to be resited periodically. The system was labour intensive both for Sappers and the customers.

#### RE ORGANISATION AND UNITS

The move into the Canal Zone was effected during 1947 and 1948 and was accompanied by changes in the structure of the Command. The appointment of E-in-C was changed to CE MELF in 1948 when the title E-in-C was reserved to the War Office. The works organisation under HQ BTE comprised CRE North at El Ballah, under Lieut Colonel N L Blandford and CRE South at Fayid, under Lieut Colonel P Postlethwaite; plus an independent GE at Aqaba, in Jordan. For a short period in 1951/52, CRE South was split into two, CRE Fayid and CRE Suez; both under Colonel Postlethwaite as CE South. However, this arrangement was discontinued after a few months and the original organisation resumed until the base was evacuated. Sapper establishments located in Egypt included 8 ESD (Engineer Stores Base Depot), an EBW at Fanara, and a plant depot at Quassassin. There was a Middle East SME at Gebel Maryam near Moascar. The Survey Director from 1946 to 1949 was Brigadier H A L Shewell; the appointment was regraded colonel in March 1953. The RE survey units, consisted of 19 Field Survey Regiment which was renumbered 42 in August 1948, 525 GHQ Survey Squadron, renumbered 47 in January 1950, 2 Army Field Survey Depot and a base survey drawing and photo-press office.

Under the Director of Movements and Transportation, MELF, Brigadier G J Bryan, were the movements staff and movement control detachments throughout the theatre, and 4 Port Operating Group commanded by Lieut Colonel J R L Owen. This group disbanded in 1949 and all remaining RE Tn units were formed into the Middle East Transportation Regiment commanded by Lieut Colonel N L Stuart, and consisting of 10 Railway, 53 Port and 169 Railway Workshop Squadrons; there was also an IWT workshops at Port Said<sup>2</sup>. The IWT fleet and the railway workshop were largely civilian manned, a factor that had considerable repercussions when the Treaty

was abrogated. 10 Squadron operated military freight trains on the Egyptian track between Suez, Port Said and Tel-el-Kebir as a training expedient which was to prove of great value later on. It also manned the Adabiya Military Railway while a detachment in Tobruk maintained the Western Desert Railway in Libya using 3-ton trucks with flanged wheels. In addition, a programme to recover disused line was in hand and some track was shipped to the Mackinnon Road Depot in Kenya. 53 Squadron maintained detachments for port tasks at Fanara, Darse Island, Port Tewfik and Aqaba where the silted quay had been cleared using a dragline mounted on a "Z" craft. When General Sir Brian Robertson was appointed C-in-C MELF in 1950 the guard of honour for his arrival was provided by 10 Railway Squadron, exercising their privilege as senior RE squadron in Egypt.

35 Army Engineer Regiment under Lieut Colonel T H F Foulkes moved into the Canal Zone in September 1949 from Benghazi where it had been replaced by 22 Field Engineer Regiment. It had run down to virtually one squadron (62 Engineer Squadron) but was built up again in Egypt and in 1950 all its squadrons were renumbered, 62 became 16 Field Squadron, 64 and 65 became 42 and 30 respectively, and 63 became 18 Field Park Squadron; making the fourth change of squadron designation in three years. The regiment was stationed at El Ballah until it moved in October 1951 to Fayid in an emergency redeployment plan.

#### ABROGATION OF THE TREATY

Seizure of the Anglo-Iranian Oil Company by the Iranian Government in August 1951 and the dismissal of British employees of the Company had fanned the flames of nationalism in the Arab world. 16 Independent Parachute Brigade was sent to Cyprus on stand-by and troops in the Canal Zone made preparations for intervention. MELF was therefore not unprepared when in October 1951, as the oil crisis tension lessened, affairs with the Egyptian Government came to a head with the abrogation of the 1936 Anglo-Egyptian Treaty. The internal security situation became acute, and massive troop movements took place.

Between October and December 1951, 1 and 3 Divisions and 16 Independent Parachute Brigade moved into the Canal Zone. 1 Division RE, 22 Field Engineer Regiment consisting of 3, 17 and 23 Field Squadrons and 6 Field Park Squadron, under Lieut Colonel T H Evill moved to Fayid from Benghazi. 25 Field Engineer Regiment had recently formed in Maidstone as the engineer regiment for 3 Division; it was sent to Cyprus with 39 Field Squadron and 46 Field

Park Squadron, deploying 37 Field Squadron as replacement for 22 Regiment in Libya, and 50 Field Squadron to Suez. By March 1952 the whole regiment was in the Canal Zone dispersed between Moascar, El Ballah and Tel-el-Kebir under Lieut Colonel R C Orgill. As part of 16 Parachute Brigade, 9 Independent Airborne Squadron went to Moascar, moving to Fayid in 1952.

The Egyptians had now become openly hostile, and the RE field units were involved in a number of security operations, with mobile columns from their brigade groups. These comprised the blocking of routes, protecting bridges and ferries against attack, and supporting internal security measures. Preparations were made to protect British interests in the Delta and also to secure the Canal Zone's water supply from the Sweet Water Canal; none of these latter operations materialised. An emergency floating bridge across the Suez Canal at Kilometre 75 South of Port Said was prepared and the closure section was kept ready in Lake Timsah. Camp perimeter protection work was undertaken, minefields were laid and fences strengthened by Sappers around a number of large depots. But the defences were frequently penetrated by stealth, toes being used as detectors: thefts and sabotage of equipments, signal cable, electrical distribution lines and water piping, already a considerable problem in peaceful conditions, increased and became highly organised. Stealing electric power line, always a hazardous operation wherein a man would climb the pole and cut the live cable with pliers "insulated" by sticks to the handles, and which caused at least one Egyptian to be seen racing down the road near Moascar with his *galabiya* on fire, intensified. Lines would be shorted, pulled down with trucks or camels and loaded on to lorries or even, in one case, on a train that ran alongside; and even if the line were patrolled, the thefts continued. Such was the extent of the loss of cable that at one stage a 3.3kV line was erected using barbed wire; Lieut Colonel H G T Harris then OC Fayid and Suez Station commented "Corona effects were interesting at times".

In order to establish the scope of operations, a boundary on which patrolling and military activity could be based was defined. It became known as the "Erskine Line", after the GOC BTE, Lieut General Sir George W F J Erskine. Within the "Line", water supply became an operational problem, and extensive RE appreciations were made of possible effects of cutting the Sweet Water Canal supply. The conclusion reached was that, because of the large civil population and the Egyptian's own operational needs, such action was unlikely; and in the event, did not occur. However contingency plans were drawn up,

and water reconnaissances, both in the Zone and in Sinai, were carried out.

Riots occurred in the main towns. In Ismailia, the main NAAFI was looted and set on fire with families still in the building; fortunately there were no casualties, and the incident was efficiently dealt with by soldiers of the Lancashire Fusiliers. Several murders and attempted murders of British servicemen however occurred. A disturbing factor was the pressure from Egyptian authorities on local labour, of which there were several thousands in the Zone, to leave British employment: and, while a small number resisted and stayed at their posts, most of the skilled artisans, labourers and virtually all the contractors wasted away. Those that remained were considered to be security risks, even the ex-POWs doing valuable work in the power stations. Certain installations were defined as "vital"; these included all waterworks and power stations and no local or ex-POW civilians were allowed access. The situation for dependants became difficult,<sup>3</sup> many families were evacuated to the UK and those who remained had to be within secure areas. The families situation generally at this time was not easy; 22 Regiment for example had left their dependants in Libya while those of the new arrivals to MELF had remained in UK. A few families found their way to Cyprus where their husbands occasionally managed to rejoin them on leave.

#### RE TASKS IN THE EMERGENCY

Apart from the operational and training commitments, two main tasks faced the Corps. Accommodation had to be provided for the increased garrison, and utilities had to be kept going despite the loss of the local labour force. To deal with the first problem, a programme of manufacture of camp structures was started in the EBW and other units, including even GE Aqaba. Initially an incoming unit could be provided with only spartan necessities, latrine structures, some cooking shelters and a few office huts. The next stage of construction provided better facilities with buildings for cookhouses and messes; and there were progressive subsequent improvements, even so the standard was lower than that provided for the permanent garrison. The problem was intensified by an influx of East African, Mauritian, and Seychellois labour and artisan units hastily sent to help replace the wastage of Egyptian labour. These troops not only required accommodation but also had their own special requirements for cooking and latrines. Sapper field units found themselves supporting works services due to the demand for camp construction while at the same time being

required to support their parent formations for training and operations; it was a familiar but never easy problem of serving two masters. 9 Airborne Squadron found an answer by rotating their troops, keeping one troop on building while others trained. Despite pressure of work 9 Squadron succeeded in winning the major units Rugby Cup and were joint winners of the major units Hockey Cup in 1952, a remarkable double for a minor unit.

The second problem, of keeping the utilities going proved even more difficult. Power stations, waterworks, cold stores all had to operate around the clock seven days a week and had to provide for the large numbers. Additional British staff were required to operate the shifts and all Army units, not only RE units, sent any man on their strength of a suitable trade, to the two CRE (Works), CRE North, Lieut Colonel P C M Hingston, and CRE South, Lieut Colonel R L White. About 750 men came from Army units and the Royal Air Force provided over 200 airmen; a number of specialists, particularly for the steam jets in the Fayid Power Station came from the Royal Navy. Thus the CRE (Works) whose normal complement comprised small military numbers became major military units and were therefore reorganised on a regimental basis with a suitable staff including Second-in-Command, Adjutant and RSM. Most of the plant was war-time stock, some of it had already been running for years and spares were difficult or impossible to obtain. At Tel-el-Kebir, the Caterpillar compressors on the main air lift water supply pumps were so old and worn that it was feared that they could not be restarted from cold if they were ever stopped. Many replacement parts for equipment were successfully manufactured by the EBW at Panara.

The behaviour of all ranks from all arms and services on these tasks was of the highest order. Conditions in some of the installations, such as the unsuitable tin shed at Fayid Power Station with several Alco diesels running, were noisy, hot and dirty to an almost unbearable degree. Yet servicemen, mostly national servicemen, worked there in shifts seven days a week.<sup>4</sup> It is also an unspoken tribute to the control exercised by the CsRE concerned that the installations continued to operate. In order to ease the load on servicemen, an attempt was made in 1954 to provide artisans from the UK who became known as 'Red Star Civilians'. Since there was full employment in the UK, the men sent out were often not of the best quality and they had to be provided with accommodation in Sergeants' Messes. It was not a good arrangement, but nevertheless did provide some much-needed help.

Ten officers and 207 soldiers of the AER were mobilised at Long-

moor in October 1951 for dispatch to the Canal Zone together with Regular Army reinforcements for the transportation units. The Transportation Regiment subdivided to HQ Railway Troops Middle East and HQ Port Troops to control the variety of tasks which came their way and which included taking over the entire running of the Egyptian State Railways in the Canal Zone. The hazards of this operation were indicated by the detonation of twenty-eight mines under trains and it became standard practice to run two rail flats in front of the locomotives. Despite reinforcements however the defection of labour hit hard at the repair facilities, and locomotives had to be returned to the UK for repair. The Transportation Regiment was reformed again in 1952 under Lieut Colonel G C L Alexander and continued to run operations until they handed over their tasks to the "Contractors" in 1954. 10 and 53 Squadrons returned to Longmoor

#### THE EVACUATION OF THE ZONE

Throughout 1951-1954 diplomatic negotiations were continuing with the Egyptians, but a decision had been taken in 1953 to build a new base in Cyprus. Such was the volume of stores and equipment in the Canal Zone that it would take years to move, yet the Egyptian Government was pressing for an early evacuation. Eventually a new treaty was signed providing for withdrawal of British troops from the Canal Zone; stores and installations being left behind in the care of British civilian contractors, with the Egyptian Army responsible for their security. This arrangement was implemented, and in 1954 the first civilian contractors arrived.

There followed the depressing period of withdrawal. Main GHQ moved to Nicosia at the end of 1954 and Rear GHQ followed in the Autumn of 1955. 35 Army Engineer Regiment had already departed for Cyprus earlier in 1954 and 22 Field Engineer Regiment had returned to Libya to become 10 Armoured Division RE. It left behind 3 Field Squadron in the Canal Zone as the only field unit, 9 Airborne Squadron having returned to the UK with 16 Parachute Brigade.

Survey Directorate, now with a Deputy Director of Survey, Colonel L J Harris, and 47 GHQ Survey Squadron moved with Rear GHQ. 42 Survey Engineer Regiment moved to Zygi camp in October 1955 and 2 Army Field Survey Depot moved during October to December. The latter's move, involving the transfer of over 100 tons of maps, went smoothly in spite of the unit having its HQ at Polemidhia and its issues detachment at Larnaca. The Canal Zone RE establishments closed down and disbanded as the garrison contracted; the remaining

units converged on Moascar and 3 Field Squadron pitched its tents on Roberts Barracks square there. It did however have a diversion before moving from Fayid when a troop from the Squadron was sent to Aden in support of 1 Battalion The Seaforth Highlanders group from Egypt to mount an operation to Wadi Ain in the Aden Protectorate in April 1956. The last Commander BTE and the last British soldier to leave the country was Brigadier J. H. S. Lacey. As he embarked on an LST from Navy House, Port Said, bound for Cyprus, nearly three quarters of a century of British power in Egypt came to an end.

It was foreseen that the arrangement with the civilian contractors was a doubtful proposition, efforts had been made to ship to Cyprus the more valuable stores and equipments, and a considerable quantity of engineer equipment had been transferred before the moves were stopped on financial grounds. In the event, the misgivings about the new treaty arrangements proved to be justified: when attempts were made, after the evacuation, to order stores for Cyprus, nothing could be obtained out of Egypt. The contractors were powerless to control the stockholdings, and eventually, in November 1956 were evacuated during the Suez Canal operations.

The RE stores left behind amounted to nearly 100,000 tons valued then at £13 million. They formed the main War Reserve for the Middle East and included sufficient equipment for two Class 80 bridges across the River Nile, the Suez Canal or the River Euphrates. Transportation stores could serve railways in Egypt, Jordan, Israel or Lebanon, while the engineer workshop at Fanara was large and comprehensively equipped for major base repairs of all kinds.

So another page in the history of the British Empire was turned. From the RE point of view the last period was notable for the flexibility of the units concerned: field units had become heavily involved in works services, while the works units developed into regimental organisations. The period from a national viewpoint was a sad one; the Corps can be proud of the part it played.

#### OPERATION MUSKETEER

In July 1956 on the fourth anniversary of the deposition of King Farouk, the President of Egypt, Gamel Abdul Nasser, nationalised the Suez Canal Company. The Canal Company's concession had been due to end in 1968 and Egypt was already well represented on the board of management and could have expected full control in a few years, so the act of nationalisation could be seen as a measure of national self assertion following the withdrawal by the USA of financial

support for the building of the Aswan High Dam. Britain had also offered a loan but without US support the project could not be envisaged, and Britain had therefore also withdrawn her offer. The British Prime Minister, Sir Anthony Eden with political memories of the pre-war appeasements of Hitler and Mussolini ordered "precautionary measures of a military nature".

In August, by Royal Proclamation, some 25,000 individual reservists and units of the Army Emergency Reserve were mobilised, and a few days later General Sir Charles Keightley, the C-in-C MELF was appointed Supreme Allied Commander of an Anglo French force with the task of planning intervention. The British Army contribution was to be 2 British Corps under Lieut General Sir Hugh Stockwell then GOC 1(BR) Corps in BAOR and comprised 3 Infantry Division, 10 Armoured Division, 3 Commando Brigade and 16 Parachute Brigade, who were located in the UK, Libya, Malta and Cyprus, as well as certain units from Germany.

General Stockwell selected Brigadier M C A Henniker who was then CCRE 1(BR) Corps in BAOR as his CCRE for Operation MUSKETEER, and on 6 August 1956 Brigadier Henniker moved from Germany to the War Office to form, with a GSO1 RE, the nucleus of HQRE 2(BR) Corps. Within a few days the War Establishment had been prepared and 36 and 38 Corps Engineer Regiments in Germany commanded by Lieut Colonels J H Gillington and R L White respectively were alerted as Corps Engineers and brought up to strength with reservists. An item of significance in the planning stages was engineer resources: for the assault stage the stores required could be foreseen and estimated with reasonable accuracy from intelligence available. They were ordered and loaded in three LCTs which were dispatched to Malta; but the operational plan on which the stores requirement was based envisaged an assault on Alexandria; in the event about half the quantity was needed and was used in Port Said. The requirement for the engineer maintenance of a force ashore was a less complex problem since the nature and quantity of stores would not differ greatly within a theatre of operations; a figure of seventy tons per day for each division ashore was agreed between HQRE 2(BR) Corps and the War Office in August 1956, designed to sustain the engineer effort and to provide defence stores for the force. A reserve of nearly 1,000 tons of engineer stores to be positioned in Cyprus was asked for but not all had arrived before the operation started, fortunately Cyprus already held stocks against a general emergency in the Middle East.



An AD Survey, Lieut Colonel W A Seymour, was appointed for 2(BR) Corps and shared an office in Whitehall with CCRE. Reinforcements were posted to 42 Survey Engineer Regiment and 2 Army Field Survey Depot in Cyprus to enable those units to work around the clock on map production. From August to December as operational planning progressed, the turnover of maps increased from some 100,000 to 850,000 sheets a month. Survey was controlled by the General Staff but co-location with HQRE had advantages in personnel matters.

In similar vein the CCRE had no initial responsibilities for transportation which was to be handled by the Q staff. It however became apparent that the transportation units would lack a focal point once they left Longmoor where the Commandant had concerned himself deeply with their preparation for operations. The CCRE gradually assumed responsibility for these units in all Corps matters and kept an eye on their problems in much the same way as he was required to do with the divisional engineers: technical direction continued to be exercised by an AD Tn, Lieut Colonel G W Shepherd. In order to provide an adequate force for handling ships cargoes 35 Engineer Regiment, commanded by Lieut Colonel J D Starrock, in Ripon, was given a port operating role and was amalgamated with 276 Port Regiment AER to provide squadrons over 400 strong, each with two majors, the AER squadron OC providing technical advice: squadron combinations were 16 and 653, 30 and 655, 42 and 654. The other two reserve port regiments, 81 and 82 were mobilised. 83 IWT Regiment AER was called on to provide only one squadron, 174 IWT Squadron; allegedly the RSM of 83 Regiment was so disappointed that he threatened to burn his uniform.

Other reserve RE units which were mobilised were 323 Electrical and Mechanical Squadron and 119 Works Section, both included staff from Kensington and Chelsea Borough Councils, and 551 Field Survey Depot AER. Postal Section AER reservists were called up to provide adequate Postal and Courier support for the operation and a number of individual reservists brought the regular units up to strength. The Sapper units of the field formations nominated for 2(BR) Corps were placed on a war footing. Regular units alerted for more specialist roles included 8 Railway Squadron, 51 Port Squadron, a detachment from 59 Airfield Construction Squadron, and 1 Stores Section; when the operation started, a new CRE (Works) Port Said was in the process of formation at Barton Stacey under command of Lieut Colonel D E M Ingram who had been appointed in October, but before the unit was ready to leave the UK the operation was over.

74 Field Park Squadron which had returned from Kenya to Ripon embarking in Mombasa on Christmas Eve 1955, had retrained as the field park squadron for 17 Gurkha Division and its advance party was already entering the Mediterranean when the Canal was nationalised. The Squadron was therefore completely ready to move when warned for Suez, however there appeared to be uncertainty as to its required role. After various alarms it embarked in November for Port Said earmarked as 2(BR) Corps field park squadron but was diverted to Malta because by then the evacuation from Port Said had been ordered.

The Autumn was a trying period; most reservists had been called up with little or no notice;<sup>5</sup> they were away from their usual jobs and unable to visit their families. Initially, packing up, loading stores, vehicles and equipment for the docks kept everyone busy. Thereafter as time went by without any move or news it became difficult to maintain interest and even keeping troops occupied and training them with all the equipment packed was not easy. Some of the families experienced domestic hardship. Despite the problems the morale in the engineer units remained generally good and in mid-October leave was approved, but hardly had it been given than action started.

#### THE SUEZ LANDING

Israel attacked across the Sinai Peninsula on 29 October. The next day an Anglo French ultimatum was issued to the two belligerents to stop fighting and to withdraw their forces ten miles from the Suez Canal on either side, but requiring Egypt to admit an Anglo French force into the Canal Zone. Egypt refused; and the Israeli undertaking was conditional upon a positive response from Egypt. The Prime Minister, Sir Anthony Eden announced that Egypt could be considered to be "in a state of armed conflict with Britain and France" and intervention was ordered. However Libya had objected to the employment of any British unit based there; a measure which forestalled the use of 10 Armoured Division. From the Sapper viewpoint it meant that 22 Field Engineer Regiment, except 3 Field Squadron which was in Cyprus, was out of the order of battle. To plug the gap, 37 Field Engineer Regiment, commanded by Lieut Colonel A C Lewis, which was engaged on internal security duties in Cyprus was warned for operations, but it was intended to relieve it as soon as possible by one of the engineer regiments of 2(BR) Corps.

The airborne assault on Gamil Airfield, Port Said, was made at dawn on 5 November by 3 Parachute Battalion supported by 3 Troop, 9 Independent Parachute Field Squadron. The 2nd French Colonial

Parachutist Regiment jumped south of Port Said to capture the twin Raswa bridges and were accompanied by a detachment from 2 Troop, 9 Squadron; the Raswa swing bridge captured intact had to have its handrails cut off to produce sufficient width for Centurion tanks. Initial tasks for 3 Troop included demolition of a bridge West of Gamil Airfield to prevent the movement of Egyptian reinforcements, but in the event it was destroyed by the Fleet Air Arm attack, clearing the runways of obstructions which proved to consist only of forty gallon drums none of which was booby trapped, water supply and general engineer support for the parachute force. 3 Troop commander recalled that RE casualties were light but "tragedy overtook us . . . a Sapper poured the rum ration into his shaving water".

The seaborne assault was made the following day by 3 Commando Brigade with 6 Royal Tank Regiment. Legend has it that at one stage the invasion fleet was led by Z craft, manned by transportation Sappers, who because of the slow speed of the craft, had started early and, off the Egyptian coast preceded even the minesweepers. The sea assault force had been launched from Malta and was joined off-shore by the shipping from Cyprus. 3 Field Squadron with a troop of 40 Field Squadron was in support of 3 Commando Brigade tasked with improvement of beach exits, mine clearance on the beaches and general support in which the main task became assistance with preparing defence positions during the mopping up phase. During the day, 37 Corps Engineer Regiment with 33 Field Squadron and elements of 18 Field Park Squadron came ashore, and Lieut Colonel Lewis assumed the duties of CRE Port Said to coordinate engineer work of all units, except 9 Squadron, the remainder of which came in with the seaborne element of 16 Parachute Brigade.

The Egyptian forces cut off at Gamil in the west, by the French at Raswa in the South and at Port Fuad in the East, had attempted to surrender on 5 November but were over-ruled from Cairo. The Port Said police had distributed Czech rifles and machine guns, with ammunition, to the local population and the Egyptian radio and loudspeaker vans exhorted the citizens to defend their houses, promising Soviet troop support and announcing air attacks on London and Paris; Egyptian soldiers escaping from the Israeli advance in Sinai had abandoned their uniforms and merged with the armed civilians. The task therefore of working through the streets of Port Said, where towering buildings were flanked by narrow side streets, was laborious and slow. Although there was little organised resistance, it was not until after dark on 5 November that Port Said could really be said to

have been captured, even then sniping and sabotage continued. By the evening, fourteen LSTs had unloaded men, vehicles and stores in the harbour and Z craft, as well as the LCT and LCS of the assault force, were unloading ships off-shore. The British armour crossed the Raswa bridge earlier in the day but not until after dark did the break-out to the South by 16 Parachute Brigade start with 2 Parachute Battalion and 6 Royal Tank Regiment, their Sappers riding on the tanks. A ceasefire was ordered at midnight (0200 hours local time) and the advance stopped at El Cap, twenty-three miles down the causeway.

#### ENGINEER TASKS

Since the Raswa bridge had been captured intact, the construction of a Class 60 Pontoon Bailey over the Interior Basin which had been a priority task for 37 Regiment, was not immediately required; the second bridge at Raswa had been damaged but repair was not urgent. Gamil airfield was virtually undamaged. The accumulation of troops in Port Said, who would have to be accommodated there because of the stand-fast, together with the need to take on town administration all pointed to an urgent need for restoration of the public utilities. 37 Regiment and the unbrigaded squadrons tackled the municipal services. 3 and 9 Squadrons were left to support their respective formations principally by clearing mines, unexploded bombs and booby traps including those on the beaches where all mines laid by the Egyptians were to the West of the landing, and removing debris.

Many of the Suez Canal Company officials had remained at their posts but the employees were local Egyptians still under a propaganda barrage from Cairo Radio urging the people to fight, kill and take revenge. It was clear that the support of the Egyptian officials was necessary and Brigadier Henniker made contact with the Borough Surveyor Mr Tufiq-al-Dib who, he recalls was helpful<sup>8</sup>. Liaison with local officials was also achieved by Lieut Colonel Lewis and minor unit commanders. The OC 119 Works Section who arrived by air at Gamil airfield, found that the Head Engineer of the Public Works Department was a fellow Rotarian and as such provided plans for the sewage system. 323 E and M Squadron, the stores, works and airfield detachments were among the first of the follow-up troops to arrive in Port Said on 7 November, and they went straight to work, but with limited effect until vehicles and stores arrived.

#### THE PORT SAID PUBLIC SERVICES

One gallon of drinking water per head had been brought ashore in jerricans for the troops and contingency plans had been prepared to

supply water for the population by ship, however the French had captured the waterworks by the Interior Basin even though distribution mains had been broken. An inspection of the Sweet Water Canal on 6 November had showed that the water level was dropping and it was found that sluices had been opened some miles south; fortunately it transpired that the waterworks manager at Kantara, who controlled the sluices, was the brother of the manager at Raswa and a telephone call solved that problem. 323 Squadron, which had one of its Sappers shot in the stomach by a sniper, took over the waterworks and the water supply thereafter exceeded ten gallons per head per day for both the civil and the military population, despite a constant commitment for repair of the distribution pipes. The possibility remained that the Sweet Water Canal supply might be cut off: but assurances of its continuation were received through diplomatic channels.

The Port Fuad Electricity Station which belonged to the Canal Company was undamaged and continued to be run by its staff. 323 Squadron took over the Municipal Power Station on 7 November; the station, which provided power for the waterworks pumps, was intact, but the distribution lines had been damaged. The town was however lit by the same evening, largely due to some skilled operations on the switch boards.

Sewage quickly became an affair of wide interest. The Port Said system was barely adequate for the civilian population and designed for local habits where toilet paper was rarely used. The pipes were of small bore, near the surface and, with no natural falls, boosted by compressed air, pumps and other means. Many pipes had been broken either by bombing or by tanks, and the mechanical boosters were out of action; the system was not improved when an infantry subaltern tried to clear blocked drains by setting off hand grenades in manholes. Leaking sewage, the hot climate and flies led medical authorities to become apprehensive about dysentery. 119 Works Section started work immediately and later 323 Squadron was relieved of duties at the waterworks by 33 and later 24 Field Squadrons, to help on the sewage system and the compressed air plant. Drain rods, not normally considered as operational stores, had to be sent from Cyprus. The system continued to give trouble and absorbed the energies of the erstwhile Borough Engineer of Chelsea throughout his stay; the town authorities were fortunate in having his skilled services without charge.

#### FOLLOW-UP

35 Army Engineer Regiment (Port) disembarked on 9 November and set about unloading the many ships anchored off Port Said. The ships'

derricks had to be used for offloading which required considerable ingenuity since the ships had been loaded by crane in the British docks and some of the heavier and more awkward loads such as tank transporters posed interesting problems. The CO of 82 Port Regiment, Lieut Colonel D M Fletcher became Port Superintendent commanding a composite regiment of 165 Port Operating Squadron (81 Regiment), 168 and 169 Port Operating Squadrons and elements of 175 Port Maintenance Squadron (all from 82 Regiment) and 174 IWT Squadron (83 Regiment), strengthened by Z craft detachments of 51 Port Squadron from Cyprus and Libya; a former stevedore at the London Docks, WO2 F. D. G. Cavenagh was appointed consultant stevedore, for which he was subsequently awarded the MBE. Work went ahead in twelve hour shifts at a speed greater than anticipated; it was noticeable how good field engineers quickly became skilled stevedores. Despite the pressures of work on unloading, 35 Regiment had to deploy 42 Squadron at one stage to reconstruct the sewers.

36 Corps Engineer Regiment which Lieut Colonel B G Rawlins had taken over as CO in October, arrived in the middle of November and replaced 37 Regiment which was allowed to return to Cyprus. 36 Regiment, which had left 20 Field Squadron in Malta, consisted of 24 and 57 Field Squadrons and had been warned for the construction of a ship to shore fuel line. 24 Squadron went to the waterworks, railway line and contingency break out tasks, while 57 Squadron which had been earmarked for pontoon bridging, carried out bridge repairs and lifted mines, in preparation for a possible break out if negotiations with the Egyptians broke down. The Regiment had moved from Osnabrück at eighteen hours notice with half its strength on leave including the QM and RSM; signals had been sent to those on leave to join at Southampton and each man moved from Germany carrying his own and another's kit and weapon, only five men failed to reach Southampton in time to sail.

The railway station was occupied on 9 November and 37 Regiment started a train service to El Cap, run by a National Service subaltern whose father had served with the Indian State Railways; several ambulance train services were run. 24 Squadron took over the railway role and brought back the first batch of UN troops from El Kantara, the engine driver being the squadron second-in-command who was transportation trained, while his OC acted as fireman. Subsequently, a section of 8 Railway Squadron operated the railway.

A 330-foot Class 80 Bailey Pontoon Bridge was built at Raswa to provide a standby in case of accident or sabotage to the swing bridge,

it was started by 3 Squadron and completed by 24 Squadron. The bridge was broken on completion and the rafts dispersed but maintained in readiness for immediate reassembly. Other small bridges were constructed across the Sweet Water Canal to assist lateral communications. The CRE 3 Division, Lieut Colonel R R L Harradine arrived with a skeleton HQ, but 25 Field Engineer Regiment was not called forward except for 37 Field Squadron, which disembarked at Malta. A CRE (Works), Lieut Colonel W A P Court who had been CRE Cyrenaica, arrived on 12 November and a HQ was assembled but a complete CRE Works establishment was never achieved. One of his main difficulties revolved around engineer resources. Out of twenty-two ships which were loaded or due to be loaded for Operation MUSKETEEER, only three were actually discharged at Port Said due to a variety of circumstances brought about by changes in the plans, the limited dock facilities and the shortage of real estate ashore; the original stores area set up by 18 Field Park Squadron in the railway station being too restricted for development. Engineer tasks were sustained from the buffer stocks held against contingencies in Cyprus and brought in by coasters which worked with a four or five day turnaround; urgent demands were brought in by air, but some delays in engineer work were nonetheless unavoidable. An additional stores area was established in the docks and the resources handling was taken over by the detachment of 59 Squadron with guidance from 1 Stores Section.

Postal Units had been formed under an ADAPS 2 (BR) Corps, Lieut Colonel G Dennison (the Head Postmaster of Buxton). Nearly 300 AER reservists had been mobilised including postal units for 3 Commando and 16 Parachute Brigades and reinforcements for 3 and 10 Division Postal Units as well as for 19 (Cyprus) Command Postal Depot. Four field post offices had been opened in the Salisbury area for troops who stood by for embarkation orders. The address BFPO 300 was appointed for mail to those involved in the operation. The first mail was delivered to the airborne forces on the same evening that they landed and the Commandos also had letters delivered within hours of landing.

The Postal Directorate was established on 10 November and on the same day a regular mail service by RAF flights from Gamil airstrip to Cyprus was established. Initially only one field post office could be opened in a small garage and later in a small school without windows. The hard pressed postmen were also called on to deal with large quantities of civilian mail in transit from the UK to South East Asia

found violated in the dockside Customs sheds. The main body of 203 L of C Postal Unit arrived on 26 November and a second field post office was opened. The Egyptian Club on Rue America was requisitioned for postal work and a first class office was provided; counter transactions rose to an average £1,500 per day, one week in December £8,000 worth of postal orders were sold. The busiest week accounted for some 72,000 letters and 300 parcels. The sterling work, almost entirely planned and executed by AER units, was much appreciated and was recorded in a message from the Task Force Commander.

#### EVACUATION

The arrival of UN observers and forces, together with a proliferation of the world press was the signal for noisy demonstrations and looting by mobs in the towns; the situation was demoralising and unpleasant. Directly it became clear that no further operations would take place, everyone's one wish was to get home by Christmas. In early December a withdrawal was ordered and once evacuation became certain, guerilla warfare started; Sir Charles Keightley records that the Egyptians did their best to provoke incidents and a campaign of intimidation was carried out to prevent Egyptians and foreign nationals from cooperating with the Allies. On 15 December, there were seventeen incidents in which three British and a number of Egyptians were wounded, and the next day an officer was killed; later another officer was kidnapped and murdered.

Construction tasks which had included the setting up of stores and ammunition dumps with perimeter protection, as well as a POW cage, were required to prepare for the arrival of the UN force. Work had been undertaken to prepare accommodation for British and French troops, shoring up damaged buildings and clearing debris. A workshop to manufacture camp structures locally had been set up by 323 Squadron; it also manufactured coffins. The evacuation started on 3 December and 35 Regiment found itself reloading many of the stores which had been unloaded a few days before, it then moved to Cyprus to release the reservists operating ports there. 24 Squadron built an LST hard outside Port Said harbour for the evacuation.

The UN troops, Norwegians, Danes, Swedes, Colombians, Indians and Yugoslavs arrived and were helped where possible, few had anything but light equipment and the British Army made up much of their deficiencies. At the beginning of December, it was estimated that there were nearly 22,000 foreign troops in Port Said, 13,500 being British. British nationals in Egypt were evacuated and the 430 "con-



tractors" who had been operating the base and had been interned at the start of Operation MUSKETEEER, arrived on 21 December under an exchange of prisoners. Finally, evacuation was complete on 22 December, one of the last to leave being Brigadier J H S Lacey then Brigadier AQ 2 (BR) Corps, who had been the last to leave Port Said eight months previously. However, two Z craft remained behind for six weeks operated by crews of 51 Squadron wearing blue berets, attached to the UN Expeditionary Force.

Considerable controversy arose over the political background to Operation MUSKETEEER, "the Suez misadventure" as it was called by some. World opinion, Russian threats and American objections all played their part in forcing the cease fire to be called just as the military objectives were in sight. Analysis of the background has no place in a history such as this but the after effects undoubtedly led to changes in British foreign policy. Pressures to liquidate the colonial commitments grew, accompanied by cuts in defence expenditure and manpower. Operation MUSKETEEER could be said to mark a turning point in defence policy.

## LIBYA

### AFTERMATH OF WAR

After 1943 the former Italian colonies of Cyrenaica and Tripolitania on the North coast of Africa were administered by the British, and the Fezzan to the South by the French. Both powers bore a large part of the expense of this administration, much effort was put into restoring the public utilities and services which had been shattered by the war, and to training Libyans for government service on independence. Internal autonomy was transferred to Cyrenaica under an amir, Idris of the Senussi, in September 1950, and to Tripolitania in March 1951. A unified state, came into being under Idris as King of Libya, on 24 December 1951.

### GEOGRAPHY

The greater part of Libya's 680,000 square miles, more than seven times the size of Britain, was desert and unsuitable for cultivation. Nearly all the cultivated land was situated in two comparatively small regions on the 1,200 mile Mediterranean coastline. The larger region was in the extreme North West, the other separated from it by some 600 miles of the Desert of Sirte was in the eastern part in the Barce peninsula. The population was little over one million inhabitants,

mostly Bedouin nomads. The Senussi of whom King Idris was head, mostly lived in Cyrenaica, but Tripolitania where the Italian colonial influence was stronger, was rather more developed than the other two provinces. Two capital cities were established for Libya, at Benghazi and Tripoli and the Federal Government alternated between them.

#### EVENTS TO 1956

After independence, Anglo-Libyan relations continued to be close and friendly as reflected in the Anglo-Libyan Treaty of 1953. The Treaty which was to run for twenty years provided for the stationing of British troops in Libya and for use of training areas, ports and airfields, it also contained a clause which was to be significant in later years that the signatories would not "... adopt in regard to foreign countries an attitude which might create difficulties for the other party".

Libya was also forming associations with other nations; agreements were being negotiated with the UN, USA, and, in March 1953, Libya was admitted to the Arab League. The new state was far from self supporting; substantial financial aid continued to come from Britain, France, USA, Turkey, Egypt and other nations. Despite some initial dissention, Egypt began to exert an influence; she claimed a revision of the border with Cyrenaica which was canvassed with the UN; and in 1952 there had been an abortive armed rising in Tripoli of the so-called National Congress Party, reputedly backed by Egyptian funds. However, relations started to improve after General Neguib came to power in Egypt. Egyptian judges, civil servants and teachers were seconded for duty in Libya; the Egyptian press, carrying anti-British propaganda, was freely circulated, and Libya found herself obliged to try and remain on friendly terms with two nations bitterly opposed to each other. The Egyptians tried by all means possible to replace British influence by their own and opposed the signature and ratification of the Anglo-Libyan treaty: Egyptian influence reached its peak in 1955 but thereafter Libya sought to loosen its ties with Egypt. The discovery of oil was the key; although few significant concessions were let until 1955 and large oil resources were not found until 1959, oil revenue removed the dependence on foreign aid and reduced the extent of external influence.

#### BRITISH ARMY PRESENCE

Cyrenaica and Tripolitania, separate District HQs under GHQ Middle East, were placed under Malta Command in July 1947 to prepare for the arrival of troops withdrawn from Palestine. The

SORE 1 Malta, Lieut Colonel G C Stainer, moved to Cyrenaica to set up 193 CRE (Works) in Benghazi, although the District Controller of the Tripoli PWD continued to meet works requirements there. The number of British troops was very small following the withdrawal of West African units from Tripolitania in 1946, but Libya, with its superb unrestricted training facilities, became the chosen location for the Middle East Strategic Reserve and 1 Division moved to Cyrenaica in May 1948. In October the GOC was redesignated GOC 1 Division/Libya District becoming responsible to MELF for both Tripolitania and Cyrenaica, and independent of Malta. The CE Malta, Colonel J T Godfrey, moved to Benghazi as CE Libya, and Malta Command reorganised as Malta Garrison. Colonel Godfrey left in 1949 and with him the post of CE disappeared. An engineer group Commander Colonel J V C Moberly was appointed and subsequently his post was redesignated Commander RE Establishment Cyrenaica before also disappearing at the end of 1950. It was not until 1956 that a new CE Libya, Colonel H R Greenwood was appointed, but this was no case of third time lucky because his appointment too terminated with the general withdrawal in 1957.

#### RE ACTIVITIES

The situation which faced the CE Malta in 1947 when he became responsible for the works services in preparation for the move from Palestine was not easy. The existing barracks were generally not of a standard for British troops, there were virtually no local artisans and few Sappers, except those assisting five German POW mineclearance sections. Four German artisan works squadrons and two German plant troops had been made available from Egypt, and later reorganised with some British Sappers into the RE Establishment. The Western Desert Railway from Benghazi to Barce and Sollum was reopened as a military railway in 1948 and run by a detachment of 10 Railway Squadron.

1 Division RE under Lieut Colonel A W Kiggell on arrival from Palestine reformed as 22 Field Engineer Regiment in June 1948 near Benghazi; it consisted of 12 and 23 Field Squadrons and 6 Field Park Squadron; 17 Field Squadron, also part of the regiment remained in Egypt after leaving Palestine and did not rejoin until the end of the following year. 35 Army Engineer Regiment commanded by Lieut Colonel J E T Nelson also moved to Cyrenaica in mid 1948; having formed in Crowborough in June 1948 with 62, 64, 65 Engineer Squadrons and 63 Engineer Park Squadron. Once in Libya it was run

down to virtually one squadron strength (62 Squadron) until it moved to the Canal Zone in September 1948 where it was again brought up to strength.

#### TRAINING AREAS

Libya had begun to show its value as a training area by 1957. A composite squadron based on 40 Squadron from 37 Regiment in Cyprus exercised there in 1957 and, as tensions relaxed other formations from outside the theatre also trained there. In 1959, 9 Independent Parachute Squadron took part in a 16 Parachute Brigade airborne exercise in Cyrenaica, mounted from Cyprus; a similar exercise the following year was mounted from Malta with a parachute drop in Tripolitania. In retrospect, the training scope was perhaps the most valuable aspect of Libya to the British Army; it was not a popular station for British soldiers as it had few resources and only primitive labour.

#### THE BLUE PLAN

The plan for redeployment from Egypt specified a distribution of troops to both Cyprus and Libya (The Blue Plan), and a requirement was stated for a divisional cantonment in Cyrenaica which was considered to combine good training facilities with a secure political future. An over-riding factor in planning was economy of administrative overheads, implying proximity to a port, which would have resulted in building in the unattractive plain near Benghazi, more than 100 miles from the training areas. The WOPT under Colonel W F Anderson which had been set up by the DFW, was briefed to seek alternative sites, and found the Djebel around Cyrene more attractive both climatically and scenically; land there would be easier to acquire and good building stone was available, the critical problem was water. 22 Field Engineer Regiment had been tasked with a local resources reconnaissance in 1949 and, by good relations with the local population had been shown water inside a low cave, a secret which had been preserved from the Italian colonists who had never been popular with the Senussi. The building project was put in abeyance at the beginning of 1950 but resuscitated in June 1951 in view of developments in Egypt. The area where water had been found, Ain Debusir, was available for construction but proof of the reliability of the water source was essential to detailed planning. After some intensive aerial photographic reconnaissance, a deep reconnaissance unit was formed to investigate this and other sources by pot-holing. They found that

this source which was 200 feet inside the rock, 600 feet below the level of the Djebel would provide a more than adequate supply of three million gallons per day.

An adit to the water supply was tunnelled by miners from the Malta Fortress Squadron and a flow of pure water emerged; irreverently termed "The Rock of Horeb". A zone plan for a 9000-man cantonment was produced by June 1952, but was abandoned at the request of the Libyan Government in 1953.

#### UNIT REDEPLOYMENTS

22 Regiment which had moved from Cyrenaica to Zavia, Tripolitania at the end of 1949, returned to Cyrenaica in 1950 and was sent to the Canal Zone for emergency duties in October 1951. While in Libya its tasks had included reconnaissance of resources already mentioned, mine clearance and rebuilding camps in the Benghazi, Derna, and Tobruk areas. Another task was to sponsor raising 28 Field Engineer Regiment for Korea in May 1951; an RHQ and 64 Field Park Squadron were formed, 12 Field Squadron was transferred to 28 Regiment and 3 Field Squadron was raised to replace it in 22 Regiment. Lieut Colonel P N M Moore, CO 22 Regiment became CO of 28 Regiment and was replaced by Lieut Colonel T H Evill. 37 Field Squadron from 25 Field Engineer Regiment moved to Libya in 1951 to replace 22 Regiment which was sent to the Canal Zone but did not remain there for long; after six months, due to tension in the Canal Zone, 37 Squadron rejoined 25 Regiment when the latter moved from Cyprus to Moascar in March 1952.

Thereafter until 1955, the only RE units in Libya were the works services comprising CRE (Works) Cyrenaica and CRE (Works) Tripolitania each reporting directly to CE MELF. A number of large scale surveys were carried out by 2 Army Field Survey Depot from Egypt but building contractors were few and work mainly relied on directly employed labour including a small number of ex-POWs. The "Blue Plan" was abandoned in late 1952 when the Libyan Government requested the immediate removal of British troops from Libyan towns. British units had to keep a low profile, and work was started on the rehabilitation of the old Italian barracks outside the towns as a short-term measure. Meanwhile, a general redeployment plan continued to be discussed with the Libyans. It was becoming obvious that the Canal Zone would have to be evacuated earlier than had been foreseen and Britain still wanted to establish in Libya an armoured division, to act as a strategic reserve, and also to benefit from the

training areas available. Agreement was reached at the end of 1953 to deploy troops, not in a large single cantonment in Cyrenaica, but distributed over a number of centres including Tripoli, Homs, Benghazi, Derna, Barca and Tobruk. A short-term redeployment, at a cost of £1.5m, was to be completed within eighteen months, with a further £6m plan to be completed in five years. By August 1954, a 75-bed British military hospital, in single-storey prefabricated aluminium construction was approved and was completed in thirteen months. Master plans for barracks in Tripolitania and Cyrenaica were approved by the end of 1955 by the War Office and the new CE Libya, Colonel H R Greenwood, was appointed. As units withdrew from the Canal Zone, a new formation, 10 Armoured Division, began to build up in Libya. The works load due to the increased garrison grew more quickly than the Works establishment's ability to meet it. The constant problem of skilled labour was aggravated by competition with the oil companies and the US Corps of Engineers constructing the US Air base in Tripolitania, at Whetlus Field, and the tasks were handicapped by the distances apart of the various projects and the difficult communications. In 1954, 22 Field Engineer Regiment, then commanded by Lieut Colonel C A O'B Compton, less 3 Field Squadron, returned to Tripoli as 10 Division RE. 3 Field Squadron remained in the Canal Zone until April 1956 and was one of the last units to be withdrawn when it went to Cyprus, where it remained on detachment.

In Libya at that time was 3 R Force specialising in preparing deception against aerial reconnaissance. It was a combined RE/R Signals unit specially trained in the techniques developed during the war years and at the Visual Interservice Training and Development Centre (VISTRE) which later became the Joint Concealment Centre. 3 R Force was a small unit which had been in the Canal Zone until 1954, but had the capability to represent, by deception techniques, one armoured brigade. It took part in exercises, trials and training over much of the Middle East including Iraq and Jordan until disbanded in 1957.

#### REACTIONS TO MUSKETEER

10 Armoured Division was to have formed part of the order of battle for Operation MUSKETEER but the Libyan Government invoked the Anglo-Libyan Treaty and asked for assurance that the British based in Libya would not be used against Egypt. In consequence the only unit of 22 Regiment to take part was 3 Field Squadron, which was in Cyprus. However two Z craft from the IWT detachment at Tobruk were sent to Cyprus in September 1956, followed by further

craft in November and four Z craft under assisted tow direct to Port Said in November. Two of these craft remained in Port Said as part of the UK salvage unit working for the UN under the Royal Navy until late January 1957. Plans to form a CRE (Works) for Port Said were overtaken by the operation and the CRE (Works) Cyrenaica, Lieut Colonel W A P Court was despatched at very short notice in November to become CRE (Works) Port Said for six weeks.

The landing at Port Said triggered off riots in Tripoli which resulted in the evacuation of British families. A contract for construction of married quarters in Barce had been won by an Egyptian firm at an absurdly low figure, despite strong military representations against acceptance; the dictates of financial economy ruled and large numbers of Egyptian labour had been imported. It was those who came to Tripoli who were ringleaders in the anti-British riots, with arms suspected of being supplied through the Egyptian Embassy. 22 Regiment found itself in the infantry role defending its barracks against bomb throwers.

During the air evacuation of families a Hermes aircraft carrying some fifty military dependants, including twenty-six with Sapper connections, crashed at Blackbushe Airfield. Four of the Sapper dependents, all children, died and another nine adults and ten children were admitted to hospital; all lost their possessions and winter clothing.

#### EFFECTS OF MUSKETEER

The effects on British policy in Libya were far reaching. It became clear that Libya, as a base for operations, had severe limitations even though it continued to offer fine facilities for training, especially for armoured units. Once again plans were laid to withdraw units from Libya and to run the garrison down to a care and maintenance basis to support training exercises. Some of the works projects were halted in mid progress and recoverable items such as plumbing ancillaries were extracted. Brigadier Greenwood commented "Derna then contained Phoenician, Roman, Italian and British ruins - and the last were the worst!"

Within two years, the Garrison was reduced from one armoured division with a suitable scale of administrative units, to a single battalion in Tripoli; Cyrenaica had been evacuated completely, except for the RAF at El Adem and an infantry company at Tobruk detached from the Tripoli battalion. 22 Field Engineer Regiment under Lieut Colonel F M Hall returned to UK in December 1957, and were joined on the troopship by 3 Field Squadron from Cyprus. The post of CE

Libya was deleted, and the works units were reduced to two independent DCRE (Works) at Benghazi and at Tripoli, which were civilianised together with other RE Works Units in MELF in 1959.

### CYPRUS

THE third largest island in the Mediterranean is Cyprus, some 150 miles from East to West and about 60 miles in breadth. The population was about 80% of Greek origin, the largest minority group being Turkish. Geographically the island divided into three well defined areas; along the North coast ran the Kyrenia range of mountains, 3,430 feet at the highest point, extending North East to the Karpass peninsula known as the "pan-handle"; the western half of the island was the wooded Troodos mountain range dominated by Mount Olympus (6,400 feet); between the two mountain ranges and open to the sea to the South and East lay the Messaoria plain. The more gentle Mediterranean weather made a pleasing change from that in the Canal Zone. The Cyprus rainy season lasted from October to March leaving the countryside covered with green vegetation. Summer could become uncomfortably hot in the inland plain and the mountains in Winter could be cold, but the coastal area provided a comfortable and healthy climate with few extremes all year round. The climate accounted, in part, for a small retired British community, sometimes referred to as "the Ancient Britons" most of whom lived near Kyrenia.

From its location close to the sea routes of traders, conquerors and colonisers for centuries, the history of Cyprus has recorded many changes of ownership. British interest first came by Richard Coeur de Lyon in 1191; but it was not until 1878 that British administration came to the island although under Turkish sovereignty. Turkey forfeited her rights by declaring war on Britain in 1914 and Britain's annexation of Cyprus was recognised at the Treaty of Lausanne in 1923; in 1925 Cyprus became a Crown Colony. The Colonial Government served the interests of the Cypriots impartially but was hampered by limited resources stemming from a lack of consistent policy on the role of the country in British Commonwealth strategy. Roads which had been adequate for the slow moving tempo of pre-war life in rural Cyprus became increasingly overloaded and inadequate for the volume of traffic which developed upon them. Until 1951 a single line railway with antiquated rolling stock still operated from Famagusta port through Nicosia to the mineral mines at Lefka.

As modern Greece had developed on the mainland, so emotion had grown among the Cypriot intelligentsia, for recognition of their ties



and for union with Greece (*Enosis*). Ever since Gladstone had instituted a representative legislative council in Cyprus there had been periodic petitions by Greek Cypriots, almost invariably led by the church, for *Enosis*. These were almost always accompanied by a counter-petition by Turkish Cypriots to retain the *status quo*. Following riots in 1931, the constitution was withdrawn. The Greek Orthodox Church of Cyprus refused to accept the Governor's decree regulating election of an archbishop in 1933 so the post remained vacant; the church suffered political eclipse and political agitation in Cyprus reduced. The wartime alliance between Britain and Greece brought a calmer climate of active collaboration of the Cypriots, and Cyprus became a convenient place where reserves of men and materials could be safely positioned. It was used in this manner during the Abadan crisis in 1951, when 16 Parachute Brigade stood to there, and 25 Field Engineer Regiment staged there on it's way to the Canal Zone. The Colonial Government did nothing to restrict indoctrination of Greek Cypriot children in schools, but little publicity was made of the political background. In the eyes of most of the Army, Cyprus was a quiet backwater with a docile population; and it came as a surprise to find that their racial consciousness was so deep rooted.

After the war, Cyprus was used for a time to hold illegal Jewish immigrants intercepted on their way to Palestine. The requirements for illegal immigrant camps, together with a need to tidy up the proliferation of small administrative units and depots left behind after the war, brought to a head problems in the system whereby the Public Works Department of Cyprus carried out work for the armed forces. Major General B E C Dixon, as E-in-C MELF, sent Lieut Colonel D M Eley who had come from 20 CRE (Works) Salonica, to set up a new RE Works establishment in Cyprus in March 1947, as 87 CRE (Works). This establishment had to be filled with locally employed civilians and initial recruitment brought a medley of races and religions raising sundry problems, not least of which was the conflicting holy days of each. A RE workshop and stores was already in being; all replacement stores came from Egypt; a plant pool was set up which grew to some 100 items of every type and make, some dating back to pre-war and perhaps really fit only for an industrial museum. It was not until 1956 that new plant from the UK arrived. Planning started to concentrate all administrative units at a sparse windswept site perched on a limestone plateau four miles from the port of Famagusta, astride the main road to Nicosia; it was called St George's Cantonment.

Also in 1947, the British Government restored the Cypriot Church

hierarchy. The Church, under some duress from the growth of the Cyprus Communist Party during the war, wanted something dramatic to restore its position and initiated a new drive for *Enosis*. In 1950, the young ambitious Bishop of Kition succeeded to the Archbishopric as Makarios III, and a period of intense political activity followed, eventually erupting into open violence against the colonial rule; it even went so far as to endanger the solidity of the eastern flank of NATO.

#### THE NEW BASE

Late in 1949, GHQ MELF determined the proposed composition of the peacetime Cyprus garrison, and it was decided that a custom built permanent station would be provided. The same factors that guided the choice of St George's Cantonment for administrative buildings were applied again and a site adjacent was selected, the location became known as Four Mile Point. The same WOPT which had been sitting a new cantonment in Libya under Colonel W F Anderson was tasked for Cyprus. The WOPT had engaged the architectural firm of Alister MacDonald which included a wartime Sapper major, Edward Jamilly, with experience of cantonment planning in India. Alister MacDonald's overall experience and political flair proved valuable. The choice by GHQ of Four Mile Point had been dictated by economy in administrative overheads and proximity to a port; the QMG had not been impressed and considered the sea an obvious amenity, so the WOPT was sent to Cyprus in the spring of 1950 to investigate and report. Six months before, Dhekelia had housed a barbed wire camp for illegal Jewish immigrants with no firm date set for evacuation and perhaps the MELF staff did not choose it for that reason, but the possibilities were immediately apparent to the WOPT who then had to sell their proposal for a change. Here the value of including an architect of standing in a planning team was apparent, and Alister MacDonald was able to achieve what would have been virtually impossible for a colonel sent out from the War Office; GHQ MELF was persuaded to re-examine their decision and Dhekelia was declared worthy of investigation.<sup>8</sup>

Construction had been started at Four Mile Point for St George's Cantonment and, by 1950 had progressed to a stage where forty-two married quarters were nearing completion but remained uninhabitable awaiting financial authority for a main sewage system, despite voluminous correspondence. Cyprus was being urged by GHQ MELF to find married accommodation so Lieut Colonel Eley took the matter into his own hands; the drains were completed and paid for from a

still dormant permanent signals camp project. At last a reaction was obtained from the financial authorities. Lieut Colonel Eley had to attend a Court of Inquiry in Egypt: he recalls: "The solemnity of the proceedings was short lived. . . . Tubby (Major General W M Broomhall, by then CE MELF) rose to his feet and assured the President that he had all the answers. So instead of being called to account . . . the 'criminals', witnesses and Court Officials collaborated in producing a *modus vivendi* which would satisfy the financial commissars; and that was the last we heard about it."

Planning for the new projects in Dhekelia on top of his existing work would have overloaded the CRE (Works) Cyprus, as 87 CRE (Works) became, and Colonel W C H Prichard was appointed as CE Cyprus in 1950. At first he had to share the offices of the CRE but by December he was able to move into his own HQ, and the planning shifted from the War Office to CE Cyprus. An establishment for a CRE (Works) Dhekelia was promulgated in December 1952 and Lieut Colonel C E Warth arrived to fill the new appointment.

#### DHEKELIA AND EPISKOPÍ

By June 1950 the siting at Dhekelia had been accepted in principle. Detailed layout planning was started on plans plotted from an air survey at 1/1250 scale. It had been agreed that War Office standard designs would be used where possible while the buildings which did not fall into the standard pattern were specially designed. Garages, workshops and store sheds were based on the framework of prefabricated hutting of which there were large stocks in Egypt. Alister MacDonald prepared the overall layout plan to blend the various styles effectively. Target dates for tenders were set at April 1951 but in the event tenders were not received until July and then the lowest bid exceeded the £10 million estimate by £1.4 million. Economies in specifications to save the excess proved to be a more time consuming effort than actual contract preparation. The contract for the first phase of the Dhekelia cantonment was let in early 1952 to Lindsay Parkinson Ltd, who were also contractors for a Cyprus Government power station adjacent to the cantonment site.

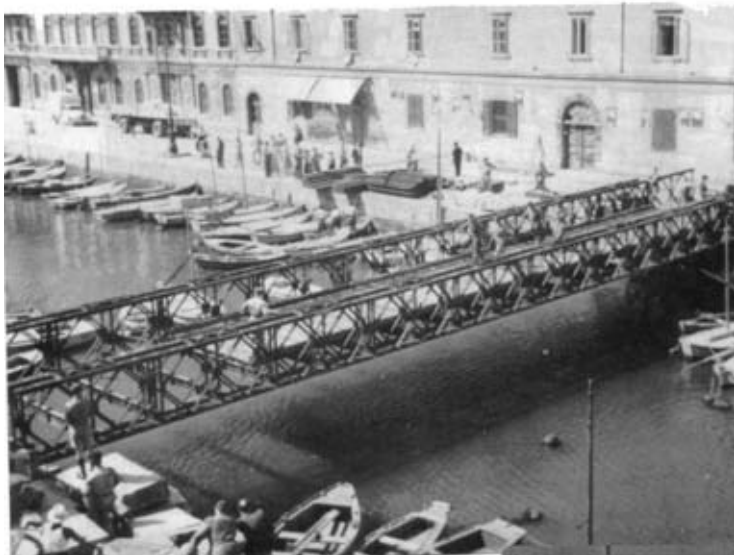
Subsequently the cantonment was further enlarged. Planning ceased in 1958 awaiting decisions on the future of Cyprus and the majority of construction was finished in 1959. By then a first class cantonment had been established set on a Mediterranean coast with many of the amenities of a modern town. It included lines for two major units as well as administrative facilities, married quarters, schools and a



General Sir Kenneth N Crawford KCB MC, Chief Royal Engineer 1958-61



A Bailey bridge being built in Trieste shortly after the war to assist the civil population



Bailey Bridge

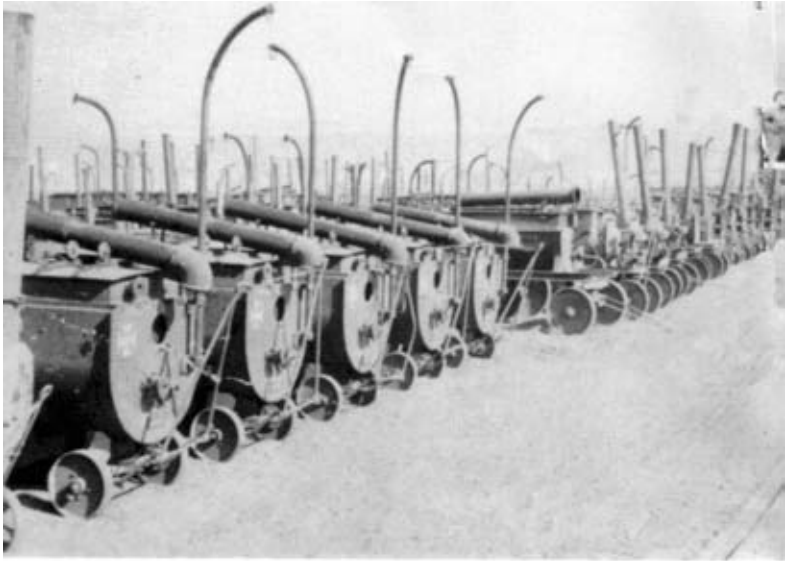


Sappers training at Middle East SME, Gebel Maryam. The twin towers of the ANZAC Memorial are just visible in the background

A military train with engine *Corporal W J Lendrum VC* derailed by saboteurs in Egypt, December 1951. The diversion seen in use was opened within thirty-six hours including the construction of a new embankment. The recovery was a joint task by 3 Field, 10 Railway and 53 Port Squadron



Sapper Training at Middle East SME, Gebel



Tar boilers and road rollers at the plant depot, Quassassin, Canal Zone



Tar boilers and road rollers at the plant depot, Quassassin, Canal Zone

garrison club. Of particular note was a new five-storey military hospital for both the Army and the RAF, built to the most up to date principles, dramatically sited overlooking the whole of Dhekelia and the broad sweep of Larnaca bay.

A preoccupation of British military planning in the Middle East during 1952 had been to resolve the evacuation of the Canal Zone base in approximately three years and the decision to site the new GHQ at Episkopi was taken that Summer. The Cyprus Government wanted development in the area to the west of Limassol and land was also provided nearby for an airfield at Akrotiri. The final siting board was in the Autumn of 1953 presided over by the MGA and AOA from GHQ; London subsequently approved the site for development. The design and construction was to be quite different since it was anticipated that the resources of skilled labour in Cyprus would be inadequate; prefabrication which would transfer as much work as possible into a factory was required.

The planning team of the DFW at Chessington went through some fifty different methods eventually selecting a precast concrete wall panel system called REEMA. Since REEMA had no overseas experience at that time, the factory to make wall panels was built for the firm by the Army and remained in Army ownership. The factory was opened in 1953 and a start was made on the permanent office blocks as well as on the main external services in August the following year. A CRE (Works) Episkopi was appointed, and Lieut Colonel C E Otway was established there in 1953. The HQ consisting of office accommodation, lines for a signals unit and staff, four married quarter villages, two residences for the two Cs-in-C and ancillary messes and other domestic accommodation was virtually complete by 1959.

While construction was still in progress the move from the Canal Zone had started. In November 1954, Main GHQ MELF including the CE, Major General W G Fryer moved to Cyprus and set up in Nicosia. The DDW, Brigadier J B Brown and works staff remained in the Canal Zone with Rear GHQ until the end of 1955. Even though the new construction was occupied progressively as it was completed, expedients were necessary; temporary married quarters made of "Cyprus hutting", timber and asbestos were built near Limassol, and christened Berengaria Village.

#### KISSOUSA PIPELINE

The first field engineer unit was deployed to Cyprus to help prepare the Episkopi project. A water source at Kissousa, a small village some



ten miles into the Troodos mountains and about 1,800 feet above sea level had been selected following a survey by 19 Topographic Squadron. It was decided to supply the Episkopi cantonment by gravity feed through a pipeline eighteen miles in length using pipe from the Canal Zone.

30 Field Squadron 35 Army Engineer Regiment moved to Cyprus from the Canal Zone in January 1953 and went into camp close to Limassol, at Polemidhia, where there remained some thirty wooden huts built by Captain H H Kitchener in 1882 when he made a survey of the island. 30 Squadron worked on the pipeline throughout 1953. Two earthquakes interrupted work; the first in August 1953 when the Squadron embarked to carry out rescue work after an earthquake in Greece, but the Royal Navy had already arrived and had carried out the majority of work; later the same year, in September, Paphos was damaged by earthquake and once again the Squadron was called on for assistance. Another incident in Paphos occurred on the eve of the Coronation parade in 1953: 30 Squadron which formed the parade contingent found itself called on to quell riots; despite its dual role the following day's parade received the usual acclaim of the watching crowd. Another Sapper contribution to the Cyprus celebrations of the Coronation was in Larnaca where the CRE, Lieut Colonel Warth ran a magnificent fireworks display for the district. The winter snow and rain affected the speed of pipeline work and threatened the completion date of 31 December 1954, therefore 35 Regiment commanded by Lieut Colonel J R G Finch moved from Egypt and by April 1954, 42 Field Squadron had joined 30 Field Squadron in the field with 18 Field Park Squadron in support; in July 1954, 16 Field Squadron joined the others on the project.

Need for a reserve water supply led to the installation by CRE Episkopi of deep borehole pumps in Happy Valley, Episkopi comprising a sophisticated fourteen stage pumping system lifting some 700 feet to the reservoir; this was at the time a new departure from conventional means. Water flowed from Kissousa to Episkopi on 31 December 1954 and the supplementary supply from Happy Valley was completed in March 1955. 35 Regiment concentrated at Polemidhia and, although involved in other construction tasks, had time for some much needed training. One task already in progress was the construction at Larnaca of store sheds urgently needed for the impending move from Egypt, which were shipped from Egypt to be constructed by infantry working parties.

### THE TROUBLES BEGIN

Under growing Greek Cypriot pressure an appeal by Greece had been made to the UN in 1954 asking for self-determination for Cyprus. After a short debate in December the UN refused to consider the matter and the outcome was widespread rioting in most of the towns.

The Cyprus garrison in 1954 consisted of a Brigadier's HQ at Nicosia and four major units: infantry battalions at Larnaca and Famagusta, a gunner regiment at Nicosia and 35 Army Engineer Regiment at Polemidhia which became increasingly involved in internal security duties. In December 1954 it was decided to dust off internal security plans. In Limassol, the Assistant District Commissioner, with whom 35 Regiment made its plans, was a Turkish Cypriot who had been at Eton and Oxford. Local schemes were exercised, but a scheduled island-wide exercise on 17 December was called off because of school childrens' riots in other parts of the island; the following day adult rioting was widespread. 35 Regiment put its training into practice in a copybook episode of riot control in aid of the civil power: following withdrawal of a police cordon, the Assistant Commissioner formally requested<sup>9</sup> the Army to take over; after appropriate visual and oral warnings to the crowd to disperse, a ringleader was shot and nearly killed; tension eased and sporadic further outbursts in Limassol finally ended in a heavy downpour of rain.

Lieut Colonel J R G Finch was the military commander of the area. The Regiment maintained active patrolling to keep the initiative and to avoid a "fortress mentality" behind barbed wire, at least one attack was pre-empted at a crucial moment, and on another occasion the "ready troop" stopped an impending riot by deploying quickly and charging with fixed bayonets. After the flare up of violence in the Spring of 1955, Commando reinforcements from Malta were not long in arriving and after a short spell in command of two RM Commandos, Lieut Colonel Finch was able to hand over much of his internal security responsibility to HQ 3 Commando Brigade. Perhaps due to the quick reaction from the very start, Limassol remained relatively free of major disturbance throughout the following campaign.

### GRIVAS

An elderly retired Colonel from the Greek Army who had served as a Royalist guerrilla in the war was brought by Makarios from Greece to train the Cypriot youth for violence. Grivas, a self styled General who had actually been born in Cyprus arrived at the end of 1954 by caique, despite an attempt, based on very flimsy intelligence, to

intercept him. He founded EOKA (the National Organisation of Cypriot Combatants) whose campaign opened on 1 April 1955 with a number of rather amateurish and generally ineffective bombs, mainly in Nicosia, but including an explosion against the garden wall of Lieut Colonel Otway's house in Limassol. The outbreak achieved significant publicity; emergency measures followed in June 1955 and in September Field Marshal Sir John A F Harding was appointed to be Governor and C-in-C Cyprus, his immediate appraisal of the situation resulted in a State of Emergency being declared and further reinforcements. The situation was complicated by the move of Main GHQ MELF which established itself in Nicosia, and Rear GHQ which moved later that year straight to Episkopi. Among the new arrivals was 42 Survey Engineer Regiment commanded by Lieut Colonel M H Cobb, with its three squadrons, 19 Topographic, 22 Cartographic and 32 Lithographic Squadrons; it was stationed at Zygi on the coast East of Limassol.

#### DEPLOYMENT CAMPS

The growing garrison needed accommodation which had not been foreseen; in many cases the short notice meant that unit strengths were barely known before they arrived in Cyprus. A Cyprus camp scaling was devised so that the Works Services could provide essentials without delay, with supplements to be added as detail became known. The Cyprus Scale "A" was itself in two parts, the first being a get-you-in service comprising cookhouse shelters, ablutions, latrines and assistance in tent pitching, especially if on rocky ground. This was followed, if required, by a second stage of piped water, soakaways, grease traps and hardstandings to achieve a camp suitable for a stay of months rather than weeks. Scale "B" provided additional hutting for communal buildings and also electricity and hot water. A final stage, Scale "C" provided a standard of temporary accommodation which, although still largely tented, was well acceptable in a Mediterranean climate. In fact, many units lived for years in Cyprus Scale "B" camps. The RE Workshop and Stores was geared to this system which proved to be satisfactory. In addition to the usual camp structures, a local pattern structure named the "Simmonds Hut" was produced as a substitute for non-available Nissen and Romney huts. By the end of 1955, the RE staff consisted of the CE, Brigadier D R Guinness, with a Deputy CE (Works), Colonel R H Reynolds and three CsRE (Works). Lieut Colonel H C G Cartwright-Taylor, CRE (Works) Dhekelia and Lieut

Colonel C E Otway at Episkopi were both heavily committed to construction of the new base, consequently the bulk of the deployment camp work fell to the CRE (Works) Nicosia, Lieut Colonel R M Stevenson, already busy with the task of bridging the accommodation gap for the GHQ move.<sup>19</sup>

35 Regiment had reverted to engineer tasks after its infantry role in the earlier part of the year but support for the internal security forces continued to demand much of their energies. The Tunnelling Troop of 32 Fortress Squadron in Gibraltar was sent to Cyprus for a period in 1955 to drive a tunnel through a headland below Episkopi to give access to a beach below the main camp, with detachments from 35 Regiment in support, and a survey by 1 Radar Air Survey Liaison Section. The far end of the tunnel came out in a fall of loose scree subject to periodic rock falls so that a reinforced concrete extension was needed to protect the tunnel mouth. Construction had started and the double/double Bailey bridge which was to provide the main reinforcement was ready to be launched when all troops were called away for internal security duties. The tunnel approach was completed by 37 Field Engineer Regiment in 1956.

By the Autumn of 1955 it was obvious that there would be no early withdrawal of the reinforcements and 37 Field Squadron of 25 Field Engineer Regiment arrived from UK to help with winterisation of the spartan temporary camps. Located in a temporary camp itself, it deployed a number of detachments in the Troodos mountains on tasks in the more inaccessible camps where Cypriot contractors would not or could not be allowed to work. The wild hilly country with narrow twisting roads was ideal for minor insurgency operations offering, as it did, opportunities for ambush and escape. 37 Squadron lost two men on separate occasions, one to small arms fire in an ambush, the other when a boulder which it was suspected had been pushed by unfriendly individuals, rolled down the hillside onto a road and caused a vehicle crash. The Squadron Commander, Major B J Coombe was also ambushed, and his driver killed but he single-handedly took on the ambushers, killed one and captured two: the British Press were delighted to have a military success to report during a period when the main news from Cyprus was of sabotage and casualties, but at a press conference after his action Major Coombe made an appeal for sanity "... I killed a frightened young Cypriot ... do not deepen the rifts between the Cypriots and the British ... do not encourage the Cypriots to build up a hero by producing a British hero." Major Coombe was awarded the George Medal. In March 1956, 37 Squadron returned

to England and was relieved by 3 Field Squadron of 22 Field Engineer Regiment from the Canal Zone.

Under the regimental trooping programme published in December 1954, 35 Regiment was to be replaced in Cyprus and the change over took place in December 1955. 37 Corps Engineer Regiment commanded by Lieut Colonel A C Lewis with 33, 34 and 40 Field Squadrons arrived in Cyprus, and 35 Regiment returned to the UK with a remarkable strength of long serving NCOs many of whom had extended their overseas tour to troop home with their squadrons. 18 Field Park Squadron was not included in the trooping and remained in Cyprus.

275 Postal Unit had been established in Cyprus with two field post offices, one at Nicosia, one at Famagusta and the address BFPO 53 prior to the influx of troops. The peaceful life was changed as units arrived in number from Egypt and after early *ad hoc* adjustment a new postal organisation was established by the beginning of 1956. A base army post office was set up near Nicosia initially as part of 21 Base Army Post Office from Moascar but later designated 19 Command Postal Depot. Service to the troops was provided by 275 Postal Unit manning seven field post offices including one in the RAF base at Akrotiri. The growing civil unrest brought new problems, many tiresome and some unique. Letter X-ray machines were installed at 19 Command Postal Depot (CPD). Outgoing mail was held, letters for twenty-four hours, parcels forty-eight hours, to mitigate against an explosion while moving by air. It was at this stage that the effects of X-ray on undeveloped photographic film was made apparent. Incoming mail was also X-rayed for arms imports, but a compromise was necessary at Christmas 1955 when some 8,000 bags of parcels arrived on 22 December. In late 1956, a bomb in a mail bag blew up the local taxi which was used to preserve anonymity for military visits to the civilian Post Office inside the walled city of Nicosia. Fortunately injuries to postal Sappers were few, but many experienced alarming incidents at first hand; bombs exploded in the Postal Depot area at an average rate of one a month and special arrangements were made for the security and escort of mail which by then included classified mail, in road transit.

#### EOKA CAMPAIGN

After the declaration of a State of Emergency, discussions in early 1956, between HM Government and Archbishop Makarios were held, but the EOKA violence continued and the talks broke down. Three

days later the Archbishop declared publicly "no attempt will be made to reopen this door"; he was deported to the Seychelles in March, a decision subsequently justified by the capture of EOKA documents in December 1956 clearly showing his involvement with the organisation. Despite an increase in the Cyprus Garrison from four major units to thirteen in 1955, widespread dispersion had tied down many troops in static guard duties. The newly built, but unoccupied bases were vulnerable, a sergeants' mess was burnt down at Episkopi as was the Army C-in-C's new house. A senior officer occupying a new quarter objected to a searchlight sweeping the perimeter because the light kept him awake; it was turned off and soon afterwards bombs were thrown over the perimeter wire at the married quarters.

In February 1956 after the arrival of 16 Parachute Brigade in Cyprus, the Security Forces were able to take the initiative, and a series of operations were launched; EOKA began to suffer serious losses, as a result of which they called off their activity in an unofficial truce, declared in August. Lord Radcliffe's report aimed at making the Cypriots "master in their own house" but including safeguards for Turkish Cypriots was published in December, but a previous propaganda campaign on Athens radio precluded any meaningful discussion of it. The Turks refused to agree to self determination fearing that it might lead to *Enosis*, and emphasised their point by an attack on Greek Cypriot property; they seized on the idea of partition. EOKA resumed sabotage activity for a comparatively short but intensive burst. In the interval however Nasser had seized the Suez Canal in July.

#### CYPRUS AND THE SUEZ CRISIS

The Suez Canal crisis broke during the hottest summer known in Cyprus for many years with shade temperatures reaching 115°F in the Nicosia area. As troops poured into Cyprus, Brigadier A H G Brousson, CE Cyprus, was able to shed some of the load of CRE Nicosia, Lieut Colonel K R Hasildon to CRE Episkopi, Lieut Colonel A G Peart. It is worth recording that at this time CRE Nicosia was responsible for some ninety-nine camps spread throughout the eastern two thirds of the island. A ship to shore pipeline 1250 feet long was laid off Akrotiri in September 1956 by 37 Regiment together with aviation fuel storage and associated pipe work and pumps for fuel supply; it was apparent that pipe laying was a fundamental field engineer task in Cyprus. 9 Independent Parachute Field Squadron, which accompanied 16 Parachute Brigade to Cyprus in 1956, carried out minor works for CRE Nicosia, but had returned to the UK with

the remainder of 16 Parachute Brigade for parachute training some two months prior to the Suez landings.

The influx of troops included a French brigade which arrived at only seven days notice, the site selected for their camp was at Pyroi some fourteen miles South of Nicosia. The erection of this camp, initially to Scale A, was a typical all out effort: the camp was erected mainly by directly employed labour, recruited in a somewhat unorthodox manner, with the aid of village bus drivers, rounding up the labour until the buses were full. In spite of curfews work continued day and night and the camp was ready on time.

In November, the Anglo-French forces entered Port Said. RE units from Cyprus who accompanied the expedition included HQ 37 Regiment, 3,9,40 Squadrons, the Stores Troop of 18 Field Park Squadron and elements of 51 Port Squadron. They all returned in November and December.

35 Army Engineer Regiment which had returned to Cyprus for this emergency in the port operating role amalgamated with 276 Port Operating Regiment (AER) and worked the docks at Famagusta and Limassol, unloading and sorting out the stores evacuated from Suez. 81 and 82 Port Regiments also reinforced the docks operating force in Cyprus during this period. The majority of the reserve units were returned to UK during December and 35 Regiment finally left for UK in January 1957. 551 Field Survey Depot AER which with the Survey Directorate had accompanied 2(BR) Corps to Port Said, returned to Cyprus and remained there until April 1957.

### THE FINAL PHASE OF EOKA

Once again anti-EOKA activities could be resumed unencumbered by external priorities, but the guerrilla warfare phase had really ended, never again was there any significant operation against the Army. The campaign degenerated to sneak bombing attacks and individual murder attempts mostly against fellow Cypriots. Pressure was maintained on the small remaining EOKA cells whose main success now lay in evasion from capture. The success of the Security Forces was such that EOKA declared another unofficial truce from April to September 1957, making it possible to reduce the Cyprus garrison, and 16 Parachute brigade, including 9 Parachute Squadron, returned to Britain. 3 Field Squadron sailed for home in December and were reunited on board the troopship with their parent 22 Field Engineer Regiment who embarked in Tripoli. Field Marshal Harding relin-

quished the governorship in November to be replaced by Sir Hugh Foot.

Archbishop Makarios was released from internment in the Seychelles and returned to Athens where he succeeded in drumming up the propaganda campaign with accusations of atrocities. At this stage in the light of an easing of emergency regulations, the Turks had begun to suspect and fear a British deal with Greece; and intercommunal violence occurred in Cyprus. The final flare up of EOKA violence took place from March to May 1958. The death of yet another sapper occurred in a large scale operation launched in May by 3 Infantry Brigade, with 33 Field Squadron and 18 Field Park Squadron in support. There was no let up in security forces pressure on the remnants of EOKA but the scale of operations became smaller, interspersed with sporadic outbursts of intercommunal fighting.

It had become obvious that any solution of the Cyprus problem required the concurrence of both Greece and Turkey. A meeting of Foreign Secretaries of both countries, together with the British Foreign Secretary resulted in the Zurich Agreement in which plans were laid for Cyprus independence, the agreement was ratified in London in February 1956. The Greek Cypriots renounced *Enosis* for independence, which they had not been agitating for; while the Turkish Cypriots reluctantly gave up the idea of partition. In December 1959, elections were held resulting in overwhelming support for Makarios as President, Grivas came out of hiding to return to Greece and a hero's welcome, despite his denouncement of the agreement, but Archbishop Makarios had transferred the bulk of the EOKA members support to himself and Grivas retired a disappointed and disgruntled man.

A less acute security situation saw no corresponding reduction of demand for engineer work, indeed it intensified the requirement for training and recreational facilities and camp improvements, as well as for aid to civil communities. The post Suez period saw Sappers constructing rifle ranges at Dhekelia, playing fields at Episkopi, a ski lift on Mount Olympus, in addition to periodic security call outs. A large civil aid project was carried out by 40 Field Squadron and the Plant Troop of 18 Field Park Squadron in the early summer of 1958, to connect the villages of Trozina and Yerovasa in the Troodos foothills with a 1½ mile road and a 130 foot Bailey Bridge. Despite other commitments some training was possible, and during 1957 and 1958, 37 Regiment which had been redesignated as a field engineer regiment in 1957 was able to undertake some long deferred desert training in Libya, as well as regimental exercises in Cyprus under its new CO,



Lieut Colonel B A E Maude. In the summer of 1957, 40 Field Squadron was called on to send a reinforced troop to Oman for operations lasting nearly two months, it was as well that they had just completed training in Libya.

#### THE JORDAN CRISIS

On 14 July 1958 King Faisal of Iraq was overthrown in a coup led by Brigadier General Abdul Karim el-Kassem and as a sequel the RAF who occupied Habbaniya by treaty rights were given notice to leave, bringing to an end also the work of 19 Topographic Squadron. Jordan was threatened and requested aid from Britain. 16 Parachute Brigade with 9 Squadron was flown to Amman on 17 July; 1 Guards Brigade from 3 Division was sent to Cyprus and once again the temporary camps in Cyprus were required. 23 Field Squadron in support of 1 Guards Brigade arrived in August sending one troop to Jordan. As ever, the brigades were supported by their postal detachments whose departure from the UK had been so rapid that ancillary kitting out by 19 Command Postal Depot in Cyprus was necessary. The postal service adapted itself quickly to the ever changing pattern of events always trying to achieve the fastest routes for despatch of mail. 16 Parachute Brigade withdrew from Jordan through Cyprus in October and the following month 1 Guards Brigade returned home after four months in Cyprus during which they carried out some operations as well as unit training.

This departure was the fore-runner to a further reduction of the Cyprus garrison. 34 Field Squadron left in November 1958 to go to Kenya as an independent squadron; Works Services were fully civilianised in April 1959; and later that year Lieut Colonel More was faced with the depressing task of disbanding 37 Regiment; leaving 33 Field Squadron behind in Cyprus at Dhekelia with 3 Infantry Brigade, by then the sole remaining field formation. 42 Survey Engineer Regiment, the RE Stores Cyprus, a composite Cyprus Transportation unit and Postal units also remained; the other two squadrons of 37 Regiment, 40 and 18 went into suspended animation before reappearing at the SME Chatham in 12 SME Regiment.

#### TAILPIECE

Cyprus became independent on 16 August 1960, leaving a British military presence in two Sovereign Base Areas. Much of the ground-work for the defence provisions of the Cyprus Treaty of Establishment

had been the responsibility of a Cyprus Working Party set up in the Joint HQ Under the Chairmanship of the CE MELF, Brigadier C E H Sparrow with another Sapper, Major I T C Wilson as secretary. As well as advice on general defence aspects of the treaty, the working party was deeply involved in the shape of the Sovereign Base Areas and much of the boundary definition was carried out under the direction of the DD Survey, Colonel R C A Edge, by 42 Regiment. From a comparative military backwater, Cyprus had been transformed into a strategic base which had been used for mounting the Port Said operation, and, to a lesser extent, for other operations in the Middle East. Two major construction projects had been undertaken by the Army at Dhekelia and Episkopi and by the RAF at Akrotiri, with occasional Sapper assistance. Overlapping all this activity was an insurgency campaign being waged against the Government of Cyprus, but it never really disrupted the movement of troops or base facilities.

A familiar controversy was exemplified by the employment of RE field units, mainly from 35 and 37 Regiments, for long periods on construction tasks, not from operational necessity but to save money. During his appointment as CE, Brigadier T H F Foulkes pointed out the disruptive effect of this type of work on the unit's training for its proper role and the lowering of discipline and morale caused. He established a principle that only projects with a training value should be accepted, that only one squadron at a time should be so employed and that sufficient notice of the task should be given so that it could be fitted into an organised training programme.

### JORDAN

On evacuation from Palestine in 1948, the British Army had no foothold left in Arabia, but the RAF retained bases by treaty in the former mandates of Iraq and Transjordan. The RAF also maintained a station at Sharjah and reassumed its pre-war responsibility for military control of the Aden Protectorate. The naked state of defences in the Arabian Gulf area was a matter of concern to General Robertson as C-in-C MELF; he used to refer to the area as the largest and richest power vacuum in the world. Contingency plans covered attack or threat to the British sphere of influence; in addition to close liaison with the Jordan Army and exercises there to preserve the entry facility through Aqaba, major exercises were held with RAF support in the Kurdish mountains of Iraq in 1951, while an all arms force, 17

by sea water. Oil tanks were constructed; camp accommodation was provided, including messes and a NAAFI club; a church was built of local stone; a power station, water supply, cold storage and sullage disposal were all run under RE control. In addition, the road running north from Aqaba up Wadi Iim as far as Ma'an was rebuilt and surfaced, there was a reserve of RE Stores held at Ma'an; it was also the staging point for visitors to Petra "the rose red city", a popular calling point for visitors from Egypt. Later on camp structures were produced in Aqaba for use in the Canal Zone at the time of the emergency.

#### THE ROYAL HASHEMITE RAILWAY

Another commitment that fell to the Corps in 1948 was to take charge of the overall management of the Hejaz railway. At the turn of the century, the Turks had built this railway from Damascus to Medina, later a link line to Haifa had been constructed. The gauge was 105mm, an unusual size, thought to have been chosen by the Turks in order to make it more difficult for an invading army to provide locomotives and rolling-stock. The line had been heavily attacked by Lawrence in the First World War, and the section from Ma'an into Saudi Arabia had ceased to operate. In 1943, the line had been extended by Australian Sappers South West from Ma'an to the edge of an escarpment whence the road ran down to Aqaba. However the railway had been operated by Palestine Railways and therefore the Royal Hashemite Railway, as it became, was cut off from its workshops and stores, which had been at Haifa. Two RE officers in succession were appointed as director of the railway, with their help, additional rolling-stock was ordered; oil fired steam engines were supplied from the Canal Zone; workshops and facilities in Jordan were improved; and the trains began to run to time. Railway directorship was handed over to a British civilian engineer in 1955.

#### ARAB LEGION ENGINEERS

Glubb Pasha had foreseen that the Arab Legion required full supporting arms and services if it was to be effective as an army; there was no shortage of manpower and the former Transjordan Frontier Force, run by the British Army but disbanded in 1948 was a useful recruiting source. Artillery, signals and workshops had all been established by 1947 but engineers were late starters. Shortly before the end of the British mandate in Palestine, a RE subaltern had been seconded to the Arab Legion to teach Bailey bridging to an Arab lieutenant and

some forty soldiers with the intention of providing an alternative crossing over the River Jordan for the Arab Legion to occupy the West Bank. A British OC, Major G Horne was posted to this unit on the eve of the Arab Legion occupation of the West Bank area designated as Arab in the UN Partition Plan. The unit which expanded to become a field squadron, provided engineer support during operations and, after the armistice in July, remained on the West Bank where it enlarged to some 300 strong; in 1950, having built its own camp there, it moved to Zerqa. The OC Arab Legion Engineers was also Director of the Royal Hashemite Railway.

After a visit by General Sir Brian Robertson, C-in-C MELF, in April 1951, expansion of the Arab Legion Engineers was approved. Formation of a second field squadron started in May; and Lieut Colonel J Constant was appointed shortly after the assassination of King Abdulla in July, as Commander Arab Legion Engineers. An engineer training wing, later to be a squadron was established, and by 1952, the engineers had expanded into a regiment. Even though RE Officers and WOs had been posted into key positions, there were problems of training without training manuals, shortages of equipment, manpower, vehicles and weapons, which were overcome, largely due to the interest shown by King Hussein and General Glubb, both of whom visited the unit on a number of occasions; and also by help from the British Army in the Canal Zone. Subsequently a base engineer regiment was formed. Colonel F W Simpson was appointed as CE in 1955. By this time the only remaining seconded Sappers were Lieut Colonel J S W Bennett as CO of the field engineer regiment, and the OC and 2IC of the field park squadron.

#### DISMISSAL OF GLUBB

Internal pressures in Jordan led to the abrupt dismissal of General Glubb in March 1956 and withdrawal of the other British officers from the Arab Legion followed two months later. During its short life the Engineers had, under RE direction, become well trained, well equipped and efficient; they had provided necessary support both on operations and exercises; the CE was able to hand over a competent formation to his Jordanian successor. Shortly afterwards the Arab Legion was combined with the National Guard, a militia organised to guard the frontier with Israel, to form the Arab Army of Jordan. British Forces left Aqaba and the RAF treaty bases in July the following year.

## BRITISH ARMY EXERCISES IN JORDAN

Over the eight previous years a number of British troops had trained in Jordan, which had been regarded as an important line of communication in the event of Russian involvement in the Middle East. On at least one occasion a temporary camp was built by combined British and Jordanian engineers; on another, Captain R Wheatley, OC RE Works Aqaba, was amused at having to put up direction signs in the desert leading to a signboard about ten foot square reading Exercise HOT SPOT.

## 1958 CRISIS

The events of 1956 had been a manifestation of internal problems in Jordan due to some extent to the fact that Palestinians owed no traditional loyalty to the Hashemite royal house and were aggravated by Arab nationalism. A crisis in 1957 was forestalled by positive action by King Hussein but Syrian troops stationed in Jordan were found to have been involved. Political changes led to the termination in March 1957 of the 1948 Anglo-Jordanian Treaty, but in the summer of 1958, the security of Jordan was endangered by movement of Syrian forces towards the northern frontier following the Iraqi revolution of 14 July; King Hussein appealed to Britain for help. The overthrow of King Faisal of Iraq posed obvious dangers of a similar attempt being made in Jordan, since Iraq and Jordan had formed an Arab Union in February 1958. The Lebanon requested the USA for help to maintain independence in the face of United Arab Republic (the name given to a union between Egypt and Syria 1958-1961) infiltration into that country and 16 Parachute Brigade was moved to Cyprus in preparation to take part in joint UK/US assistance to the Lebanon under Operation BLUEBAT. On 15 July, US forces landed in Lebanon and a political decision against British participation there was taken. On 16 July a request for military assistance was received from Jordan and the following day 16 Parachute Brigade was in Amman.

The first task was the tactical deployment of the Brigade to secure Amman Airfield. The bulk of the force remained there, mostly in bivouac and with scant facilities for comfort, while a detachment of one infantry company with administrative support went to Aqaba. 9 Independent Parachute Squadron accompanied the Parachute Brigade and set to work with their usual spirit. Weapon pits were blown and essential camp structures were set up including an improvised shower

block. In August a RE Works task force was sent to Amman and an infantry battalion from Aden travelled in HMS *Bulwark* to Aqaba, thence to Amman; a troop of 23 Field Squadron, despatched from England with 1 Guards Brigade via Cyprus also arrived. The camp in Aqaba had to be refurbished, fly proofing and latrines made good; airfield, cold store and sullage plant repaired; fans and refrigerators restored. A local labour force was organised by the Works Force, stores and special items were provided by sea from Cyprus using a scheduled service by landing craft operated by 51 Port Squadron. The opportunity was taken for some field survey checking of the new 1:25,000 map series under production.

The onset of winter called for better standards of accommodation, and plans were made for work to be undertaken by local contractors, however no sooner were the contracts let and work started than the withdrawal was ordered. The UN Secretary General had arranged to station a special representative in Jordan. The British force was withdrawn between 30 October and 2 November and the RE work was measured up and the contractor paid off. The Prime Minister of Jordan expressed gratitude for the psychological assistance given by the presence of British troops in Jordan, he praised the troops behaviour and their friendly relations with the Jordanian Army and people. The intervention had been successful.

## SOUTH ARABIA

### ADEN

Aden had become a British colony in 1839 as a coaling station, but possession had always been disputed by claims that it formed part of the Yemen. Twenty-three tribal territories had been formed into the Aden Protectorates, and the rulers provided with arms to keep the peace. Aden formed part of the Middle East Command, becoming an RAF responsibility in 1947 when British Army units were withdrawn and the military policy reverted to its pre-war system under which air power was used to deal with trouble amongst the up-country tribes, and, for a local ground force, the RAF had formed the Aden Protectorate Levies. Generally however, the inhabitants of Aden were considered to be docile, and those of the Protectorate, although wild, were uncoordinated and accounted no menace. A foretaste of future trouble occurred in December 1947 in Aden, sparked off by the Arab-Israeli situation; four days of arson and looting were stopped only after naval and military parties landed. Calm was restored, and the RAF resumed total military control.

## YEMENI INVOLVEMENT IN THE ADEN PROTECTORATE

Evidence of British weakness in the Middle East encouraged the dissident elements who began to receive increasing Yemeni support, their activities became more belligerent. The trend to lawlessness was highlighted in June 1955 by an ambush of the Levies in the Protectorate. HQ 51 Infantry Brigade with a squadron of the the Life Guards, 1 Seaforths and a troop of 3 Field Squadron was despatched from Egypt as a punitive expedition. Its route from Aden was some 350 miles eastwards along the coast and then inland to Wadi Ain where the Levies had been ambushed. This force, withdrawn in October, was replaced by troops from Kenya and a small Army HQ attached to the AOC's HQ; but a permanent Army HQ Aden under a Brigadier was established in April 1956 and Aden became an Army station, but without Sappers. It was manned initially by a battalion from Kenya with an armoured car squadron from Malaya and in September 1956, a battalion from the UK was sent there on a tour of duty, reinforced in December by another battalion. The Yemen made a claim to the UN in January 1957 for possession of Aden, and soon afterwards began to support insurrection up-country including sending troops across the border to attack Dhala; and in March the four battalions of Aden Protectorate Levies were transferred to Army control. Works services remained under the Air Ministry Works Department.

A problem, not apparent under an air-policing strategy, soon became evident in that there were no roads from Aden leading up-country. Therefore, after the 1958 operations in Oman in which 34 Independent Field Squadron had been deployed from Kenya and had also supported the battalion from Kenya which had been sent to Aden, it was considered necessary to retain a troop in Aden. 34 Squadron less a troop returned to Kenya and a fourth troop was flown out from the UK so that the Aden troop could be rotated every three months. This troop was raised to independent status at the end of 1959 after continuous employment partially on works tasks but also on operations in support of the Aden Protectorate Levies with mine clearance and track construction. That Autumn the first Sapper had been killed in action on the Dhala road. The Aden troop maintained a detachment in Muscat with minewarfare tasks—a widespread command for the troop commander.

The Army became responsible for the forces postal service in Aden in 1957 and in January 261 Postal Unit took over from an RAF postal organisation and the civil authority. One of the first field post offices

was set up in the old RN gaol where the rings for tying down prisoners still existed. As the troop strength increased to meet the various situations in Arabia, so too did the work of the Army Postal Service. A DAD PCC was appointed in Aden in 1958 and full APO facilities were provided in Bahrain and Sharjah.

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

#### GROWING IMPORTANCE OF ADEN

The relative importance of Aden had grown with the withdrawals from other areas of the Middle East. A Joint HQ, British Forces Arabian Peninsula (BFAP), opened on 1 April 1958, and two years later became HQ Middle East Command. There had been growing signs of insurgency. British troops had flown in from Kenya in April 1958 to assist the Colonial Authorities to deal with a gang run by the Jifri brothers; in the event the brothers were arrested by the Political Officer at Lahej and the battalion from Kenya was not committed. The next five years were comparatively quiet from the Army view point. The garrison was reduced in December 1958 to two battalions with supporting arms and services and indeed Aden started to become a family station. Short and medium term plans for accommodation for two major units were approved in the War Office in 1957 and a long term plan for a battalion barracks the following year. The road to Mukeiras was an exacting commitment to which there was much tribal hostility at first but as its commercial advantages became apparent it became increasingly popular and its completion at the end of 1960 was greeted with as much rejoicing in local circles as by the military.

There were teasing political and strategic problems and the embryo Federation of Southern Arabia was started in 1959 when six of the Protectorate States merged, to be joined by four more the following year. Both Yemeni and Egyptian opposition was virulent and did not bode well for the future.

#### OMAN

South East Arabia was enclosed on three sides by the sea and was cut off from the bulk of the Arabian peninsula by the *Rub' al Khali*



("Empty Quarter") desert. The whole area was known as Oman. Politically, it was divided into the Sultanate of Muscat and Oman, comprising most of the land between the *Rub' al Khali* and the sea, and the Trucial Oman States, the northern strand on the Persian Gulf, the latter comprising seven independent sheikhdoms, the largest of which was Abu Dhabi. The Trucial States took their name from a Perpetual Maritime Treaty which the Sheikhs concluded with Britain in 1853 and which was aimed at the abolition of piracy and maritime hostilities. Despite the fact that no formal arrangement for protection existed between Muscat and Oman and the British Government, it was an accepted principle of British policy in eastern Arabia to uphold the sovereignty of the rulers of all the Gulf states against their enemies, both within and without. Such protection was implicit in the Treaty of 1853, so far as the Trucial States were concerned.

#### BURAIMI OASIS

On the borders of Abu Dhabi and the Sultanate of Muscat and Oman and West of the Hajar Mountain range lay Buraimi, a large oasis consisting of nine villages. It was a position of some importance for either political manoeuvres or military operations and also was a convenient base for oil exploration. But boundaries of this area had never been well defined, and Saudi Arabia had made various claims to Buraimi, indeed they had occupied it between 1800 and 1869. In 1949, a Saudi claim prompted no doubt by oil discoveries, was made for a boundary line running further north than ever before, and when this was rejected by both Britain and Oman an armoured column sent by King Saud, occupied Buraimi. Britain advised a diplomatic reaction but after some three years of fruitless negotiations the oasis was reoccupied in October 1955 by the Sultan of Oman's forces and the newly raised Trucial Oman Scouts. At the same time a British force was despatched from Libya to Sharjah where the RAF maintained an airfield.

#### MUSCAT AND OMAN

Meanwhile the internal affairs of Muscat and Oman had deteriorated. For centuries there had been a division between the Sultan, who was the temporal ruler, and the Imam, the religious ruler whose sphere of influence was strongest over an area South West of the Hajar. Prior to 1954 there had been good relations between the two for many years; but the old Imam died, and the new Imam, Ghalib-ibu-Ali and his ambitious brother Talib sought backing from both Egypt and Saudi

Arabia, who supplied money and arms. When the Sultan moved against Buraimi he also took steps to assert his authority in Inner Oman; and Ghalib and Talib fled, the latter to Saudi protection. An unstable situation prevailed; the Saudis were still determined to obtain access to the oil resources and, having failed the direct approach at Buraimi determined on an indirect method by supporting the Imam and his brother. The two had powerful allies inside Oman, in particular on the plateau of the Jebel Akhdar (The Green Mountain), whose peaks towered to 10,000 feet and whose approaches were so favourable to defence that no enemy had hitherto been able to capture it. Money and arms began to trickle through from Saudi Arabia into the mountains. The Sultan meanwhile had shown little concern in these matters, and did not even visit the area after the successful Buraimi Oasis operation of 1955. Signs of trouble came in the Spring of 1957, Talib's Liberation Army recruited from Omanis working in Saudi Arabia began to infiltrate back to Inner Oman, a minor revolt occurred in West Hajar, and the Sheik concerned was imprisoned. By July, the white flag of rebellion was being flown in all the main towns and villages of Central Oman, the revolt was too powerful to be dealt with by the Sultan's forces and he appealed to Britain for help.

#### BRITISH SUPPORT

A British garrison of one infantry company, which had been in Sharjah since it arrived from Libya in October 1955, was flown to Bahrain in March 1956 for riot duty. It was subsequently reinforced by a second company and later replaced by a battalion from Kenya. 73 Field Squadron joined the Bahrain garrison at the end of 1956 but was sent home for disbandment early in 1957. By then the garrison had become one battalion in Bahrain with a detached company in Sharjah. At the time of the revolt a force consisting of the British garrison battalion, three squadrons of the Trucial Oman Scouts, one of the Sultan of Muscat's Northern Frontier Regiment, Scout cars from Aden and a troop of 40 Field Squadron from Cyprus, under an HQ from 51 Infantry Brigade in Cyprus, deployed to Ibri, Buraimi and Fahud. Three weeks later the revolt was crushed. The RAF attacked their principal strongholds; the British troops, with the Sultan's Army and the Trucial Oman Scouts were joined by the loyal tribes. They advanced on the rebel centres which capitulated after token resistance, and Talib, who had returned to Oman with the tribal leaders, fled to the Jebel Akhdar. Sapper tasks included mine clearance, demolitions and water supply.

The British Government supported the Sultan for a variety of reasons. The revolt had outgrown the status of internal politics through interference of the Saudis and Egyptians, and the other Gulf states rulers had been alert to Britain's reaction over this subversion of one of their number within his own country; the Sultanate was an ally of 150 years standing. Furthermore there were obvious economic and strategic stakes for Britain in the area.

#### JEBEL AKHDAR

However, for political reasons, British troops were withdrawn in late August 1957, except for a few armoured cars. The Sultan's forces, three weak companies based at Nizwa, were faced with the problem of reducing the rebel force on the Jebel Akhdar.

Ignorance of the area was extreme, nobody in the Government side having apparently any idea of what was on the top of the Jebel, or how to get there. The rebels began to build up their strength faster than the Government troops, and began to carry the fight to territory in the plains. Over one hundred and fifty mining incidents were reported, and eighteen Ferrets of the Life Guards were damaged in this way. Despite artillery and aerial bombardment, the rebels were still strong at the end of the cool weather in April 1958, and the British Government took over active control of the Army with the aim of settling the matter. 24 Infantry Brigade Group, from Kenya with 34 Independent Field Squadron under command was deployed with a squadron of the Life Guards. The force was supplemented in November 1958 by a squadron of 22 SAS Regiment from Malaya followed by a second squadron in January 1959, the Trucial Oman Scouts and a squadron of scout cars. In late November the SAS secured a foothold on the North face of the mountain, and in a brilliant action in January 1959, the SAS with the Life Guards in a dismounted role captured the rest of the Jebel. During this time, 34 Squadron had been employed on the construction of a base camp for the force at Beit al Falaj, HQ of the Sultan's Armed Forces, as well as on mine clearance, work on tracks and on mining and booby trapping the Jebel paths.

#### MALTA CC

WITH its fine natural harbours and its strategic position on the sea lanes, Malta had been a vital link in Britain's defence planning since the Napoleonic Wars: and even more a key point after the opening of the Suez Canal in 1869. A constitution, established in 1921, set up self government subject to certain limitations. In 1947 a new constitution

came into force. The economic structure was based to a considerable extent on employment by the British defence departments.

The connections of the Royal Engineers with Malta go back to 1806 when a Corps of Maltese Military Artificers was first formed. In August 1946, the Malta Fortress Squadron was formed from Maltese Sappers who served in RE units in Malta during the war. Locally enlisted Maltese Sappers served in both 16 and 24 Fortress Squadrons pre-war when the duties of these units were largely the manning of searchlights, as well as in a number of war-formed engineer units, but the opportunity to serve in a Maltese unit of the British Army was new. The initial tasks of the Malta Fortress Squadron were to carry out reconstruction work in support of the works services, and bomb disposal. However in 1959, they became the first post-war Maltese unit to leave the island as a whole when they went to Tripolitania to train for a month.

In April 1947 Malta Command became part of Middle East Command and in July 1947 was given responsibility for Cyrenaica and Tripolitania, which meant that preparations in Libya for an influx of troops after the withdrawal from Palestine became the task of the CE Malta. In October 1948, the two military districts of Libya were amalgamated with 1 Division; the CE Malta went to Benghazi as CE Libya, and Malta Command was reorganised as Malta Garrison under MELF; Lieut Colonel G D McK Sutherland as CRE (Works) Malta was made responsible in July 1949 for the Malta Fortress Squadron as CRE Malta. There was a full, if undramatic programme of repair of war damage as well as a backlog of normal maintenance of buildings which had of necessity been neglected during the preceding years, and modernisation of military buildings. Major repairs were carried out at the Castile, St Francis Ravelin, and at Lintorn, St Andrews and St Georges barracks. There were a few variations from the programme of work including military and field engineer training for the Fortress Squadron in Malta. A Sapper workshops on detachment was provided for Tripoli from July to September 1948 to support the works services necessary there, and a tunnelling troop was raised in the Squadron in 1949. Originally started to clear the bomb debris in Malta, this troop also went to Libya for tunnelling work in connection with a proposed water supply for the Derna cantonment project. In the war damage repair role, unexploded bombs were discovered and a BD trained captain and sergeant were authorised on the Fortress Squadron establishment in February 1950; during the following years a number of bombs were successfully disposed of. By

March 1950 a ten year building programme for the accommodation of the Army in Malta had been prepared and work on it had started.

During much of this period 3 Commando Brigade was based in Malta but RE attachment was limited to an SORE 3 at the Brigade HQ. It was not until after Operation MUSKETEEER that a Sapper detachment, initially in the form of a beach troop was allotted to the brigade; there was however periodic sapper participation in amphibious affairs, reflecting their active involvement in amphibious warfare. Trials of the Naval Landing pontoon (NL) equipment were held in Malta in December 1952 and a small party of Sappers were flown from the UK to assist; although not entirely conclusive the trials showed the practicability of using the equipment to bridge the water gap between an LST, carrying Centurion tanks, and the shore. The following year saw Malta selected as the site for the Middle East station of the worldwide Army communications network to replace the loss of the station at Fayid. Two transmitter stations and a tape relay centre were put in hand in August 1954 by the works services and completed by the end of 1955. Also in the same year a retriangulation of Malta and Gozo was carried out by 1 Radar Air Survey Liaison Section working with the survey ship HMS *Dalrymple*. The Suez crisis in 1956 saw 20 and 37 Field Squadrons and 74 Corps Field Park Squadron arriving in Malta destined for Port Said. Changing circumstances prevented their travel further east and they returned to their permanent locations in Germany and the UK in December and January, having carried out some useful work for CRE Malta in the interval. 74 Squadron found itself embarking on a troopship on Christmas Eve for the second year running.

By the end of the 1950s, Malta's importance as a strategic base had declined and a run down had started of defence establishments. The RE had handed over works services to the new civilian works organisation but the CRE Malta was retained with wider responsibilities for training and construction tasks undertaken by the Fortress Squadron. As far as the British Army was concerned, Malta was becoming a staging base for military training in Africa; and the Malta Engineers had achieved a valuable reputation.

## GREECE

THE British troops thinned out quickly from Greece after 1945, 4 Division RE consisting of 7, 42, 242 Field Squadrons and 18 Field Park Squadron was placed in suspended animation in early 1947, 242 Squadron having reverted to the TA; 103 (Glasgow) Army Troops

Squadron changed its title to 337 and was sent to Kenya; 1014 Port Operating Squadron returned to Egypt; and the works units reduced to 20 CRE (Works). The CRE, Lieut Colonel G W Preston became CE Land Forces Greece for a brief period in 1947 until the post disappeared in the run down. In 1950 an SORE1 was appointed to the Military Mission.

A British Military Mission to Greece remained as the British garrison was run down in 1947, and a crash programme to train some thirty senior RE NCOs for the mission was set in hand at the Middle East SME that Summer. As HQ British Troops Greece was disbanded in 1948, Brigadier C P Jones took HQ 2 Infantry Brigade on its withdrawal from Palestine to Greece, and took command of the British Forces there, remaining responsible to GOC 1 Infantry Division who had moved to Libya. On the departure of 2 Brigade to rejoin its Division in Libya at the end of 1948, only the Military Mission was left; its deputy commandant was a Sapper, Brigadier C D Steel, and the chief engineer advisor was Lieut Colonel F M Hill. RE advisors in the Military Mission had the task of ensuring that the Greek Sappers were properly trained for their battle against communist insurgency. The main engineer problem was that of trying to clear daily many miles of dirt roads of anti-tank mines, mostly of German origin, which were laid at night by insurgents who came down from the mountains.

In 1950 the chief engineer advisor, then Lieut Colonel I G Loch, had his appointment combined with that of SORE1 to the Mission; and Brigadier L E C M Perowne was appointed in 1951 to command the British Military Mission where he remained until it was withdrawn in 1952. Almost inevitably no sooner had the British Army left than they were called for, and following an earthquake in 1952, Lieut Colonel J R G Finch, CO 25 Field Engineer Regiment in Egypt, went by flying boat to Greece and subsequently made a reconnaissance of the devastated area from a Canberra bomber; in the event, however Sappers were not deployed.

A marble plaque to serve as a permanent reminder of the connection between the Corps and the Greek Army engineers was presented by Major General D Carachristos, the E-in-C of the Greek National Army on 6 October 1948 at the Greek SME at Loutraki. The plaque which resides in the RE Museum at Chatham, was accepted by Major General W M Broomhall, CE MELF, on behalf of the Corps of Royal Engineers; it is beautifully carved in relief from Pendelic marble, the same marble that was used in ancient times for the building of the

Parthenon and the inscription in Greek reads that it was given: "To the Officers of the British Engineers from the Officers of the Greek Engineers as a sign of the unbreakable bonds of friendship forged in their common cause."

### THE SUDAN

THERE were three organisations, British, Egyptian and Sudanese, in the Anglo Egyptian Condominium of the Sudan. The Condominium was due to end in 1954 and post-war measures were taken to Sudanise the Sudan Defence Force (SDF) completely by that date. A British major general (*Kaid*) commanded the British forces and SDF troops but not the Egyptian forces. Other British officers were retained in the SDF as commanders of the subordinate formations and on the HQ staffs. The *Kaid* HQ in Khartoum was split into a British staff and a Sudanese staff. British officers with the SDF wore Turkish rank badges, "two-up" from their British rank; majors were graded *Kaimakams* with colonels' badges, and captains as *Bimbashis* with lieutenant colonels' badges. The DAQMG of the SDF was always an RE officer whose duties included that of acting as engineer adviser and also liaison officer with the SDF Engineers; there was also an RE Movement Control officer. The SDF Engineers had no British officers seconded to them but a well established engineer school and depot existed in Omdurman where a SDF Field company was based.

The British troops, except for one infantry company in the hills above the Red Sea at Gebait, were all located in Khartoum, they comprised one battalion with supporting services but without field Sappers. Contingency plans were current to convert the force to a brigade group by flying in reinforcements from the Canal Zone.

The RE Works Services had ended shortly after the war and the PWD undertook all works for the SDF; and for British troops and the Egyptians on an agency basis. A British Sapper major was seconded to the PWD to run the works, with some British clerks of works and a mechanist. Most work was in the Khartoum/Omdurman area, and in 1953, the RE works officer became much involved in the planning for the new Khartoum airport. Apart from this, a five-year programme of new works for both British and SDF troops, mostly new barrack blocks and some married quarters, had been started in 1949, most of the major works being carried out by contract; direct labour being used for maintenance. Even during the period of strained relations between Britain and Egypt, the RE works officer continued to visit

the Egyptian barracks in the Sudan on duty and a friendly relationship was maintained.

In 1954, the Umma party won the first election and called for the withdrawal of British officers seconded to the SDF. The British troops left the following year. However, as a sequel to its long association with the Sudan, the statues of Gordon and Kitchener were offered to be returned to Britain from Khartoum; they were re-erected in April 1960 at the Gordon Boys School, Woking, and at Kitchener Barracks, Chatham, respectively. It is perhaps of interest to note that neither statue was an original; that of Gordon was a duplicate, from the same cast of the statue in Brompton Barracks while Kitchener's was copied from a statue erected in Calcutta.

### MAPPING THE MIDDLE EAST

THE various crises which affected different parts of the Middle East caused sudden, and sometimes unexpected, demands for maps within the very large area of British responsibility. Map production facilities were stretched permanently and a large number of map series had to be maintained; 2 Army Field Survey Depot held some 15 million maps. Production averaged some 150,000 impressions a month but this rose to some 1.1 million a month for five months over the Suez crisis in 1956 and 600,000 a month during the latter half of 1958. Map distribution followed a similar pattern; 850,000 sheets were issued each month during the last five months of 1956 and over 1 million in the month of July 1958.

1 Radar Air Survey Liaison Section was formed in January 1951 to operate with 683 Squadron RAF to carry out an extensive air survey photography programme. Initially coverage was of much of East and West Africa; parts of Iraq and South Arabia followed in 1952/53. In 1957/58 coverage of northern Kenya was flown by 13 (PR) Squadron RAF and subsequently parts of Aden and Muscat and Oman. The result was excellent cover of large amounts of unmapped or poorly mapped areas which was subsequently used to produce new mapping.

From 1948 to 1951, 19 Topographic Squadron was based at Ma'an in Jordan to fix control for and check air survey plots of 1:250,000 mapping of South Jordan. The triangulation included the measurement using Macca Base equipment of a 3½ mile base, the line of which was cleared by 17 Field Squadron. In 1950 and 1951, 19 Squadron also carried out a triangulation astride the Kirkuk-Haifa pipeline. During the winter of 1951/52 the Squadron was in Iraq, based on Habbaniya,



carrying out preliminary work for the 1:100,000 series of Iraq and Kuwait.

After spending some fifteen months in Cyprus, 19 Squadron returned to Iraq in October 1953 and was based on Habbaniya until having to leave after the *coup d'état* in October 1958. The main task was establishing control and carrying out field work for the Iraq 1:100,000 mapping and revision of 1:25,000 contract mapping in Kurdistan and, in addition, a connection between the Iraq and Turkish primary triangulation was undertaken. Most of the work was carried out by small parties working hundreds of miles from base with young surveyors working alone in mountainous country and having to hire mules and buy food locally; they worked in plain clothes, did not carry arms and used vehicles painted in civilian colours. Initially, the soldiers wore pin stripe demob suits, civilian shirts and ties and pork pie trilby hats, but more suitable clothing was issued after a visit by the GOC Middle East Land Forces to a mountain survey camp.

Although the field survey work in Iraq and Jordan produced the most spectacular results in mapping terms, military field surveyors were employed in all the countries of the Middle East where the Army was involved as well as in the Seychelles. Working, often in very difficult terrain, occasionally under fire and liable to have their vehicles blown-up, and frequently at very great distances from base facilities, their work was in the highest traditions of the Corps and made a major contribution to the mapping of the area.

#### FOOTNOTES TO CHAPTER IV

1. *MEANDER* had spent her wartime years running clandestine groups to the Dodecanese.
2. The IWT yard was on Chevalier Island, Lake Timsah where Z craft had been assembled during the war.
3. Captain R Wheatley, then GE Aqaba, on a visit to the Canal Zone witnessed an Egyptian raid near Ismailia: "A train load of Arabs stopped at the suburb where the married quarters and flats were, and the occupants . . . dashed into the flats and took all the furniture away. They were well disciplined, they did not touch the women and children . . . but they took everything of value."
4. Colonel R L White comments "Stringent control had to be exercised over the large number of shift workers involved; their welfare facilities had to be improved, sanitation, laundry of working clothes, all built up to a formidable man-management problem not usual in a works unit . . . The Corps did a good job in the Canal Zone and large numbers of people worked long hours under hot, dirty and depressing conditions to keep the show going."
5. Major (later Lieut Colonel) Goldring then commanding 119 Works Section and Borough Surveyor of Chelsea received his call-up papers at the start of a month's

diving holiday in the Mediterranean where he had just arrived complete with family and caravan which he then had to tow back.

6. "Return from Port Said" *Blackwoods Magazine*, March 1957, by Brigadier Henniker.

7. Intervention in Port Said in 1956 and its outcome put the final stopper on a cantonment development in Libya but not on the development of the water source. Messrs Howard Humphries engaged as consultants to DFW became consultants to the Libyan Government and provided water supply to Beda Littoria which became the new Capital of Cyrenaica.

8. Mr. MacDonald's report included:

"Anyone who visits both sites cannot fail to be excited by the variety and beauty of the scenes which meet the eye at every turn at Dhekelia and make comparison with the flat and tedious environs at Mile 4. The sea is surely the finest mental and physical tonic in a climate like that of Cyprus"

9. The written instruction on the back of a bill for potatoes, is now in the Corps Museum.

10. The C-in-C, General Sir Charles Keightley was provided with an emergency residence in Waynes Keep, Nicosia pending completion of the new Flag House at Episkopi. Necessary work had to be completed in two months during Sir Charles' leave but this period was foreshortened by two weeks, however, all was ready on time. Sir Charles was delighted when he moved in until a startled cry from Lady Keightley disclosed that the lavatory cistern was full of boiling water.

11. There were some thirty British officers with the Arab Legion of whom about half were seconded, the remainder being contract officers employed directly by the Trans-jordan Government, the seconded officers were withdrawn from participation in the Arab Israeli war.

## CHAPTER V

### WITHDRAWAL FROM PALESTINE

A National Home for the Jews—The Military Commitment—Divisional Engineer Units—The Impending Withdrawal—Works Service Tasks—Engineer Stores—Transportation—Summary of Sapper Work—The Last Act.

#### A NATIONAL HOME FOR THE JEWS

Britain ruled Palestine for thirty years from 1918. It had been captured from the Ottoman Empire by Imperial Forces under General Allenby and, in 1923, became a Mandate under the League of Nations to be administered by Britain. But the Balfour Declaration, "to view with favour the establishment in Palestine of a national home for the Jews", was published by the British Government in 1917 at a time when it was uncertain who would carry out the recommendations and few could have foreseen the anti-semitic policies of the Nazis. At about the same time there was an understanding in the Arab world that Britain would help Palestine towards self rule in recognition of the assistance given by Arabs towards the overthrow of the Turks; and this was assumed to mean Arab rule.

Although the Jews and Arabs had lived together in amity for centuries, an increasing number of Jewish settlers began to introduce changes which Palestinian Arabs saw as a threat to their way of life: a pattern which has had familiar overtones in other countries. Both Jews and Arabs were convinced of the validity of their own claim to ownership. The problem had received much attention. The Report of the Palestine Commission of 1937 observed:

"It is obvious in any case that HMG could not commit itself to the establishment of a Jewish state. It could undertake to facilitate the growth of a home. It would depend on the zeal and enterprise of the Jews whether the home would grow big enough to become a state." and on 18 February 1947 the British Foreign Secretary, Mr Ernest Bevin stated:

"The British Government has no power under the terms of Mandate to award the country to either the Arabs or the Jews or even to partition it between them." Palestine thus found herself a twice

promised land and the British Government found itself in a dilemma which in the end it could not resolve.

Despite a carefully imposed quota of Jewish immigrants, the Palestinian Arabs had rebelled in protest in 1936. The Jews raised a self protection force, the *Haganah*, which although never officially recognised, became virtually the Jewish National Army; a militant offshoot was the *Irgun Zwei Leumi (IZL)*. The Arab revolt was put down and the immigration quota was reduced. Then war intervened and both sides sank their differences and rallied to the British cause, except for a small radical faction of the *IZL* who became known as the *Stern Gang* who remained fiercely anti-British and even worked for the Germans. Jewish demands came again to the fore as defeat of the Axis became certain, the *IZL* started their underground activities again in February 1944, with a slogan "VE day for the British is D day for us".

In 1946 Jewish immigration was restarted but only to the extent allowed for in the 1939 White Paper. Public opinion, particularly in the USA, tended to side with the Jews because of their appalling treatment under Hitler. The British Government stood firm; but confident of international support and with an almost endless supply of immigrants from recently liberated concentration and displaced persons camps, a Jewish campaign of hate and murder against British rule started. Preventive measures were turned into formidable propaganda.

#### THE MILITARY COMMITMENT

Palestine had been a popular station for British troops. The first arrival in Palestine from Egypt across the Sinai Desert was a refreshing experience with the red soil, the luxuriant green of the orange groves and in the distance the long blue line of the Judean hills. In addition there was admiration of the industry, enterprise and contentment of the Jewish settlements. During the war Palestine had been used for rest, training and re-equipping military units and post-war proposals visualised the siting of a base for strategic reserve troops near Gaza. The construction had started in 1945 and the subsequent "stand fast" on all building has already been described in a previous Volume.

The Army HQ, British Forces Palestine and Transjordan, was in Jerusalem together with the seat of Government. There were two subordinate Area HQ in North and South Palestine which were responsible for the various static and administrative units, superimposed on this framework were the divisions. 1 Infantry Division had

withdrawn from Italy to Palestine in the Spring of 1945, and 6 Airborne Division destined for South East Asia was diverted to Palestine in September. 3 Infantry Division, similarly diverted, arrived in the Middle East in the late Autumn and deployed two brigades to Palestine by the end of the year. The growing threat of trouble in Palestine brought about a revision of the wartime system whereby internal security duties were handled by the area HQ, and direct responsibility was allotted to divisions.

The CE, Brigadier R H Perry, had his HQ heavily committed to the works programme. In addition to four works areas each with a CRE (Works)<sup>1</sup>, engineer specialist troops deployed on construction tasks were 344, 796 and 887 Electrical and Mechanical Companies, 653 Road Construction Company and 659 Artizan Works Company, who incidentally ran a dance band much in demand for Army social functions. There was also the RE Establishment Beit Nabala and 4 Engineer Stores Base Depot. Divisional engineers were mainly employed by their own divisions, much of the time providing assistance to improve the temporary camps which most units occupied and periodically becoming involved in peace-keeping operations. There was occasionally time for training, a very necessary consideration because of the high rate of turnover of all ranks. An AD Survey Palestine, Lieut Colonel A Walmesley-White, controlled 13 Field Survey Squadron and 9 Army Field Survey Depot.

The sabotage campaign was launched in October 1945 by an attempt to disrupt rail communications in Palestine with a simultaneous attack at 240 places. Although many lines were cut by explosive all main lines were in action again after two days. The attack was generally considered to be a demonstration by the Jews of their capability, it was attributed to the *Palmach*, the elite of the *Haganah*. The skill, discipline and determination displayed and the faultless information on which the attack was based was typical of many to follow.

The Jewish Underground displayed considerable ingenuity and expertise with explosives; a number who had served with the wartime British Army in the Jewish Brigade and in the Special Operations Groups had joined the underground. A significant effort of the divisional engineers went into the removal or neutralisation of explosive devices, or into clearing up the effects of an explosion afterwards. The most dramatic such incident, the demolition of a wing of the King David Hotel in Jerusalem in which 9 Airborne Squadron, as the rescue force, maintained its inimitable reputation, was described in a previous volume. There were a number of similar incidents, the

Semiramis Hotel and the Goldsmith Officers' Club being just two; virtually every squadron in Palestine experienced at least one similar task. As time went by the triggering mechanisms for explosive devices grew more sophisticated and booby trap systems were incorporated which caused a number of casualties among the Sapper officers called out to deal with them. The 6 Airborne Division historian wrote "No one would question the fact that the real dirty work went to the Royal Engineers". Sappers from 248 Field Company had a lucky escape in October 1946 when called to Haifa East Railway Station where a suspect bomb in the form of a 40-gallon oil drum had been off-loaded into the booking office. When preparing to rope out the drum to waste ground behind the station a slight noise from within was heard, the subaltern in charge just managed to get his Sappers clear of the building before the entire centre section of the railway station was blown down. Subsequently this officer was killed on a mine in May 1947.

Eventually casualties from attempting to neutralise devices became such that in early 1947 the order was given to destroy explosive devices in situ, accepting damage as the price for saving life. Eight Sapper officers lost their lives in dealing with such devices; a particularly gruesome episode was the booby trapping of two field security sergeants, who were hanged by the IZL in July 1947 after a mockery of a trial; an officer from 23 Field Squadron was wounded when he cut down the bodies and thereby detonated an explosive charge.

Other explosive innovations made their appearance at the end of 1946. Dummy milestones made of tin camouflaged with plaster, filled with explosives and nails or scrap metal to taste, and exploded electrically, made an anti-vehicle mine which it was difficult to anticipate. One of the first mines to be detected was found by a weary guardsman of 1 Guards Brigade who sat on a convenient milestone and noticed that it was insecure, fortunately for him the firing mechanism was not functioning. A variation of the milestone mine in the form of a kerbstone was also used. Explosive vehicles were made by the simple expedient of loading, and concealing, explosive on to a stolen vehicle, the first such incident was an attack on the South Palestine District HQ by the Stern Gang causing thirty casualties. The Central Police Station and Barclays Bank in Haifa were damaged in January and February 1947 by "explosive vehicles". A vehicle-mounted "Barrel Bomb" launched sideways down a ramp from the back of a lorry was used by the IZL to crash through a fence and roll in the side of the building housing the Haifa District Police Head-



Rubble clearance during the Suez operations in 1956

Bolted steel tank farm built by 37 Field Engineer regiment to supply aviation fuel for British and French air forces at RAF Akrotiri for the Suez operations



Suez operations in 1956



37 Field Engineer Regiment on anti-EOKA terrorist operations in Cyprus.





The survey of Northern Kenya 1956. A field party from 89 Field Survey Squadron, armed with the No 5 Lee Enfield, establishing a ground station in a remote location  
*(By courtesy of the Trustees of the Imperial War Museum)*

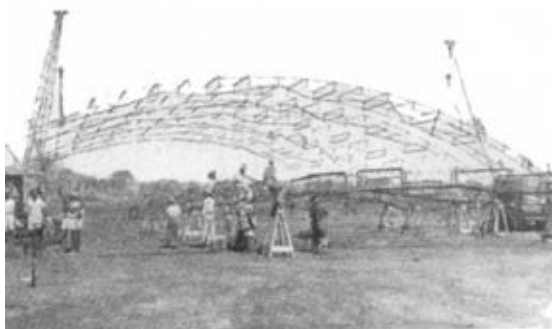


A road for the Security Forces in the Aberdares built during the Mau Mau Emergency by 73 Field Squadron *(By courtesy of the Trustees of the Imperial War Museum)*

Northern Kenya 1956



The Mackinnon Road project. Typical Mackinnon Road bush



South-West-Pacific hangar, colloquially known as "Igloo", partially erected using 19 RBs



"Igloo" partially clad



Part of Ordnance Depot showing dense bush

The Mackinnon Road project

quarters on 29 September 1947. The bomb estimated to contain some 500lb of explosive almost totally wrecked the building. This type of bomb was used on other occasions but never again with comparable success.

By no means all demolition attacks were successful. An attack on Mount Carmel by the IZL in July 1947 was surprised and the attackers fled leaving their assault charges for 6 Airborne Division RE to dispose of. The successful destruction by the Jews of all the bridges across the River Jordan in June 1946 was another illustration of the thoroughness of their planning, and the difficulties of preventing sabotage. The demolished bridges were generally replaced by Bailey bridges<sup>3</sup>. It was fortunate that there was little Arab activity against the Military at this stage; the only recorded incident was an Arab arrested in July 1946 carrying a load of land mines which he said he had contracted to carry for Jews; at the same time another Arab was trying to buy the consignment with counterfeit £5 notes. It brought variety to the role of the divisional engineers.

There were other Sapper tasks, searching being one. In July 1946, 1 Division Sappers unearthed a major arms cache at Mesheq Yagur near Haifa. The following month 6 Airborne Division RE had a similar significant success in a 3 Parachute Brigade operation in the Negev, on this occasion the search dogs proved their value.

In the meantime the Jews formed an organisation aimed at flooding the country with immigrants. Refugees from the displaced persons camps in Europe were only too eager to journey to Palestine, little realising that they became pawns in a game. From mid 1946, a steady stream of dilapidated, often unseaworthy vessels, loaded to the gun-wales with refugees in appalling conditions of filth and lack of sanitation made their way across the Mediterranean, to be intercepted by the Royal Navy and have their pathetic cargo captured and interned.

But it made good propaganda. From August 1946 these illegal Jewish immigrants were shipped to camps in Cyprus. The process of off-loading the immigrant ships and transferring the refugees, some so debilitated by their journey that they were too weak to walk to transport to take them to Cyprus, was one of the most distasteful tasks set the Army in Palestine. It was a moving sight to see the fanaticism with which these hopeful immigrants regarded the *Holy Land* and the hardships they had faced to get there. Many were in no fit state for a journey at the outset; a number of births during voyages were recorded. The organisers of such voyages deliberately traded in human misery knowing that there was little chance of escaping the blockade

and that the only value of the enterprise would be the publicity of transshipment. Sapper teams were invariably present at the transshipments to effect entry with engineer tools to any particular part of the ship, and as a final search party for explosives or other potentially dangerous items when the ship was empty. On one occasion there were no adequate vessels in which to transport the illegal immigrants and two cargo ships had to be converted at short notice for the task. By working around the clock with every available welding set the 1 Divisional RE completed the task; it was ironic that the two vessels were "Liberty" ships. In August 1947 some 4,500 illegal immigrants on the *President Warfield* were shipped back to Germany. But the attempts continued and the divisional engineers were called on periodically to construct field machines on beaches to rescue illegal immigrants from ships offshore.

#### DIVISIONAL ENGINEER UNITS

The post-war turbulence which caused a rapid turnover of manpower in units also induced a number of changes of title. 1 Division RE consisting of 23, 238 and 248 Field Companies and 6 Field Park Company, became 12, 20, 23 and 6 Squadrons at the beginning of 1947 when the Territorial Army was re-formed and traditional titles were required. 3 Infantry Division which had deployed fully into Southern Palestine by the end of 1946 disbanded the following year. Their Sappers were broken up; 17 Field Squadron amalgamated with 20 Field Squadron in 1 Division, 246 and 253 returned to the TA and 15 Field Park Squadron sent a cadre to Germany to carry forward the title in 5 Division. 3 Division was replaced in Palestine by 1 Armoured Division which had come from Italy and, in turn, also disbanded in Palestine, leaving behind 61 Lorried Infantry Brigade until February 1948. The Divisional Engineers (8, 55, and 56 Field Squadron with 143 Field Park Squadron) were renamed East African Engineers in September 1947 and sent to Kenya. 6 Airborne Division had arrived in 1945 with only 1 and 9 Airborne Squadrons and with 286 Airborne Park Squadron subsequently redesignated first 249, then 147. The Sapper strength had been made up by the attachment of 482 (Royal Bombay) Indian Field Company. In 1947 the Division was reinforced temporarily with 2 Parachute Brigade including 3 Airborne Squadron, while on their way home from South East Asia. 482 Company was then attached to 1 Division before returning to India. By the time of the withdrawal the only divisional engineers in Palestine

were those of 1 Division with Lieut Colonel A W Kiggell as CRE and 6 Airborne Division where the CRE was Lieut Colonel A D Hunter.

### THE IMPENDING WITHDRAWAL

Jewish and Arab aspirations were completely irreconcilable; a fact recognised by Dr Weizmann, the Jewish leader in suggesting "the line of least injustice". Every initiative to achieve a solution was blocked by one or the other. Public opinion in Britain had become increasingly uneasy and Britain had incurred the animosity of both the Arab world and international Zionism. It was an impossible situation. A UN Special Committee on Palestine published its report in September 1947 recommending partition which was accepted by the UN in December, but not by either Arabs or Jews. The former had already realised that time was on the side of the Jews and had declared that partition would be resisted by force; there had been Arab riots against Jewish property. In November 1947 the British Government announced that they would end the Mandate on 15 May 1948.

It was obvious that not all British troops could be clear by that date since there was a responsibility for law and order to the very end of the Mandate. The plan was that the covering force should see the government safely out of Palestine and then concentrate in an enclave at Haifa from which final evacuation would be made not later than 1 August 1948. The withdrawal period thus fell into two phases: firstly the six months before the Mandate ended, during which the military establishment would run down and as much as possible would be evacuated; secondly a period of some ten weeks for clearing the Haifa enclave. In the event the final evacuation was made on 30 June, a month ahead of schedule. Plans had to cover evacuation of some 5,000 British Palestine Police and civil officials, about 80,000 servicemen and more than 250,000 tons of stores, not counting unit equipment. Meanwhile the Army had to maintain law and order, replacing the police as they disappeared; and on occasions the judiciary.

Intercommunal strife started in Jerusalem where 2 Infantry Brigade Group, commanded by a Sapper, Brigadier C P Jones, had responsibility for internal security. The strife spread to Jaffa, then to Haifa. The area most in dispute was along the proposed partition line which became in effect the start-line for the Arab Israeli war when the British left. The role of middleman was not easy and the Army was frequently blamed by one side for the misdeeds of the other. An officer

of 1 Airborne Squadron was shot dead in Haifa when going to the aid of a Jew hit by a sniper. On another occasion Brigadier Jones was given a very hostile reception when investigating an explosion in a Jewish establishment in Ben Yahuda Street in Jerusalem, for which the Arabs were responsible but the British were blamed. By 1948 the *Haganah* had started to control their own extremists and were appearing in the open as armed patrols, sometimes disguised as British troops, to an extent which caused Arab demands to exercise authority over British Army and Police patrols. In general, however, Arab leaders remained genuine and helpful in their efforts to assist the British but they did not have the same unity of command as did the Jews, particularly when volunteer reinforcements from Iraq and Syria, as well as ex-members of the Transjordan Frontier Force, swelled the Arab Liberation Army to an estimated 10,000 strong.

There were few attractions in the daily life of the troops; living in temporary accommodation with long hours of work and frequent guard duty. Off duty pleasures were severely limited and visits to towns were hedged with many restrictions, even bathing on the coast had to be escorted and guarded. Despite this morale remained high<sup>4</sup> particularly so in RE units possibly because of the variety and obvious value of their work, and the overall attractions of the country which left a lasting impression.

A number of permanent camps, some to the comparatively lavish pre-war standards, existed. Sarafand, for instance, was a well found cantonment with married quarters, messes, clubs, cinemas, shops and swimming pools, as well as trees and gardens. In the Gaza area the camps for two divisions mentioned earlier were nearing completion by the time of withdrawal; some of them were occupied. As far as possible fixed assets such as camps and buildings were to be sold, and this meant holding on to property until it was suitably disposed of or evacuated. It was clear to both sides that anything left behind could be to their own benefit. Arabs had for a long time appeared to regard British Army property as a legitimate source of general supply and were experts in the art of silent pilferage of even bulky articles. British troops invited to Bedouin hospitality were accustomed to being offered food, drink, cigarettes and even cutlery of obvious NAAFI origin. There were several incidents in which individuals, in one case a commanding officer, woke in the morning to find their bed the only article left in a tent. On at least one occasion the tent itself had disappeared too. In particular the protection of weapons and warlike supplies became of even more concern as both sides redoubled their

efforts to ensure that as little as possible left the country and to equip themselves for the coming struggle.

Sometimes an Arab child would creep into a tent where the duty sentries slept with their rifles to place a hook attached to a cord on the trigger guard of a rifle. The cord would then gently be pulled, perhaps from outside the camp perimeter, if necessary for hours, until the "fish" was landed. The Arabs almost invariably relied on stealth. On the other hand the Jews were more conscientious about direct theft and Jewish gangs employed a variety of subterfuges, and even murder, to achieve their aim. There were a number of proven incidents of Jewish clerks diverting consignments of stores to their own contractors. Both Arab and Jewish civilians were employed in the larger camps. Both worked conscientiously on the whole and appeared to have a tacit agreement to keep the peace during working hours which was maintained until the last few weeks. But some undoubtedly also kept their eyes open for advantages to be gained by their own side. The British soldier almost literally had to hang on to his shirt.

It was an especially busy period for the Sappers. Some of the time was spent in the infantry role; sometimes being Infantry by night and Sappers by day, and with dawn patrols along the railway to remove mines. Specific engineer tasks for evacuation included the construction of "Exodus Bridge" built between Haifa and Acre. It was not really a bridge but a jetty made mainly of Bailey bridging with a floating landing stage at which vessels of nine foot draft could be loaded. It was built in three weeks of stormy weather by 12 Field Squadron and 4 Engineer Stores Base Depot. An official "military observer in Egypt" visiting at the time was impressed with the guts of the young Sappers building the bridge. In a press article he concluded "Exodus Bridge will not go down in history as an engineering epic. . . . but it stands today stronger than the waters which surround it, a tribute to men too proud of their craftsmanship to admit defeat". 1 Airborne Squadron also constructed a hard for landing ships at Haifa. As things turned out the port remained in action to the end and the alternative insurances were little used: an 800 yard road built to Haifa harbour from the East to facilitate evacuation, was of much value.

A more popular engineer task was that of destruction of obsolete armoured vehicles. A local contractor who had tendered for cutting up some 500 armoured vehicles, including sixty tanks, was found to be adopting a deliberate go-slow policy as well as carefully marking what he had cut up for subsequent reassembly. The task was given to 1 Airborne Squadron who chose a graveyard at Wadi Fara near Nablus.

The vehicles were pushed over a cliff in batches of five and then blown up<sup>5</sup>. It became a favourite show piece for visitors from the War Office and GHQ Middle East.

#### WORKS SERVICES TASKS

As soon as withdrawal had been decided upon, the liquidation of the Army's fixed assets became a matter of concern, as much as possible needed to be saved from the wreck. It was on this salvaging operation that the Works Services laboured, at high pressure, for the six months of the withdrawal. For those who had built the new camps near Gaza it must have been a disheartening job to undo the result of two years' work; Lieut Colonel Sandeman, commanding 65 CRE (Works) at South Gaza, gave the following account:

"The idea was to sell the camps as they stood to Arabs or Jews according to the area they were in. As far as the South Gaza group of camps was concerned, they were all in an Arab designated area and the Arabs would not, or could not, buy. So the order was given to strip the camps of all valuable stores and fittings and then to abandon them. The contents were sent by road to the Canal Zone. The truck drivers who, to start with, were Arabs, got away with a good deal, refrigerators in particular seemed irresistible. Even in convoy a driver would suddenly turn his lorry off down a side road and be seen no more. Later, British or Mauritian Pioneer drivers were used."

The security problem in the camps themselves became acute. As soon as the Arabs realised that evacuation had started, they became much bolder in their attempts at theft which went on every night and brought a considerable strain on the few British works services staff who remained, with a small guard, after the occupying unit had marched out. The Arabs had apparently no wish to use the buildings left behind; they were regarded merely as a source of supply of building material. Within minutes of the last British troops departing from a camp a horde of Arabs, men, women and children, would appear mysteriously from the surrounding countryside and proceed systematically to remove everything except roads, paths and the foundations of buildings. Some of their demolition techniques were interesting. An RE Warrant Officer witnessed the demolition of a camp cinema built of concrete blocks and large enough to seat 600:

"The Arabs made six holes, just above ground level, in each of the long walls. Through each hole they put a length of rope and tied it, on the inside, to a timber 'spreader'. The spreaders were lengths of



palm tree trunk and the ropes were, I think, made of twisted palm stalks. They then hitched two camels to the outer end of each rope. An Arab climbed up on the roof of the cinema and stood on the ridge conducting operations. When all was ready he gave the signal and all the camel drivers, yelling like mad, drove their animals outwards. The walls of the building gave way and the roof, with the 'conductor' still on it, crashed to the ground. Some hundreds of Arabs, including many children, then descended on the wrecked building and 'took it apart'. The larger pieces such as roof girders were dragged away by the camels; smaller items such as roofing sheets were carried by men and children."

In Jewish areas a certain number of camps, of which Sarafand was one, were sold, more or less as they stood, to Jewish contractors who were in effect agents of the embryo Israeli government; the prices paid were not disclosed. The Works Services were not involved in the sales, which were carried out by the "Hirings and Disposals" branch of GHQ Middle East. As a rule each camp was sold on the site and paid for in cash, the Jewish authorities were then allowed to put in armed guards; but even so, some of their purchases must have been unremunerative. It was said that at an RAF camp South of Lydda some of the buildings disappeared whilst the sale was actually in progress; a sandstorm was blowing at the time and the negotiations were being conducted in a tightly shut room, they were interrupted by the sudden disappearance of part of the roof, through which a small and somewhat startled Arab boy looked down on the proceedings; someone opened the door to go and capture him, whereupon a pile of bank notes on the table blew out into the desert and were chased impartially by Christian, Jew and Moslem.

As withdrawal progressed some of the RE Works units remained the only British presence in certain areas. 62 CRE (Works) had been moved from Southern Palestine to Kenya in the Autumn of 1947; the last of 61 Brigade withdrew in February 1948 and with them 65 CRE and 484 RE Workshops, leaving 1295 Stores and Workshops Section on its own, until it left Palestine at the beginning of March, having spent the last few days with no water as the pipes outside the perimeter had been dug up and removed.

#### ENGINEER STORES

The Engineer Resources organisation in Palestine was centred on the RE Establishment at Beit Nabala near Sarafand. Colonel R C K Stevenson, its Commandant, controlled also various subsidiary estab-

lishments including 4 Engineer Stores Base Depot at Kiriath Motzkin near Haifa. At Beit Nabala was 10 Engineer Base Stores Depot holding stores to the value of some two million pounds, an RE base workshop, a jerrican factory, an oxy-acetylene bottling plant and, latterly, an engineer plant depot. Also permanently in the Establishment were an infantry company for guard duties, a section of police dogs, a horsed transport company RASC and, for no apparent reason, a military school for Polish boys. Various RE field units were also housed from time to time within the perimeter. The civilian staff numbered about 3,000; 2,000 were Arabs, who came in daily on foot, while the Jewish staff had to be convoyed in lorries or buses from Tel Aviv or Jewish settlements.

The UN partition boundaries put the RE Establishment in an awkward situation, the Depot which covered nearly 500 acres was in Arab territory; its western boundary, however, practically adjoined Lydda Airport allotted to the Jews, and on the further side of the airport lay the Arab town of Ramleh. Eventually the Jewish ledger keepers employed by the Depot lost their nerve and refused to come to work, so a branch of the Depot had to be opened in a Jewish town the other side of the "frontier". Here the ledgers were kept and entered up by Jewish clerks from the vouchers, made out by Arab foremen, and sent over daily under escort. Other establishments employing local civilians also had to adopt similar measures. The Establishment continued to work at high pressure, and had to be kept going until a late stage in the withdrawal. The Depot had to handle stores recovered from dismantled camps while the woodworking shops were working to capacity making packing cases. It was intended that the engineer installations in Palestine should eventually be set up in East Africa; there were four main methods of disposal. Certain requirements for North Africa were shipped direct from Haifa to Benghazi or Tripoli. One such consignment contained the electric generators and switch-board gear from the Sarafand power station and fifteen couples of fox hounds from the kennels of the Ramleh Vale Hunt. Engineer equipment, mainly earth moving plant, required in the construction of the base depot at Mackinnon Road plus reserve stores, including many hundreds of pontoons which did not require covered storage, were shipped to Mombasa from Haifa or Suez. By far the greater part of equipment and stores evacuated went to a staging dump at Rafah on the border with Egypt and then to the base depot at Tel El Kehir by rail or road. Some equipment was sold to British owned oil companies in the Middle East.

Of the stores sold to oil companies some six thousand tons were shipped to the Persian Gulf. Consolidated Refineries Limited, a British Company with offices in London and Haifa bought the largest amount. A representative of the company arrived by air at Lydda and was taken straight to Beit Nabala; no sooner had he arrived than an Arab Jew battle started with apparently the officers mess as the main objective. The representative, who was elderly, took it all in his stride merely remarking that he found it hard to believe that he had breakfasted quietly that morning in his house at Surbiton. Eventually his company made arrangements for railing some 20,000 tons of stores to their Haifa depot, this eased the work of the Depot, and proved successful except on one occasion when a train was despatched without a military escort; it was held up by Arabs who killed the driver and fireman and then switched it into a deserted quarry and pillaged it.

By the end of April Beit Nabala had been completely cleared and was evacuated, most of the staff moving to 4 Engineer Stores Base Depot in the Haifa enclave. This became, for the remaining months of the withdrawal, the RE Establishment, Haifa.

#### TRANSPORTATION

The Palestine Railways and the Port of Haifa were administered by the Government, their clerical staff and the skilled tradesmen were Jewish while train crews, dockyard stevedores and less skilled labourers were found from the Arab population. In Haifa, allotted to the Jews under the partition, there was a sizeable Arab community and the docks relied almost entirely on Arab labour. It was therefore foreseen that the Army might have to take over some or all of the running of these vital facilities and a number of transportation units both in Palestine and Egypt were alerted for action.

The Palestine Railways Administration was the first to call for help. Following the disappearance of the Jewish fitting staff in the Lydda Junction locomotive sheds, 199 Railway Workshops moved in to man them. Progressively Sappers became involved; in January 1948 RE crews ran the trains on the Ras el Ein to Petah Tiqfa line, during February and March two sabotage incidents, one at Rehovot resulting in seventy-eight British military casualties, the other between Lydda and Haifa with some one hundred civilian casualties, resulted in RE working of the main line from Lydda to Haifa; in April, RE took over the Lydda-Rafah line and then the line between Lydda and Jerusalem when heavy fighting broke out between Jew and Arab adjacent to the

railway. 193 Railway Operating Squadron continued to run trains to Jerusalem until the line was finally completely blocked by sabotage.

Meanwhile fighting around Haifa had caused some casualties among railway staff and resulted in so much absenteeism that the RE were obliged to take over there too, including manning of signal boxes. On one occasion a much surprised sapper signalman in Haifa East Signal Cabin was lifted off his feet and blown down the steps of his cabin by the force of a nearby explosion. This was the same box in which previously a sapper had been murdered for his rifle.

From 1 to 25 April 1948, Transportation operated all trains in Palestine. They also provided staff for the railway locomotive sheds and control offices as well as operating the entire Haifa docks area. 603 Railway Construction Squadron maintained permanent way, reconstructed sabotage damage and also provided the detachments to recover railway stores in evacuated military depots. There were a number of attacks; on 17 April an ammunition train was ambushed and attacked by a well armed party of Jews who were held off by an outnumbered train escort of Sappers and Gunners for several hours until reinforcements arrived, three British soldiers were killed and several wounded including the sapper engine driver. A few days later three more soldiers were killed and several seriously injured when a train was wrecked by sabotage North of Lydda, the sapper fireman died of his injuries. It was estimated that the RE worked about 200 trains over the Palestine Railway main line. On 25 April, on orders from HQ Palestine, the operation of the main line railway came to an end and only that in the Haifa enclave continued to work.

In contrast to the gradual take over of the railway, the port units had to take over the running of Haifa comparatively suddenly. When the Jews succeeded in driving the Arabs out of Haifa in April the Port Authority virtually ceased to function, a Port Executive Committee was formed under the chairmanship of the Commodore RN Palestine who was appointed Port Commander. The part of the port required for the evacuation was then operated as a military port. 1261 Port Operating Squadron with 193 Railway Operating Squadron and Mauritian pioneer labour handled up to eight ships at a time, working twelve hour shifts. At one stage thousands of Arab refugees streamed into the port area with as many of their personal belongings as they could manage. They were shipped by Z craft to the town of Acre, across the bay from Haifa, by 1207 Inland Water Transport Operating Squadron, as an additional task to their normal port duties. Some 20,000 Arabs were evacuated in several days at the end of April.

## SUMMARY OF SAPPER WORK

It was a difficult as well as dangerous task to continue to keep the essential services going while at the same time trying to salvage worthwhile moveable equipment. Many of the Sappers involved had to work in small detachments in static locations on routine timings which made them extremely vulnerable to ambush while the nature of their duties required concentration on the task in hand rather than an alertness for an enemy; many of the units were not designed for this sort of action. It stands greatly to the credit of those involved that evacuation proceeded smoothly and that the majority of stores and equipment was safely salvaged.

## THE LAST ACT

The High Commissioner General Sir Alan Cunningham, left Jerusalem by air for Haifa on 14 May. Part of 2 Infantry Brigade commanded by Brigadier C P Jones and including 1 Airborne Squadron withdrew North from Jerusalem to Haifa where they joined the troops in the enclave under 1 Guards Brigade. The remainder of the Brigade including 12 Field Squadron headed South by road to Beer-sheba and then by the Sinai desert road to Egypt. The rest of 1 Division which had concentrated at Sarafand crossed the frontier to Egypt during the night 14-15 May with its Sappers poised for rearguard action. As they moved South on 15 May they passed the Egyptian Army on its way to invade the Negev.

There was a ceremonial parade to mark the departure of the High Commissioner who embarked at Haifa in one of HM Ships which sailed at one minute past midnight on 15 May, the time set for the termination of the Mandate. On that day also the Israeli-Arab War began. An Egyptian force of two brigade groups crossed into Southern Palestine. Units of the Arab Legion crossed the River Jordan and occupied the central area allotted to the Arabs; a Syrian mechanised brigade advanced towards Lake Tiberias and captured Semakh. Jewish forces advanced northwards from Haifa to capture Acre. So the country was dismembered and the name Palestine became a historical term. 233 British, including 22 RE, soldiers lost their lives in some three years of peace keeping duties, a casualty figure exceeded only by the war in Korea and the Malayan emergency. The average annual casualty rate in Malaya was, however, only approximately one third of that in Palestine.

British troops left in the Haifa enclave prepared for final evacuation; there were 16,000 troops, 1,370 British police, 3,000 vehicles and

35,000 tons of stores within the enclave; by 30 June all had been got away with exception of a small quantity of low priority stores. In complimenting the RE troops engaged General G H A MacMillan the GOC described it as "a magnificent achievement in the face of many difficulties". On 30 June 1948, the last day, Z Craft 79 of 1207 IWT operating Squadron embarked the last remaining transportation staff, conveyed them to the troopship *Orduna* and then joined the Transportation fleet which was standing out to sea. Except for the GOC, these were the last British troops to leave Palestine. At noon the GOC paid a formal call on the British Consul, leaving at 1240 o'clock, as he descended the Port Office steps to embark on HMS *Phoebe* a salute of fifteen guns was fired and the Union Jack was lowered. So ended thirty years of British occupation and British endeavour for Palestine.

#### FOOTNOTES TO CHAPTER V

1. At the time of announcement of withdrawal the RE Works Organisation comprised:
  - 63 CRE (Works) Haifa, Lieut Colonel F C West with 1293 Stores and Workshop Section
  - 64 CRE (Works) Sarafand, Lieut Colonel J M Lambert with 1294 Stores and Workshop Section
  - 62 CRE (Works) Julius, Lieut Colonel F H Neill with 1295 Stores and Workshop Section
  - 65 CRE (Works) Nusierat, Lieut Colonel E E N Sandeman with 1296 Stores and Workshop Section
2. *Cordon and Search* by Major R D Wilson MBE MC, published by Gale and Polden Limited, Aldershot.
3. Some twenty-five years later television programmes showed Israeli troops advancing to the Golan Heights across a Bailey bridge in the exact location of that built by 23 Field Squadron near Lake Hula across the demolished Jisa Bana' at Yacub. (Bridge of the Daughter of Jacob").
4. A war diary of the period includes the sentence: "Morale among the Sappers remains high despite a slight tendency to shoot at each other with ball ammunition when drunk".
5. A previous volume of Corps History records how a retreating Turkish Corps was trapped in the Wadi Fara on 21 September 1918 and was destroyed; 66 and 85 Field Companies had the job of reopening the road. The remains of the Turkish guns and transport which were then pushed over into the Wadi could still be seen thirty years later.

## CHAPTER VI

### EAST AFRICA

Opening Stages. OPERATION LEADER—Requirement—Deployment—Development—Disbandment. MAU MAU—Rebellion—Need for Sappers—Road Construction—Withdrawal—Strategic Reserve. SURVEY. GROUNDNUTS SCHEME

#### OPENING STAGES

The Italians operating from Ethiopia had attempted to turn the British out of Africa during the Second World War, but had been unequal to the task. A result however was the formation of an East Africa Command covering Kenya, Uganda, Tanganyika, Nyasaland, Northern Rhodesia, Somalia, Mauritius, Zanzibar and the Seychelles, with its HQ in Nairobi. East Africa Command became part of Middle East Command on 1 April 1947. The immediate post-war period was peaceful and the troop strength was run down; the disbandment of engineer field units took place rapidly leaving the original 54 Field Squadron East Africa Engineers which survived only until the beginning of 1950. The remaining *Askaris* were absorbed into the Command Engineer Stores Depot which itself disbanded in August 1951. Works services for the Army were operated by the Public Works Departments (PWD) of the various territories except for works in Kenya which were an RE responsibility until 1952. Thereafter the PWD accepted full responsibilities except for Kahawa cantonment on the outskirts of Nairobi. The CE East Africa, Brigadier W D M Christie, controlled two subordinate CE HQ: CE Nairobi, Colonel C Topham, who commanded the CRE (Works) East Africa, an engineer stores depot, a works pool and a plant troop as well as CE Mauritius; and the new organisation set up under Colonel RE Wood as CE (Works) for Mackinnon Road.

As in many parts of the developing world the local populations were advancing politically. They had seen white men fighting each other, using *Askaris* on both sides; indeed some of the older soldiers had served the German Army in the First World War and had later served the Italians and then the British. The white man's reputation for infallibility had been perceptibly tarnished, there was rumbling beneath the surface and rising national aspirations.

The British forces from Kenya which had been policing Somalia were withdrawn in 1950 when the territory was returned to Italy. The event passed off quietly despite anticipated trouble. Construction of a stores holding area in Kenya at Mackinnon Road which was given the codename LEADER was a major Sapper task; there was also a project by the British Government to grow groundnuts in East Africa in which Sappers were involved. In both these enterprises it was found that the country was inadequately mapped, and Survey Sappers were put to work before long to re-map the country, a task which the *Mau Mau* activities made even more important. Although only one survey squadron was involved, perhaps the survey work was the most enduring of the Corps' activities in East Africa during this period.

### OPERATION LEADER

#### REQUIREMENT

The background to the choice of a site at Mackinnon Road in Kenya some sixty miles from Mombasa as a stores holding area has been described in Chapter IV. A special organisation was set up for its construction under its own CE, Colonel R E Wood, who handed over to Colonel H M Taylor in 1948. In the first instance a depot was to provide covered accommodation for 200,000 tons of stores, accommodation for the troops to operate and guard the stores and for a considerable force of locally employed civilians, and there were contingency plans for expansion of the depot in case of emergency. Although perhaps Mackinnon Road did not look at first sight to be an inviting place, it had a number of advantages; it was on Crown land, the ground was level, there was no climatic hazard and it was easily accessible by rail and road.

To those who soldiered there, Mackinnon Road did not seem unduly remote and the problems presented did not seem particularly difficult.

#### DEPLOYMENT

The works organisation consisted of four CsRE (57, 62, 65 and 1292), and because no OC Troops was provided, one, initially Lieut Colonel B D Peake, became Administrative Commandant. Site planning, initially the responsibility of Lieut Colonel A Bennetts, was handed over to Lieut Colonel E E N Sandeman. Site work was controlled by Lieut Colonel B J Daly, who was later joined by Lieut Colonel Bennetts. The first troops on site were 717 Artizan Works Squadron who started by clearing the virgin bush and building their own accommodation. 337 Army Troops Squadron arrived from Greece in



1947. In October they were joined by 34 Army Engineer Regiment commanded by Lieut Colonel D R M Orchard, consisting of 8, 55 and 56 Field Squadrons and 143 Field Park Squadron, formed from 1 Armoured Division Engineers on their withdrawal from Palestine. The regimental task was to lay the pipeline for water supply from the Tsavo River, seventy-three miles away. 873 Plant Squadron was also deployed to Mackinnon Road. The Depot labour force came from far and wide, Italian artisans and Indian, Mauritian and Seychellois Pioneer Corps units provided the semi-skilled; and the unskilled labour was recruited from Africans living in the bush, as one young officer described it: "the emphasis was on the word unskilled".

#### DEVELOPMENT

By April 1948 the initial work was done and the project passed into a second stage: a camp had been built for 2,000 Europeans and 7,000 Africans and a 150-bed tented hospital was complete; nine miles of road had been made,  $1\frac{1}{2}$  miles of railway sidings laid, 1,600 acres of bush cleared and the whole area had been surveyed on a 1:2500 scale with 5ft contours. A thirty foot wide swathe had been forced through the jungle and across the mountains for the first pipeline to deliver water from the River Tsavo. Local resources had been used for construction; sandstone for hardcore, *makute* mats and *horith* poles for temporary structures. The main consignments of stores were expected in September and work on the stores sheds, a wartime product known as South West Pacific Hangars and nicknamed Igloos, assumed major importance. However, a run down of British troop strength had started and some 650 Italian replacements were brought in, but whereas the Italians worked well when supervised in workshops, scattered about in small parties they scarcely worked at all.

An astonishing amount had been achieved in short time despite the austere background and the prevalent military preoccupation with demobilisation. Life had its lighter side too, a successful rugby team was run, there was a big game club and a flying club from which fourteen members achieved "A" licences. One hardworking officer, Major I S Keelan even found time to become amateur gull champion of Kenya. Animal stories abounded: there were a number of confrontations of elephant or rhinoceros with bulldozers on the pipeline but, perhaps to the disappointment of the Sappers, animal caution invariably prevailed. On one occasion there was a shout of "lion" from the African Camps and a lion was cornered in one of the *shambas* and shot by the Garrison Sergeant Major with his service rifle. Another

story told of a visiting supply officer from Mombasa who, on his way to bed after a good evening, met a lion by the "Desert Rose". Stores had begun to arrive in Mombasa early in 1948 and a transit arrangement from there to Mackinnon Road had to be devised. The East African and Uganda Railway whose General Manager was Brigadier (Retired) Godfrey Rhodes late RE, was very reliable, but the road was barely adequate. Materials of all kinds arrived by sea at the rate of 7,500 tons a month but it was not until July, by which time a peak of nearly 40,000 tons had accumulated, that clearance began to keep pace with arrivals.

By September the British troops manpower difficulties were so acute that a reorganisation was necessary, 34 Army Engineer Regiment was reduced to cadre strength in December and one CRE(Works) was disbanded early the following year. But in December 1948 the scope of LEADER had been reduced. The principle reduction was in the number of store sheds, which although reducing the holding capacity of the depot, did not greatly affect its other aspects and the tempo of work was slowed. The 34 Regiment cadre with its squadrons in suspended animation left for the UK in March 1949. Work continued and by mid 1949 all Igloos were erected, an 11,000 square foot REME workshops was nearly complete, as was a 600-bed hospital, the road network was being surfaced, a steady water supply had been established, a township had sprung up and about £1½ million had been spent. By 1950 Mackinnon Road was a going concern, stocked with 80,000 tons of RE stores.

#### DISBANDMENT

Other considerations were, however, at work as outlined in Chapter IV. The impossibilities of an alternative base to the Canal Zone had become evident and there were hopes of an agreement with Egypt. There were second thoughts on British world wide strategy and the LEADER Project was abandoned in 1950. Various reasons were quoted including the vulnerability of an isolated military target such as Mackinnon Road to nuclear attack. It may have been just a coincidence that the Minister who sponsored the Groundnuts Scheme had become Secretary of State for War. It was a sad day to those who had worked on the project when the news was received. Mackinnon Road was run down and a more modest stores holding depot for East Africa Command was concentrated at Kahawa near Nairobi. Later Mackinnon Road was used as a detention camp during the *Mau Mau* troubles.

## MAU MAU

## REBELLION

Mau Mau was a subversive movement which originated in the *Kikuyu* tribe of the Central Province of Kenya. The *Kikuyu* were the largest tribe totalling some two million, they were generally intelligent and adaptable but their introduction to civilisation went back only to the beginning of the twentieth century. The causes of the rebellion were complicated but were associated with the *Kikuyu*'s particular feeling for land; they suggested that the white settlers had acquired *Kikuyu* land without moral right and implied that part of the *Kikuyu* identity had been taken away with the land. *Mau Mau* secured adherents by means of oath taking, often with obscene rites aimed at cutting the ties binding tribal discipline. In reverting to savagery and superstition the gang leaders made it difficult for their supporters to desert them. Although aimed against the white man, the *Mau Mau* movement concentrated on its own tribe and established a reign of terror by brutal killings and mutilations to ensure support; white victims were few. Police and Army reaction tended to cause *Mau Mau* terrorists to form large gangs, occasionally over one hundred strong, and to withdraw into the forests where they exploited their tribal skills in movement and concealment.

It was fortunate that *Mau Mau* made little appeal to the other tribes of Kenya. There was a small following among the *Embu* and *Meru* whose tribal areas bordered the *Kikuyu* and some of the de-tribalised and half-bred *Kikuyu* from outside the tribal reserve joined in, but the heart of the movement lay in the *Kikuyu* Native Reserve. The *Kikuyu* Reserve lay to the North of Nairobi, stopping just short of the township of Nyeri. Two mountain masses, the Aberdares and Mount Kenya dominated the whole area; they also dominated most of the Sapper work during the emergency; the weather was a close runner-up and the *Mau Mau* a poor third. The Aberdare mountain range was an elongated feature running North and South, rising to nearly 13,000 feet in places with no conspicuous single peak. Much of the range was forest covered; the ridges and valleys formed a pattern running East and West into the *Kikuyu* Reserve; numerous river valleys were steep sided and densely forested providing good cover for fugitive *Mau Mau* or the shyest deer; elephant, rhinoceros, buffalo and a multitude of wild life were often encountered. North and South communications cutting the grain of the country tended to be tortuous and slow; the main Nyeri-Nairobi road followed a curve to the East rather than

cross the hilly country of the Reserve, two routes across the range to the Rift Valley existed and were usually practicable in dry weather. In contrast, Mount Kenya rose from forest covered lower slopes forming a circular area some forty miles in diameter, with moorland above the tree line at about 10,000 feet rising to a rock mass culminating in two peaks, of which the higher, Batian, reached 17,040 feet. River valleys ran radially from the centre, the forests contained a rich animal life, leopards, colobus monkeys, giant forest hog and many other species. The moorland offered no easier movement because it consisted of long tussocky grass intersected by boggy crevices; travel in a circumferential direction was often impossible. It was an eerie region, the quietness, after the creaking of the forest, emphasised by the whisper of wind; the unusual vegetation, lobelias like tall shaggy pillars bearing little resemblance to their counterparts in an English garden. Snow lay on the rock mass, an attractive and anomalous phenomenon within a few miles of the Equator. When the peaks infrequently emerged from their covering of cloud, especially at sunset, when the pink glow illuminated them long after the lower slopes were in darkness, it was a sight to remember.

#### NEED FOR SAPPERS

The *Mau Mau* rebellion started in 1952. The GOC East Africa Command at the time was a Sapper, Lieut General Sir Alexander Cameron. After a step up in atrocities in September when fourteen civilians were killed, Sir Evelyn Baring was sent to Kenya as Governor, troops were sent from the Canal Zone and a State of Emergency was declared in October. East Africa Command was divorced from GHQ MELF, preoccupied as the latter was with other problems, and became an independent command again in April 1953. The *Kikuyu* who lived in scattered family groups of huts, were collected into villages for protection and control, a measure which introduced a social life and activity formerly unknown and in addition permitted more specialised systems of agriculture. But the greater the control established by the security forces in the settled areas, the more the *Mau Mau* withdrew to the forests; recalling the old tribal wars when the *Kikuyu* were invariably defeated by the *Masai* or *Somalis* in open country, until they retreated to the forests which they understood and where they could hold their own. It was against this background that Sappers were needed to build roads and tracks for the deployment of the security forces.

39 Corps Engineer Regiment at Crickhowell, commanded by Lieut

Colonel M W Prynn, was warned for a move to Kenya in September 1953; the warning order was classified but the BBC informed the Regiment where it was going two days after the order was issued. 72, 73 Field Squadrons and 74 Field Park Squadron were selected to go to Kenya. The third field squadron, 71 Squadron, which had recently returned from the Monte Bello Islands and was employed as the SME demonstration squadron, was left behind as were the families, many only recently reunited with their husbands. They remained in quarters at Crickhowell since it was thought that the tour overseas would be for one year only. The Regiment, less 71 Squadron, flew out to Kenya during the second half of November; the first consignment of their sea freight arrived, perhaps appropriately, on 25 December, having taken longer to travel from Mombasa up-country than its sea journey. The Regiment had moved into a camp convenient for simultaneous deployment in both the Aberdare and Mount Kenya forests; it was some six miles from Nyeri and 100 miles from Nairobi on a ridge above the Amboni River.

The task to be undertaken had been approved by the Emergency Committee of the Central Province. In round figures, 300 miles of forest road in the Aberdares and 400 miles on Mount Kenya were required to run up through the forests to the moorlands above and to be joined by laterals at both ends. The RE were to undertake all work in the forests while the civil authorities carried out new construction and maintenance outside. The rate of work was based on PWD experience of forest tracks and planned at thirty miles per month per field squadron. A briefing on the detailed tasks was given by the CRE East Africa, Lieut Colonel C J Godfrey. Subsequent experience showed that such forest tracks rapidly became unusable, broke up in the wet and did not meet the requirement; better roads with adequate clearance and drainage were needed but their construction took longer.

The delay before the sea freight arrived was a useful period for acclimatisation, familiarisation with the country and reconnaissance as well as settling into the new camp. Officers and NCOs were attached to Kenya Police patrols and to infantry companies to learn anti-*Mau Mau* drills. At the same time refresher courses were run for wireless operators and plant training was brushed up. Provisional road alignments were checked and modified where necessary. The first casualty occurred in December when a police vehicle on patrol was ambushed, a police officer was killed and a sapper of 74 Squadron who was with him was wounded. A second sapper helped to drive off the attackers with rifle fire. In general, active pursuit of *Mau Mau* was not allowed

to interfere with the main task; in spite of this, one terrorist was killed and two captured by Sapper working parties in chance encounters, and many members of the Regiment spent much time on patrol and in ambush, particularly by night. No fatal casualties were suffered despite the fact that the field troops spent longer continuous periods in the jungle than any other soldiers. A high standard of vigilance was necessary for good security and was maintained despite the fact that it became harder to enforce as it proved its value; no attacks were made on any Sapper camp except some long range desultory shooting, nor were any arms or ammunition stolen.

### ROAD CONSTRUCTION

Road construction started in earnest in January 1954 and continued until November when the Regiment was given a much needed six weeks break by direct order of the GOC. In ten months, 247 miles of road had been built, nearly one mile a day; the experience merits a short description. The first and most important requirement was reconnaissance, not easy in thick forest and occasionally attended with risk from wild animals. Air reconnaissance was of assistance but was no real substitute for exploration and road alignment on foot; Lieut Colonel Prynn, reflecting on the work of the Regiment, said that he would have devoted even more time to reconnaissance had it been possible. The next step was to clear the forest; about eighty natives were employed by each troop to clear bushes and small trees, while the larger trees were felled by explosives. Two Sappers with two native porters could fell a three-foot diameter tree in nine minutes with explosives; it would take skilled forestry workers three hours to do the same task by hand felling. Tree felling became a skill, and good operators developed an eye for a tree; although more extravagant in explosives the best way to fell a tree was found to be by charges placed among the roots, the alternative method by borehole left a stump like a shaving brush to be cleared. Bamboo could be cleared by a chain connected between two dozers. After cutting and felling, the road alignment was cleared by dozer so that the sunshine and air could help dry out the ground. Practice showed that a width equivalent to the height of the trees was needed to each side of the side drains on a North-South track, and half that on an East-West track. Forest clearance enabled the real appearance of the road alignment to be seen, often for the first time. The pilot track was first cut by dozers, then it was widened, graded and drained. Gradients steeper than 1 in 10 were avoided but if necessary were covered with Sommerfeld track, a

camber of 1 in 15 was found to be a fair compromise between adequate water shedding without causing drivers to hug the crown of the road. Bad subsoil was dealt with by corduroy, stone or flexible duckboards; the carriageway invariably ran on "cut", the outer berm alone being made up ground of "fill". The profiles used were either *Class 9* or *Jeep*, with a two way carriageway except on some hillside stretches. The outstanding lesson was the necessity for good drainage; culverts, ditches and gullies had to be generously proportioned; on Mount Kenya soakaways of eight cubic yards capacity were needed in many places.

Weather was the worst problem, frequently when it was clear and sunny outside the forest, several miles inside there would be heavy rain which immobilised plant and dispirited native labour. Other difficulties occurred; one road temporarily abandoned during heavy rain was found to have apparently been used as a dance floor by elephants and pockmarked with footprints which had dried out to form an awkward and unorthodox obstacle to wheels. When the weather was too wet in the forests, roads and bridges in the native reserves were constructed and much appreciated; on one occasion a local village presented a Sapper field troop with a cow as a token of their gratitude. Although road construction was the main task a wide variety of other Sapper work, including clearing live ammunition from a firing range at Archers Post, was undertaken.

Each field squadron kept two troops on road construction but the limitation to the rate of construction lay with the plant. Of six bulldozers one never worked at all and all suffered from shortages of spare parts. Workshop repair by the Kenya PWD was a slow business, and every repair possible was carried out in camp in an integrated workshops of REME and regimental tradesmen. In general a 70% serviceability rate was maintained on the working dozers but less on other plant.

#### WITHDRAWAL

In 1955, the Regiment undertook a new task to provide hatted communal buildings and hot water installations in all British Army camps, the job was finished in July and the following month the Regiment was given notice to move back to the UK, less one composite squadron. 73 Field Squadron was reorganised as an independent squadron; RHQ and 72 Squadron were to disband and 74 Field Park Squadron to reform in Ripon.

### STRATEGIC RESERVE

By this time the *Mau Mau* rebellion was past its peak and a withdrawal of troops had started in August though the Emergency was not officially declared ended until January 1960. In 1956, troops from Kenya were sufficiently uncommitted to allow reinforcements to be sent to Oman in April. The Kenya Garrison under 40 Infantry Brigade was becoming a minor strategic base. In November 1956, 40 Brigade disbanded and the last British battalion left Kenya for the Arabian Gulf area. 73 Squadron was sent to Bahrain at the end of 1956 and returned to UK the following year to disband.

However, Kenya was to be used as a base again, and 24 Infantry Brigade arrived in December 1958 with 34 Field Squadron, formerly of 37 Field Engineer Regiment, having been made independent in Cyprus in July 1958. The Squadron established a new base at Gil Gil but spent very little time there; it operated with elements of its brigade almost continuously on the Aden frontier, and in Bahrain and Oman.

### SURVEY

THE local maps were not good enough for the security forces to hunt *Mau Mau* terrorists effectively and the existing survey resources, consisting of some Survey of Kenya individuals commissioned into the Kenya Regiment, supported by a detachment from 42 Survey Engineer Regiment in Egypt, were insufficient to carry out the required military mapping within an acceptable time frame. 89 Field Survey Squadron was formed in December 1953 and a small survey directorate formed at the same time in HQ East Africa Command. The DAD Survey was responsible for liaison with the civilian survey departments who were producing much of the mapping being used by the Army; he also provided the normal control of and support for the work of the Survey Squadron. Initially consisting of field surveyors, the squadron strength was increased in October 1954: a cartographic troop and a reproduction troop were formed and the unit became self-accounting.

The existing maps left many spaces completely blank. There had been two former surveys, one at a scale of 1:1,000,000 which was a compilation from various existing material and travellers' maps; the other an enlargement to 1:500,000 by a wartime South African survey unit. Time was short and the need for maps pressing: mapping started in an area South West of Nairobi around Narek at 1:100,000 scale, air photograph cover was obtained and was tied in to ground stations. In November a second field survey troop went to the Aberdares around Olkalou and started mapping at 1:50,000 scale. Work continued in



these areas until late in 1956, by which time the emergency programme had been completed.

The next task allotted was to map the Northern Frontier District of Kenya. In April 1956, preliminary planning started for mapping some 50,000 square miles at 1:100,000 scale. Although there was a delay in obtaining necessary air photography, work started in the Mandera area by December. The area as a whole was very undeveloped; roads were few and far between and unmetalled, camping places were determined more by the presence of waterholes than anything else. The countryside varied from precipitous ridges to plains of sand, pumice or lava, in parts there was thick jungle, in other scrub and bamboo while some was completely barren with no vegetation at all. Temperatures were high, water limited and much of it tainted and unpleasant to drink. Even the native population averaged only just over one person to the square mile.

There were unusual aspects to the work. The ground stations, for instance, which had to be fixed by field astronomy, were selected from the air photographs and were often the only visible feature for many miles, in places consisting of a single acacia tree. Well over a hundred ground stations had to be established: each had to be visited by a field party which camped there for up to a week while observations were completed, at the same time the stations had to be accurately pinpointed on the photographs. A general pattern of fixed points was made across the whole of the Northern Frontier District with distances of thirty to sixty miles between stations. Field parties consisted of five to ten men under a junior officer or senior NCO, self-contained with a landrover and two 3-ton trucks and would remain in the bush while a series of ground stations was established. They carried "compo" rations but frequently supplemented their food with local produce, occasional gazelle, guinea fowl or fanned grouse if a party contained a competent safari hunter; one party lived almost entirely on fish while on the shores of Lake Rudolf. The parties had to contend with nature in many forms. On one occasion trucks could not be used and loads were carried by camel. Floods held up travel; by contrast some work was delayed by lack of water. Wild animals from elephants to ants provided additional hazards; at one stage the squadron commander was committed to wearing a hat in which ants had eaten a large hole overnight; there was no way he could replace the hat until he returned to the comparative civilization of base. Many incidents were recorded, including a military take-over in the Sudan, unknown to a survey team who had permission to cross the frontier into Southern Sudan to cover

the boundary line survey. Kenya Police aircraft were invaluable for liaison and communication work in helping to control and maintain the field teams. Vehicle spares up to axles for 3-tonners were replaced in the field.

The compilation and printing of the maps was done in Nairobi, largely by the cartographic and printing element of the Squadron; during the rainy season each year the field surveyors helped too with the compilation.

89 Field Survey Squadron was disbanded in 1959 and its farewell parade was attended by H.E. The Governor of Kenya, Sir Evelyn Baring and the GOC East Africa, Major General N P H Tapp; a notable tribute to the work of the squadron. Nearly one hundred sheets of Series Y633 Kenya 1:100,000 had been produced, providing evidence of a worthwhile task performed in the best traditions of the Corps. The outstanding work, a small residual amount of compilation and printing was taken over by the Survey of Kenya, who had worked in close co-operation with the Squadron throughout and who were the recipients of the Squadron's map reproduction equipment.

#### GROUNDNUTS SCHEME

THE history of the post-war years in East Africa would not be complete without mention of the Groundnuts Scheme, and, since it involved R.E. participation it deserves a place in the record. The object was to produce edible oils and protein, commodities which were in desperately short supply. The idea was first proposed by the Overseas Development Corporation in London in 1948 as a commercial venture, but it became a government sponsored and financed project. The scheme aimed to clear five million acres of East African bush and forest and to plant them mainly with groundnuts, all in a period of five years. Three areas were involved, two in Central and one in the South of Tanganyika, all about 100 miles from the coast.

The plant available to clear the ground consisted of bulldozers of various makes including tank chassis as prime movers, salvaged mainly from South East Asia. The machines were tired if not nearly worn out and without spares. Long before adequate workshops and spares could be built up, the dozer fleet, gradually cannibalised, had ground to a halt. African labour from various tribes was plentiful, some of them walked up to 1,000 miles to enrol, but none of them stayed very long. They preferred to collect a sizeable store of shillings and walk back to their families.

Initially the most important engineer tasks were to provide for the needs of a new community and communications to it. The RE contribution consisted of two seconded regular officers and a large number of ex-Sappers. Major General D Harrison went from being DFW to become General Manager in East Africa; unfortunately he was compelled to resign because of ill health. Two Sappers were seconded to his staff, Brigadier G A T Pritchard and Colonel W F Anderson, while another ex-Sapper Brigadier H E Horsfield, was employed by the main contractors for the Southern area, Messrs Mowlem. On the whole this aspect of the engineer work was successfully achieved; schools, hospitals, workshops were constructed; and thanks to Sapper inspiration a church was built, consecrated and regularly attended.

However insuperable difficulties took over. A combination of climate and an abrasive soil which compacted hard when dry, killed off the main central areas and threw doubts on the massive expenditure for the whole project. Some ten years later the main area had become a vast grass-land supporting a ranching business; the other areas were developed into small individual holdings, while the new port area and feeder railway had been adapted to other operations. All was thus not lost, but the lesson once again was the rashness of acting without thorough reconnaissance. It was said that the report on which the scheme was based was prepared without the benefit of engineer advice. By the time the Sappers had joined the project it was already under way and the framework was no longer flexible.

## CHAPTER VII

### THE FAR EAST

GENERAL SURVEY—RE Involvement. THE SINGAPORE BASE. MALAYA—Emergency—Engineer Tasks—Gurkha and Malayan Sappers—Command—Progress of Insurgency—Jungle Forts—Roads—Survey—Barracks—The Federation of Malaya. HONG KONG—Reinforcement—Reorganisation. THE GURKHA L OF C—Dharan.

#### GENERAL SURVEY

THE total defeat by Japan of the British in Hong Kong, Malaya and Burma, of the Dutch in the Netherlands East Indies, the expulsion of the Americans from the Phillipines and the dispossession of the French colonies of Indo-China, was a severe blow to European prestige in South East Asia, as much by the speed of the event as by the event itself. By the time their erstwhile protectors prevailed, the indigenous populations had established a new set of values. With the end of World War 2 in 1945, self-government, hitherto a remote ideal, emerged as a live issue, not only amongst the communities of the East but also in the capitals of the colonial powers. The Indian Independence Act of 1947 constituted India and Pakistan as dominions<sup>1</sup>. Burma became an independent republic outside the British Commonwealth in 1948. So far as British possessions and dependencies in the Far East were concerned, the first step towards independence was the creation, as from February 1948, of the Federation of Malaya. This measure, planned in Whitehall while the war was still in progress, placed the former Straits Settlements of Penang and Malacca, the Federated Malay States, and the five unfederated states of the Malay peninsula for the first time under a common administration, centred in Kuala Lumpur. Of the remaining Straits Settlements, Singapore had been established as a separate colony in 1946, and Labuan was merged with British North Borneo to form Sabah. Sarawak, surrendered by the "White Rajah" Brooke, also became a colony, while Brunei was restored to an independent sultanate under British protection. Meanwhile, Hong Kong had resumed its status as a Crown Colony. There was no question of replacing, in mainland China, the previously maintained military outposts at Tientsin and Shanghai.

Liberation from the rigours of Japanese control brought such general relief that there was no significant opposition to the resumption of British authority in any of the aforementioned territories. It is true that the Federation of Malaya was, in its earliest form, not popular, either in the States or in the former Settlements, but the opposition was conservative to the extent of wishing to see the situation restored as it had been before the war. In consequence, the British were nowhere faced with virulent nationalist movements such as those which confronted the French and the Dutch in their colonies. However, the communists, predominantly Chinese, had provided the backbone of wartime militant resistance to the Japanese and had been supplied with arms by the Allies, with the result that communism emerged after the war stronger in numbers and in influence than it had been before. Its leaders perceived that colonialism was on the way out. They foresaw that British suzerainty could not long survive and they made ready to replace it with their own regime. Whatever intentions Whitehall had for a gradual and peaceful transition to independence for Malaya, the seeds of conflict were already sown.

In former times the Indian Army had stood ready to support the Imperial authority in the East but was no longer available. Most of the British units which had fought in the Far East had also been run down, leaving slender garrisons in Hong Kong, Singapore and Malaya, and rapidly dwindling occupation forces in Japan. This situation was substantially improved by the arrival, in December 1947, of the first of eight battalions of Gurkha Rifles, transferred to the British Army upon the partition of India. These, collectively styled "The Brigade of Gurkhas", were to form the body of 17 Gurkha Division in Malaya in 1952 and to contribute a component to the garrison in Hong Kong. The Brigade would, in the ensuing years, be expanded to include, among other supporting units, a field engineer regiment, later the Gurkha Engineers.

Post war policy with regard to coastal defence dispensed with the fixed armaments, which had characterised defended ports throughout the British Empire prior to the Japanese invasions of 1941. Moreover, responsibility for the maintenance and operation of searchlights had been transferred from the Corps to the Royal Artillery before the outbreak of War, so that there was no longer any requirement for fortress companies of the type formerly stationed at Hong Kong, Singapore and Penang<sup>2</sup>. Those RE squadrons including several recruited locally, which were employed in the Far East during the years covered by this Volume, will be mentioned in the proper context.

For the projected peacetime garrisons to be maintained and reinforced as occasion demanded, a base was to be developed in Singapore. Meanwhile the process of recruiting Gurkhas in their homeland and of transporting them from and to Nepal necessitated the setting-up of a new organisation known as British Gurkhas (India), with HQ in Barrackpore.

The command structure in the theatre was headed by the C-in-C Far East Land Forces (FARELF), with GHQ at Tanglin, in Singapore. Subordinate headquarters were HQ Malaya District (later Malaya Command), HQ Land Forces in Hong Kong and HQ Singapore Base District. Chief Engineers were appointed at GHQ FARELF, at HQ Malaya Command and, from 1949, at HQLF Hong Kong. The major events in the Far East during this period were the Revolutionary Civil War in China, 1946 to 1949; the Malayan Emergency, 1948 to 1960; the War in Korea 1950 to 1953; and the achievement of Independence by Malaya in 1957.

#### RE INVOLVEMENT

The Corps was engaged in varying degrees in support of the other arms of British and Commonwealth forces deployed in FARELF, in a continuing programme of works services and in a related survey commitment. Operational activities follow in the sections devoted to Malaya and Hong Kong.

A factor which complicated all military planning for works services during this period was the proposed grant of Independence to Malaya (1957) and to Singapore (1959), which made it uncertain that there could be any long term tenure of British military installations in those areas. As a result, scales of accommodation were constantly modified as the foreseeable tenure shortened. Moreover, user requirements were continually fluctuating so that projects that one day were of first priority, with planning proceeding at high pressure, might be abruptly abandoned on the next. Even when not cancelled in the planning stage, the period of gestation of a major service was so long that, by the time all was ready for work to begin on site, the requirement itself had not infrequently evaporated.

At the time of the Korean War, stockpiling by the USA made the cost of all building materials, particularly steel and cement, soar so that estimates for construction projects were constantly overtaken by rising prices. Even timber became scarce when lumbering in the Malayan forests was restricted during emergency operations and had, in 1954, to be procured elsewhere. In general, the situation from the

point of view of a CE was most disheartening. Despite efforts made at every level to speed up the working of the approvals procedure, the machinery remained extremely slow. Projects for which finance was available were in many instances no longer wanted, while for those urgently needed there was often no finance.

The large quantities of engineer stores brought into the Far East at the end of the war caused something of a problem but, by various expedients, orthodox and unorthodox, the most important and more perishable had been placed under cover by 1954. Meanwhile, disposal was continuing smoothly, if slowly, and by 1955 the Command was almost down to its planned scales of engineer stores, plant and equipment. A preservation plant for Bailey Bridge equipment was built in 1952/53 and successfully handled most of the stock in FARELF over a period of three years. After initial treatment it was generally found economical to allow local stock-holders to do preservation by hand. A bridging liaison team was established to give advice and to inspect holdings.

The most serious resources problem was that of providing and renewing earth-moving plant. Although provision was the responsibility of RAOC and repair that of REME, both impinged so directly on performance in the field that it was impossible for the Corps not to intervene. In consequence, it became necessary to allocate workshop space in 305 Engineer Stores Depot at Batu, in Malaya, for plant repair and to introduce a REME staff to work with local labour from RE sources to accelerate the overhaul of plant. A board, composed of representatives of the Q Staff, RE, RAOC and REME at GHQ FARELF, sat at regular intervals to consider each separate item of plant offered for repair and to decide whether repair was economical. It was not until field engineer units were deployed in support of emergency operations that the state of the plant received adequate staff attention. Following representations, new Fowler and Vickers tractors were sent to the Far East in 1956 and the plant situation improved slightly, though the Fowlers were unreliable. No workshop organisation could have coped with the backlog of repairs to scout cars, B vehicles and tractors from Hong Kong and Malaya that piled up between 1950 and 1953.

By April 1948, the considerable Survey organisation in the theatre at the end of the war had been reduced to 2 Air Survey Liaison Section and the Singapore Map Depot, with no representation at GHQ. 2 Air Survey Liaison Section, based in Singapore, continued to support the extensive survey photography programme being carried out by the

Royal Air Force in the Malay Archipelago, Borneo and Indo-China. The Map Depot supplied all the maps required by the three Services. Early in 1951 a small survey directorate, under Lieut Colonel L H Williams as AD Survey, was re-established in GHQ to exercise technical control over these units, to co-ordinate the work of various mapping agencies and to resolve the map supply problems. At the end of 1952, this survey directorate was once more closed down and a staff captain absorbed into the staff of G(Ops) to handle map supply. With the survey photography programme nearly completed, 2 Air Survey Liaison Section was at the same time reorganised as the General Survey Section (FARELF), the tasks of which included the compilation of a ¼ inch to 1 mile series of Malaya and the production of town photo-maps to the scale of 10 inches to 1 mile.

Towards the end of 1954, the C-in-C called on the OC General Survey Section to evaluate the existing 1 inch to 1 mile mapping of the west side of the Malay peninsula, which was inadequate for operational purposes. The initial recommendations for a limited revision by the General Survey Section, with local assistance from the Malaya Survey Department, were unacceptable and War Office sanction to augment survey resources in the command to a field survey squadron was received in May 1955. In September, the General Survey Section was disbanded and 84 Field Survey Squadron and 570 Map Reproduction Troop were raised in Singapore in December 1955. When raised, neither unit was up to full establishment due to operational and administrative factors. While the reproduction element had necessarily to be in Singapore, the work in the field had to be controlled centrally to the task in hand and conveniently close to an operational command HQ. At the same time, a small survey directorate under an AD Survey, with an Australian deputy, was again re-opened in GHQ. It was decided to locate 84 Field Survey Squadron alongside HQ Malaya Command at Kuala Lumpur but the move was delayed until May 1956 due to lack of accommodation. In the intervening months, the Squadron undertook a revision of the 1:25,000 maps of Hong Kong. In 1959 a detachment, supported by personnel from 13 Field Survey Squadron in UK, was sent to Borneo to establish control for new 1:50,000 and 1:25,000 mapping.

The Engineer Training Centre, Far East (ETC), a GHQ establishment, opened at Kluang in Johore early in 1948 to provide in the Command as many as possible of the facilities offered by the SME Chatham. It was organised in three wings, field, plant and trades, and at one time or another Sappers from Australia and New Zealand,



Chinese from Hong Kong, Fijians and men of Borneo and Sarawak, attended courses there in addition to an unceasing flow of British, Gurkhas and Malaysians. With British, Chinese, Muslim and Hindu cookhouses in operation and a variety of differing scales of pay and allowances, administration presented complex problems, added to which the Commandant carried for much of the time the responsibilities of Garrison Commander, Kluang. The ETC became operationally involved in the Malayan Emergency, as recounted later in this chapter<sup>3</sup>.

Transportation from and to the UK and within the Command, between Singapore, Hong Kong and Calcutta, was in these years mostly by sea. Progressively air transport began to be used. Increasing use was made of charter flights and RAF schedules for trooping. The earlier flights from UK to Singapore took several days with overnight stops included. Meanwhile the familiar white-painted troopships continued, in dwindling numbers, to work the Far East run out of Southampton<sup>4</sup>, and took three to four weeks. The effects of National Service were felt more seriously in the Far East where the period of duty was decreased by the time spent in sea transit. Also the frequent turnover within units coupled with the difference in outlook of those on regular engagements, a greatly increased proportion of whom were accompanied as married quarters gradually became available, altered the character of a British unit and rendered the task of its commander more than usually demanding. Those British officers and men concerned with the raising of new units of Gurkha and Malayan Engineers also had particular difficulties with which to contend.

For all, such frustrations as there were from these and other causes were to a large extent compensated for by the operational urgencies of the times and the absorbing interest of the work in hand. To the daily round there existed in many parts of Malaya, in Singapore, and in Hong Kong, a background of sport and social life unrivalled anywhere else in the world. Throughout this period of transition, a remnant of the old colonial order persisted, while the conditions under which the garrisons lived were materially improved. Few officers and men who served in FARELF in the 1950s will remember their tours of duty there as other than both happy and rewarding. The period 1948 to 1958 saw the Corps in the Far East fully engaged in all its traditional activities. In the field, Sappers laboured ceaselessly towards the ultimately successful outcome of the Malayan Emergency and for the security of Hong Kong. Innumerable important works projects were completed and over one thousand married quarters were built in 1951 alone.

## THE SINGAPORE BASE

DEVELOPMENT of a base at Singapore formed part of the plan for the post-war deployment of British forces in the Far East and a start, already described in the previous Volume of Corps History, was made on this project under the CE, Allied Land Forces, South East Asia (ALFSEA) soon after the Japanese surrender in 1945. When FAR-ELF succeeded ALFSEA in 1948, the work was taken over and carried forward under HQ Singapore Base District. The pre-war barracks at Blakang Mati, Changi, Tanglin, Nee Soon and Gillman were refurbished in the years which followed and extensive depots, stores and workshops were built, as well as accommodation for the troops to operate them. With barracks, married quarters, churches, gymnasias, institutes, clubs and playing fields, this made up a massive programme of works.

The Engineer establishment of the District in 1948 comprised a CE, Brigadier W G Fryer, and two CsRE, North and South, each with three deputies. In 1952, a rearrangement took place in which the CRE appointments were abolished and replaced by Grade I Staff Officers. The DCsRE were reduced from six to five, working directly under the CE. The resulting saving in manpower proved less than had been hoped for, while the works suffered because there were then too many HQ officers and not enough on site for efficient supervision. Accordingly, in 1955, one CRE was reinstated and shared with one DCRE the workload, under the CE.

By the end of 1947 the last of the wartime engineer units of the reoccupation forces had left or been disbanded. When the ensuing reorganisation was complete, the principal RE unit on the island was the Singapore Engineer Regiment, whose CO Lieut Colonel O J R Orr was also Commander, Engineer Base Installations (EBI). In the latter role he was responsible to the CE FARELF. Simultaneously he was responsible to the GOC Singapore Base District for the administration of his regiment, comprising:

- HQ Squadron (including a field troop)

- Stores Squadron, to operate the Engineer Stores Base Depot (ESBD) and 304 ESD.

- Workshops Squadron, to operate the Engineer Base Workshops (EBW).

- Plant Squadron, to operate the Engineer Base Plant Park (EBPP).

- MT Squadron, holding a fleet of motor cars for engineer staff, all vehicles for works services and the EBI, and unit transport.

Initially the unit was largely British but it became progressively composed of locally enlisted troops, mostly Malays but with a handful of Chinese who generally made excellent NCOs. The field troop, with elements of the plant squadron, took part in a number of engineer tasks associated with operations in Malaya in 1952 and 1953 as well as other jobs in the theatre. It went to North Borneo in 1953 to open river routes for use by troops travelling by long boat and a major task that year was the rehabilitation of an old Japanese airfield in the Nicobar islands as a standby alternative staging post to Ceylon for the RAF.

Apart from the Engineer Regiment, the Map Depot and 2 Air Survey Liaison Section (subsequently General Survey Section FAR-ELF) were based in Singapore. In September 1955, 570 Map Reproduction Troop was formed and took over administrative control of the Map Depot, which was redesignated 556 Field Survey Depot in October. Delays in arrival of essential equipment, in the provision of air conditioning, and in other works services, inhibited the work of 570 Troop and necessitated considerable improvisation to achieve any production at all. By 1957 however, the Troop was in full production with an output of some 300,000 to 400,000 impressions a month. A major task was the production of the 1 inch to 1 mile Malaya series but in addition considerable quantities of other maps were reprinted and general printing work carried out. 556 Field Survey Depot moved into new accommodation in Dover Road early in 1955, where it held some 25 million maps. Turnover varied widely depending on operational and other factors, but averaged some 65,000 sheets a month.

A welcome reinforcement was the arrival in April 1956, of the first elements of 10 Transportation Squadron, which ran the railway sidings in the Base Depot at Alexandra from January 1957, onwards. The Squadron also operated a self-contained military port at Tanjong Belayar on Keppel Harbour, handling ammunition and general stores with two Z craft crewed by locally recruited civilians. This unit furnished a most useful standby in the event of internal security troubles in the port of Singapore. Up to 1956, transportation matters were dealt with by an officer on the CE's staff but, with the arrival of 10 Squadron, a separate transportation directorate was set up under the MGA FARELF with an AD Tn, Lieut Colonel D C Merry. In addition to technical control of 10 Squadron he supervised the operation and maintenance of four rail-served depots in Malaya, port operating in Hong Kong and the LCTs dumping ammunition off Singapore.

The Officers' Mess at Gillman Barracks, Alexandra, became the

principal RE Mess in the Far East<sup>5</sup>. Little of former mess property survived the Japanese occupation save a length of gilded carved wooden frieze taken from the Chinese temple, which had stood on the site of the pre-war Corps Mess at Changi. In its new location it greeted the visiting Sapper officer with a silent welcome to the spacious rooms, cool verandahs and excellent appointments of his new home. The Gillman Mess was managed by the Singapore Engineer Regiment and here, among other Corps functions, the RE Ball was held annually.

### MALAYA

EVENTS on the mainland were dominated by what came to be known as the Malayan Emergency, which after the grant of Malayan Independence, or *Merdeka*, in 1957, continued in lesser degree until its formal end in 1960.

Four years of enemy occupation had left the country in a state of disorder which was by no means restored to normality by the time British Military Administration (BMA) handed over to civil government in April 1946. In particular the former Straits Settlement and Federated Malay States Police, decimated and demoralised during the war, were in process of reconstruction as an integrated federal force. Of locally raised army units available in support of the civil power, two battalions of the Malay Regiment were re-established and engaged in recruiting and training but the State Forces and the Volunteers, dispersed in 1942, had not been reconstituted. By mid-1947 the last of the Indian Army had departed leaving as a nucleus of the Far East Strategic Reserve a handful of British units in Malaya and Singapore, reinforced early in 1948 by six of the battalions of Gurkha Rifles, all substantially under strength, transferred to British service.

The indigenous civilian communities had suffered dislocation during the occupation. The Chinese, who made up the largest immigrant ethnic group, were for the most part workers on the estates and tin mines, or were shopkeepers, craftsmen and businessmen in the towns and cities. To escape the oppressive régime, numbers of them had migrated to the jungle fringes, where they remained, deriving a precarious livelihood from agriculture. These squatters were to present a problem when the insurgency erupted in 1948. Within this Chinese population there had been cells of ardent communists, some of whom had sought refuge in the jungle from forces of law and order before 1941. Led by a few British Army and Police officers after the fall of Singapore, these groups offered the only effective resistance to the Japanese throughout the occupation. In these circumstances it was

deemed politic to assist them with additional officers and to supply them with arms and ammunition by air and by submarine. By 1945 they had become well armed and well trained components of Force 136. In the brief interval between the Japanese surrender and the arrival of the returning British troops, Force 136 emerged as the only stable authority in the Country.

As soon as the British authorities were re-established they took action in December 1946 to recognize the services of the Malayan Peoples Anti Japanese Army (MPAJA) and to disband them. While most obediently handed in their arms, there were many who hid them away for future use. Inevitably the Malayan Communist Party was declared illegal, whereupon its hard-core members withdrew into the jungle and began to organize a self-styled Malayan Races Liberation Army (MRLA) with the aim of establishing by force a communist republic in Malaya. There they drilled, carried out weapon training and political indoctrination, obtaining recruits, supplies of food, medicines and money principally by extortion from the squatters. April and May of 1948 were months of sudden violence and intimidation. In June the MRLA embarked upon an ambitious campaign of aggressive guerilla activity intended to eliminate Europeans from their estates, mines and industrial projects, and police and government officials from the small towns and villages.

#### EMERGENCY

The Government responded by declaring a State of Emergency and the Army reacted swiftly, inflicting in the first weeks such casualties on the communists that the latter were forced to abandon the policy of open confrontation and to resort to more clandestine tactics. From the shelter of the jungle small parties emerged to raid isolated posts and habitations for food and arms. Sabotage and ambush became their favourite stratagems. Such was the pattern of incident which was to continue with fluctuating frequency until the emergency was declared at an end in 1960. In official parlance, members of the MRLA were referred to as Communist Terrorists (CT), colloquially as "bandits", and to the Gurkha riflemen they were *dushman*, the enemy.

As the months passed numerous Emergency Regulations were promulgated, the most relevant from the engineer's point of view being that under which the Chinese squatters were removed from their vulnerable settlements on the jungle fringes and concentrated in new villages where they could be surrounded by wire and isolated from the attentions of the CT. The Malays, being Muslims, had little sympathy

with communism and were besides the principal source of recruits for the Police and the Armed Forces, so they could be safely left to look after themselves. Of the Indians, those not in defensible estate labour compounds were mostly employed on the railways, posts and telegraphs and in the PWD; with very few notorious exceptions all of them remained loyal to the Government.

From North to South the single track railway offered a target of which the CT took surprisingly little advantage, preferring as objects of sabotage isolated stretches of water pipeline on which repair parties could subsequently be ambushed. Both systems were well serviced by the appropriate civilian organisations and neither called for assistance from army engineers. There was little that could be done about damage to the thousands of unguarded acres of rubber trees, except to destroy the saboteurs. It was on the roads that the majority of ambushes took place and particularly on spurs leading up to the hills and on branches terminating in remote estates or in villages set in the foothills. Even there the enemy never resorted to cratering and only rarely to blocks, which were easily dealt with by the PWD.

The aims of the Security Forces, Police and Army acting jointly, were to keep open the roads, to protect the settled areas and by aggressive patrolling to seek out and destroy the increasingly elusive CT in the jungle. Army reinforcements were hurried to Malaya and others were raised locally. By 1953 there were thirty major units in Malaya together with units of supporting arms, deployed in innumerable detachments through the length and breadth of the country. Thus the provision of accommodation became the first priority. For some years indeed, there was to be little else for the Sappers to do<sup>6</sup>.

#### ENGINEER TASKS

There was, in 1948, a substantial programme of works services related to the long term accommodation requirements. It included maintenance and modification of pre-war permanent barracks in Penang, Port Dickson and at Majedee, outside Johore Bahru; construction of new cantonments, notably in Taiping, Ipoh, Kuala Lumpur and Seremban; and the rehabilitation and modernization of both British and Japanese wartime camps such as those on abandoned airfields at Alor Star, Sungei Patani and Kluang, and at Sungei Besi and elsewhere. To this considerable assignment was now added the requirement for a large and fluctuating number of temporary camps to accommodate troops deployed on emergency operations.

The larger camps were designed to house a brigade HQ or major

unit while smaller camps served as operating bases for companies or even platoons. Major camps were generally of semi-permanent construction of timber or of poles clad with panels of *attap* palm leaf, which provided the cheapest, most durable and most comfortable accommodation<sup>7</sup>. Most were provided with married quarters, frequently in more substantial construction, though in several instances Gurkha soldiers' families remained under canvas for years. The number and location of minor unit bases fluctuated with shifts in the operational scene. They were usually centred on some existing permanent building, such as an estate bungalow and supplemented by tentage and hutting. Water supply presented few problems and it was rare for the occupying units to require tankers or water trailers to the extent that, at one time, it became difficult to find men trained in their use. Sanitation and anti-malarial precautions followed traditional practice. Electric lighting was universal, supplied either from the mains or by portable generating sets.

The tent in service was the MUG (Marquee Universal General Service) pattern, which was sectional and capable of extension to adapt to a variety of uses. Tent floors were sometimes of *Bit-hess* (Bituminous Impregnated Hessian Canvas), or more conveniently of concrete slabs, which could be moved from site to site. In the humid climate of Malaya, tentage proved to be most uneconomical because the canvas rotted and had a life of no more than one year. As a substitute, a cheap, dismountable, metal structure known as the "Godolphin Shelter" was introduced in 1951 and manufactured in large numbers by the EBW in Singapore over a period of two years<sup>8</sup>. The frame was fabricated of welded unserviceable water-pipe and the cladding was of corrugated metal sheets. A ceiling cloth of canvas helped to keep the interior cool. Even so, they were uncomfortably hot unless sited under trees but they stood up well under operational conditions despite frequent dismantling and re-erection by unit labour.

The establishment of HQ Malaya District, provided for a CE, Deputy CE, and an ADW in Kuala Lumpur, with CsRE and DCsRE allocated on a geographical basis to cover the entire peninsula. By trial and error the areas of responsibility were adjusted until August 1950, when Malaya Command (MALCOMD) was formed. After that the appointment of ADW lapsed and the number of works districts was reduced to two, CRE North at Taiping and CRE South at Seremban.

As part of the intended strategic reserve in Malaya, 553 Field Squadron had been allotted to 25 Infantry Brigade in Johore but by

March 1948, both the Brigade and the Squadron had disappeared from the Order of Battle. When the emergency erupted in June there was no RE field unit in the country. In October 561 Independent Field Squadron arrived with 2 Guards Brigade from the UK and shortly afterwards, redesignated as 1 Independent Field Squadron, was engaged in anti-terrorist operations in Selangor until May 1949, when it was transferred to Hong Kong. Thereafter the only RE unit remaining was the Works Squadron (Malaya), formerly 890 E & M Company. This Squadron was originally an all British unit and was based at Batu from 1945 to 1951 with numerous detachments employed largely on works tasks, including hospitals, power stations and water-works, throughout the whole of Malaya. As time passed the British Other Ranks (BOR) were progressively replaced by Chinese, Indians and Malays. Initially these were called Locally Enlisted Personnel (LEP) and later Malayan Other Ranks (MOR) until 1950 when the Squadron was renamed the Malayan Engineer Squadron. By mid-1952 the list of major works completed by this unit included eight airstrips, fifty miles of roads, site clearance for three military hospitals, and five Bailey bridges exceeding eighty feet in length.

#### GURKHA AND MALAYAN SAPPERS

The raising of Gurkha Sapper squadrons for the projected Gurkha Division started towards the end of 1948 when the first drafts of re-enlisted riflemen, from every Gurkha regiment of the former Indian Army, assembled at the ETC Kluang on permanent attachment to the Corps. With a cadre of RE officers, warrant officers and NCOs, these drafts took form as the Gurkha Training Squadron. They were followed by others and, though training was frequently interrupted by operations in an infantry role, the first field squadron formed up on 1 October 1949 and the second on 1 April 1950. In September 1950 these two units, named respectively 67 and 68 Field Squadrons RE (Gurkha), were transferred to Hong Kong, to relieve infantry despatched to Korea, without ever being employed on any but the most minor engineer tasks in Malaya. At the ETC, the Gurkha Training Squadron continued to receive annual intakes of recruits and to carry out trades training.

In October, 1952, the Malayan Engineer Squadron was disbanded to form 75 Field Squadron which was Malay with British Officers and some BOR and a British/Malayan 78 Field Park Squadron. These were grouped with the two Gurkha squadrons in 50 Field Engineer Regiment commanded by Lieut Colonel A N Clarke. This



somewhat bizarre arrangement gave the CO an unusual command comprising men of six different races (British, Gurkha, Malay, Chinese, Indian and Eurasian) and diverse religions, in units separated by a thousand miles and more of the South China Sea. From Hong Kong the 2IC, Major I G Wellsted, and the RSM were detached to oversee the Malayan squadrons at Kluang, in Malaya. At the end of 1954, RHQ with 67 and 68 Gurkha Field Squadrons returned from Hong Kong and were based at Sungei Besi on the outskirts of Kuala Lumpur, but there was never any effective cohesion between the Regiment's two component parts. In 1955 the partnership was dissolved. Officers of local origin had been commissioned into the RE (Malayan Section)<sup>9</sup> and as a next step, 76 Federation Field Squadron, the first to be raised outside the Corps of Royal Engineers for the Federal forces was formed in 1954, with a composition approximately 50% Malay, 40% Chinese and 10% Indian. In May 1955, 51 Field Engineer Regiment was formed under the command of Lieut Colonel J B B Milton as a separate organisation consisting of 75, 76 and 78 Squadrons.

Since 1952, the Army in Malaya had been grouped operationally in two divisions which were allocated divisional areas corresponding as closely as the tactical situation allowed to those of the two districts (North and South). The engineer units, 75 and 78 Squadrons and 410 Independent Plant Troop, were in support and tasked by the CE MALCOMD. The increments and reorganisation permitted the allocation to each division of an engineer regiment. Thus, as they became available, 50 Field Engineer Regiment was assigned to 17 Gurkha Division/South Malaya District which was commanded from 1952 to 1955 by Major General L E C M Perowne; 51 Regiment was assigned to 1 Federation Division/North Malaya District. As a result a field formation was made viable for contingency operations beyond the borders of Malaya<sup>10</sup>; while a further step had been taken towards the eventual constitution of the Malaysian Army.

#### COMMAND

Through all this the organisation for works services continued unchanged, with a CRE (Works) at each District HQ. With the prevailing need for stringent economy in manpower, the establishment for HQRE at divisional HQ was not implemented. Each commanding officer had also to act as CRE making use of his own regimental resources. It was soon found that the type of operations to which the Army was committed in the jungle, necessarily planned on a daily or

weekly basis, called for little in the way of engineer support. The few operational tasks beyond the capability of infantry pioneer platoons were easily included within the wider schedule of engineer work by Sappers. Because of this the COs, though nominally CsRE of divisions, had little beside contingency planning and occasional exercises to occupy them in that capacity. Their units were placed at the disposal of the CE for employment on what, in more conventional circumstances, would be corps, or army, tasks. The need to integrate engineers with other arms of the division to which they belonged dictated that, as often as possible, each squadron be assigned to a major project within its divisional area, thus allowing a capacity for minor tasks in direct support.

By amendment to the Corps Warrant dated 28 September 1955, The Gurkha Engineers were invested with a separate identity and incorporated, for convenience of personnel administration, in the Brigade of Gurkhas. Thereupon, RHQ, 67 and 68 Field Squadrons ceased technically to be units of the Corps and the regiment was redesignated 50 (Gurkha) Field Engineer Regiment. The Gurkha officers and men, hitherto infantrymen permanently attached to the RE, could now be posted into the Regiment and the rifleman became for the first time a Sapper<sup>14</sup>.

In May 1956, 84 Field Survey Squadron moved up from Singapore to begin work on the revision of the 1 inch to 1 mile maps and was placed under administrative command of CRE South Malaya District. In August 11 Independent Field Squadron joined 28 Independent Commonwealth Brigade Group in North Malaya, which was commanded by Brigadier P N M Moore from 1955 to 1958. The Federation Army HQ was set up in Kuala Lumpur in September 1956. 76 Squadron was then withdrawn from 51 Field Engineer Regiment and redesignated 1 Field Squadron Federation (later Malaysian) Engineers. In April 1957, 74 Field Park Squadron reached Malaya from Ripon after delays in transit attributable to the Suez Canal intervention, and joined 50 (Gurkha) Field Engineer Regiment at Sungei Besi. 410 Plant Troop was released to the Commonwealth Brigade at Butterworth, in Province Wellesley. These were the last shifts in the Engineer Order of Battle, which reached its peak at this time, the eve of Independence—*Merdeka*.

#### PROGRESS OF INSURGENCY

Through all those years the Emergency pursued its melancholy course. After the initial successes of Major General Sir Charles Boucher's

offensive tactics while GOC Malaya District, which resulted in the abandonment by the MRLA of open confrontation, the law of diminishing returns demanded ever-increasing effort to yield fewer and fewer "eliminations" of the elusive CT. In 1950, the "Briggs Plan"<sup>12</sup> for squatter resettlement and food control was evolved but the measures could not at once be implemented and it was some time before they began to take effect. Terrorist violence reached a peak in October 1951 and marked the lowest ebb in the fortunes of the security forces. The CRE (Works) North Malaya, Lieut Colonel T H Cross was shot in one of the rare railway ambushes in 1951 when the night mail train to the North was attacked. All units and military establishments became involved operationally, even men under training at the ETC were called out at times. To meet these demands, recruit parties were organised in self-contained patrols, with leaders of suitable infantry experience. A few examples must suffice here to indicate the nature of Sapper participation in this phase. The majority of calls were for static guards on outlying rubber estates but opportunity sometimes presented itself for offensive action, such as when one small patrol under a Gurkha officer, moving by motor launch in the Tan Hongsurat area, came upon a bandit outpost armed with automatic weapons and protected by a ravine. The Sappers charged, routed the enemy, wounding one, and discovered a camp that had been occupied by fifty CT. At Bentong, a detachment of the Works Squadron turned out and drove off bandits attacking the police station. Two officer's patrols, each about thirty strong, from the first NCO training cadre at Kluang, were engaged in a 48-hour operation in the course of which one important CT was killed, three wounded, and twenty made prisoner. On another occasion an officer and two troops from the ETC spent twenty-three consecutive days in the jungle, working with infantry and with air support to achieve the surrender of two units of the MRLA. Not all were so successful; in Operation CONSTELLATION (September-November, 1949), the entire Gurkha Training Squadron was engaged in patrolling a large area in Johore, being supplied by air, but no CT were contacted though many camps were uncovered.

As time passed, a variety of engineer tasks came as welcome alternatives to infantry action. Thus, for eight months a detachment from the ETC operated a ferry at Temerloh, while the PWD were building a permanent one. Others built airstrips at Seremban and at Jerantut, and renewed timber bridges in the Kulai district of Johore. A 160-foot Bailey bridge was put over the Betong River in Pahang by the Works Squadron and another, 280 feet in length, was launched

across the Sungei Muda at Jeniang, in Perak, by an RE officer using PWD labour. In July 1949, the Gurkha Training Squadron was involved in Operation BORROWDALE, which was mainly water-borne in the lakes and swamps of the Tasek Bera. The Sappers played a prominent part in ferrying men and stores by storm boat and in local craft in support of 1st Battalion, The Seaforth Highlanders. Two NCOs were subsequently awarded C-in-C's Certificates for their work on this occasion.

Gradually the "Briggs Plan" began to take effect, as some four hundred New Villages came into being, in which the formerly vulnerable squatters could be watched over by special constables and, in due course, defended by their own Home Guard. Meanwhile a comprehensive system of controls were introduced to deny supplies to the CT in the jungle. Most of the work in the New Villages was carried out by the PWD but the Malayan squadrons were allotted the task of installing water supply in those at Yong Peng<sup>13</sup> and Jemaluang. The intention was for the Police to dominate the populated areas, leaving the Army free to kill or capture the CT. The start of this offensive in February 1952, coincided with the appointment as High Commissioner, of General Sir Gerald Templer, who was, for the first time, accorded unified authority over both civil and military components of the security forces. From inception, the Malayan Squadrons were increasingly employed on operational engineer tasks, opening up jeep tracks, constructing camps at the jungle edge, making dropping and landing zones in the deeper forest, reconstructing airstrips and disposing of bomb dumps up and down the country. The Gurkha squadrons moved to Hong Kong just when the work was becoming interesting.

Gradually the measures enforced with confidence and tremendous energy by the new High Commissioner began to bear fruit. The incident rate fell significantly while the morale of the general public rose and information on CT activity improved both in volume and in accuracy. The MRLA, by no means admitting defeat, broke up into smaller units and retreated further into the deep jungle. The Army responded by superimposing upon its routine framework operations, a series of sustained long range penetrations. The police, acting increasingly on information received, worked on the jungle fringes to intercept CT raiders, while the Army aimed to dominate the interior; to threaten the security of the communists' bases and to disrupt their communications. In this phase, which started in 1953, the Army's need was for greater mobility. With the increments of 1954/5, the Sappers

had at last the resources to contribute a major effort in airstrip construction and road building in support of operations. It was perhaps a coincidence that the Chief of Staff MALCOMD from 1955 to 1956 was a Sapper, Major General J R C Hamilton.

### JUNGLE FORTS

In the deep jungle were settlements of aborigines, inaccurately referred to by the soldiers as *Sakai*, following their timeless primitive way of life and maintaining themselves by fishing, hunting, and subsistence cultivation. Being remote from civilization and lacking any form of protection, these settlements were easily intimidated by the CT, who were thus able to make use of them for food supplies and as sources of information on the movements of troops. To bring this situation under control, permanent military or police outposts were established in the heart of the aboriginal areas offering protection and amenities to *Sakai* thus isolating them from the communists and securing their allegiance to Government. These outposts, known as Jungle Forts, were at first maintained entirely by helicopter and by airdrop, which was both precarious and uneconomical, detracting a disproportionate amount of the limited air resources from other operational requirements. Brigadier W F Anderson, CE MALCOMD, proposed to relieve the load by providing the jungle forts with airstrips capable of receiving fixed-wing aircraft<sup>14</sup>. He predicted that in time each might lie at the end of a road instead of being an island in a sea of jungle.

A start was made on the easiest and most accessible, which were Fort Kemar and Fort Shean. A detachment of one officer and twelve MOR Sappers was lifted by helicopter into Fort Kemar with authority to pay cash to the local *Sakai* to start work with hand tools. At the same time inquiries and experiments were made with all importers of agricultural tractors and machinery, with the idea of developing airportable earth-moving equipments, since none of the in-service tractors could be broken down into anything near the 800lbs limit of the S55 helicopter. The only possible machine in Malaya at the time appeared to be the 26HP Ferguson wheeled tractor. The Federation Government agreed to buy one of these and 78 Field Park Squadron, with advice from the importing agents, broke it down into helicopter loads and moved it into Fort Shean, where it was successfully re-assembled with the help of shears made of jungle timber. A variety of towed equipments such as harrows and rollers was then made up in the field park squadron workshops at Kluang and flown in for use with the Ferguson. A 120-foot bridge on two timber crib piers was

work. Stores and spares had to be ordered by wireless and delivered by helicopter or air-drop; of entertainment and amenities there were none, and the detachments' interest was focussed on the state of their machines and on the date of the acceptance-trial of the strip. Morale and health alike were excellent and, although arrangements were made for individual reliefs after three months, it was common to find that both officers and men moved only under protest, for they set their hearts on being present when the first Pioneer landed.

### ROADS

Road construction policy was subjected to the pull of divergent interests. The PWD was unable to expand its potential beyond that needed to carry-out its modest long-term highway programme; moreover, they disliked earth roads on account of the continuing maintenance involved. The Army, on the other hand, would be content with these, but was also unable to carry the maintenance commitment; while the planters, who were confirmed advocates of the earth road, pressed for them only when they could foresee some commercial advantage to their estates. It was for the CE to reconcile these interests and to ensure that whatever was done by Army engineers would be of tactical value to the Security Forces. Operations were, however, projected at most six months in advance, whereas road-planning had to cast forward two years or more, with an eye to the end of the Emergency and to the time when the Civil Administration would take-over. In these circumstances, road projects were assessed in three categories:

- "A"—Those required in connection with a specific operation and which were likely to be abandoned within twelve months;
- "B"—those required for operational use over a period and likely to be taken over subsequently by the PWD;
- "C"—Those forming part of the long-term permanent highway programme, but with operational priority as military roads.

Category C roads were the most attractive, both to the Federal Government paying for them and to the Army engineers who did the work; but the PWD quite properly insisted on standard highway specifications regarding grade, width and trace, and while they were prepared to accept very heavy earthwork to meet them, Sappers were not well equipped for this and had besides a primary responsibility to produce quick results. A compromise was reached by which hastily built military roads would serve as construction tracks for the heavier earth-moving plant required subsequently by the PWD to build the highway, and worked admirably provided that the follow-up was

rapid. The Rompin-Gemas road was a good example of a Category C project that went according to plan, with the PWD following closely on the heels of the field Sappers, however on the Kemayan-Ayer Hitam route, two years elapsed between the completion of the military road and the arrival of the PWD, and the delay was disastrous. In the interval timber culverts were attacked by white-ants and collapsed; mutual recrimination followed, and morale suffered. In consequence it was decided that the Army should make all bridges and culverts in permanent construction from the start and do the full specified earth work wherever the terrain permitted; leaving the PWD only the pavement to complete in their own time. This revised policy was effectively applied to the Kedah Roads Project described below.

By 1955, all the field engineer units in Malaya were deployed on airstrips or on roads of one category or another; 11 Field Squadron was engaged at one time on as many as six Jungle Fort airstrips simultaneously<sup>17</sup>. 67 and 68 (Gurkha) Field Squadrons with 410 Plant Troop took on the southern section of a new link between Rompin and Gemas, to reduce the distance by road between these two centres from seventy to thirteen miles, so that troops could move quickly into an area at that time infested by bandits. Their task was a seven mile stretch through virgin jungle, with two Bailey spans on the way and a 300-foot timber piled bridge at the end of it. The PWD worked from the North to meet them. The bridge, over the Muar River, involved the driving of 56-foot spliced 12-inch square timber piles into water, a feat which firmly established the Gurkha as a field engineer in the eyes of the Army and of the PWD, the bridge was named "Gurkha Bridge". The Gurkha Sapper's use of jungle poles and lashings of tree-bark for falsework was most effective. This task occupied both squadrons and 410 Plant Troop from February to August 1955. Meanwhile, 75 and 78 Malayan Squadrons began with a short road in the Padang Lembu area, followed by a much longer one linking Jalong and Chemor in Kedah, which included three Bailey bridges.

Early in 1956, Sappers of four nationalities were deployed on some sixteen miles of road connecting Kemayan with Ayer Hitam. An important tactical objective of this project was to bring within easier reach of the Security Forces the isolated Ayer Hitam Estate, scene of several terrorist attacks and accessible hitherto only by armoured train from Bahau. This project was directed by RHQ, The Gurkha Engineers. The Malaysians contributed a hutted camp at Kemayan, made in sections at Kluang and erected by 78 Field Park Squadron. 11 Field

Squadron, with its attached RAE troop, worked from the North over swampy terrain into the jungle, while from the South 67 and then 68 Gurkha Field Squadron, with 410 Plant Troop, completed a seven mile section through very dense primary jungle. At the same time this group undertook the reconstruction of a further six miles of track running South West from Ayer Hitam to Ulu Serting, thus establishing connection with existing routes via Kuala Pilah to Seremban, and through Bahau to Rompin and Gemas. Game was plentiful in this remote district; Gurkha Sappers bagged a tiger within a week of establishing camp at Ayer Hitam, while pig and venison provided welcome supplements to the ration. When completed, these links brought Kemayan within forty-two miles of Rompin by road, a journey which had previously necessitated a detour of two hundred and forty.

On release from Ayer Hitam, 67 Squadron moved to Johore, where among other tasks it completed in three months a six mile stretch of road, including three bridges, between Sedenak and Tak Wah Heng. Here, for the first time, the plant was operated exclusively by Gurkhas, and a sizeable force of local Chinese labour was employed, which coincided with a remarkable falling-off in CT activity in what had been notoriously hostile area.

Not the least of the problems was that of protection, as most of the country in which the Sappers were operating was covered with dense jungle, and the location and probable duration of their tasks could not be concealed from the CT. Small parties were, therefore, always at risk from ambush or surprise attack; though only one such incident is on record. As a rule, not less than one-third of a unit's strength would be consumed in local protection, the remainder working with arms piled and under guard. In all, eighty-five miles of new roads were opened by the Sappers between 1954 and 1956, and eighty-three by the PWD, resulting in a very substantial improvement in operational mobility.

#### SURVEY

84 Field Survey Squadron, which arrived in the command in 1956, was affected by the same problem of protection, and individual surveyors had to be provided with escorts when working beyond the limits of town or village. Even so, they could only proceed with prior clearance by the local operational commanders, for any unauthorized movement in jungle, plantation or open grassland was liable to investigation by security forces with orders to shoot on sight. When the presence of CT was suspected, or when operations were in progress,



surveyors could be denied access to specified areas for two or three weeks on end. Initial revision of the 1 inch to 1 mile maps was made from up-to-date air photographs specially taken by the RAF, and the final revision completed in the field. The advantages of having the Squadron Headquarters located alongside HQ MALCOMD were many and, notwithstanding the restrictions imposed on field work referred to above, over sixty sheets were revised in the ensuing two years.

From October 1956, 84 Squadron was assigned the additional task of fixing target director sites for air strikes against the MRLA. These fixations were required at short notice (48 - 72 hours) and, because of the absence of second or third order triangulation and of the inaccessibility of the primary stations, mostly on hills and overgrown by secondary jungle, co-ordinates were obtained by traverse from the nearest cadastral points which were re-computed in terms of the operational grid. Bearing pickets for each site were established from sun azimuth, a method giving satisfactory accuracy in these equatorial latitudes. Numerous bombing sorties on terrorist jungle camps invisible from the air were carried out successfully with the help of these target directors, using data furnished by the Squadron.

#### BARRACKS

Works services continued with their routine of moving, maintaining and improving operational base-camps, to which was added in 1954 an important new construction project, the Sungei Besi Cantonment which had at last become a firm requirement after many planning vicissitudes. Policy had by now shifted away from permanent multi-storey design in favour of a semi-permanent single-storey, light, concrete construction named *Permalcon*, with a life of twenty years. While the drafting of standard type-plans and a new lay-out went on, extensive drainage and site-preparation works were set in hand under the heading of "Preliminaries." The task turned out to be more formidable than the original survey suggested, for much of the flat ground was, in fact, old tin-tailings and little better than a clay bog. Conventional drainage alone had little effect and it became necessary to squeeze-out the plastic clay to a depth of up to fourteen feet and to make up with spoil from terracing carried in by scraper. It took more than a year, and a million cubic yards of earth, to complete this process, at the end of which the ground stood up to loading at one ton per square foot. Meanwhile, water supply and sewerage schemes were prepared, mainly by young architects and engineers doing National

Service, and by mid-1956 the externals were nearing completion and a first building contract was ready for tender.

In September 1956 the Federation Government became responsible for internal security, in anticipation of Independence. Thereafter, under the terms of a contemporaneous agreement on external defence and mutual aid, the UK in association with Australia and New Zealand would maintain in Malaya a Strategic Reserve restricted in the long term to one brigade group. It now became evident that Sungei Besi lay too close to the capital to serve as a base for this force; all work was stopped, and the site abandoned, although subsequently developed by the Federation Army for its own purposes. Other projects suffered the same fate; reconstruction of the Gurkha Depot at Sungei Patani, planned and re-planned no less than five times, was now finally cancelled, together with projected developments at Taiping, Kluang and Johore Bahru, and attention and effort were switched to a proposed cantonment to house the Commonwealth (ANZUK) Brigade at Bukit Terendak, on the sea-coast ten miles North of Malacca. A modest start on Preliminaries was all that was approved until 1958, when Lieut Colonel D E M Ingram was appointed as CRE (Works) to complete this project under the new Army Works Organization in London; by then a water supply had been established and simple construction tracks to the sea pushed through.

By 1956, sound security measures among the populace, coupled with energetic anti-terrorist tactics in the jungle, had substantially reduced the strength of the MRLA and forced the residue of militant communists on to a desperate defensive. The foundations of democratic government had meanwhile been securely laid, and it had become possible for all emergency restrictions to be lifted in extensive so called white areas of the country; so that, with the proclamation of *Merdeka* in Kuala Lumpur on 31 August 1957, the nationalist aims of the insurgents ceased to have any meaning for the masses. A hardcore of CII, however, continued for another three years to occupy the attention of the Security Forces until, driven by process of attrition into the mountainous tracts on the Thai border, they no longer posed a serious threat.

#### THE FEDERATION OF MALAYA

With Independence in 1957, the status and organization of the British and Commonwealth forces in Malaya changed. All non-Federation troops passed henceforth under the command of the GOC 17 Gurkha Division, who assumed the new style of GOC Overseas Commonwealth

Land Forces (OCLF); Malaya Command became once more a District, with HQ at Seremban; and the CE removed there with a reduced staff<sup>18</sup>. The CO (Gurkha) Field Engineer Regiment preserved his position as CRE 17 Gurkha Division, and the divisional engineers then comprised 11 (RE), 67 and 68 (Gurkha) Field Squadrons and 74 (RE) Field Park Squadron<sup>19</sup>. As the Army's preoccupation with emergency operations abated, training for more conventional forms of warfare was resumed and it became expedient to allot the field squadron in support of specific formations. Thus, 11 Squadron, with 410 Plant Troop, was assigned to 28 Commonwealth Brigade, 67 Squadron to 99 Gurkha Brigade and 68 Squadron to 63 Gurkha Brigade.

On Independence, 51 Field Engineer Regiment was disbanded and volunteers from 75 and 78 Squadrons were called for to form 2 Field Squadron, Federation Engineers; of some 300 MOR eligible, all but seventy elected to transfer. 1 and 2 Squadrons were thereupon allocated in support respectively of 1 and 2 Brigades in 1 Federation Division; 78 Field Park Squadron was disbanded and 75 Squadron was reconstituted as an Independent (Malayan) Field Squadron RE<sup>20</sup>. At Federation Army HQ a SO RE remained, seconded with a small staff, to assist with operational planning and the initiation of works services, using the PWD architect's office for all design work. Here the frustrating delays which arose from remote War Office control were eliminated; the Federal Government knew exactly what it wanted for its Army; it was prepared to pay for it, and was politically motivated in getting results without delay. The PWD had in being a powerful, well maintained plant fleet which could tackle the clearing and site work, thereby making it possible for building to begin within six months of the initiation of a project. Under the GOC, Federation Army, Major General F H Brooke, the programme of work in the field continued to be dominated by road construction and improvement. An interesting task carried out in 1957 by 68 (Gurkha) Field Squadron with two troops of 67 Squadron under command, was the building of a 280-foot high-level Bailey pontoon bridge to relieve a ferry across a navigable tidal reach of the Sungei Simpan Kanan at Tongkang Pechah in Johore. The bridge was launched as one unit and then broken over the single central floating pier to form two 140-foot spans, the nose being lowered nearly twenty feet with a winch on one bank and shear-legs on the other. When completed, this bridge greatly facilitated the rapid deployment of security forces responsible for that region, and up to 1,400 vehicles a day made use of it in the ensuing

twelve months, after which it was replaced by the PWD with a more permanent structure. In the latter part of 1957, the chief task of 67 Squadron supported by 410 Plant Troop was the Masai-Ulu Tiram road which, due to an exceptionally long spell of continuous rain, was not finished until February 1958.

The Kedah Roads Project, more extensive than any hitherto conceived, was planned to give access by Class 24 roads to a number of *kampongs* in an undeveloped and previously uncontrollable area lying to the East of Alor Star. It involved the replacement of existing footpaths and tracks by more than fifty miles of road, of which ten were to be made by the PWD and the rest by the military, the effort to be shared between Commonwealth and Federation Engineers on a two-year schedule. All bridges and culverts were to be built in permanent construction and the roadway should be finished to its full width and projected alignment by the Sappers, leaving only the permanent surfacing to be put on by the PWD. This necessitated the design and construction of a number of concrete spans using pre-stressed concrete beams, made by the Hume Pipe Company, on concrete piles or piers. The longest of these, 450 feet in length with twelve piers, six of which had to be built in water, was built by the Federation Engineers at Nami.

11 Independent Field Squadron and 410 Plant Troop<sup>21</sup> began the first ten miles from Naka to Nami in July 1957, and were followed in 1958 and 1959 by 67 and 68 (Gurkha) Field Squadrons respectively and by elements of 74 Field Park Squadron, working from a base camp at Gajah Puteh on the routes from Jeniang to Kampong Bahru and Kampong Kura. Protection was provided by police, releasing nearly fifty-percent more Sappers for work; while coolie labour was employed in large numbers together with civilian plant operators, which afforded junior NCOs and Sappers in all the squadrons, British, Gurkha and Malayan, excellent experience in overseeing minor tasks. The whole network was not completed until September 1959, when the roads were ceremonially opened by the Sultan of Kedah<sup>22</sup>.

The Malayan Emergency was declared at an end on 31 July 1960. The period of history covered by this chapter ends before then, but saw Malaya established as a self-governing state within the British Commonwealth. A remarkable feature was the growth in strength and effort of Sappers in support of operations which were, at first, supposed to have no need of them. In consequence of this early misappreciation, the first four years went by with no field engineer unit whatever engaged; but, by 1958, with victory in sight, eight squadrons were

deployed on tasks of operational significance. That their work turned out to be for the greater part less intimately in support of the fighting arms than was traditional, was due to the unconventional nature of the campaign; many intimate support tasks were undertaken, camps for security forces, helicopter landing pads in jungle and in swamp, road and track repair, wiring, village searches and basic infantry work when priorities allowed. The building up of Sapper strength was due to imaginative direction able to perceive the opportunities in such a situation, and to a flexible organisation which could be adapted to exploit them. This era saw also the birth of two new bodies of military engineers, raised in the theatre of operations and fostered by the Corps. By 1958, the Gurkha Engineers were no longer an integral component of the RE, but remained affiliated to them and continued with their help to mature within the British Army as part of the Brigade of Gurkhas. Of the Malayan squadrons, two had already taken their appointed places in the framework of the infant Federation Army.

The period closed with a polyglot force of engineers in the field, in which Briton, New Zealander, Australian, Gurkha, Malay, Chinese and Indian worked side by side under the leadership of the Corps. Over the years these Sappers of different races and creeds had contributed no less to the suppression of communist insurgency than to the stability and welfare of the future Malaysia<sup>23</sup>. Further projects for this fruitful partnership, even more ambitious than the unfinished Kedah Roads, were already being initiated by the Federation Engineers<sup>24</sup>.

In the frontier tracts of Perak and Kelantan, an expedition made up of detachments from the Federation Engineers, 74 Field Park Squadron and 84 Field Survey Squadron, using aborigines as porters, was even then surveying a trace between Grik and Bukit Melintang for a road which, it was estimated, would take from five to eight years to build according to availability of engineer troops. This highway, when it came in the fullness of time to be made, would provide a much needed link between the eastern and western states, and one of great strategic importance to the defence of the country. In the meantime, the long association of Royal Engineers with the *Tanah Melayu* was by no means over.

## HONG KONG

AFTER the Japanese surrender in 1945, Hong Kong set to energetically to erase the effects of enemy occupation and to restore the former structure and security of a Crown Colony. Meanwhile, in China, the

nationalist forces were losing the struggle and withdrew to Formosa and, on 1 October 1949, the Communist Chinese People's Republic was proclaimed. So it came about that, in the space of a few years, two widely divergent philosophies established themselves on opposite sides of fifteen miles of potentially vulnerable land frontier.

During the war lavish Allied support, for the greater part American, had been given to the Chinese Nationalist (KMT) forces fighting the Japanese in the South, while the Chinese Communist (CCP) Red Army in the North subsisted as best it could unaided. Once the war was over, conflict inevitably broke out between these two politically opposed factions and, in 1946, the KMT launched an all-out campaign to suppress communism and to unite China under their control; a nationwide civil war ensued, in which the KMT were initially successful in occupying most of the cities and communication centres. But CCP strategy, founded on a doctrine of social revolution, proved more attractive to the masses and led to large-scale defections from the nationalist ranks. In their own time the Communists went over to the offensive and, in March 1949, captured Peking; Nanking, the nationalist capital, fell in April, and Shanghai in May. Then, sweeping South across the Yangtse river, the Red Armies went on to make themselves masters of the whole country.

As they advanced, hordes of non-communist Chinese, fleeing before them, began to stream into Hong Kong, setting serious problems to the colony's already over stretched administration. Simultaneously, a powerful anti-American sentiment was being fostered in the areas liberated by the CCP, leading to riots and demonstrations against the United States' policies of political and financial domination, which its leaders saw as differing in no way from those traditionally pursued by the colonial powers. In these circumstances there could be no certainty that the communist advance would halt at the frontiers of Hong Kong and Macao, and no guarantee that the situation would not be exploited to eradicate once and for all these last remaining Imperial outposts on the coastline of resurgent Red China.

#### REINFORCEMENT

The garrison of Hong Kong, already hard-pressed in support of the Police to contain the flood of refugees, was quite inadequate to meet an external threat on the scale which seemed possible in the spring of 1949. Reinforcements were accordingly hurried in and 40 Division formed up to defend the colony in the event of that threat materializing. These reinforcements generated urgent demands for work on the

The Red Army was, meanwhile, busy eliminating the last KMT resistance, combating terrorism, and restoring law and order in the new republic. Notwithstanding continuing reports of military activity across the border, the likelihood of an attack was seen to be receding and, in the early months of 1950, some reductions in the garrison were effected. In February, 1 Independent Field Squadron was withdrawn to the UK; in March, an entire brigade, including both the Gurkha battalions left for Malaya. Then, Allied intervention in the Korean War regenerated anti-Imperialist sentiment in mainland China, the appearance of the US Navy off Taiwan led to renewed confrontation and, in August, tension rose sharply. At that precise moment the Hong Kong garrison was further depleted by the dispatch of a brigade HQ and two battalions to Korea, necessitating a contraction of the forward line of defended localities.

It was in these circumstances that the C-in-C FARELF found it necessary to transfer the two newly raised Gurkha engineer squadrons from Kluang, in Malaya, to reinforce 40 Division in their proven capacity as infantry, while continuing as opportunity offered, their training and employment as Sappers. 67 and 68 Gurkha Field Squadrons reached Hong Kong, by sea, in September and took their places with 54 Field Squadron in a Provisional Battalion forming part of "X" Brigade, hastily extemporized to occupy the left, or western sector of the new line. For this purpose the Sappers were equipped with carriers and given two Vickers MMG and two 3-inch mortars per squadron in addition to their normal armament of LMG and rifles. The CO of 24 Field Engineer Regiment, was placed in tactical command of the Provisional Battalion.

Consequent upon the reduction in the Order of Battle it had been necessary to withdraw from the forward position initially adopted, and the line was retraced on a wide arc from Yuen Long in the West to the neighbourhood of Tai Po in the East, following the high ground and about five miles back from the border. On this line, defended localities were then progressively improved from groups of hastily dug isolated weapon-pits to fully developed bunker systems provided with overhead cover, covered communication trenches, bomb-proof shelters and command posts, many of which were excavated in solid rock. An interesting innovation of this period was the "S", or "Hairpin" shelter devised by Major J R Radford, which was adopted throughout the defence. An unforeseen complication arose when localities perfected by Gurkha Sappers were taken over by a British battalion since the weapon-pits were found to be too shallow for use by BOR, and the

shelters too short. Some positions were sited among Chinese graves and gaps were ordered to be left in perimeter wire to allow the families of their occupants to attend to them; as a result there was in the early days much pilfering by the local population of materials from completed works, when the troops withdrew to camp at nightfall. As time went on, coolie labour was introduced to carry out wiring and other less agreeable tasks; and camouflage from isolated strongpoints was removed into safe custody except during manning exercises, which occurred with decreasing frequency as the political situation improved.

The forward defence zone was separated from Kowloon by the mountain massif culminating in Tai-Mo-Shan (3,143 feet), so that communication with the rear was possible only by the vulnerable coast roads on either flank; a route up the centre of the New Territories was obviously necessary and, with the likelihood that the enemy would enjoy local air superiority in the opening stages of an invasion, it ought to be made as invulnerable as possible to bombing. The specification called for a 24-foot Class 70 all-weather road without bridges; the alignment was to be as far as practicable in cut, the maximum gradient 1 in 10, and curves not less than 100-foot radius. As an operational priority, a 14-foot Class 9 water-bound track was to be pushed through and kept open throughout the construction of the highway which, it was appreciated, would take several years. This route, designed to link Tsun Wan with Sek Kong and known colloquially as "Twisk" (TW-SK), was over seven miles in length and negotiated a pass 1,600 feet above sea level; it was to become the most important engineering project undertaken by the Corps in Hong Kong.

The initial survey, carried out by 24 Field Engineer Regiment with the assistance of Chinese surveyors, was completed in three weeks; the first key-plan was prepared by July 1950, and given War Office approval in August. The task was assigned to a CRE (Works) with a resident DCRE, and the work was done in part by Army units reinforced by directly-employed coolie labour, and in part by civilian contract. In order to give work to as many as possible of the million-and-a-half refugees in the Colony, it was the policy of the Hong Kong Government for earth moving to be done manually; on the prevailing rates of pay this was financially as economical as using mechanical equipment, though less expeditious. But, in this case, where speed rather than financial or philanthropic considerations was the governing factor, it was resolved to deploy military plant to the fullest extent possible on the formation both of the pilot track and main alignment, and to let contracts for the construction of culverts and retaining walls.



In all, over 800,000 cubic yards of material were moved, of which 620,000 cubic yards was shifted by the machines of 410 Plant Troop and the remainder by coolie labour. Nearly 80,000 cubic yards of rock was handled, including more than 50,000 the product of blasting carried out by detachments of all squadrons, and even by infantry pioneer platoons. To conform to the General Staff requirement, existing storm-water catchment channels were crossed by a series of Irish bridges which, after heavy rain, could become impassable for up to four hours at a time. For emergency use in such event a 120-foot Bailey span was launched by one of the field squadrons on a short deviation, the only bridge on the route. When completed, there was only one reverse gradient for 300 yards in the whole alignment, and a level stretch of the same extent at the summit; the rest was rise on both sides to the Saddle Pass and nowhere was the maximum specified gradient exceeded. A track to Saddle Pass was in use by the end of September 1950, and the first jeep traversed the link from end to end on 23 December. This was then widened to the planned fourteen feet, given temporary Armco culverts with dry rubble walling, and sufficiently metallised for all-weather use by tracked vehicles and jeeps by June 1951. The primary operational requirement was thus completed in ten months, largely at the expense, both in time and cost, of the permanent highway. Plant work on the main alignment went on steadily from September 1950, until the formation was completed to within nine inches of finished level in September 1952. The final grading was then taken on by coolie labour, who also trimmed the sides of cuts, many of them over fifty feet in height. In October 1950, the first contract was let, for Irish bridges, followed by others for catchwater drains, retaining-walls and turbing of embankments and, lastly, for surfacing. Asphaltting started in October 1951, and was completed before the rainy season set-in in May 1953, when the TWSK route was opened to normal military traffic and the operational track abandoned<sup>25</sup>.

Across the border, the communists held their distance while the defence kept ceaseless watch and their position moved towards an illusion of impregnability. The squadrons of the Provisional Battalion took their turn in manning observation and listening posts and were from time to time called upon to furnish patrols in support of the Police, checking smuggling and other nefarious activities; but, gradually, it came to be appreciated that invasion of Hong Kong was unlikely and once more the garrison was reduced. In August 1950, HQ 40 Division was disbanded, its units absorbed by Hong Kong

Land Forces (HKLF), and thereafter all engineer units in the Colony came directly under the CE. The first of them to go was 11 Field Squadron, which, reorganised as Independent, left for Austria in March 1951.

The first, and only, chance of action for the Provisional Battalion came early in June 1951, when Operation FERRET was mounted to deal with a gang of bandits believed to be in occupation of some war-time concrete bunkers on the summit of Tai-Mo-Shan. 35 Infantry Brigade, which was redesignated in June 1951 from "X" Brigade, deployed its infantry battalions and 54 Field Squadron to form stop lines, while 68 Squadron was detached to clear the mountain top and 67 Squadron to cordon and search squatter settlements on the lower slopes. The local Press reported that "the whole affair proceeded very smoothly, all ranks carrying out their duties cheerfully under somewhat trying conditions", but no contact was made with the bandits and the troops returned disappointed to camp. Shortly after, in July, 54 Field Squadron was released from its infantry role and, at the same time, RHQ 50 Field Engineer Regiment was raised under Lieut Colonel F M Hill, with 67 and 68 Gurkha Field Squadrons under command, and took over from 24 Field Engineer Regiment the operational commitment in the line.

Coincident with the opening of the temporary track on route TWSK, a plan was set in train, in the second half of the year, to raise the load classification of many of the older bridges throughout the colony, to make them passable for armour. A substantial share of this work, mostly over-bridging with Bailey spans, was given to the Gurkha squadrons and, by the Summer of 1952, the C-in-C could confidently direct that their infantry involvement be kept to a minimum. The Gurkha squadrons could, at last, begin to concentrate on engineer training; their first introduction to mechanical equipment was in the construction of two miles of jeep track carved out of the face of a conspicuous feature rising to the East of their camp at Tam Mi.

#### REORGANISATION

At the end of 1951, a CRE (Works) was disbanded leaving one CRE (Works), with an ACRE and Adjutant, and one DCRE (Victoria). Due in part to the constant turnover of national servicemen, units were experiencing difficulty in maintaining their working strengths, while adequately qualified civilian tradesmen were hard to come by due to the low rates of pay permissible. To ease this situation, and to provide the CRE with his own labour and transport, authority

was given for the raising, within the existing UK-based manpower cover, of a unit of locally recruited Chinese and, in July 1952, the Hong Kong Squadron RE<sup>26</sup> came into being. This unit, commanded at first by the ACRE, Major P E Edmonds, with the Adjutant RE as second-in-command, included a proportion of British WOs and NCOs, including Clerks of Works, and absorbed the Hong Kong Bomb Disposal Troop of Chinese Sappers, which had been established in June 1950. On formation, the new unit comprised three troops (Works, BD, and MT), but was later reorganised into four (Field, Works, Plant and Transport); on 1 February 1984, it was redesignated 82 Independent (Hong Kong) Squadron, RE.

In August 1952, a group made up of two sections of 54 Field Squadron, two sections of Gurkha Sappers, and one section from the Hong Kong Squadron took part in Operation SEAGULL, which was planned to secure ninety-eight commercial aircraft and associated equipment and spare parts, the ownership of which was in dispute between the Chinese Communist and Nationalist governments. In pouring rain and total darkness all the aircraft were searched for booby-traps and a quantity of explosive devices was made safe among the stores.

After completing its task on TWSK, 410 Plant Troop was transferred to Malaya in September 1952; the remaining Sapper units continued work on the route and on the defences. A concrete factory was set up to fabricate components to replace more perishable defence materials, further tracks were developed to serve gun positions, and the construction of semi-permanent camps continued. When the TWSK highway was opened in May 1953, the entire complex-obstacles, positions, communications and accommodation was complete; just as the state of emergency in Hong Kong came to an end. Thereupon, mines were lifted, road-blocks dismantled, and the defence works put on a care and maintenance basis; the garrison reverted to a peace footing 50 Field Engineer Regiment, with 67 and 68 Gurkha Field Squadrons was still carried in the orbat as infantry, though available, and increasingly occupied, as engineers and so they remained until November 1954, when they were relieved by 2/7 Gurkha Rifles and returned to Malaya. HQ 35 Infantry Brigade which was commanded from 1953 to 1954 by a Sapper, Brigadier R W Urquhart was replaced by HQ 48 (Gurkha) Infantry Brigade, with 54 Field Squadron allotted in support.

With the end of the invasion scare Hong Kong passed out of the limelight and life in the Colony resumed its traditional unhurried

routine, broken briefly in 1955 and again in 1956 by periods of internal unrest requiring the intervention of the Army in aid of the civil power. Both 24 Regiment and 82 Squadron were called out to deal with riots in October 1956, and earned special commendations from the Governor as well as from the Commander British Forces (CBF). It was noted on this occasion as particularly creditable that the Chinese ranks of 82 Squadron, who lived out of barracks, reported daily for duty without a single absentee, passing back and forth through some of the more sensitive areas on foot, or bicycle, and in uniform. Two years after this, in 1958, further reductions were made, in which 82 Squadron was disbanded, but provision was made for the retention of sixty Chinese Sappers in a reformed BD Troop attached to 306 ESD. In April, 24 Field Engineer Regiment also disbanded; 56 Field Squadron was transferred to Aldershot and 15 Field Park Squadron to suspended animation until reformed in Ripon in 1960; leaving 54 Independent Field Squadron in support of the Brigade remaining on the frontier. The appointment of CE continued until 1960, when it was downgraded to that of CRE. The situation was then much as it had been before the menacing advance of the communist forces to the frontier of the colony. The Commander British Forces Hong Kong from 1954 to 1955 was Lieut General Sir Cecil S Sugden and he was followed by another Sapper, Lieut General Sir William Stratton as CBF from 1955 to 1957.

In the light of events it is improbable that the Chinese People's Republic ever really intended an invasion of Hong Kong in 1949, or in 1950. Whether the threat was deliberate, or incidental, is of less importance than the fact that it subsided of its own accord; for few can seriously have supposed that, if the Chinese attacked in force, the defence could possibly have held out for more than a few days.

### THE GURKHA L of C

THE creation within the British Army of a Brigade of Gurkhas called into existence a tenuous line of communication through India into Nepal, along which there developed a regular seasonal two-way traffic of recruits and pensioners, leave-parties and families between their units and establishments in Malaya and Hong Kong and their homes in the hills. In the beginning, this trail led through transit camps in Singapore and Calcutta to the Indian Army Recruiting Depots at Kunraghat, not far from Gorakhpore in what was known after Partition as Uttar Pradesh, formerly United Provinces, and at Ghoom in Darjeeling. In due course the British depots cast off from their

Indian counterparts and set up on their own at Lehra and Halapahar to serve respectively the western and eastern recruiting districts of Nepal. Movement was by sea<sup>27</sup> and, in India, by rail; beyond the Nepalese frontier the men went to and fro on foot. To manage the recruiting and pension-paying processes and to operate this L of C, HQ British Gurkhas (India) (HQBG(I)) was formed in 1948 at Barrackpore, outside Calcutta, and included from the first a DCRE and a Movement Control Section. The first Commander British Gurkhas (India) was a Sapper, Brigadier E F E Armstrong.

It was not long before objections began to be raised in the new Republic to the permanent occupation of Indian territory by establishments of the British Army and, in 1953, the decision was taken to provide alternative facilities within the boundaries of Nepal. The negotiations took place during the time when the Major General the Brigade of Gurkhas, was Major General L E C M Perowne. The target date for evacuation was fixed as March 1959; but, it was, in deference to Indian nationalist sentiment, agreed that the acts of enlistment and attestation would, with immediate effect, be performed across the border. Accordingly, from that time on, recruiting for British Gurkhas took place at temporary camps set up each season inside Nepal at Simana, near Jalapahar, and at Pakhlhawa, near Lehra. After enlistment, recruits proceeded to the existing Depots in India for documentation and onward transit.

The requirement was that the new site, or sites, should lie in an area of relative political stability, within reach of an existing road and rail-head, and not further inside Nepal than the foothills of the Himalayas, about twenty five miles from the frontier. Following a reconnaissance in the Autumn of 1953 it was resolved to locate a combined Depot, which would accommodate also HQBG (I), in East Nepal at Dharan Bazar, with a subsidiary collecting-post in the West at Bhairawa (Pakhlhawa). Dharan Bazar was a sizeable village at the foot of the mountains, some 1000 feet above sea level and twenty-nine miles from railhead at Jogbani on the Indo-Nepalese border. Between these two places an earth road covered the first twenty-one miles across the Gangetic Plain, followed by eight miles of water-bound stone track through the *sal* forest of the Terai, two wooden bridges spanned the Rivers Dhuhi and Soti.

#### DAHRAN

In 1954, Major H W Baldwin<sup>28</sup> succeeded to the appointment of DCRE BG(I) and was placed in charge of the project under the

direction of CE FARELF. A local consulting engineer was engaged to make and to submit proposals for improving the road and preliminary designs for the Depot. This major commitment, in one of the more undeveloped regions of the world, was to present the engineers with all the classic difficulties anticipated, with a few more thrown in for good measure. The site selected lay in an area subject to earthquakes; Nepal had no suitable tradesmen and insufficient labour, so these had to be procured from India; there were no contractors in the country capable of undertaking work of the required sophistication and magnitude; and the local building resources were completely undeveloped. Water supply had to be engineered, bricks made and, for timber, trees ringed, cured for a year, and then felled and sawn. At the time India was fully engaged in its own construction programme, so that cement, steel and most other stores had to be imported from overseas. Before reaching the rail-head, these would have to pass in bond through India with all the complications of obtaining exemption from both Indian and Nepalese Customs as well as the taxes levied by the several states through which they moved. No rail priority could be expected and, on their 450-mile journey, stores consignments would have to be transhipped across the Ganges and from broad to metre gauge railway. On the way, each station was a potential source of delay, demurrage and pilfering. Overriding all other factors was the necessity for the existing Depots to be out of India by the target date.

The first major set-back was caused by the monsoon of 1954, which turned out to be the heaviest in living memory in Nepal. The whole of the road from Jogbani to the Terai was virtually washed away, including both bridges, so that it became necessary to build anew. It was decided that the first four miles, between Jogbani and Biratnagar, the provincial town, would remain the responsibility of the Nepalese, but that the remaining twenty-five miles to Dharan should be re-built as part of the Depot project.

Over the plains section of the new road the pavement base was locally-made brick, burnt hard by the use of imported coal, and in the forest section it was stone pitching brought from the bed of the River Seoti. Stone for the premix surfacing was obtained by crushing material from the same source; bitumen had, of course, to be imported. In order that the benefits of constructing the road should be reflected in the local economy only very basic plant was used and the work was planned to be labour intensive. The heavy earthwork through the plains section was all carried out manually and much of the surfacing was hot-mixed in hand-operated drums fabricated from the 40-gallon

bitumen containers. Most of the labour was brought in from Bihar and for a long time there were over 2,000 men employed. This large influx of imported labour spent a substantial part of their earnings locally and the resulting prosperity eliminated almost entirely the opposition which had at first been shewn to the whole project and did much to counteract the influence, ignored, or under-estimated in the reconnaissance report, of a strong communist element active in the district. To keep within set financial limits, the recommended specification for the pavement was modified which proved to be a false economy both in time and money, for the surface failed to stand up to the prevailing conditions and much of it had to be done again to a higher standard. The finished route included a 250-foot piled bridge over the River Dhubi and a 200-foot vented causeway across the Seoti.

The "Q" brief for the Depot was settled in 1954 and covered some three hundred buildings including married quarters and a hospital. To find a suitable Indian contractor acceptable to the Nepal Government was a problem solved only by insisting that the successful tenderer took into partnership an influential Nepalese. The first contract, for site development, was let at the end of 1956 with a completion period of one year; but, due to almost insuperable difficulties, the work took nearly three. It very soon became obvious that it was not practicable for an Indian contractor to operate efficiently in Nepal under existing conditions; so encouragement was given to Nepalese to organize themselves in a manner that would enable them to compete for the main construction. The outcome was that a local firm, employing as their agent a former DCRE, was successful in obtaining the contract. A number of RE NCO tradesmen were posted to assist in training and supervising the contractor's men and reasonable standards of workmanship were attained.

By early 1956 it was clear that the consultant, even when reinforced with qualified RE officers and draughtsmen, was not able to meet the exacting schedule essential if the project was to be finished on time. His agreement was therefore terminated and, in June, a CRE BG(I) was authorised on a special establishment to complete the designs and to supervise construction. Lieut Colonel Baldwin filled the new appointment and the RE staff was expanded to include an ACRE, a DCRE, an E & M Officer, a quantity surveyor, three garrison engineers, and eight other ranks. The necessary administrative support was furnished by detachments of RASC, RAOC, RAMC and REME; while the Gurkha Royal Signals established a direct wireless link between Dharan and GHQ FARELF in Singapore. From then on



CORONATION PARADE





Korea. British Sappers coming to the aid of an American jeep blown up on a Chinese mine

Korea. Cable-way to carry food, ammunition and other stores to Hill 355 on the right of 1 Commonwealth Division Sector



Korea

Korea. Searching for  
mines in the front line



Korea. Camouflage screens erected on a road leading to the HOOK position to shield  
movement from observation by the Chinese

Korea

Korea, Searching for  
mines in the front line



Korea. Camouflage screens erected on a road leading to the HOOK position to shield  
movement from observation by the Chinese

Korea



Bailey bridge under construction by 24 Field Engineer Regiment at milestone  $3\frac{1}{2}$  on the Tai Po Road, Hong Kong, after a wash-out in 1956



Monte Bello Islands. Camps under construction for the 1952 trials

Bailey Bridge under construction Monte Bello Island

the works progressed more smoothly, but the provision of a water supply for the cantonment raised an unexpected problem. The original intention to draw water from the nearby River Sardhu was subsequently ruled out on the grounds that this source was fully required for supplying the village of Dharan Bazar. On the advice of the Geological Survey of India, an exploratory borehole was sunk on the Depot site, from which it was concluded that drilling to about 1000 feet should produce an adequate supply of water. A second borehole was then drilled, but was abandoned at 900 feet when it became apparent that the yield would be insufficient. A gravity supply, in 6-inch victaulic pipe, was therefore constructed from the River Seoti, about five and a half miles from the camp. The failure of the borehole at Dharan contrasted with success at the Western Collecting-Post, where a strong artesian supply was tapped after drilling only 190 feet.

Electrical distribution in the Depot was by HT and the power plant installed comprised four English Electric 300KW generators. The transporting of these machines across India and from Jogbani to Dharan before the new road was open presented the Movement Section with one of its biggest challenges.

By the end of 1958, despite all vicissitudes, construction was well advanced, but it still proved impossible to achieve the target date for completion and occupation. In the meantime the eastern seasonal camp at Simana had been abandoned in 1956, since when all enlistments had been carried out at Bhairawa (Pakhlihawa), which was developed progressively into a permanent recruiting centre. Jalapahar was closed down in September 1958 when its functions, except for recruiting, were transferred temporarily to Barrackpore. In March 1959 Lehra was evacuated on schedule and migrated across the frontier into Pakhilhawa. Lieut Colonel JC Thornber was CRE BG(I) from 1959 to 1960, after which the RE Establishment was reduced once more to that of DCRE with the staff required to operate the essential services and for maintenance at the three stations. It was not until October, 1960, that HQ BG(I) removed from Barrackpore to Dharan, signalling the completion of the project.

#### FOOTNOTES TO CHAPTER VII

1. India became a Republic in 1950; and Pakistan in 1956.
2. 41 (Malayan) Fortress Squadron was, notwithstanding, reformed in Singapore after the War. It was renamed Singapore Fortress Squadron in January 1948, but lost its separate identity when it became part of the newly raised Singapore Engineer Regiment.

3. The ETC lost its identity in November 1961, when its functions were absorbed by HQ, The Gurkha Engineers.
4. The last outward-bound voyage was that of HMT *Oxfordshire*, which left Singapore in October 1962 for Hong Kong, carrying 67 Gurkha Independent Field Squadron.
5. The RE Mess in Singapore was for many years on the island of Pulau Brani in Singapore Harbour, when the work of the Corps was concerned chiefly with submarine mining and coastal defence searchlights. For a period during the early phases of development of the Naval Base (1927-1930), it occupied a former Japanese hotel built of timber and atap on stilts over the waters of the Johore Straits. In 1935, it moved into a new building at Changi, where it was at the time of the surrender of Singapore in 1942. The Gillman Barracks Mess was built by Captain J F Doelberg RE and was first occupied, in 1936, by the 1st Battalion, The Middlesex Regiment. It is appropriate that the wooden frieze from the RE Mess Singapore was transferred to the RE Mess, The Postal Depot, Inglis Barracks, Mill Hill, previously the Depot The Middlesex Regiment.
6. The notorious assertion that "there is no foreseeable role for engineers in the Emergency" is generally attributed to Major General R E Urquhart CB, DSO, GOC Malaya, 1950-1952. While there is little doubt that the comment was in context with an overall manpower cover for the theatre it is indicative of the traditional lack of understanding of Sapper potential.
7. These *attap* huts were built to many designs, one of the most satisfactory being that of Lieut Colonel J D F Curling OBE, commanding 1st Battalion 7th Gurkha Rifles.
8. Referred to occasionally as the "Godawful Shelter", the Godolphin Shelter was designed by WO1 (MSM) H J Price of the Engineer Base Workshops commanded by Major B G Godolphin MBE. Over 3,000 shelters were constructed, mostly by the Engineer Base Workshops. A stores shed was also produced by the same team; simple to manufacture and without any openings it was used on the dish cover principle placed over stores by crane and was effective in theft prevention.
9. The first Malayan RE officer was Captain Aminudin Bin Bahaudin who was a locally recruited sapper in 1937, served in Force 136, taught the first Gurkha Engineers, and finally retired in 1967.
10. By their terms of engagement, locally recruited personnel were proscribed from serving outside Malaya and Singapore.
11. By invitation of the Chief Royal Engineer, dated 28 February 1956, The Gurkha Engineers retained the right to use the Corps colours and such devices as had been granted to them whilst serving as units of the Corps; and, on 31 January 1957, Her Majesty the Queen approved the Affiliation of the Gurkha Engineers to the Corps of Royal Engineers. The Commanding Officer 50 (Gurkha) Field Engineer Regiment (1955-1956) was Lieut Colonel J H S Bowring.
12. Lieut General Sir Harold Briggs KCIE, CB, CBE, DSO, Director of Operations 1950-1952. The "Briggs Plan" reflected in no small degree the recommendations of Brigadier J M Calvert who also set up the Malaya Scouts, a force for deep jungle operations which was later to develop into 22 Special Air Service Regiment.
13. There is a story that General Templer visited Yong Peng and asked the headman if there was anything the village needed and, on being told that a proper water supply would be appreciated, promised it by the following day. Intensive Sapper effort followed and all was ready some thirty minutes before the deadline but no water emerged from the pipe! Frantic uncoupling of pipes disclosed the stoppage; all pipes

had a wooden bung at each end for storage, these had been carefully removed and checked but the offending pipe had a third bung which was stuck inside. Water eventually flowed as the helicopter carrying General Templar to see fulfilment of his promise, came into earshot.

14. The "Pioneer", which was in common use in Malaya, could be used on a very short runway. The original single-engined Pioneer aircraft were soon replaced by the twin-engined version (TWIN-PIN) which had a remarkable short-field performance.

15. The colloquial term for grass-cutters operating in this manner was "hockey players".

16. During the war, Langkap had been used as a dropping-zone for the supply and reinforcement of Force 136 and provided a convenient retreat for the CT during the emergency.

17. On one of his many inspections by helicopter, the OC, Major T O'G Cochrane, and his pilot survived immersion in two fathoms of the fast-flowing Pahang River near Temerloh.

18. The two CsRE (North & South) remained in post until 1960 when the RE Works Services were transferred to the Army Works Organisation. The appointment of CE OCLF lapsed in 1960.

19. 74 Field Park Squadron RE was disbanded in April 1960, when 70 (Gurkha) Field Park Squadron was raised in its place.

20. 75 (Malayan) Independent Field Squadron continued as a unit of the British Army in Singapore until 1967, when it too was absorbed into the Malaysian Engineers.

21. The strength of 410 Plant Troop during this task was 230 all ranks including 120 locally employed civilians. The troop remained continuously employed on this task for over two years.

22. The Sultan awarded the Kedah Distinguished Service Star and Kedah Distinguished Service Medal to a number of those engaged on the road building task.

23. On 16 September 1963, the Federation of Malaya was enlarged by the accession of the States of Singapore, Sabah (formerly British North Borneo) and Sarawak; and the name of Malaysia was adopted from that date. On 9 August 1965, Singapore seceded from the Federation and became an independent Republic.

24. The Federation Engineers were renamed Malaysian Engineers in 1963, the first Malaysian CE was commissioned from RMA Sandhurst in 1955.

25. In 1957, thirty-seven inches of rain fell in Hong Kong between 21 and 29 May, fourteen inches on 22nd. The only significant damage to TWSK was caused by a landslide; there was no subsidence or wash-out. During those ten days, the route was never closed for more than six hours at any one time.

26. The Chinese Sappers were the lineal successors of those who served in 40 Fortress Company RE, 1906-1941 and, before that, in 40 Submarine Mining Company RE, 1886-1905, which had been "principally composed of natives". After the fall of Hong Kong in 1941, a few of these Sappers had made their way through Japanese lines to Chungking where they reported to the British Mission and subsequently served in a Chindit Column commanded by an erstwhile subaltern of 40 Company, Brigadier J M Calvert.

27. In the 1955/1956 recruiting season, air movement finally replaced sea transport.

28. Promoted in 1956, he remained for five years in charge of the works. In recognition of his services in this connection, he was awarded the OBE and invested by HM The King of Nepal with the Order (3rd Class) of the Right Hand of Gorkha.

## CHAPTER VIII

### THE KOREAN WAR

Political Background—British Commonwealth Involvement—Chinese Intervention—Second Withdrawal South—Advance to 38th Parallel—Chinese Spring Offensive—I Commonwealth Division—Consolidating the Divisional Front—The Base in Japan—Fortifications—Armistice

#### POLITICAL BACKGROUND

Korea had been annexed by the Japanese after the Russo-Japanese War of 1906 and became effectively a part of the Japanese Empire. After the defeat of Japan in 1945 the division of Korea into zones of occupation separated by the 38th Parallel was arbitrary and unrelated to any political or military factors. It was not intended that the boundary would form any permanent basis for the future government of the country but, once communist control had been established in the North it became impossible to establish a United Korea. The USA whose zone of occupation was South Korea, provided a military mission and basic equipment for a small defence force, mostly army, of some 50,000. The force comprised seventeen regimental combat teams, basically infantry, formed into eight divisions; it had no armour, modest artillery, 57mm anti-tank guns, and was designed primarily as an internal security force.

Little is known of what had been going on in North Korea but subsequent events showed that a powerful army about 200,000 strong had been built up based on Soviet lines. On 25 June 1950 it attacked across the 38th Parallel with eight full strength divisions supported by some 250 Russian T34 tanks with the obvious purpose of overrunning the South. The invasion seemed to have achieved complete surprise. World reaction was remarkably swift. On the same afternoon the Security Council of the UN called for cessation of hostilities. The Soviet Union was unable to veto this initiative as it had temporarily withdrawn from the Security Council, a tactic that it never used again. Two days later members of the UN led by the USA ordered armed forces to support South Korea in the absence of North Korean reaction to UN demands. US troops deployed with remarkable speed from Japan and, even though not designed or properly fitted for operations



in a wild country like Korea, succeeded in holding, with the remnants of the South Korean Army, a bridgehead around the port of Pusan; further reinforcements from Hawaii and the USA were provided in July.

#### BRITISH COMMONWEALTH INVOLVEMENT

Initially, British Commonwealth contribution was limited to naval forces from the UK, Australia, Canada and New Zealand with air forces from Australia and Canada. The British Government, although heavily committed in the Middle East, Malaya and Hong Kong ordered a force of two infantry battalions grouped as 27 Infantry Brigade, from Hong Kong in August. It went into action in September and was heavily involved in the break-out operations which were launched in co-ordination with General Macarthur's brilliantly successful strategic stroke of a seaborne landing at Inchon, West of Seoul, on 15 September. On 1 October 1950, a battalion of the Royal Australian Regiment joined 27 Brigade, thereafter re-named 27 Commonwealth Infantry Brigade. By the end of October the Brigade went into reserve for the first time in eight weeks, for the last two of which it had led the advance to within forty miles of the Manchurian border.

#### CHINESE INTERVENTION

The North Korean Army had been defeated, and almost destroyed in the process. Large Chinese forces had concentrated in South Manchuria and crossed the Yalu River at the end of October. In November they attacked 27 Brigade positions covering the Chongchon River, suffered heavy casualties and withdrew several miles, but the encounter showed that they were a formidable enemy. Their soldiers were often illiterate, but fit and well inured to hardship, and because of lack of air support their actions usually took place by night. The Chinese advance found the UN forces extended after their rapid advance. During the last days of November, 27 Brigade took part in a general withdrawal, passing through the newly arrived 29 British Infantry Brigade which had been given the task of providing the rearguard from Pyongyang, the Northern Capital, southwards to cover the withdrawal of US and South Korean troops. 29 Brigade had been virtually reorganised in the UK specially for Korea. It included 55 Field Squadron transferred from 32 Assault Engineer Regiment. A considerable number of reservists had been recalled to bring units up to strength so the average age group was older than many British Army units of the time, and there

was a spread of maturity and experience throughout the ranks. The Brigade arrived at Pusan in early November. After concentrating just South of Seoul the Brigade moved North, and it was soon in action against pockets of North Korean troops but after leaving a battalion at Kaesong it advanced to Sukchon to support the withdrawal of 1 Republic of Korea (ROK) Division.

A full understanding of the activities of the British Sappers in Korea requires a constant realisation of the conditions under which the troops campaigned in an undeveloped country with extremes of both climate and terrain. In the vicinity of the 38th Parallel, the western coastal plains and foothills bore a resemblance to a bigger edition of Palestine, with occasional chestnut, tamarack and elm trees in place of olive and cypress. Beyond this plain, some ten miles from the coast, there were almost precipitous mountains which although less than 3,000 feet high were as rugged as any in the Balkans. Most valleys were intensively cultivated and terraced with marshy paddy fields. The bare foothills had rock outcrops which made digging both slow and tedious; sometimes they were rounded in shape with a deep layer of soft decomposed granite devoid of all cultivation, sometimes they were covered with scrub and occasional pine, wild cherry and azalea on a sandy or gravel subsoil. Further East, along the general direction of what became the Armistice line, the terrain became more consistently steep with ranges of mountains, extremely rugged and of the hardest granite, up to 6,000 feet high, together with some low marshy expanses and lakes; far to the North along the Manchurian frontier the mountains rose to over 10,000 feet. The countryside was sparsely populated with few roads, and those that existed were incapable of carrying heavy military traffic, and were flanked with paddy making it difficult to deploy off the roads. The many streams and rivers, sluggish and fordable in dry weather, became swollen during the monsoon; rainfall could be extremely heavy, perhaps up to twenty inches in a week and caused floods in which a river such as the Imjin could rise thirty to forty feet in as many hours becoming a raging torrent 1,000 feet wide flowing at over eight knots, faster than the design speed for much military bridging equipment and causing tremendous hazards for bridges and ferries, particularly when compounded by debris or floating ice in winter.

In spring and autumn the climate in Korea was good and similar to North West Europe; July and August were oppressive and humid with torrential monsoon rain which turned the land into a quagmire; the winter was extremely severe. Those who have never served in

arctic conditions may find it difficult to visualise the difficulties caused by temperatures falling as low as minus 30°C; weapons had to be kept dry, due to lack of suitable oil; digging in the frozen ground was usually impracticable and necessitated the use of explosives before earthmoving plant could be effective; vehicles could become a source of embarrassment and hot water poured into radiators froze almost immediately; frost bite was a permanent danger and the cold placed a great strain on troops working in the open, particularly on minelaying and mine clearance tasks where manual dexterity was so essential. The cold, followed by a spring thaw, caused a disintegration of roads which had to be seen to be believed. All produced a requirement for Sapper work of a scale and nature seldom encountered in training. The initial engineer problem consisted largely of trying to provide sufficient roads and, especially where they crossed rivers, of keeping them open in the demanding climatic conditions; but even a routine task such as running a water point could assume significant proportions in time of flood or freeze. To the natural hazards were added the difficulties caused by the stretch in the lines of communication due to the rapid advance and superimposed on all was the tactical Sapper task against the Chinese enemy, cunning and clever as well as brave.

Engineer support for the withdrawal included building a Class 30 floating bridge over the Han River, using US M4 equipment which the British Sappers had never seen before. The bridge marked a turning point in relations with the US Army Engineers who up to then had treated them as helpless strangers (indeed they were until vehicles and equipment arrived); but having built a bridge at a rate which agreed with the US Army text books, they were suddenly accepted as equals. Major A E Younger OC 55 Squadron, commented at the time that, in fact, British and US engineer units were not equal; the US road building and improvised bridging skills were difficult to match, but the British had the edge in demolition techniques and equipment bridging, particularly Bailey. The US text books and planning data were adopted of necessity, and all mapping and survey support came from US Army sources.

#### SECOND WITHDRAWAL SOUTH

On 3 December 1950, 29 British and 27 Commonwealth Brigades found themselves in the same area, the latter by now experienced but tired, the former fresh. By this time winter had started and conditions were bitter. British battledress offered little protection from the biting wind, and greatcoat and blankets were similarly not designed for such

climate; for the first winter the British contingent was reduced to scrounging the sensible and serviceable winter equipment of the US Army.

By mid December the UN line ran roughly along the 38th Parallel; contact with the Chinese was not close but a new offensive was expected before long. In the early hours of 3 January 1951, Chinese troops attacked 29 Brigade but were repulsed, nevertheless the Brigade was ordered that afternoon to pull out and withdraw South of the River Han, and Seoul. 55 Squadron had blown two bridges on the main approach and then the huge Han River bridges. One of these was a pile bridge carrying both road and rail across this 1,000 foot wide river called the "Shoofly Bridge." The bridge was in continuous use while it was being prepared for demolition. Disaster was narrowly averted when a spark from one of the trains ignited a charge set to cut a girder; a quick witted Sapper managed to climb between the cross members and kick the hissing charge into the river. The Shoofly consisted of sixty-six spans and each pile was cut below water level to prevent re-capping by the enemy. The demolition, which must have ranked as one of the most demanding of preparation in a partly frozen river, was a complete success, the CE 1(US) Corps gave the order to fire: as he surveyed the shattered timber covering the ice of the frozen river he said "You British should be proud of yourselves for this." 29 Brigade moved quickly South to establish a line at a place called Pyongtek. Squadron tasks included fourteen bridges prepared for demolition, help to the battalions with wire and mines and road work in the Brigade area. It was a harsh time for the Sappers on their tasks in the open day after day; even the forward infantry had more protection from the bitter wind and despite the fact that the hardships induced a perverse increase in morale, the exposure took its toll. By mid January 1951 the United Nations withdrawal had reached its limit, with the line roughly on the 37th Parallel. Morale in the British and Commonwealth Brigades was still high, and there was a natural feeling that the Chinese had seized the initiative to a greater extent than was warranted, particularly so in view of the UN naval and air superiority.

#### ADVANCE TO THE 38TH PARALLEL

The new 8th Army Commander, General Matthew B Ridgeway, was not satisfied with the Army's position at the end of the withdrawal and planned to make a steady advance to new positions on approximately the line of the 38th Parallel. Between mid January and mid

April 1951, 27 Commonwealth Brigade advanced steadily, though having to withstand some Chinese counter-attacks, until reaching a new line North of the 38th Parallel. During this period the Brigade was joined by 2nd Battalion, Princess Patricia's Canadian Light Infantry, this addition giving the Brigade the unique international composition of an Australian Battalion, a Canadian Battalion, an English Battalion, a Scottish Battalion, a New Zealand Field Regiment and an Indian Field Ambulance; it did not however include a field squadron.

Apart from some fierce but small scale actions, 29 Brigade had been less committed during the advance until it took over a position on the River Imjin on 31 March. Meanwhile a second turning point in the life of 55 Squadron happened in February when they were allocated 300 Korean labourers and 110 police. The numbers of this auxiliary force fluctuated as time went by but the Koreans became amazingly loyal and added greatly to the squadrons capabilities. With the thaw came the rain and every paddy field, which in effect was every flat piece of ground, became the colour and consistency of custard. The roads built for a dozen bullock carts per day were being subjected to a thousand vehicles and once the thin surface of stone was ruptured required a seemingly endless supply of fill to repair. On 10/11 April, an assault crossing of the Imjin river was made by 29 Brigade; a crossing site had been found, fortunately within the wading capabilities of the Centurion tanks and the Oxford carriers. Initially the engineer plan envisaged the construction of a footbridge for the infantry crossing, followed by a Class 12 assault bridge, both were made of American components, with which the squadron was unfamiliar, both bridges were successfully completed, though not without incident, since the footbridge failed when about 75% complete and about fifteen minutes before the infantry were due to cross. The initial infantry crossing had therefore to be made on the Oxford carriers which had been used for bringing up the bridging stores.

#### CHINESE SPRING OFFENSIVE

A large scale offensive had been anticipated for some time and the attack was launched on 22 April. 29 Brigade was in the line under 1 (US) Corps holding the line of the River Imjin while 27 Brigade was in support of 6 ROK Division further East. The attack on 29 Brigade front was in great strength. The Belgian infantry battalion, which had been attached to help hold the Brigade's extended frontage, was West of the river, and the first Sapper casualties were caused when bridges

had to be defended to permit the withdrawal of the Belgians. This manoeuvre was successfully accomplished.

All units of the Brigade came under attack and the Sappers took three more casualties in holding the hill overlooking their location, whilst their attackers left twenty dead on the lower slopes and suffered more as they withdrew. By 24 April, the 1st Battalion, The Gloucestershire Regiment was completely surrounded and it was clear that they could only be extricated by a successful counter-attack; but attempts to get through to them were unsuccessful. Heavy pressure was continued on the Brigade and on 25 April it was ordered to withdraw. During this operation 55 Squadron, still acting as infantry, kept open a vital defile for the withdrawal of the two battalions of the Royal Northumberland Fusiliers and the Royal Ulster Rifles. It was a difficult task, under constant fire, and the Squadron suffered three killed, four missing and fourteen wounded. All attempts to relieve the "Glosters" had failed so the Battalion attempted to fight its way back. Only the remains of D Company, thirty-nine strong, succeeded in regaining the UN lines, whilst the rest of this gallant unit became casualties or were captured.

All units of 29 Brigade had suffered from the battering of the hordes that had tried to swamp them, and it was almost as if the clock had been put back three months. 55 Squadron found itself preparing for demolition again the same bridges that it had blown in January and rebuilt in March and the new Shoo-fly bridge was similarly prepared, with the difference that, in April, there was no ice and the river was deeper and faster<sup>1</sup>. However the dogged stand made by the Brigade had defeated the Chinese aim of breaking through the 8th Army front and driving on Seoul, and in doing so they had inflicted extremely heavy casualties on the waves of attacking Chinese.

At midnight on 25 April, 27 Commonwealth Brigade changed its name, and its commander, becoming 28 Commonwealth Brigade albeit with the same units. 29 Brigade came into corps reserve North West of Seoul on 27 April. In mid May the Chinese resumed their offensive and by 21 May the UN forces had contained it, with very heavy losses to the Chinese, but during this period 28 and 29 Brigades were little committed and this greatly helped in the assembly of 25 Canadian Brigade and the formation of 1 Commonwealth Division. By the end of May all three Commonwealth Brigades had taken up positions along the line of the Imjin River, and arrangements were in hand for them to be reinforced with supporting arms and services to complete their formation into 1 Commonwealth Division.

On 30 June General Ridgeway proposed that the two sides should meet to discuss an armistice. This proposal was accepted and the two sides met at Kaesong in early July 1951. Hopes of an early cease-fire were soon dispelled and as the talks continued sporadically, it gradually became clear that the Chinese had little interest in a cease-fire. They used the talks mainly to gain what military advantage they could, keeping in reserve the ability to end hostilities quickly should it suit them to do so. Initially, when it was clear that the talks would not lead to an early cease-fire, they had little effect on the fighting. However, later on when a cease-fire agreement seemed more likely, they almost certainly helped to reduce the level of operations; and they did eventually, many months later, lead to an armistice and an exchange of prisoners.

#### 1 COMMONWEALTH DIVISION

Experience of the Second World War had shown the need of a regimental organisation together with a CRE at divisional HQ; and for a separate divisional field park squadron directly under the CRE to support both the field engineer regiment and any other engineer troops which might be placed under command. This organisation which had been accepted but not implemented generally, was authorised for Korea. The formation of 1 Commonwealth Division took place formally on 28 July 1951 with Major General A J H Cassels as GOC. The field engineer component of the division was:

CRE—Colonel E C W Myers.

28 Field Engineer Regiment. CO—Lieut Colonel P N M Moore.

12 Field Squadron RE in support of 28 Commonwealth Infantry Brigade.

55 Field Squadron RE in support of 29 British Infantry Brigade.

57 Independent Field Squadron RCE—in support of 25 Canadian Infantry Brigade and under them for administration but under 28 Regiment for operations,

64 Field Park Squadron RE.

The nucleus of 28 Regiment had been raised in Libya from 22 Field Engineer Regiment which Lieut Colonel Moore was commanding; 12 Field Squadron was transferred as a unit and 64 Field Park Squadron and RHQ were formed from scratch. It is of interest that over one hundred volunteers from 22 Regiment extended their overseas tours or extended their period of National Service to go to Korea.

The engineer problem in Korea was vast, in addition to the usual tasks of mine warfare, demolitions, river crossing, field defences and water supply were the particular problems posed by the country itself. But the mobile campaign which had flowed up and down the country had ended; thereafter the campaign became in general terms, one of limited set piece attacks with heavy artillery support. There was intensive patrolling and barbed wire, field works and mines began to play an increasingly prominent part.

At its formation on 28 July 1951, the Commonwealth Division was holding its sector of the 1 US Corps front on the South bank of the River Imjin. The Chinese line was some 7,000 metres to the North, with a light outpost screen some 2,000 to 3,000 metres North of the river. Contact was limited to patrols, which had to cross the river by ferries or rafts, and to meet the need for movement across the river 55 Squadron had established a Class 12 ferry on the divisional left (TEAL) while 12 Squadron had established another ferry on the division's main axis (PINTAIL) and 57 Canadian Squadron operated a Class 50/60 raft. The TEAL and PINTAIL crossings were to remain the main crossing points for the rest of the war and were steadily developed. By this time the rains had started and the Imjin flooded frequently. On 6 August six inches of rain fell in seventeen hours, the ensuing flood isolating divisional HQ and leaving two battalions of 29 Brigade North of the river. The maintenance of the ferries, and particularly of their cables, became a constant battle, if cables were slackened off to lie on the bottom they fouled obstacles, and if not, the drumming of the rising water on the taut cables would eventually snap them. On one occasion a cable established well clear of the water was nevertheless broken when a complete Korean house floated into it, riding the flood well. There was no shortage of other less spectacular debris, whole tents floated down and the QM acquired a few spares, and on one occasion the river at PINTAIL rose 37 feet in 24 hours, with a current speed estimated at 15 feet per second. The Rocket Propelled Holdfast proved very useful at this time in replacing the frequently broken ferry cables. There was also the perpetual problem of roads. Once the division started offensive raids to the North of the Imjin it became necessary to put across tanks; none of the ferry sites had roads leading to them, so, in the middle of the wet season it became necessary to construct long approach roads—a two mile one in the case of PINTAIL—over very poor ground, as well as to blast out an exit ramp on the North bank.

Much work had been accomplished on the divisional line South of



the Imjin; considerable wiring had been carried out and anti-personnel mines laid in the valleys. However, it was now felt that the Corps defensive line should be pushed further forward, so in conjunction with 1 ROK Division on their left and 1 US Cavalry Division on their right, the Commonwealth Division attacked to secure a new line of dominating features. Three detachments, each of one officer and six sappers, were placed under command of the Divisional RAC Regiment for the operation, to accompany the leading tank troops and search likely places for mines. Valuable engineer intelligence was obtained from these detachments over the Division RAC Regiment wireless net. Fighting was severe in several places but the attacks, supported by tanks and heavy artillery bombardments, went generally according to the phased plan. On the right however, the fighting for Hills 217 and 317 was bitter, particularly for Hill 217. But by 8 October all objectives had been reached and work to consolidate the new line began. The main engineer problem had as usual been access roads, and a new road into the 28 Brigade area on the right was vital; new gun positions North of the Imjin were needed and were not easy to prepare at the end of the wet season in areas consisting largely of paddy fields. Since most tracks had to be side-hill cuts to avoid the paddy, much plant work and many culverts were needed. Everyone quickly became expert in choosing a line and in constructing a jeep track, and with close liaison with the infantry, D4 angledozers were not infrequently worked to the forward company positions. One of the best bulldozer operators, a reservist, had spent much of his Korean tour in a 55 Squadron cookhouse until one day he admitted that he might be able to achieve something with a dozer!

#### CONSOLIDATING THE DIVISIONAL FRONT

Few would have suspected at the time that the line then reached was to remain virtually unchanged for the rest of the war. The positions occupied by the division were more commanding, but the troops were spread more thinly on the ground and, initially the battalions occupying the hill features (355, 217 and 317) felt exposed as they waited for the inevitable counter-attack. The divisional area was divided by the River Imjin with the administrative area to the South and the two crossing places at PINTAIL and TEAL became major preoccupations. Field defences on the new positions were rudimentary and access was difficult, some companies being supported by a porter carry of two miles with a 1000 foot climb at the end; and no Sapper effort could be made available at the time to improve the positions. In this situation

the Korean Service Corps (KSC) was invaluable. Growing out of the auxilliary force which 55 Squadron had found so useful, the KSC, consisting of men unfit for the South Korean Army, was organised on military lines; a regiment of three battalions each of four companies supported the Commonwealth Division; and subdivided to provide support to the forward battalions. 28 Regiment had over 1000 Koreans employed on engineer tasks. In portorage they could carry extraordinarily heavy loads and some learnt elementary engineer skills. They worked under their own command system normally supervised by Commonwealth troops, and often showed considerable loyalty and courage.

12 Squadron was made available for a large minelaying programme for 28 Brigade on the right flank. Mines were laid between defensive positions to hamper Chinese infiltration but some could not be covered by small arms fire. They undoubtedly helped to confuse and delay the Chinese troops when they eventually attacked in early November 1951. Intense fighting took place over the next few days but the enemy was unable to achieve any advance. For a critical twenty-four hours during this period two troops of 12 Squadron occupied fall-back positions during the night in case of a Chinese break-through. 1 Commonwealth Division learned some useful lessons during the action. The Chinese clearly now had a great deal of artillery, the expertise to use it effectively and were well provided with ammunition; they had effectively breached our wire and nearly every slit trench not on the steepest reverse slopes had received a hit near enough to blow in the overhead cover. Telephone lines had been cut early on and radio could not be relied on unless the sets were protected by thick overhead cover.

After this period of excitement, the reservists with 55 Squadron began to go home. They had blended their experience well with the youthful national servicemen and regular soldiers who made up the majority of the strength of the Squadron and, of course, the Regiment. During the following months the whole of the original contingent of 55 Squadron went home. The British squadrons turned over their manpower several times before the final withdrawal under a policy that no man should serve more than one winter in Korea; the Canadian squadron however was replaced as a unit. Colonel Myers and Lieut Colonel Moore<sup>2</sup> were relieved during 1952 by Colonel F M Hill and Lieut Colonel A M Field respectively. In the meantime hopes of an armistice were raised during November and a demarcation zone had been agreed during the "peace talks" at Panmunjon, from which both

sides would withdraw when the truce was signed; hopes foundered in stalemate over the question of exchange of prisoners.

Snow fell in November and the frost came with a vengeance during December; the Imjin now a placid river, only 300 feet wide at PINTAIL, froze on 12 December 1951. More snow fell on Boxing Day and the landscape was white for the next five weeks. The veterans who had moved continuously during the previous winter, talked with the greatest regard about the cold and wind to be expected in January and February. It was a considerable relief, therefore when a new range of winter clothing began to reach units in December. It was late in the winter when diesel burning space heaters or stoves became available; every conceivable type of improvised stove had been installed in tents, dugouts and hutchies. The combination of improvised stoves and tents was a sure recipe for disaster; there were many fires throughout the division and seemingly endless Courts of Inquiry. Firewood cutting took a terrible toll of trees.

The lessons of the November attacks brought a change of emphasis on field defences. For some time a contrast between the UN and Chinese lines had been most marked; from the air, miles of trenches stretching like a road network were visible behind the Chinese lines. Some trenches were two metres deep, up to ten kilometres long and wide enough to allow mules to pass. If these trenches were uncammouflaged their dugouts, tunnels and gun pits were certainly well concealed. The Chinese simply had to dig to survive. As the weight of Chinese artillery effort increased and its accuracy improved, the need for a similar policy in the UN battle positions became obvious, and a much more comprehensive digging policy was laid down by division. As a result the CRE ordered a lumber camp, known as NUTHATCH, to be set up by 57 Squadron RCE which produced over 50,000 lengths of timber in the first six weeks from a site eight kilometres west of Uijongbu. The Canadian Sappers were naturally adept at this lumberjacking; and HQ RE produced designs for command posts and bunkers, which were to be dug to a depth of thirteen feet and carried five feet of overhead cover so that they could ensure survival from two direct hits by 155mm shells.

Meanwhile 12 Squadron was again engaged in a heavy programme of minelaying. It was impossible to bury mines when the ground was frozen hard, so anti-personnel mines with trip wires were the only practical answer. Moonlit nights were best for minelaying activities and in January, itself Korea's coldest month, they were also the coldest; laying out tripwires and withdrawing safety pins in normal weather

requires care enough, laying and arming mines on a North facing slope with bare hands at temperatures down to  $-25^{\circ}\text{C}$  called for considerable concentration, especially with the Chinese just over a hundred metres away.

During the early part of 1952 it seemed that a Chinese spring offensive was most probable. Although the division was well established north of the River Imjin, an alternative line of greater strength, called line KANSAS, was selected South of the river. Two access routes were started by 12 Squadron. Both routes ran through valleys with little top soil and lots of granite, dozers would not touch the rock and the earth itself was frozen nearly as hard. A combination of explosive and beehives, using about four tons per mile, was employed to carve out a 4-metre wide roadway. Meanwhile three major landing strips in the divisional area, were built by 57 Squadron RCE, including the divisional HQ airstrip. Minelaying continued and training was run for assault pioneer platoons. There was unfortunately never enough time for fully adequate training and a hard core of Sappers was always required for minelaying to ensure safety and correct procedures. As a result of experience gained so far in the campaign a divisional policy of minelaying was issued based on the advice of the RCE.

Patrolling, with the aim of capturing prisoners, became more intense and more skilful on both sides. On several occasions Chinese patrols managed to pass through our lines; one such patrol ambushed a mine re-supply vehicle from 2 Troop 12 Squadron; the NCO in charge was wounded, but escaped capture, while the driver was taken prisoner. He returned safely in late 1953 after the truce became effective. Thereafter night movement along certain routes was by convoy under escort.

Towards the end of February a big engineer effort was once again mounted to prepare routes for the thaw. Road maintenance received an even higher priority. Ditch clearing, culverting and potholing, necessary but not exciting, became the order of the day. Even during the hard winter frost the heavy traffic soon created a rippling, corrugated surface on the earth roads. Motor graders were the most suitable plant for smoothing out the "wash board" effect on road surfaces, but they were in short supply. The most effective improvised device for surface maintenance adopted from US experience the previous year was to drag a steel beam at an angle behind a 3-ton truck. Dragging, as it was called, was an exceptionally boring process, but a combination of the realisation of the clear need for the task and some dedicated officer leadership gradually induced a sense of pride amongst Sappers

engaged in this routine task which had to continue year round. Many miles of low gear work for this task added to vehicle serviceability problems. The very severe weather during January to March 1952 caused considerable damage to roads. The two main results were, frost heave as the temperature fell and the delayed result of frost boil when the thaw set in towards the end of March; in the case of frost heave the road surface broke up and constant pothole repairs were required; when frost boils occurred the road structure, already strained by frost heave, disintegrated into a slush under the weight of the traffic. It was found that, with a prompt and reliable reporting system, it was possible to keep frost heave or boil damage under control by digging out the patch concerned and filling with stones, subject of course to operational use of the road. Regular Sapper air reconnaissance of roads in the divisional area reinforced the reporting system but the troop commanders and officers had to cover a proportion of their roads every day to check on surface and drainage. Tippers pre-loaded with hardcore were on standby wherever operations permitted; hundreds of tons of stone were quarried and moved daily by the Commonwealth Sappers using KSC labour, *grizzlies* and *chinamen* for loading; and plant holdings grew far beyond the normal establishment. Prevention of frost damage was inevitably found to be in the proper drainage of roads before winter set in, requiring a combination of adequate side and catchwater drains, which together with culverts, needed constant maintenance to keep them free from obstruction.

On 6 April 1952, the Regiment suffered a sad accident which caused more casualties than any single enemy action. 3 Troop, 12 Squadron had been tasked with laying an anti-personnel minefield for 1 KOSB. The mines had been taken to the battalion rendezvous, but due to a heavy enemy attack the operation was postponed for twenty four hours, and the mines had been brought back. On the following evening three boxes containing 150 schumines (75lb TNT) were being reloaded into a truck when they exploded, killing five Sappers and wounding two. A most searching inquiry revealed no lack of safety and no definite proof of sabotage. 3 Troop completed the minelaying operation two nights later.

The Korean countryside, brown or snow-covered all winter came to life again in April; the country took on a much kindlier aspect with the dead grass gone and the hillsides covered in purple azalea and other flowering shrubs. This was accompanied by a divisional sidestep to the East coupled with a brigade redeployment, the feature Hill 355 again came into the divisional area and, once more, this raised the

minefield problem. Divisional policy had always been to count any friendly dominated area as safe unless marked as a minefield, the Americans who were the previous tenants of the Hill 355 feature had come to regard all areas as dangerous unless marked safe. This was not altogether surprising as the heavy fighting in the area had obliterated most of the perimeter fences and land marks, as well as rendering the tripwires ineffective. It required a considerable and courageous effort on the part of many Sapper reconnaissances to plot and re-mark the minefields and gaps. As a result of this experience the divisional minelaying policy was modified; American M2 jumping mines, with pressure fuses only were to be laid to the British pattern of four mines per yard of front; the use of trip wires was abandoned. An immediate effect was a logistic one; one and a quarter tons of mines being required for every hundred yards of minefield.

At about this time a much needed second forward supply route to the divisional front was constructed from near PINTAIL bridge some 6,000 yards long to the East-West road to the South of the Hill 355 feature. Construction took about six weeks to main supply route standards with special drainage arrangements across paddy fields. Simultaneously 55 Squadron erected and manned a cableway for priority stores to Hill 355, the winch station attracted a certain amount of enemy attention but by taking advantage of morning mist and the brief Summer night shadow, the service was maintained. Supplies to forward positions remained difficult; many battalions would pile stores by the jeep head and ensure that everyone going forward, even visitors, carried something useful up with them.

Preparations for the 1952 rains were made in good time. US Army Engineers had built a single-way timber trestle bridge over the River Imjin at TEAL and completed a two way steel and concrete bridge at PINTAIL four days before the first major floods. Both crossings were supplemented by cableways and rafts, Class 50/60 at PINTAIL and M4 at TEAL. Since the possibility always existed of a withdrawal South, either because of enemy pressure or of river conditions, tactical demolition drills remained practised; it had not pleased the bridge-builders to be asked to include demolition chambers in their design. Special arrangements were made to keep the bridges open. An organisation which included upstream observers and a troop of tanks to shoot up large size debris, was set up. Lifting shearwaters were designed and installed by 64 Squadron on the bridge piers, and motor tug teams stood by to guide debris through the spans, or to demolish obstructions in the gaps by pole charge. 12 Squadron was made

responsible for TEAL and 23 Squadron RCE newly arrived, for PINTAIL. The latter bridge survived the floods but regrettably TEAL bridge was overwhelmed in the first major flood on 29 July 1952. Despite heroic efforts by Sappers to clear the debris with explosives, the bridge went creating a gap of 280 feet. By mid-day on 29 July the river had risen thirty feet. For the remainder of the flood season 12 Squadron had to be content with an M4 ferry at TEAL, backed up by the cableway for small stores. 57 Squadron RCE had been relieved by 23 Squadron RCE. Like 55 Squadron, 57 had a high complement of reservists. 23 Squadron RCE on the other hand was all regular. It soon became apparent that they were well trained and well briefed on engineer problems in Korea.

A great improvement had taken place in the Korean Service Corps (KSC). The units under command of 28 Engineer Regiment had steadily become more effective. A proportion of their officers were now men with front line experience. They had shown that if they were left to work independently on task work, under their own officers, a fair measure of success was achieved. Eventually three of the six companies were formed into an independent battalion, with a Sapper liaison officer. Later on Korean attachments to the Commonwealth Division, (KATCOMs), served in many units and were treated totally as normal soldiers, except for pay.

A second forestry camp was set up at the end of July by 23 Squadron RCE. The timber was of excellent quality and output was good, limited only in the interest of conservation at the insistence of the South Korean government. Once extracted, it was prefabricated at 64 Field Park Squadron into standard bunkers. A warning that the Chinese Air Force might become active and that an atomic threat could not be discounted was followed by orders to make Divisional HQ bombproof. A tunnel 184 feet long was driven through the hill under the HQ by 55 Squadron in twenty-two days; working in shifts, and starting at both ends, two chambers 18ft by 9ft were prepared with provision to break out other chambers; the tunnel was timbered throughout. Despite lack of tunnelling expertise or survey techniques the two ends met in the middle to within one inch of accuracy. Apart from this, demands for engineer work had slackened a little and, for the first time, the regiment had men to spare for work on infantry defences. As in the past infantry skills in field works showed some deficiencies and differences in battalion priorities caused duplication of effort<sup>3</sup>; careful planning and steady work resulted in major achievements. In September the regiment also established a mine training

area and ran one day courses for all arms on how to avoid casualties on mines, especially our own. The mine training area proved its worth many times over.

Towards the end of October 1952, 1 Commonwealth Division again side-stepped to the left; with one battalion of 29 Brigade West of the River Samichon. One battalion, The Black Watch, took over from a US Marine Corps battalion<sup>4</sup> who had held on successfully against heavy Chinese attacks, but had suffered severely in the process. The feature, later to be famous as the HOOK position, was left a powdered, ragged hill with no bunkers intact and communication trenches almost useless. The Black Watch immediately requested Sapper assistance and 55 Squadron was given the task of putting the position in order. Forty-four bunkers and protective positions were built and six crawl tunnels for section strongholds dug. Within a fortnight the Chinese made a further heavy attack. The newly started tunnels offered protection to about a platoon who managed to stay on the hill by bringing our own artillery down on themselves. While 55 Squadron was repairing damage and continuing new field works on the HOOK, 12 Squadron was starting similar construction on Hill 355. Bunkers were dug into solid granite to a depth of thirteen feet, beehives and explosives had to be used and, not infrequently, hammer and chisel; each re-deployment in this position produced requirements for new or additional minefield gaps in battalion positions and a great deal of this work fell on 12 Squadron and its New Zealand contingent in particular.

At the close of 1952, the Division had been virtually in the same area for some fourteen months, during the last thirteen the Chinese had made only four attacks of more than company size; it was not altogether surprising that the Division had neither lost nor gained a single platoon position. As far as the Sappers were concerned the emphasis had slowly altered throughout the year; having ensured communication within the divisional area with many roads and jeep tracks, the regimental effort had been directed to improving the infantry defences, first with mines and secondly with fieldworks. Initially the Infantry could not have enough mines, but minefields eventually showed their limitations in static warfare<sup>5</sup>. It had been demonstrated, on the other hand, that properly dug field defences prevented casualties and made it possible to stay on heavily attacked hills. The result was a line across the divisional front, indeed across the whole front, with very little in depth behind. As the war became, and stayed static, so original Sapper problems became fewer and dullness became the worst enemy. The notorious Korean winter set in again; and, to mark its



onset, President-elect Eisenhower paid a short visit to the Division with the thermometer at freezing point. The Imjin froze that day and stayed frozen for some weeks; the surface ice was eventually, about a foot thick.

#### THE BASE IN JAPAN

Following the formation of 1 Commonwealth Division, a battle school was set up at Hara Mura in Japan, initially to train the infantry reinforcements and to make them fit again after weeks in a troopship. A small Sapper wing, manned from 28 Regiment in Korea, was provided to train the assault pioneers and for battle simulation. Subsequently the Sappers were taken on the battle school establishment and all arms mine training became a routine feature; Sapper reinforcements too were sent through the battle school. Also in Japan at Kure was the BRITCOM Engineer Regiment, based on a unit of the RAE which was part of the occupation forces; it was commanded by Lieut Colonel P P Jackson RAE who became CRE British Commonwealth Forces, Kure (BCFK). The Regiment, which acquired a small British establishment, was responsible for all engineer stores and works outside the divisional area including works detachments in Seoul and Pusan; it also provided stores, machinery and workshop facilities to the divisional engineers even though the US Army was the main source of supply. Most Sapper drafts, both to and from Korea through the Joint Reinforcement Base Depot (JRBD) were helped by the BRITCOM Engineer Regiment who also handled postings, reinforcement matters, wounded returning to duty, and on occasions individuals on leave. Its help to the limit of its resources could always be relied upon and its hospitality was renowned. Lieut Colonel W P C Curlewis RAE relieved Lieut Colonel Jackson and was in turn relieved by Lieut Colonel S F Fletcher RAE who gave invaluable advice to 55 Field Squadron when they were preparing to go to Christmas Island. By then the British element of the regiment had been withdrawn but the spirit of helpfulness remained.

*Bomb Disposal.* A small RE BD Section formed part of the BRITCOM Engineer Regiment in 1952 and dealt with a number of unexploded bombs, including three influence sea mines, both in Korea and Japan. The section worked in close conjunction with the US Army BD organisation and also maintained a flow of BD intelligence to the the UK. In mid 1953 the Section was disbanded since it was apparent that neither the weight of enemy air attacks in Korea nor the residual tasks in Japan justified its continuation, especially in view of the US

resources available. Thereafter, the 28 Regimental establishment included one BD trained officer and two NCOs to ensure a continued flow of BD information and to give extra assistance to the US organisation when necessary.

*Postal.* An integrated British Commonwealth Postal Unit commanded by an Australian Major provided a Base Post Office in Japan. Canadian and New Zealand forces had their own postal organisation. Correspondence for troops was addressed to British Army Post Office (BAPO) 3 for Korea and BAPO 5 for Japan. There was a hardworking and much appreciated Commonwealth Division Postal Unit in Korea, a postal detachment in Seoul (removed to Pusan for a short while) and post offices at the JRBD and in Tokyo where a leave camp was established. An unusual feature of the mail arrangements was the provision for a postage free parcel at Christmas 1950 for every man in Korea; more than 13,000 parcels arrived by specially chartered aircraft. BOAC introduced Comets on the London to Tokyo run in 1952 with a consequent speed up of mail, and units in Korea became accustomed to yesterday's London newspapers. During the peace-talks there was a thrice weekly exchange of POW mail at Panmunjon. The British subaltern in charge of the postal department usually made one of these exchanges each week. The exchange was made in a large tent furnished only with a folding table in the centre; the UN and Communist representative would enter from opposite sides, synchronise their arrival at the table, salute and exchange mail against a signed receipt, salute again and leave without a word. If the peace talks were going well a slight informality might be accepted and an occasional "Good morning" was possible; on bad days the Communist representative would drop the mail on the ground and indicate that it would go no further.

*Transportation.* Both Movement Control and Transportation were represented in Korea with detachments in Seoul and Pusan as well as in Japan. A BRITCOM Movement Control Group including a Canadian Group was set up in Kure as was a BRITCOM Transportation Squadron. The transportation working was confined to docks and water transport; no rail working was involved since the US Army was mainly responsible for the theatre logistics.

#### FORTIFICATIONS

Meanwhile the static nature of the front line was encouraging major entrenchments of a nature not seen since the First World War. The tunnelling blitz on the HOOK position continued furiously, with teams

working in shifts, each shift advancing about three feet per day. At that time of the year the frozen earth was a help in constructing MMG and LMG bunkers on forward slopes; the results were not so good when the thaw set in. Compressor tools were used where possible, but the length of hose necessary, sometimes over 1000 feet, and the state of the hose with many leaks, frequently reduced their effectiveness. On Hill 355 similar work to improve the defences was being carried out by 12 Squadron with 300 KSC, working in two shifts. Much of the work had to be done at night as it was under direct observation from Chinese on Hill 227. Progress was slow, hampered by darkness and mortar fire. Cut and cover trenches were built with concrete lintels over OPs and MMG positions as an alternative to tunnels. Experiments with revetment design were carried out as its use would be essential in the Summer and especially in the rainy season. On the main communication trenches Square Mesh Track (SMT) with a rock wall backing was used, secured by pickets every three feet; on other trenches combinations of SMT and hessian, cellular fencing (small mesh chicken wire) and CGI revetting was used. The haulway and cableway on Hill 355 were both very useful in this work, although the haulway turn around time for a 400lb load was thirty-five minutes. Cables were frequently damaged by mortar fire.

At the beginning of 1953, the divisional front had been re-organised on a new basis with all three brigades forward each, with two battalions up in the line. This system was, in general, welcomed by the Infantry because it made relief programmes much easier; and also by supporting arms because it meant less uprooting and moving in the cold weather.

After the closure of NUTHATCH II camp a new design of prefabricated timber frames for bunkers was employed. A joint British/Canadian venture to produce the frames was set up near Tokchong, using squared timber and a 42-inch saw bench borrowed from the BRITCOM Engineer Regiment in Kure, Japan. An average output of ten frames a day was eventually achieved, and they were issued to units complete with spikes, roofing felt and instructions. 64 Field Park Squadron carried out an immense amount of work in prefabrication and in repairs. The divisional engineers eventually acquired significantly more plant than any other British division and repair facilities for British plant was not available from US sources. The field park undertook major repairs at times since certain plant items such as an excavator could not be spared for the four months which it would take for repair at the base in Kure. The Squadron also had a dog troop

with both mine dogs and patrol dogs which were used by standing patrols at night to give warning of anyone approaching.

In early February 1953, 1 Commonwealth Division moved into reserve for the first time and, once settled into new locations, the whole Division felt the benefit. During the period in reserve each field squadron rotated its troops fortnightly; one troop being on rest and recuperation (R & R), one troop on track construction in the KANSAS line, and one troop training. The training was divided into a week on general military and weapon training and a week on Bailey bridge training. Superimposed was a regimental wireless exercise, a divisional exercise in the counter attack role and several brigade exercises. By the end of the ten week reserve period a lot of almost forgotten basic military skills had been re-learned. The period in reserve was crowned by a Sapper day demonstration for the remainder of the division to show the variety and ubiquity of Sapper tasks. During this period 23 Squadron RCE was replaced by 59 Squadron RCE. At the beginning of April the Division returned to its position in the line and the regiment settled down again to the never ending tasks of tunnelling, fieldworks, minefield checks and, as always, road maintenance.

The Chinese, who had been probing the HOOK since early May 1953, launched another large scale attack on 28 May, preceded by a "softening-up" period of six days. The HOOK which had been made a two battalion position, was at the receiving end of some 10,000 rounds of artillery fire during the night of 28/29 May. Immediately following the battle, two troops of 55 Squadron moved into the forward company position, under a steady hail of mortar bombs, to repair the damage. The damage was extensive and the devastation hard to describe. Apart from the latest design of Sapper built trenches on the North side, every trench or weapon slit was filled in and covered by a tangle of wire and debris. Meanwhile 59 Squadron RCE supporting their brigade in the central sector were screening two forward routes which were under Chinese observation; echeloned screens, fourteen feet high and made of chicken wire and scrim material, were not intended to camouflage the roads, but to conceal movement along them; similar screens had been placed along many routes. The work was done at night and was frequently interrupted by light mortar fire. 12 Squadron back on Hill 355 continued its work on the defence positions. A very close and effective liaison had developed between the Sappers and Infantry who were frequently accompanied on their patrols by Sappers especially for the distasteful task of putting quick lime on the Chinese bodies which had been caught by artillery fire on the defensive

wire. Despite the activity the general feeling was that the truce was not far off. The rains came and went with no major disaster on the River Imjin, where the bridge at TEAL, washed away in 1952, had been replaced in early January by a low level Class 50, two-way, semi-permanent bridge, designed so that it would be submerged quickly in flood to save it from damage by debris floating down as the flood reached its height. The rainy season did, however, have a disastrous effect on field defences. The peace negotiations which had dragged on for so long were finally agreed and the truce was announced on 27 July 1953.

#### ARMISTICE

When the euphoria of the armistice had evaporated work was resumed, but now in reverse. Field defences were dismantled, serviceable stores were recovered and battalion areas were cleared. Now there was no shelling or mortaring and lights were seen again at night. All units moved back to rear locations and the British Sappers together with "B" Echelon and the LAD moved to the 64 Field Park Squadron area and settled down in one camp. 59 Squadron RCE remained North of the river Imjin, where they had a part to play in the delineation of the Demilitarised Zone (DMZ) established by the truce, including the construction of eight watch towers along the 1 Commonwealth Division sector of the DMZ.

An immediate effect of withdrawal from fighting positions was the demand for better accommodation, and for quantities of camp structures; cookhouse shelters were prefabricated by 64 Field Park Squadron. The main type of accommodation available to the Division, however, was the American Quonset Hut, approximately 358 were received and erected by the Sappers, under Canadian tutelage, during the next two months. During October a works section including an RNZE detachment arrived in the Division for a three months stay, they completely rehabilitated 25 Canadian Field Dressing Station, planned and designed Maple Leaf Park, the Canadian Brigade Recreation Centre, and generally made an impact in the construction field.

On the operational side contingency plans to cope with a Chinese attack were made in case the truce should break down, and were practised monthly. These monthly practices culminated in a divisional exercise SHAKE-UP during the last week in November which was a complete rehearsal for the occupation of positions in an emergency. A considerable engineer effort was deployed to improve the divisional

reserve position and was a major commitment during the period from August to December<sup>6</sup>. A more sombre experience took place in September 1953; each brigade was given an area of responsibility and search teams, including Sappers, set out to recover bodies from the DMZ. UN bodies were evacuated through brigades for interment in War Grave Cemeteries, while enemy bodies were buried in the DMZ.

During this period further changes in manpower took place. 59 Squadron RCE, renamed 4 Squadron RCE in October 1953, departed in a blaze of glory, emphasised by the exuberance of some farewell explosives and was replaced by 3 Squadron RCE. Colonel A H M Morris took over as CRE and Lieut Colonel H M Millar as CO.

Although the winter of 1953-54 was, in comparison with others fairly mild, ten degrees of frost is cold by normal standards; it was possible to give attention to creating more comfortable living conditions and a winterisation operation was launched. Preparations were also made, as customary by then, for frozen roads and the winter and spring frost boils; and work continued on the innumerable tracks required. With the coming of the New Year greater emphasis was placed on unit and individual training. Unit instructors courses were started with infantry assistance and three-week squadron training periods were instituted. The longer the period of the truce the more elaborate the works requirement grew. NAAFI clubs and gift shops were improved out of all recognition, a mineral water factory was established and two officers clubs were built. The squadron's time was divided between continuation military training and engineer works construction. Besides the major and minor works projects, the routine maintenance of roads and tracks which was such a feature in the life of engineers in Korea, continued unabated. So also did running water points and water supply; a function often overlooked when considering the engineer role during the campaign, but one of fundamental importance<sup>7</sup>. Individual and unit training programmes continued with considerable enthusiasm during March and April, culminating in a major divisional exercise IMPETUS held at the end of April. A bridging camp was established on the South bank of the River Imjin in time for the good early summer weather, it was inevitably christened Upnor, and was of great value with its emphasis on unit and team, as opposed to individual training. A sad occasion on 25 June 1954 was the departure of the RNZE Section which had given the Regiment such loyal and staunch support, they had served with considerable distinction and individuality for over two and a half years with 12 Squadron, and would not be easily forgotten by all who worked with

them. The rainy season arrived as usual in mid July; however, precautions based on lessons learned and experience gained over the past four years were effective and repairs were soon put in hand.

News of the divisional run-down plan was received in the middle of August; the division was to be reduced to an independent infantry brigade group in April 1955. New camps were planned to be ready in time for the winter and it was clear that whoever might leave first it would not be the Sappers. In November 1954, HQ 1 Commonwealth Division ceased to exist, the responsibilities of the CRE's HQ passed to 28 Regiment and the CO, Lieut Colonel J C Woollett, became CRE; the Division remained in name alone but its effective strength was that of a brigade. The system of a CRE separate from the engineer regiment had been proved to be valuable in the circumstances and was reported on favourably by all incumbents. While appreciating the special circumstances, and with some doubts about the detailed establishment of the CRE's staff, the system was clearly proved, not least for relieving the CRE of routine pressure and providing opportunity for advance planning. A series of comprehensive CRE's Liaison Letters provides detail of engineer problems and requirements; but the last of these includes the comment "there have been few, if any, lessons to be learnt".

In March, RHQ 28 Engineer Regiment together with 12 Field Squadron and 64 Field Park Squadron, left for the United Kingdom. 55 Independent Field Squadron remained, as they had begun in 1950, to provide engineer support for the brigade. All services left to be maintained, roads, camps and water points required little but routine maintenance as they had been built to last: good engineering paid off. It is of interest that at this time the Commonwealth Brigade Fire Service was made a Sapper responsibility. A Commonwealth element remained temporarily in 55 Squadron with Canadians in the Park Troop and a small works section was attached for specialist advice. The Squadron developed into a tightly knit unit which showed its value later on in Christmas Island. Towards the end of May 1956, 55 Independent Field Squadron left Korea forever and embarked for Christmas Island where they rejoined 28 Engineer Regiment for Operation GRAPPLE. The last British unit left Korea in 1957 and the UN Honour Guard was provided on detachment from Hong Kong, but a Postal detachment remained in Korea with the British Embassy.

The war in Korea, a major war by an allied UN force, had a marked impact on communist imperialism. Militarily, it demonstrated again that manpower alone was not sufficient to overcome modern

weapons. The cost in lives was very high to the Korean people and also to the USA who were the main sponsors of UN effort; the British dead numbered 765. No account of the Commonwealth Sappers war in Korea would be complete without a tribute to the outstanding support of the US Army Corps of Engineers with whom relations throughout were excellent.

## FOOTNOTES TO CHAPTER VIII

1. An interesting technique adopted for placement of demolition charges was to load a strip of canvas hose with explosive and nail it to the timber bridge members.
2. Lieut Colonel P N M Moore was awarded his third DSO in Korea, few individuals have the distinction of a DSO and two bars.
3. During the Boer War a historian commented "The Sappers have a bad influence on the Infantry in that they are led to expect things to be done for them which they should rightly do for themselves".
4. The British advance parties were dressed in US uniform to conceal advance warning of the move, Lieutenant I A D Thompson was wounded and evacuated to a US Army Medical Unit where he was able to decline an award of the Purple Heart.
5. A lesson repeated from 1914 onwards is that booby traps laid by untrained troops can frequently be more dangerous to one's own troops than to the enemy in a static war situation.
6. An indent by 64 Squadron on the Ordnance Depot Kure for cross-cut saws for mass production of timbers for bunkers was rejected as excessive. Protest at the arbitrary "heartbreaking" rejection of a demand already approved by Q and ADOS in Divisional HQ brought an air freight release of the required items and the comment "replacement of hearts should be taken up with Med, not Ord Supply."
7. A pre-war comment on the North West Frontier in India was-"The Sappers make water, the Doctors pass it, and we drink it."



## CHAPTER IX

### THE SMALLER GARRISONS

GIBRALTAR—Historical—Tunnels—Water Supply—Electricity—Military Town Plan. WEST AFRICA—West African Engineers—Survey—Independence. CARIBBEAN—Bermuda—Caribbean Regiment—RE Units—West Indies.

THE major theatres and countries in which the British Army was involved have been described but there were also a number of other overseas posts. Little would be achieved by listing all the locations; suffice it to say they included many parts of Britain's Colonial Empire as well as elements on the international staffs of the three defence alliances; NATO in Paris, Naples, Oslo and Washington in addition to Germany; CENTO in Izmir; SEATO in Bangkok; and UN commitments. In the majority of places the Corps was represented and in addition the almost traditional employment of both Officers and NCOs in small detachments or as individuals, which is reflected throughout the Corps history continued; many were garrison engineers, surveyors seconded to the Directorate of Colonial Surveys or postal detachments. There were also exciting appointments on professional attachments, expeditions and exchanges with other national armies. In three smaller garrisons, Gibraltar, West Africa and the Caribbean the RE contribution merits special mention.

#### GIBRALTAR

##### HISTORICAL

The large wartime garrison of Gibraltar declined rapidly once the war was over. At the end of the war the Royal Engineer units included two CsRE (Works), 1 and 32 Fortress Companies, 172 Tunnelling Company, 218 Army Troops Company and 711 Artizan Works Company, there were also two companies of Italian pioneers. By the Autumn of 1945, a CE, Colonel R L C Colvill commanded a works organisation of two DCsRE and 1, 32 and 72 (formerly 172) Companies collectively known as the Fortress Engineers and commanded by Lieut Colonel H Grattan. In 1950 the Fortress Engineer Regiment came into being, commanded by Lieut Colonel J F D Savage and

consisting of 1 and 32 Fortress Squadrons. 72 Tunnelling Squadron had reduced to troop strength shortly before and became the Tunnelling Troop of 32 Fortress Squadron. This organisation remained virtually unchanged throughout the decade until a visit by a large civil service team in 1958 cast the shadow of abolition and replacement by a civilian over the time honoured post of Chief Engineer Gibraltar.

Concurrent with the run down was a period of rationalisation accelerating rapidly in the late 1950s. Up to this time, in a colony of less than three square miles, there were separate Civil, RN and Army water catchment areas and water distilleries, while each ran their own pumping stations for general salt water supply. There were three separate electricity generating authorities. Cross connection facilities for both water and electricity were minimal. The only joint service establishment was the Naval/Military hospital. Many must have felt that some degree of rationalisation was long overdue. 1957-1958 saw the cross connection of Army and Civil fresh and salt water systems and electrical supply, and the formulation of plans for a joint RN/Army generating station and cold storage.

Matching the decrease in military presence was the Military Town Plan designed to free military accommodation in the predominantly civilian area in the North and to concentrate it in the South. As the military preserves on the Rock became more and more open to the public, care was taken to ensure that they should be aware of the Royal Engineers involvement in the history of Gibraltar. A plaque commemorating the part played by Sergeant Major Ince in the construction of "The Galleries" was unveiled in 1958 as were various other more general plaques and notice boards.

The King's Chapel built by the Spaniards in 1530 as a convent chapel, had been used as a Garrison Church since 1704 and was damaged in the Great Siege of 1779-1783. Many regiments and corps had been closely associated with the Chapel in its long history but there was little evidence of the associations. To make good this deficiency the Governor, General Sir Kenneth A N Anderson invited regiments and corps which had played a prominent part in the history of the Fortress to make gifts to the Chapel. The Royal Engineers, to commemorate the formation in 1772 of the first Company of Soldier Artificers and their subsequent service in the Great Siege, provided a font carved in grey marble from the Sierra near Malaga and in the shape of a shell, over which was a niche for a vase or figure. At each side, the font was flanked by a marble panel carved in a Spanish design. Considerable damage had been caused to the Chapel by the

explosion in the harbour of the ammunition ship *Bedenham*, in 1951; the Royal Engineers were involved in restoration work. Mr R G Covell FRIBA, himself an ex-Sapper prepared designs to restore the Chapel to its former glory as well as to repair damage. In 1952 the Royal Canadian Engineers in commemoration of the work of RCE Tunnelling Companies during the war, presented an oak lectern, designed by Mr Covell and constructed by the Royal Engineers. The first of the new pews carried a carving of the RE cap badge and the inscription "Presented by the Corps of Royal Engineers to the Glory of God and to commemorate their unbroken service on the Rock since 1704".

The Fortress Engineer Regiment took its regular turn in the ceremonial of the Rock including the Ceremony of the Keys; indeed as the Royal Artillery presence diminished it also provided explosives to simulate the firing of the ceremonial "six o'clock gun"! In addition Sappers also became involved in exploration into the original history of the Rock when a team from the British Museum wanted to visit the caves on Governors Beach in 1958 because of the distinct carbon layers, as part of a project for carbon dating. Since the land access was vested in the CE, the Corps gave assistance; indeed Sappers carried out much of the sifting to produce the precious carbon and subsequent analysis proved that the caves had been occupied some forty to fifty thousand years ago. Throughout the period the CE sat, ex-officio as a member of the City Council: reinforcing the close ties between the Royal Engineers and the citizens of Gibraltar.

## TUNNELS

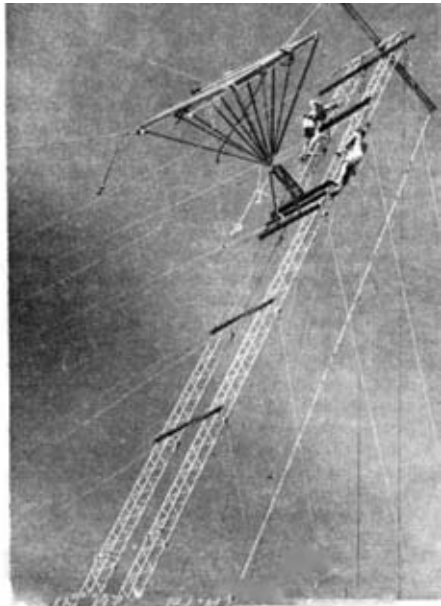
During the war years over twenty miles of tunnel had been driven. Between 1945 and 1948 excavation for a REME workshop was completed, and that for bulk petrol storage, for a siege HQ and for the Orillan Tunnel was begun. Calpe Hole, originally prepared for use as a ration store in 1943, was extended further in 1949 and 1952 to house a new power station which came into operation in 1956. After a change of scenery in 1955 during which the Tunnelling Troop of 32 Fortress Squadron went to Cyprus to drive a tunnel through a headland at Episkopi, work continued in Gibraltar in 1956 and 1957. An attempt to provide a duplicate route to the Harley Street tunnel from Governors Cottage Camp ran into the liquid mud of the major fault and had to be abandoned<sup>1</sup>. In 1958 a new tunnel replacing the ill-fated venture was driven and named Eley Way after Colonel D M Eley, CE from 1954 to 1957.

With the rapidly diminishing amount of money available for maintenance, many of the tunnels, over this period, started to fall into decay. Pilferage by the largely Spanish labour force of some nine hundred contributed; for example, it was discovered that several miles of heavy duty HT electrical cables had been stripped for their copper content; this act, whilst the cables were still live, speaks for the ingenuity of the thieves. Mine detector searches did much to reduce pilferage, it did not, however, prevent the overnight disappearance in 1958 of a steam roller from Brewery Stone Crusher, subsequently found in Tangiers. A much regretted feature of the financial retrenchment was the abandonment of Gorts Hospital in 1958; an underground hospital with full facilities including air conditioning. The run down in tunnelling activities produced side effects. With no other source of aggregate, other than salty shingle, the whole colony depended largely on tunnel spoil for its concrete structures: the demand for which was ever increasing with the extensive building programme<sup>2</sup>. The decision, in 1958, to proceed with the new tunnel from Little Bay to Europa Flats was influenced by the need for more aggregate, coupled with the desire to carry out work which would be of substantial benefit to the civilian community. An exceptional storm that winter had produced severe rock falls on the eastern face of the Rock and the public road emerging from Williams Way was covered with debris, there were also a number of rocks left precariously balanced on the cliffs 300 feet above. A large concrete portal was built over the exit: the top being sand filled to cushion the fall of boulders, some of which might weigh up to one ton, from above. An interesting sidelight to tunnelling was the discovery in 1943 and subsequent development of the Lower St Michael caves; the Upper Caves became an official tourist attraction; whilst the Fortress Engineer Regiment remained custodians of the lower complex and installed electric light therein.

#### WATER SUPPLY

Fresh water was a scarce and valuable commodity in Gibraltar; it was rationed to seven gallons per head per day and salt water used for sanitation, baths and, by force of circumstance for many kitchen needs. Over seven acres of catchment on the Rock fed rain water direct to underground reservoirs and as far as possible the roofs of buildings fed into storage tanks. Even so, in years of poor rainfall the storage supplied only about one-fifth of the Army's fresh water needs and the remainder was produced by salt water distillation. The supply was supplemented in 1958 by 1½ million gallons brought in by a tanker

Sappers erecting a twin mast 130 feet high with a reflecting aerial required as part of the work for the nuclear test programme on Christmas Island



Christmas Island. The main airfield



Christmas Island

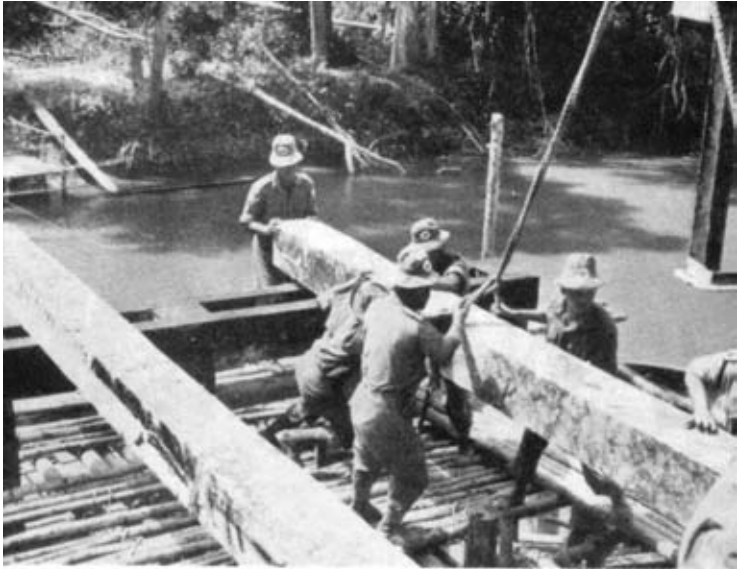


A Blaw-Knox lorry mounted crane of 74 Field Park Squadron caught in a flood on the Ipoh-Alor Star road

Soldiers of 50 (Gurkha) Field Regiment with victim



74 Fd Park Sqn & 50 (Gurkha) Fd Regt



Placing a road-bearer

Muar River bridge built by Gurkha Sappers in 1955 on the Rompin to Gemas road, Malaya

Muar River bridge completed



Muar River Bridge





Fort Dixon Airstrip. A Ferguson tractor brought by boats in pieces and reassembled being hauled up the river bank by Malayan Sappers

Fort Chabai airstrip. This view gives an idea of the very heavy earthwork carried out in some cases by light tractors imported by helicopter or boat



Fort Dixon Airstrip



on its maiden voyage to the Gulf; the water was pumped to Army reservoirs via the City Council's system.

In 1950 the Royal Engineers had investigated the possibility of borehole water supply, by geophysical survey, which unfortunately revealed no prospects of fresh water from a deep well. In 1954 the lake in the Lower St Michael cave was pumped dry to determine its capacity and rate of recuperation; another unsuccessful venture showing that very little water is held inside the Rock. With the aim of increasing the fresh water ration, a vapour compression distillation plant was installed in the Glen Rocky Distillery during the early part of 1957. Small portable plants had been built in the UK but nothing of this size had been attempted before and problems were encountered; the trouble was eventually overcome but the plant failed to produce its planned output of six million gallons per year.

Rainfall was never predictable either by quantity or the period over which it fell; in some years, particularly when the total rainfall was over a short period, the reservoir capacity was insufficient to hold water collected from the catchment areas. Extra capacity was provided in 1958 by a new storage for one million gallons in a tunnel chamber off Harley Street, even so the new reservoir was unable to compete with an exceptional eleven inches of rain which fell in three hours during the following Winter. Flooding and rockfalls were also caused by this event which was without precedent in the recorded meteorology of Gibraltar.

The need to use salt water to supplement the water supply produced its own complications. Almost every building had to have two different supply systems and the corrosive effects of salt water on metal plumbing were largely overcome by the introduction of plastic fittings and nylon pipes. The salt water was drawn from a well to a reservoir on Windmill Hill some 600 feet ASL; new nine-stage submersible pumps installed in the mid 1950s proved to be vulnerable to salt water corrosion, causing a crisis in 1958 when the salt water supply failed completely. The Fortress Engineer Regiment set up an emergency supply, using the swimming pool in place of the salt water well with emergency pipe up the cliffs to Europa Road; the importance of cross connection with the City Council's supply while the emergency supply was being rigged, was amply demonstrated.

#### ELECTRICITY

Modernisation in the form of electricity replacing solid fuel for cooking and heating, as well as the increased domestic use of power caused a

rising demand for electrical generating capacity. The Navy had their own long term plan, but Army and RAF needs were urgent, and joint development was agreed for a power station at Calpe Hole. The Army was to excavate the site; the RAF design and build the station and the Army take over and run both the station and distribution system. Design included the installation of three diesel engine driven 1000kW sets, similar to those installed in Tidworth power station. Engine exhausts were vented through a common shaft and this exhaust system was to cause a considerable noise problem since the long concrete duct acted as an organ pipe to the annoyance of the civilian residents in the area; the problem which posed much technical difficulty was solved ultimately by fitting special silencers to the English Electric Fullager engines. There were staff recruiting difficulties since suitable tradesmen were not available in Gibraltar and, for security reasons, Spanish labour could not be employed. Some of the most difficult positions to fill on the power station staff were the switchboard operators. The Fortress Engineer Regiment managed to provide some higher national graduates who both operated the board and trained others; the RAF also helped.

At one stage it almost looked doubtful if Calpe Hole Power Station would ever run, even on the morning of the changeover it was found that the transformers were actually 11kV notwithstanding the fact that the name plates said 6.6kV and juggling of existing transformers was necessary. At 0600hrs on 1 November 1955, the power stations run by 1 Fortress Squadron at Fordhams, Willis's, Gorts and Arrow Street took the load from the Dockyard Power Station; the Calpe Hole then took over the whole load; the other feeders were taken later. The changeover was accomplished smoothly with no interruptions to supply. The remainder of the RAF load, which included supply to the airfield navigation aids, was taken over during 1957<sup>3</sup>.

Early in 1957, a gas turbine alternator set was installed and taken into commission, installation caused no problems but it proved to be expensive to run and was not trouble free; it was installed without a heat exchanger since one was not available, and although fuel consumption might have been improved by heat exchange the subsequent installation would have been complicated. Limestone dust built up on the turbine blades and, when the set was running in parallel with the diesel Fullagers, the turbine would not accept its share of any sudden load increase, as a result, it was used only for peak loads, training and as an emergency set. The increasing demand for electricity had allowed little time for maintenance; by December 1957 the power station diesel

engines had run for over 15,000 hours and were in need of overhaul. An emergency power station of four 300kW sets was set up on Windmill Hill, later increased to six sets; this power station operated by the Fortress Engineer Regiment enabled the overhaul of the Calpe Hole engines to be undertaken. An interconnector between Calpe Hole and the City Council power station was completed in June 1958 and allowed for an exchange, either way, of up to 2000kW.

Perhaps an engineer lesson to be drawn from the new installations both in connection with water and electricity supply is the element of risk in introducing technologically advanced equipment unproved in local conditions to provide vital services in an overseas station. Difficulties in expert consultation, urgent supply of spare parts and in-theatre diagnosis and repair of faults produced problems which could have been insoluble in a truly fortress situation. It is to the credit of the Corps, that actual crisis was averted.

#### MILITARY TOWN PLAN

Consideration of the use of the limited land in Gibraltar brought a proposal for sale of War Department land and buildings in the city area, the proceeds of which were to be used for relocating the Army at the southern end of the Rock in accordance with a Zone Planning Development Scheme. A Military Town Plan was produced by a British architectural firm which was accepted by the War Office in 1955 and detailed planning started for new accommodation for single soldiers, a sergeants' mess and married quarters. The problems of planning in the UK working largely from maps with little detailed knowledge of local conditions were emphasised when it was found that a traffic plan had been produced using what appeared to be a road but was in reality an alleyway of over fifty steps; items such as roof catchment and salt water distribution tended to be overlooked. An example of the inventive planning demanded by the limited availability of land was married quarters of framed construction on four levels with the entrance and garage on the top floor; the cost at over £14,000 each was not believed until the financial branch had seen the site for themselves.

The last CE before handover of RE responsibility for Works Services was Colonel C R Nicholls. By then progress on the Military Town Plan was already advanced and some of it had been completed, the run down of the Army garrison had proceeded so that much of the town accommodation was able to be vacated with little new work. The handover was comparatively simple, in contrast to the many problems

tackled and overcome by the military engineers during their responsibilities for all military construction on the Rock.

### WEST AFRICA

WEST Africa Command comprised the four colonial territories of Nigeria, the Gold Coast, Sierra Leone and Gambia. In 1948 Command HQ was in Accra and there the CE, Colonel F C W Fosbery, had his office with a small staff of an SORE 2 and three junior officers. The works services were organised into three areas; Sierra Leone combining with Gambia as one, while the other two colonies were a works service area apiece; each area was commanded by an OCRE of major rank but with financial and technical responsibilities normally accorded to a CRE Works. The CE's control was also exercised over the West African Engineers and he was responsible to the GOC for the engineer training of the field units. Apart from the works organisation and seconded officers and NCOs there were no British Sappers in the theatre.

At that time the colonies were progressing rapidly towards independence and in all parts of public life, responsibilities were being transferred. Colonel E W L Whitehorn, CE in 1952, commented: "I found myself responsible to two generals, two brigadiers, four prime ministers, four governors and five treasuries—none of which had any money they were willing to spare for us." It was generally a period of military retrenchment, military establishments were under financial pressures and works services were, in the main, limited to maintenance.

### WEST AFRICAN ENGINEERS

The history of the West African Engineers went back to 1928 when the first Volunteer Engineer Unit was formed by the staff of the tin mines in the area of Bukuru, near Jos, on the plateau of Nigeria; Jos remained for many years a traditional home. After the return home in 1946 of 81 and 82 West African Divisions from overseas service in the war it was intended to retain two regular field companies, 36 in Nigeria and 37 in the Gold Coast; but various difficulties forced the disbandment of 36 Company and reduced 37 to a cadre. However, by July 1947 when the post-war manpower plot had been completed 37 Field Squadron had been expanded to establishment with British officers and a proportion of NCOs and 36 Field Squadron was reformed as a cadre, under command of a captain and with a charter for infantry training only. The longer term intention was to expand the West African Engineers to a regiment and 37 Squadron was given

a park troop within its HQ, designed to be the nucleus of a field park squadron.

In August 1948, 37 Squadron was redesignated 35 in compliance with Imperial unit numbering, by then it had become fully integrated into the Gold Coast Brigade Group, Royal West African Frontier Force and was stationed at Teshie, near Accra. 36 Squadron, by then some 180 strong, was given authority to expand to a full squadron establishment in February 1949 and a major was sent to command it; it moved later that year from Jos to Kaduna.

Meanwhile in February 1948, 37 Squadron, as it still was, had been called out for internal security duties in Accra by providing independent troops to support the battalion there. In March the Squadron, with a platoon from the School of Infantry, provided a force to prevent rioting in Nsawan, twenty miles North of Accra. There were fears that the unrest would spread to Nigeria and the tin mining area was a possible danger spot but the presence of a smart and well disciplined 36 Squadron, who showed their presence in uniform in Bukuru frequently, was considered to have a steadying effect and there were no troubles there.

The political influences did, however, cause another concern to the OCs of the squadrons in addition to their primary ones of training their units. Many of the better educated and higher skilled potential recruits came from the southern province of the Gold Coast, more vulnerable to propaganda and generally sympathetic to the anti-colonial movement. With time, however, the units gained in training and experience and at the end of 1948 the first West African sapper tradesmen were sent to the SME at Chatham for training as instructors. Africanisation went ahead rapidly. By 1949 in 35 Squadron the only non-commissioned British ranks were an SSM and a SQMS, both shadowing Africans in those ranks; by September 1950 it was the first unit to dispense with all non-commissioned British assistance<sup>4</sup>.

## SURVEY

As part of an extensive programme of survey photography in Africa, 6 Radar Air Survey Liaison Section supported 82 PR Squadron RAF in connection with the aerial survey of British West Africa during 1948 and 1949.

## INDEPENDENCE

The Gold Coast achieved independence as Ghana in March 1957 and the West African Command closed down. 35 Field Squadron WAE

became part of the Ghana Army. Nigeria followed suit in October 1960 with similar results for 36 Field Squadron WAE; in both cases RE officers continued to serve on secondment for a number of years.

## CARIBBEAN

### BERMUDA

In addition to a garrison with an overall responsibility for the Caribbean, a small local garrison was also maintained in Bermuda. Each was commanded by a separate and independent HQ. Bermuda retained a long association with the Royal Engineers. Locally enlisted troops had served in RE Submarine Mining units as early as 1884 and a volunteer fortress company had been raised in 1905. The post-war garrison, however, consisted mainly of administrative troops with an undefined Internal Security (IS) role and who were also used on occasion for ceremonial. An OC Troops combined his duties with that of CRE. Brigadier H D Maconochie handed over the post to Brigadier W D Robertson in 1948. In the same year, the British garrison was reduced to some 200 strong including a DCRE, and four QARANC. Brigadier Robertson left the island in February 1948 and garrison duties were assumed by a company detached from the infantry battalion in Jamaica.

A further reduction followed in 1952 following civilianisation of works services posts; the DCRE establishment was reduced to a garrison engineer who retained an independent command directly under War Office control. The majority of the garrison left in 1953, but returned again at company strength in February 1954 in answer to a call from the Governor to deal with civil unrest. At that stage the works establishment was reinforced to refurbish the barracks which had suffered some hurricane damage after the previous garrison had left. It was, however, only a temporary reprieve and 1957 saw the end of an RE presence in Bermuda, continuous since 1701.

### CARIBBEAN REGIMENT

In 1942 the Caribbean Forces North and South had been formed. These two forces later combined to form the Caribbean Regiment which recruited throughout the Caribbean area, including Bermuda. Some units of the Caribbean Regiment saw service in Italy and Egypt. However, it ended its brief existence in 1947 and its composite units, mostly named after their parent countries, had disbanded rapidly thereafter.

## RE UNITS

Engineer units sponsored by the Corps had existed in some of the islands of the West Indies. A volunteer engineer corps of the Kingston Volunteers had been formed in Jamaica in 1934. During the war years, a works company from Jamaica deployed detachments in various locations throughout the North Caribbean Area, the HQ of which was in Kingston, Jamaica. The company returned to Jamaica from Belize in 1947. In Trinidad, a volunteer engineer company had provided a searchlight troop with the Caribbean Regiment. The South Caribbean Area, with its HQ in Trinidad, also raised a locally recruited works company commanded by a RE Major which deployed detachments to various parts of the area. There was a CRE (Works) in both Jamaica and Barbados. Lieut Colonel R A Hay closed down CRE Barbados and returned to the UK when the two areas amalgamated in 1948 and all works services were centralised under the CRE (Works), Lieut Colonel R Clayton in Kingston, Jamaica. The CRE's major duty at that stage was to act as military land agent involving some interesting bargaining with the various island authorities on disposals resulting from the dismantling of the wartime defences and disbandment of the Caribbean Regiment.

## WEST INDIES

In common with much of the world, the times were turbulent in the Caribbean too. In British Honduras, Grenada, Antigua and Jamaica, external threats, internal disorders and hurricane disasters all contributed to maintaining a state of ever-readiness for the British Army garrison. The political background was one of effort to launch a cohesive and economically viable independent federation. To this end the Federation of the West Indies composed of the island dependencies of Britain had been planned between 1948 and 1953; the decision to federate was taken in 1956 and two years later the federal constitution came into force. In 1959, Jamaica received full internal self government followed over the next two years with new constitutions for Antigua, Dominica, Grenada, Montserrat, St Kitts-Nevis-Anguilla, St Lucia and St Vincent. The other two dependencies Trinidad and Tobago and Barbados received full internal self government in 1961.

One of the first acts taken at the start of the federation proceedings in the West Indies was to re-raise the distinguished West India Regiment, first raised in 1795 but disbanded in 1927 except for the band which was kept in being by the Jamaica authorities. An engineer unit based on Up Park Camp in Jamaica formed part of the new

force. Early in 1955, provision of accommodation for components of the West India Regiment was set in hand, in Jamaica, Trinidad, British Honduras and British Guiana, at an estimated cost of £2.5 million. The work was to be financed by the Colonial Office but the planning was carried out between HQ Caribbean Area and the War Office with both the CRE Caribbean and the DFW deeply involved. However, planning was overtaken by events and the determination of the territories to go their own ways. The CRE closed down in 1957, the last incumbent being Lieut Colonel H Nelson. An engineer squadron of locally enlisted Sappers remained to be incorporated into the Jamaica Defence Forces when Jamaica became independent in 1962.

## FOOTNOTES TO CHAPTER IX

1. A Sapper shifting spoil from the Harley Street tunnel failed to stop the small dump truck he was driving from overshooting a spoil chute on a 100 foot cliff. He managed to spring to safety on a drainage pipe but the vehicle went straight on down into the sea.
2. The extension of the airfield runway to enable modern aircraft to land at Gibraltar owed its existence to the spoil from tunnels.
3. It was unfortunate that a labourer on the pig farm put his pickaxe through the main cable to the airfield shortly after HE the Governor had formally opened the pig farm in 1957. Only some quick thinking and action by the Sapper electrical and mechanical staff averted a dangerous situation since all navigation aids on what was a tricky airfield, were put out of action.
4. The War Office in London continued to take considerable interest in the command, and visitors were fairly frequent. Colonel Whitehorn recalls a visit from a senior chaplain from the Chaplain Generals Department. To celebrate the occasion at tea-time in the Mess, the Nigerian cook produced a large cake bearing the words "Hurrah for God" in icing.



## CHAPTER X

### THE NUCLEAR TEST PROGRAMME

INTRODUCTION—Inter Service Command Structure—Army Contribution. MONTE BELLOS (Series I)—Geography—Planning and Preparation—Construction Phase—Operational Phase. MONTE BELLOS (Series II)—Planning and Preparation—Construction Phase—Operational Phase. CHRISTMAS ISLAND (Series III)—Geography—Planning and Preparation—Construction Phase—Operational Phase. CHRISTMAS ISLAND (Series IV-VI)—Planning and Control—Engineer Requirement—Post Test Period—Damage Control—Factors affecting Execution. MARALINGA. TAILPIECE.

#### INTRODUCTION

BRITAIN emerged as a nuclear weapon power in her own right in the 1950s by exploding both kiloton and megaton devices during a test programme which extended intermittently from October 1952 to 1958. Thereafter the British Government voluntarily suspended nuclear weapon testing in the atmosphere. The test programme included a test in the kiloton range in the Monte Bellos Islands, sixty miles off the North West coast of Australia, in 1952 followed by further firings there in 1956, and then a series of tests including megaton explosions in the vicinity of Christmas Island in mid Pacific. Trials were also carried out, at Maralinga Proving Ground in South Australia in 1956 and 1957, of the effects of nuclear explosions on military equipments. The programme was perhaps unique in terms of the direct involvement, not only of the three British armed services, but of scientists mostly from the Atomic Weapons Research Establishment at Aldermaston, and Australian and Fijian forces. Working in close contact throughout the planning and operational phases induced a real and enduring mutual respect at all levels. The inevitable isolation of test sites placed a high premium on logistic planning and execution. The command structures were joint service reflecting the priorities of involvement but in every case the Royal Engineers provided the bulk of the Army contribution<sup>1</sup> and command of the Army element.

The first and second series of the tests, held in the Monte Bellos were organised as Naval operations with Rear Admiral A D Torlesse and Commodore H C Martell respectively, as Force Commanders. A sequel to the first series was a request received by the E-in-C from the

Admiralty for HMS *Narvik* to adopt the motto *Ubique* to commemorate the association between the Ship and the Corps in 1952, when 71 Field Squadron was accommodated on board during the operation which led to the explosion of the first British atomic bomb. Her Majesty the Queen was graciously pleased to approve the request in a letter to the Chief Royal Engineer, General Sir Edwin L Morris on 18 June 1953.

The concept in the third series to test a weapon in the megaton range introduced a new dimension in the scale of the explosion; not only would a new location be necessary but also the device would be dropped by aircraft and therefore the force commander would be provided by the RAF. For this series a base was set up on Christmas Island. When, in 1957, the Government required a permanent nuclear weapon test base established, the Christmas Island base was reactivated and further developed under a Joint Task Force with its HQ in the Air Ministry. The Nuclear Test Programme is summarised in Figure 1/X.

#### INTER SERVICE COMMAND STRUCTURE

For Series I Monte Bellos (Operation HURRICANE) the major army unit was 180 Engineer Regiment which was under Naval command for a year and Lieut Colonel A P Smith, as CO, was also CRE to Rear Admiral Torlesse, Flag Officer Special Squadron. The Regiment was raised in August 1951, its establishment being tailor made to be compatible with foreseen tasks, and with accommodation at Monte Bellos on board an LST; a feature was the unusually high proportion of senior NCOs, whose experience paid dividends with the average age of the regiment being only twenty-three. A small REME workshop was included.

Since Series II Monte Bellos (Operation MOSAIC) was to be a prolongation of the previous test, it was understandable that an RN officer was again appointed Force Commander and that the Sapper support would be considerably smaller than previously as many of the facilities constructed by 180 Engineer Regiment some three years before would still be useable. The engineer component was an *ad hoc* Sapper troop of sixty-five men, raised mainly from 25 Engineer Regiment and under command of Major R N B Holmes, together with a small REME maintenance team.

Following the decision in 1955, that a British megaton weapon would be ready for testing in 1957, planning for Series III (Operation GRAPPLE) was initiated to drop the weapon in the vicinity of Malden

# UK ATMOSPHERIC NUCLEAR TESTS IN AUSTRALIA AND AT CHRISTMAS ISLAND 1952-1958

<i>Codename</i>	<i>Location</i>	<i>Date</i>	<i>Yield Range</i>	<i>Explosion Conditions</i>
Hurricane	Monte Bellos (off Trimouille Island)	3 Oct 1952	25 kt	Ocean surface burst (HMS <i>Plym</i> )
Totem 1	Emu	15 Oct 1953	10 kt	Tower mounted
Totem 2	Emu	27 Oct 1953	8 kt	Tower mounted
Mosaic	Monte Bellos	16 May 1956	15 kt	Tower mounted
G1	(Trimouille Island)			
Mosaic G2	Monte Bellos (Alpha Island)	19 Jun 1956	60 kt	Tower mounted
Buffalo	Maralinga (One Tree)	27 Sep 1956	15 kt	Tower mounted
Buffalo	Maralinga (Marcoo)	4 Oct 1956	1.5 kt	Ground burst
Buffalo	Maralinga (Kite)	11 Oct 1956	3 kt	Air dropped-high air burst over land
Buffalo	Maralinga (Breakaway)	22 Oct 1956	10 kt	Tower mounted
Grapple 1	Malden Island, Pacific	15 May 1957	Megaton	Air dropped—high air burst over ocean
Grapple 2	Malden Island, Pacific	31 May 1957	Megaton	Air dropped—high air burst over ocean
Grapple 3	Malden Island, Pacific	19 Jun 1957	Megaton	Air dropped—high air burst over ocean
Antler	Maralinga (Tadje)	14 Sep 1957	1 kt	Tower mounted
Antler	Maralinga (Biak)	25 Sep 1957	6 kt	Tower mounted
Antler	Maralinga (Taranaki)	9 Oct 1957	25 kt	Balloon suspended—high air burst over land
Grapple X	Christmas Island	8 Nov 1957	Megaton	Air dropped—high air burst over ocean
Grapple Y	Christmas Island	28 Apr 1958	Megaton	Air dropped—high air burst over ocean
Grapple Z	Christmas Island	22 Aug 1958	Kiloton	Balloon suspended—air burst over land
Grapple Z	Christmas Island	2 Sep 1958	Megaton	Air dropped—high air burst over ocean
Grapple Z	Christmas Island	11 Sep 1958	Megaton	Air dropped—high air burst over ocean
Grapple Z	Christmas Island	23 Sep 1958	Kiloton	Balloon suspended—high air burst over land

Kiloton—yield range (1–1000 Kiloton)

Megaton—yield range (few hundred kiloton to several megaton)

Island from aircraft based on Christmas Island 400 miles distant. Task Force GRAPPLE HQ was set up in the Air Ministry in February 1956 with a Force Commander, Air Vice Marshal W E Oulton. The CRE was Lieut Colonel J C Woollett, CO 28 Field Engineer Regiment, who was designated to be Senior Officer GRAPPLE Area in the Pacific during the construction phase, his RHQ would be split functionally to provide a small HQ for the CRE and a garrison HQ. Technical and operational control of army units would be exercised through a DCRE and works section with administrative control and discipline devolving on the 2IC; under command were detachments of 51 Port Squadron, REME, RASC and RAOC.

Up to the time of completion of Series III all of the tests had been carried out by organisations designed to meet the comparatively short term commitment of successive single operations. In July 1957 a political decision was taken to establish a permanent nuclear weapon testing base at Christmas Island. This resulted in the evolution of a more permanent command structure namely HQ Joint Task Force GRAPPLE with Air Vice Marshal Grandy as Force Commander. Briefly the RN were responsible for logistic support, weather reporting and sea search and for sea communications with the adjacent islands of Fanning and Malden. The RAF, in addition to weather reporting and sea search were responsible for delivery and firing of the weapon, for flying Canberra sorties to take cloud samples after each explosion, for maintaining regular air communication using Hastings and Dakota aircraft with the advance base at Honolulu, the adjacent islands and the UK, and also for general administration on Christmas Island including the feeding of all troops ashore. The scientific group from the AWRE provided the weapon, assembled and tested it, and were responsible also for health control and for recording, collating and assessment of scientific test data. The Task Force HQ included four staffs serving the four groups; it was located in the Air Ministry, except for the scientists who were at Aldermaston, and with the exception of an army rear HQ component, moved to Christmas Island for each test series.

#### ARMY CONTRIBUTION

The military staff was led by a Colonel Chief Military Planner who was also Chief Engineer to the Task Force as well as Commander of the Army Task Group; henceforth this "3-hatted" appointment will be referred to simply as CE. Unlike the Chief Naval and Air Planners, the CE was based on Christmas Island and only returned to London

for short periods of consultation at the Air Ministry and Aldermaston. A further Test Series (IV to VI) was authorised for completion between 1957 and 1958. (Figure 1/X.)

Colonel P F Hayes who was appointed CE in August 1957 for Series IV (Operation GRAPPLE X-RAY), handed over to Colonel R B Muir in January 1958 for the remaining Series V and VI (Operations GRAPPLE YANKEE and GRAPPLE ZULU). The participating Army units are listed in Figure 2/X and during the main construction period in 1958, personnel numbered 1800 together with a Fijian Army element of sixty. The organisational Army command structure typical of Series IV to VI is shown diagrammatically at Figure 3/X. On re-activation of the Christmas Island base in August 1957 the CEs HQ staff based on the island consisted of a DAA and QMG and a small works staff of an SO2 RE (Works), an SO2 RE (E & M), an SO3 RE (Resources) and an SO3 RE (Works). The DAA and QMG carried out staff duties concerned with discipline<sup>2</sup>, personnel movement, and administration of the Army Task Group. The CEs London-based staff at the Air Ministry comprised two elements, a military logistics staff, under an AA and QMG which dealt with the provisioning of stores and plant, movement and personnel matters and an RE Planning Team, under an SO1 RE which was responsible for the detailed development of plans for major works projects. Both posts were held at different times by Lieut Colonel B A A Plummer; Lieut Colonels H E B Frederickson and D L G Begbie also held that of SOIRE over the period 1958-60. In the new organisation the DCRE and works section disappeared and were replaced by a conventional CEs HQ and the important variation was that executive control of work was exercised through normal regimental channels. Elaborating on the Army Task Group GRAPPLE organisation, it can be seen from Figure 3/X that the engineer field units together with the construction troops of the Fijian military forces were placed under command of the engineer regiment which was made responsible for execution of new works projects. 73 (Christmas Island) Squadron RE which was organised on an electrical and mechanical basis, was concerned mainly with the operation of utilities and with the maintenance of completed buildings and installations. The field park squadron which was integral to the regiment supported all the Sapper units by providing heavy plant, cranes and also workshop facilities and materials such as crushed coral aggregate and pre-fabricated stores. The troop of 51 Port Squadron included the stevedore organisation for unloading sea transports at open anchorage. This activity

### ARMY TASK GROUP GRAPPLE COMPOSITION OF UNITS

#### *Major Engineer Units*

28 Field Engineer Regiment	Jun 56-Mar 57
12, 55, 71 Field Squadrons	
64 Field Park Squadron	
25 Field Engineer Regiment	Aug 57-Feb 58
37, 39 Field Squadrons	
38 Corps Engineer Regiment	Feb 58-Nov 58
48, 59, 61 Field Squadrons	
63 Field Park Squadron	
36 Corps Engineer Regiment	Nov 58-Nov 59
20, 24, 57 Field Squadrons	
46 Field Park Squadron	

#### *Minor Engineer Units*

71 Field Squadron	Mar 57-Aug 57
73 (E & M) Squadron	Aug 57-Dec 57
73 (Christmas Island) Squadron	Dec 57-Jul 64
12 Independent Field Squadron	Mar 58-Mar 59
17 Independent Field Squadron	Oct 59-May 60
Troop 51 Port Squadron	Jun 56-Mar 60
504 Postal Unit	Aug 57-May 60

#### *Other Units*

616 Signal Troop (Air Formation)	Jun 56-May 60
RASC Services (Bakery and DUKWs)	Jun 56-Feb 60
94 Company RASC (MT)	Jul 58-Jun 59
146 Independent Transport Platoon RASC	Jun 59-Dec 59
Special RAOC Unit (Stores and Laundry)	Jun 56-May 60
2 Special Engineer Regiment Workshop REME	Jun 56-Mar 60
Two Troops Fiji Military Forces	Feb 58-Apr 60

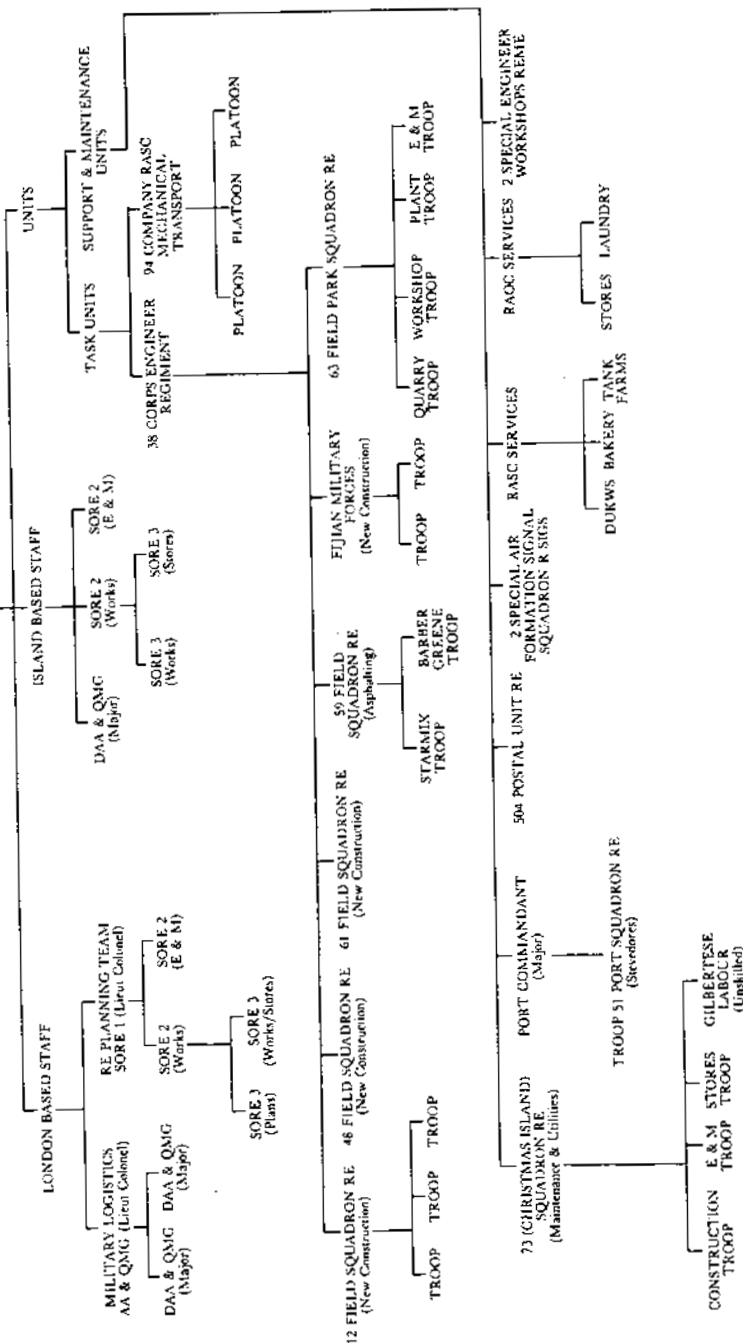
*Note:* During the period Mar 57-Aug 57, the garrison had been reduced to a state of care and maintenance with the military element consisting of 71 Field Squadron (underimplemented) with attachments from the services.

After evacuation in May 60, 73 (Christmas Island) Squadron assumed a care and maintenance role in the island.

COMMAND STRUCTURE—ARMY TASK GROUP GRAPPLE  
FEBRUARY 1958 TO NOVEMBER 1958

Figure 3/X

CHIEF ENGINEER  
(Colonel)



INTRODUCTION

was controlled by a Port Commandant, an RE Major, who was also Staff Officer (Movements) to the CE. In transferring cargoes from hold to lighter and from lighter to wharf considerable ingenuity was exercised in handling and slinging awkward loads some of which weighed up to twenty-five tons. During 1958 tonnages handled by the Sapper stevedores aggregated just over 100,000 shipping tons excluding fuel and rations. 504 Postal Unit ran British Forces Post Office 170 which provided both air and sea mail facilities for all personnel in the area. In view of the impact of this service on morale, emphasis was placed on speed and efficiency of operation<sup>3</sup>. The introduction for the first time in a Forces Post Office of Savings Bank facilities proved popular and the BFPO also carried out a brisk trade in premium bonds. 616 Signal Troop, Air Formation Signal Squadron laid and maintained line communications on an island basis including control cables for scientific use. 94 Company RASC was organised as an HQ platoon and three transport platoons. The HQ platoon operated a 24-hour service at POL points and distributed DIESO and oils to the numerous working sites. One transport platoon was absorbed almost entirely on port clearance working on a two shift basis. The other two platoons operated 10-ton tippers in close support of the Sapper field units with whom they formed a strong association. The company was provided by the War Office in 1958 at the request of the CE to relieve RE units of the task of manning and operating load carriers not integral with the unit. During its year on the Island this unit covered some 900,000 miles carrying over 1¼ million tons. The RASC services, in addition to manning the DUKWs, ran a field bakery which provided up to 6,000 pounds of fresh bread a day for all personnel ashore and afloat. DUKWs were of great value in running stores ashore to detachments on the Islands of Malden and Fanning, and at times their drivers displayed considerable skill and courage in negotiating the heavy swell. The RAOC ran an ordnance field park which provided common user stores and spares. They also operated a field laundry for the island which laundered some 8,000 sheets per week as well as personal clothing. The laundry was seldom overstrained since normal working dress was only a jungle green uniform hat, with badge or rank sewn on, shorts, boots and short puttees, a pattern of dress which also had the advantage of keeping skin diseases well under control. A Special Engineer Regiment Workshop REME supported the task group most ably, by carrying out repairs beyond unit resources on vehicles and plant. Several light aid detachments from this workshop were deployed at selected sites where there were particularly heavy



concentrations of plant or vehicles. In all, the Army Task Group operated some 200 vehicles and 300 major items of mobile plant.

### MONTE BELLOS (SERIES I)

#### GEOGRAPHY

The Monte Bellos are a group of desert islands located about sixty miles from the North West coast of Australia and lie just within the tropics. There is no fresh water and the task force relied on ships' distillation plant. The islands consist of more or less stabilised sand dunes on outcrops of limestone, and both sand and stone appear to have been formed in conjunction with the coral. Except on shifting sand dunes the ground is covered with grass or low scrub, rocky outcrops carry much spinifex, a spiky cactus-like grass which grows up to waist height. There are no trees except for small patches of snake wood and on some beaches rather stunted mangrove. A scanty rainfall occurs chiefly in the cyclone season in January and February. The climate and working conditions are pleasant, the nights are cool and the maximum shade temperature by day is about 30°C. There is usually a cool dry southerly wind, often quite strong. All the islands have frequent and attractive beaches of white coral sand, the cliffs and rock outcrops are pinkish and the vegetation a dull green. One group of islands is the home of the Japanese black rat and another of an elusive tribe of cats; both are survivors from shipwrecks in the past and have exterminated the wallabies. The sea is full of game fish, sharks and sting rays and in the spring, whales visit the islands and turtles breed freely. Flies are troublesome and strict sanitary control is essential, there are no mosquitoes or snakes but lizards abound. The islands have only been inhabited temporarily by pearlers as a cyclone anchorage. The going on land was better than had been expected and Land Rovers could travel almost anywhere making a good ten miles an hour.

#### PLANNING AND PREPARATION (May 1951-January 1952)

Lieut Colonel A P Smith was appointed CRE in May 1951 and the project underwent continuing growth during the preparatory phase. The main engineer tasks envisaged included a main base building of 1,800 foot super, a number of RC pillboxes to house cameras and recording equipment, several towers for cameras and aerials, Nissen huts for stores, generators, workshops and messes and about fifteen miles of light roadway. Clearly many technical problems had to be solved in close consultation with the scientists relating to the conse-

quences of a nuclear explosion in terms of flash, blast wave pressures, thermal effects and radiation shielding. Two reconcs of the islands were made, the first by a senior scientist and a naval hydrographer to decide the general suitability of Monte Bellos for the trial. The resultant report was a masterpiece of judgement and no important alteration was needed to the RE plan. Later the CRE visited the islands with a scientist and DD Works RAAF for three weeks, and after this it was possible to plan in detail the minor scientific works. A small detachment of 5 Airfield Construction Squadron RAAF undertook the construction of tracks and hards on beaches and in completing these before the troops reached the islands gave a flying start to the operation. Planning was on the basis that 180 Regiment would take with it from the UK its full requirement for a year of every commodity except food, welding gases and fuel supplied by RN, and at Monte Bellos two LSTs would be used as floating hostels. The Regiment was in the nature of a private army and a War Office "acquaint" (to use a Naval term) issued by DSD on the object of the expedition asking addressees to help, provided a magic key to priorities within the War Office. Equipment tables were approved in August, supply began in September, and was substantially completed by early December. 17 Port Regiment gave much valuable and skilled assistance at Marchwood where the LSTs were loaded at an average rate of eight tons an hour for hold cargo and at about ten tons per hour for deck stowage.

#### CONSTRUCTION PHASE (February-August 1952)

The Regiment sailed from the UK in the two LSTs on 19 February 1952 and reached the Monte Bellos in the last week of April. This gave fifteen weeks to complete the works project before HMS *Campania* was to arrive with the scientists in early August. Unloading of the ships went very well with great keenness and long hours. A six-day week was regularly worked and a Sunday shift was often necessary for projects that were behind. At the end of the fifth week the lag on programme was seven days but work speeded up as the NCOs improved their organisation of tasks and the CRE was able to allow the Sappers to go with their ships to Fremantle to refuel between the eighth and twelfth weeks since by then it was apparent that the backlog would be recovered. After this break came a big spurt with valuable extra working parties from the Navy, Marines and RAAF, and the project was substantially finished when the scientists arrived a few days ahead of programme. The working sites were scattered over many islands, and two hours travel time North to South and one hour East to West

by Land Rover and landing craft were the measure of the area. Craft run by the Royal Marines gave excellent service but there were never enough of them, and even time consumed in getting to and from ships a few cables apart in an anchorage could be considerable. Concrete construction was about one-third of the total works effort and concrete placing varied from 30 to 43 man hours per cubic yard. Sea water and rapid hardening cement were used and crushing strengths up to BSI standards were obtained. The crusher-run aggregate was flaky, angular and rather badly graded and gave a hardish mix difficult to compact even with vibrators; handling of aggregate and of mixed concrete was mechanised by the use of 19 RB cranes with grabs and skips. PSP proved an effective expedient for hards on beaches and was still in good condition after six months heavy use. Nissen huts with PBS floors were very quick to erect. The scale of plant and transport worked out about right but it would have been advantageous if all vehicles had been four-wheel drive. Simple sledges for towing by vehicle were made from curved sheeting of  $\frac{3}{16}$  inch MS plate with edge stiffening angles and side and tail boards, and these proved most successful. The remarkable speed with which the scientists got their equipment into action on arrival was the best possible reward to the Sappers for their efforts.

#### OPERATIONAL PHASE (September–October 1952)

In giving close support to scientific teams 180 Regiment had to reorganise and re-deploy, and Sappers quickly learned to be useful laboratory or field assistants. Resources had still to be juggled to meet with requirements and concrete gangs were kept busy for the whole of this phase on additional foundations for instruments. There was a big commitment for installing and running generating sets and, with a large number of different types, it was sometimes difficult to obtain the voltage regulation demanded for scientific purposes. The operation culminated in the successful explosion of Britain's first atomic device on 3 October 1952. Thereafter the Regiment was engaged in salvage and backloading of equipment, transport and plant before returning to UK in November. Throughout the operation the demands on individual effort and mental robustness had been a challenge to all ranks and the outcome was much to their credit.

#### MONTE BELLOS (SERIES II)

##### PLANNING AND PREPARATION (June 1955–January 1956)

This series involved further nuclear tests in the kiloton range at Monte Bellos with the weapons fired from high towers. The Force Comman-

der, Commodore Martell, was appointed in June 1955 and was joined at the same time by the RE and RAF commanders. When the joint planning staff met for the first time in early July a complete list of all RE plant and equipment to be taken out was requested to avoid holding up the provision of laboratories on the HQ ship HMS *Narvik*. This was rather a fast ball as decisions on engineer work would have to be taken without a ground recce. It was a great relief when the Sapper commander, Major Holmes, was able to pay a brief visit to Monte Bellos in October. In spite of a lapse of some three years, the hard standings, beach exits and the control hut were in excellent order and a further bonus emerged by way of a good deal of material still useable on site. On his return journey Major Holmes visited Melbourne to organize supplies including arrangements to ship 450 tons of aggregate along with 100 tons of cement to Monte Bellos from Fremantle. He arrived back in the UK well pleased with the outcome of his recce, enabling requirements to be slashed, and inducing much more confidence. The same month, October, the Sapper troop was formed, being raised mainly from 25 Engineer Regiment, and with a view to gaining the necessary experience, twelve Sappers assisted four steel erectors to build a prototype weapon tower at Foulness. The components had taken several months to prefabricate due to various hold ups, but anxiety that the further two towers for Monte Bellos would not be ready by the end of November fortunately proved groundless. HMS *Narvik* was loaded at Marchwood by Sapper stevedores of 17 Port Training Regiment, carrying LCMs, cutters, and steel structures on her foredeck, whilst the tank deck, restricted by the newly converted laboratories, was stacked full of engineer and scientific stores.

#### CONSTRUCTION PHASE (February-May 1956)

The Sapper Troop left the UK in mid February in a chartered aircraft reaching Perth the same day as HMS *Narvik* docked at Fremantle. The main tasks at Monte Bellos were unloading, erecting two aluminium weapon towers on concrete bases and one steel camera tower, welding and positioning an eight foot steel cubicle below ground level, erecting seven specially protected huts and a tented camp, building a tubular scaffolding tower to carry two 18-inch diameter paraboloids and the surveying and positioning of numerous blast measurement and radiation stakes. On arrival the leading party included a scientist who was to decide on the effect of residual radiation activity on Trimouille Island, where the first weapon tower was to be erected and on his

decision depended the need for erecting a full scale health centre. In the event a marquee and a tent to act as a changing room sufficed. The few men who had worked on the prototype weapon tower at Foulness had picked up valuable tips and after further experience on site involving plenty of guts, some half a dozen expert erectors emerged. The high winds experienced in April made work rather hazardous but not many working days were lost; inaccuracies in the manufacture of the tower parts necessitated much drilling and hacksaw work which was a nuisance especially up aloft. The camera tower presented little difficulty and an erection team consisting of a captain and two sappers completed it in ten days. The steel cubicle was fairly straightforward and was sited in a sandy area where the excavation was done by dozer. As far as blast measurement and radiation stakes were concerned, the AWRE radiological group assisted enormously and did all their own survey and fixing of stakes with the help of a couple of sappers and a Land Rover, in all fifty stakes for film had to be surveyed in up to 10,000 feet from ground zero. The 18-inch diameter paraboloid aerials required at the control hut on Hermite Island were rather awkward items to fix; originally it was intended that these would be mounted on a forty-five foot tower but after joint discussion at Aldermaston a modest twelve foot height was accepted and this worked adequately. Thanks to 180 Regiment, work on roads and tracks was greatly reduced and a PO and ten ratings from HMS *Narvik* gave valuable assistance in laying PSP. Good use was made of the steel sledges inherited from Series I for transporting heavy equipment.

#### OPERATIONAL PHASE (June 1956)

The weather and especially the direction of winds at all levels are vital factors influencing the time of firing a nuclear weapon. Following the wide publicity given to radioactive fall-out the Australian Government had laid down strict conditions for firing and shortly before the tests appointed a Safety Committee of eminent scientists to the Task Force. There was considerable objection in Australia at the time to these tests. Skilful forecasting by naval meteorologists and the goodwill of the Safety Committee resulted in the first weapon being fired on the first day preparations were complete. The upper winds normally blew at a force of about 100 miles an hour in a westerly direction over the mainland, for about twenty-eight days each month. As it turned out from 7 April, when the main scientists party arrived until the end of June there were only two days when the weather permitted firing and fortunately use was made of both. After the explosion recce parties

suitably clad in protective clothing went ashore and collected the various recording instruments and took samples. Within a week of the second firing the islands were once more deserted. All that indicated that the Sappers had been there was a stripped-down camera tower, and of the major structural works there was not a trace. HMS *Narvik* sailed home after another job well done and for which she was not originally designed; as there was more room most of the Sappers went with her. So ended another operation in which the Sappers had played a key part and had thoroughly enjoyed the unique experience.

### CHRISTMAS ISLAND (SERIES III)

#### GEOGRAPHY

Christmas Island in mid Pacific is so called because Captain Cook landed there from HMS *Resolution* on Christmas Eve 1777. It lies about 2° North of the Equator and 1200 miles due South of Honolulu. The North American continent and Australia are some 4,000 miles away. It is a classic coral island and is the largest coral atoll in the world, its maximum length is just over thirty-five miles from North West to South East and it varies in width from about twenty miles to three miles at the South East. Of its total area of 350 square miles enclosed by coast line, more than 250 square miles are water in the form of lagoons. The island is fringed by a reef at from 50 to 150 yards from the shore and beyond the reef the sea bed drops steeply into extremely deep water. Sea transports have to anchor about one mile out in the lee of the island and cargoes are transferred into small craft for carriage through a gap in the reef. During the months of October and January the swell is sometimes so severe that this channel into the port has to be closed for several days at a time. Shoreward the island consists of coral debris broken from the reef, varying from lumps of six inches or more down to coarse gravel and sand. As the lagoon is approached the debris becomes finer until areas of lagoon mud are reached which provide a useful construction material. The ground is flat and the maximum height above sea level does not exceed thirty feet. There is little top soil and vegetation consists of sporadic coarse grass, prolific evergreen bushes and a number of coconut plantations. The island abounds with a variety of sea birds, principally terns, frigates and booby birds many of which are migratory. Wildlife is completely harmless and consists mainly of gerboa rats and numerous land and hermit crabs. Mosquitoes are few and non malarial. The lagoons and surrounding sea contain a wide variety of fish including sharks, porpoise, barracuda, tuna, kingfish and manta rays. Temper-

ature varies little through the year; day temperature averages 30°C with a drop of about 5° at night. Humidity is always very high, in the region of 98%, yet the climate is far from unpleasant mainly because of the trade winds which blow almost continually from the North East at speeds from eight to twenty-five knots. Rainfall is quite unpredictable and can range from nothing in one year to six inches in eight hours with a maximum recorded annual rainfall of 190 inches. The water table is high and in most places is not more than two feet below ground level. The island is outside the hurricane belt. In 1902 the British Government granted a lease to Levers Pacific Plantations Ltd for the purpose of developing a local copra industry; the results of this enterprise were disappointing but the company planted some 70,000 coconut trees before finally abandoning the island. A somewhat bizarre humour is evidenced in the choice of name London for the small fishing harbour and Paris for a minute peninsula of land distinguished only by its complete barrenness. There is no indigenous population but around 150 Gilbertese with their families are imported from other islands in the Gilbert and Ellice group. Living in London village alongside the port they work for a tour of about two years on the coconut plantations run by the District Officer before returning to their permanent homes. During World War II a United States task force occupied Christmas Island from November 1942 to March 1946, and as might be expected with a maximum strength of 10,000 troops it had a considerable impact on the development of local facilities. The Americans built an airfield with a runway 6000 feet long and 100 feet wide laid with compacted coral mud and also a smaller strip nearby for emergency landings. About forty miles of coral mud roads were laid, approximately twelve feet in width, and a channel was dredged into the port where wharves were constructed capable of taking small destroyers alongside. Several miles from the airfield a POL tank farm was built. Malden Island, 400 miles to the South West across the Equator, is a much smaller atoll in a later stage of development than Christmas Island. It is five miles by two miles and the lagoon is completely enclosed and largely dry, forming quite a small proportion of the surface area. No one has lived there since the company that had worked the guano deposits for sixty years went into liquidation in 1926.

#### PLANNING AND PREPARATION (November 1955 to June 1956)

In November 1955 an engineer planning team was set up in the War Office for the Christmas Island project and two months later Lieut

Colonel J C Woollett, CO 28 Field Engineer Regiment, was brought in as CRE. No firm decision had yet been taken and the extreme secrecy made progress difficult. The go-ahead was given in February 1956 and Task Force HQ set up. It was necessary to go out to contract at once for hutting and many other items which were not available from engineer stores and the Task Force had to take over the engineer plan as it stood. Later amendments were made and the scope greatly increased but it is a tribute to E-in-C's Branch and the planning team that their initial "Q" brief formed a successful basis for the operation. The engineer tasks consisted of the repair of port facilities at Christmas Island, the provision of accommodation ashore including light and water, special buildings for AWRE, rehabilitation of roads and the reconstruction of the airfield to take modern jet bombers. Time was so short that only minimum standards on an austerity scale could be provided and accommodation would be tented camps with hutted cookhouses, messes, canteens and offices. The airfield was to be reconstructed to LCN35, 7,000 feet long, the centre 100 feet to be of 1½ inches hot rolled asphalt with at each end concrete turning and running up pads. The AWRE buildings often involved air cooling, air conditioning, stabilised power and in some cases gantry cranes for heavy equipment. As joint planning proceeded engineer requirements grew alarmingly and in March the CRE had to inform the Task Force Commander that the works as then planned could not be completed by the target date of 15 February 1957. This proved to be unacceptable and the Sapper planners then found themselves on the all too familiar ground of reconciling the irreconcilable in terms of tasks required and resources available. 28 Field Engineer Regiment had returned to Erlestoke Camp, Devizes, earlier in the year from Korea where it had been the 1st Commonwealth Divisional Engineers having left behind temporarily 55 Field Squadron in an independent role. The need to speed up the work meant that this squadron would now have to move direct from Korea to the island and in March Lieut Colonel Woollett flew out to warn them of this and outline their tasks. They took the news manfully and with a good deal of hearty laughter as the day before permission had been given to purchase their Korean winter kit. The CRE BCFK, Lieut Colonel S A Fletcher OBE, RAE did all he could to see that the squadron was equipped and trained for their tasks and his previous experience of operations in the Pacific was invaluable. As the tasks fell roughly into two main categories, the work on the airfield and the construction of the camp together with AWRE buildings, 12 and 55 Squadrons were organised on the lines of army



field squadrons with a minimum of transport. 71 Squadron was reorganised into an E & M troop, a plant troop and an administration troop whilst 64 Field Park Squadron had its stores and workshop troop increased to the size of those of a workshop and park squadron. The plant troop lost to 71 Squadron was replaced by a transport troop in which all the working transport of the regiment was centralised. It was particularly important that prior training should be obtained in asphaltting and storage tank erection both of which were new to the regiment and valuable assistance was given by the SME, MEXE, Ripon Engineer Training Centre and individual firms. Since the joint force was only just being assembled and most of them would be unable to meet until arrival on the island, the CRE held a two-day Study Period at Erlestoke Camp in May to finalise the engineer plan and this was attended by all squadron and specialist troop commanders and by RN, RM and RAF officers concerned with the initial landings. It emerged that the Army was still slightly overloaded and it was agreed that the RAF would provide working parties for simple tasks such as tent erection. Christmas Island being as near an administrative desert as any place can be, it was clear that an overriding factor governing the progress of work would be the rate at which stores could be delivered and discharged on the island and this in turn would govern the rate of build up of the force.

#### CONSTRUCTION PHASE (July 1956–February 1957)

On 19 June 1956 an advance party including the Deputy Force Commander, making a brief visit, the CRE and a Wing Commander landed in two Shackletons on the old American air strip which had been cleared by the District Officer using Gilbertese labour. Five days later the troopship MV *Devonshire* arrived with 55 Squadron and other detachments and being joined by the LST *Reginald Kerr*, the heavy lift ship *Ben Wyvis* and the RFA *Fort Beauharnois*, there was soon quite a fleet in the anchorage. The first task was to clear the wharf of debris and wreckage, establish two NL pontoon finger berths and lay PSP for the LCM and DUKW landings. Serious difficulties nearly arose because the LST *Reginald Kerr* which had brought equipment for the initial landings, had been wrongly loaded and the other ships had not been tactically loaded at all. In times of sophisticated mechanisation it is a sobering thought that the operation could have been seriously jeopardised had the Sappers not been trained in the construction and operation of elementary shear legs which provided the solution. For the first three days men worked on unloading stores

and on the fourth day the whole force of 500 came ashore. In addition to setting up camps, the old American air strip had to be improved for the weekly Hastings flight to and from Honolulu. Originally it had been intended to site the main camp in a coconut plantation for shade but an unobstructed breeze proved a better cooling agent and it was re-sited on the coast. The DCRE and Works Section, which the RE Planning Team had now become, issued works orders to squadrons, authorised stores issues from the stores troop and allocated plant and E & M tradesmen as appropriate from 71 Squadron. Progress was reported weekly by signal to London. For reconstructing the main airfield a good source of coral stone was found on the beach at the North East point some three miles away, where two Parker 20-ton per hour rock crushers were set up, and coral dozed into stock piles from where it was loaded into the crusher hoppers by face shovel. The runway surface was first roughly levelled and scarified and then covered with a minimum of two inches of lagoon mud which was then well watered, compacted with rubber tyred rollers, finish graded and rolled again. For the 8-inch concrete pads at the ends of the runway two Blaw Knox Batchmasters were used, concrete was delivered by one yard dumpers and placed by Holman vibrating beams. The specification called for 2,500lbs per square inch at twenty-eight days and some difficulty was experienced at first because of the porosity of the coral, finally overcome by continually hosing down the stock piles, with the result that strengths of up to 4,000lbs per square inch were ultimately achieved. For asphalt surfacing of the airstrip three Parker Starmix 8 mixers were set up near by and bitumen heated in a battery of 250-gallon kettles. It soon became apparent that the completion date of 1 November would not be met and, as the first chartered aircraft starting the RAF build up was due from England on 4 November, this was a matter of some moment. So the CRE decided to stop work on the concrete standings for Valiants and to work in two shifts on asphaltting. The Barber Green operators soon achieved a high standard of work and during October output steadily increased with a maximum of 300 tons a day being laid. The arrival of the first chartered aircraft was watched with great interest, and the successful airfield surfacing task was celebrated by a holiday and firework display on 5 November.

Tented accommodation was provided by Indian Army pattern tents shipped from Singapore. Power was generated by three-phase 120kVA generators, distributed to tents for lighting by overhead cable and proved reasonably satisfactory although the salt laden atmosphere, caused by spray from the surf, resulted in failures at junction boxes

and insulators. Cookhouses and messes were in Thorns hutting, a prefabricated type chosen for speed of delivery. For washing, a low salinity water could be found almost anywhere by digging down a few feet and this was pumped up to a tank and distributed around the camp in a victualic ring main and although not very pleasant it lathered adequately. An existing fresh water hole was improved by digging a long shallow trench and eventually some 16,000 gallons a day were pumped four miles to the main camp. Elsan closets were provided for latrines and the waste disposed of by pumping over the reef. AVGAS and other fuels were brought in by barge from tankers in the anchorage and delivered to the tank farm at the port, from where bowsers supplied a smaller farm at the airfield. The bolted tanks which were of the standard pattern developed by MEXE were erected in three weeks by a team of fifty men previously trained in the UK. The tightening up was done by torque spanners and in his film "Modern Times" Charles Chaplin gave an apt illustration of the state that men get into after continuous tightening up of hundreds of bolts. Work on the AWRE installations began after Christmas and in addition some sixty Sappers were attached as tradesmen to AWRE teams.

At Malden where the bulk of recording equipment was located the camp had to be dismantled before each trial and re-erected. Accommodation was wholly tented except for the cookhouse which was demountable. The coral mud airstrip was stripped and levelled for use by Dakotas. Small detachments of the construction force were also established at Jarvis Island and at Penrhyn where meteorological stations operated. Penrhyn is a lovely island and very unspoilt, and with trading schooners, pearl shell fishing and a friendly native population, is much more like a story book South Sea island than the barren Christmas, Malden and Jarvis Islands.

Generally it was necessary to work a full six-day week but Sunday was made a complete change with the morning left free for Church and recreation; troop officers were encouraged to get their men out of camp as much as possible on fishing and boating activities. Besides the NAAFI, the cinema was well attended and the two WVS did sterling work in their Club.

#### OPERATIONAL PHASE (March 1957-June 1957)

By the end of February 1957 the main engineer project was virtually finished and the RAF and AWRE build up well under way. Additional work included taxi-ways and standings on the airfield but otherwise tasks were reduced to maintenance and administration. Excellent

liaison was maintained with the flying and engineering sections of the RAF wing and nearly all the Sappers were given flights to view the airfield they had built. 28 Field Engineer Regiment returned to the UK during March, leaving 71 Field Squadron (underimplemented), with attachments from the Services, for care and maintenance duties on conclusion of Series III. Subsequently army personnel remaining on the island were able to witness from ships Britain's first thermonuclear explosions and so see the operation through to the finish. In retrospect a large amount of work was carried out in a very short time amounting on final count to 43% more than originally planned. In January 1956 the regiment had been planning for training as a divisional field engineer regiment and by November of that year it had completed a runway for modern jet bombers on a desert island 9,000 miles away. This would not have been possible without sound engineering knowledge at the back of the majority of officers, and events proved how essential it is for RE units to be able to improvise from first principles. When the Scientific Director, Mr W R J Cook, first arrived on Christmas Island he sent the following signal to the DCIGS—"Am very pleased with the arrangements made here by War Office Units. AWRE scientific groups are well satisfied with accommodation, offices, laboratories. They did not expect conditions to be so good. This is having a very marked effect not only on morale but on ease and efficiency of working. The help received by AWRE groups from Army is tremendous. Army cooperation extremely good and difficult work goes on regardless of hours and weather".

#### CHRISTMAS ISLAND (SERIES IV-VI)

As has been explained, unlike all the previous test series which had been "one off" operations at intermittent intervals, Series IV-VI comprised a continuous programme between August 1957 (when the Christmas Island base was reactivated) and September 1958 controlled basically by the same HQ organisation throughout. The impact on the Corps contribution was briefly one of greatly increased scale arising mainly from the decision to establish a permanent nuclear weapon testing base on the island, and also to explode the devices in the close vicinity of Christmas Island entailing much greater support in the way of scientific and recording facilities. Operationally there was a new dimension in terms of time and effort in having to rehabilitate target areas for each successive explosion. The timings of the tests which were adhered to in the event were that Series IV (Megaton) would be

fired in November 1957, Series V (Megaton) in April 1958 and Series VI (Megaton and Kiloton) in August/September 1958. (Figure 1/X). 25 Field Engineer Regiment, CO Lieut Colonel H J H Gatford, arrived at Christmas Island by air in August 1957 and in the same month 71 Field Squadron was withdrawn and 73 (E & M) Squadron formed on the island in December 1957, its title was amended to 73 (Christmas Island) Squadron. The regiment was later replaced in February 1958<sup>4</sup> by 38 Corps Engineer Regiment commanded by Lieut Colonel R L Clutterbuck which in turn was relieved by 36 Corps Engineer Regiment commanded by Lieut Colonel R L White in November 1958. Personnel of all army minor units were replaced on an individual basis after completing a tour of duty on the island not exceeding twelve months.

#### PLANNING AND CONTROL

The bulk of the planning of preparatory engineering work for each firing was carried out on the island, but as much as possible of detailed planning on the long term requirements such as development of the base, was done in London by the RE Planning Team. Members of the team visited the island as required when agreement was reached on the first key plan of a particular project and then, back in England, plans were developed and subsequently re-submitted for a check on local implications. On occasions the CE attended meetings with the Treasury and it is only fair to record that requests for financial cover were always given sympathetic and realistic consideration. Time was short and it was obviously essential to establish clearly defined priorities; the desirable had to be segregated ruthlessly from the essential. Before planning began it was necessary to ensure that the requirement was defined accurately and critically examined by asking the user not, "What do you want?" but, "What do you want to do?". During planning it was important to maintain an element of flexibility; changes were liable to be proposed by the planners as well as by the users. Field Marshal Lord Alanbrooke wrote in his published *War Diaries*— "So few people ever realise the infinite difficulty of maintaining an objective or a plan and refusing to be driven off it by other people for thousands of good reasons". Exceptionally a relatively major change was able to be implemented with very little additional effort out of all proportion to the value accruing; but generally, changes resulting from second thoughts could lead only to frustration and delay. The best is indeed the enemy of the good and when time is at a premium undue emphasis on the good may result in not even the adequate being

attained. Considerable economy in time and effort was achieved by rationalisation of user requirements for such items as laboratories, technical and storage facilities, offices and messes by standardising prefabricated timber buildings on two spans (19 and 25 feet) with an applied eight feet module of length and for steel framed buildings a portal frame of 50 foot clear span, 15 foot bays with height to eaves from 12 to 20 feet. Detailed pre-planning for each construction site was the only way of avoiding waiting time for either plant or labour both of which were at a premium, the aim being to complete setting out and optimum lay-out of stores before working parties arrived. Safety precautions during construction were rigorously enforced and in spite of the intense activity the accident rate was negligible.

Task Directives were issued for each test by the CE to the Regiment for new construction work and to the other units under his command for support operations. The Regiment set up a works office under the 2IC who, relieved of many of his normal duties because of the RAF's responsibility for day to day maintenance including messing, was in a position to assume this fairly onerous commitment. The basic principle of allocating work was to retain the command structure on a squadron or troop basis. Occasionally small adjustments had to be made between organic units by temporary reinforcement in skilled trades in short supply such as surveyors and refrigeration mechanics, but this was done exceptionally and understandably was never popular either with the units lending these men or with the men themselves. Clerks of Works gave sterling service as always and every effort was made to keep them associated with the same squadrons throughout. Requests from scientific groups for specific types of tradesmen were discouraged as this could only have resulted in a dispersion of effort. The system worked well and relationships with the scientists were excellent.

From time to time the CE made short visits to London for consultation with the Task Force Commander and conferences at the Air Ministry and Aldermaston. Weekly progress signals on engineer work and monthly detailed reports were sent to the Air Ministry. In addition the CE and his London staff were in daily communication by cable and this was supplemented by teleprinter conversation as required. He held works progress meetings once a week with Sapper commanders and a monthly coordinating conference with commanders of all units in the Army Task Group as well as representatives of the other three Task Groups. The CE was both the consultant and the main contractor to the Task Force; dual responsibility, unusual in civilian practice

which can work extremely well in the military engineering sphere. The scientific or technical necessity for particular tasks and the precision demanded were explained to working parties and scientists participated in the briefings. Quality control of concreting and asphalt-ing operations was assisted by a soils laboratory manned by one staff sergeant and three assistants.

A central stores depot organisation (CESD) was set up to receive, unpack, identify, record, hold and issue imported stores. It was clearly important to avoid tying up an undue proportion of manpower in the stores organisation. Packaging was reviewed both to ensure adequate climatic and handling protection as well as to reduce time spent on the island in identification and the introduction of readily identifiable markings paid dividends. Dumps of materials in bulk were built up at strategic points easily accessible to working sites for such items as UK pre-fabricated hutting, cement and bitumen. Policy on stores control laid down by the CE's HQ varied necessarily with the emergence of new operational requirements, with unavoidable changes in shipping programmes, and with the ability to economise in stores in short supply by using substitute materials. The CE had quite wide powers of local purchase in Honolulu, and this enabled limited use to be made of the light engineering industry in Hawaii for the prefabrication of certain items such as special ducting.

#### ENGINEER REQUIREMENT

New construction required for the tests included a variety of laboratories, weapon assembly and test sheds, and buildings to house decontamination, photographic processing and workshop facilities in close support of the scientific effort. Many of these buildings had to be air-conditioned to strict tolerance limits. An elaborate piped water system had often to be incorporated providing fresh and distilled water at a variety of controlled temperatures and the use of flexible plastic piping considerably reduced the plumbing effort. In all some 50,000 foot super of scientific facilities were provided within the nine months, mostly of steel or wooden framed construction with two laboratories built in pre-cast concrete blocks and fitted with steel plate doors to resist blast.

Clearly the scientific value of these tests was dependent on the acquisition of comprehensive data, including film and still photographs, covering a wide variety of heat, flash, blast and radiation effects, with recordings timed at micro-second intervals. Facilities housing recording equipment varied from heavy steel shelters to numerous instrumen-

tation lanes. The latter consisted mainly of a series of steel poles set in concrete together with totally enclosed chambers below ground to provide protection for the associated electronic recording equipment and an obvious necessity was accurate positioning. Additional trigonometrical stations were surveyed for this purpose by triangulation and opportunity was taken to produce a revised map of the island on the 1,000 metre universal transverse Mercator grid at a scale of 1:50,000. The steel shelters were constructed from eight foot cube units, the components for which were prefabricated in England or Australia. Whilst adequate strength was transmitted through the bolts, continuous welding of joints internally and externally was often necessary to prevent flash damage to recording equipment. Because of the number of welded steel shelters the most economical procedure was to carry out this welding in a central workshop on line production methods. As was the case with all operations of such a highly repetitive nature, attention was paid to devising the most effective timing for the frequency and duration of rest breaks. The assembled cube units were conveyed to sites by low-loader and positioned by mobile 10-25 ton cranes. Steel shelters in the forward area were sunk into the ground for protection against blast and covered with six foot of soil retained by steel plates and sandbag walling for protection from radiation. In rear areas shelters were keyed into the ground to a depth of about a foot and made resistant to blast by attachment of steel guys to reinforced concrete anchorages. Much of the installed equipment was electronic and called for the installation of dust-proof lining as well as cooling plant. For the elaborate ground telemetry system numerous steel masts up to 150 feet in height had to be built and guyed to concrete anchorages. A closed circuit TV was needed to operate between the forward target area and central control; aials were carried on masts of light alloy lattice construction. One twin mast, 130 foot high, carrying a reflecting aerial weighing over 300lbs could be erected complete in thirty-six hours. In common with a number of other special tasks, sappers had to be trained *ab-initio*; there was never any shortage of volunteers for unusual jobs. One sapper who had developed into a highly skilled mast erector, asked why he had volunteered replied; "Well, I always did have a fear of heights and I decided now is my chance".

A major RAF operational requirement for Operation GRAPPLE ZULU (Series VI) was the construction of a balloon anchorage complex on the south-east tip of Christmas Island where captive balloons<sup>5</sup> were used to suspend kiloton weapons for firing. The



Clearing the beach  
minefields in the UK.  
Searching on a soft cliff  
with a 4A mine detector  
at an angle where the  
detector operator needs  
the direct assistance of  
another member of the  
mine clearance team. (By  
courtesy of Eastern Daily  
Press, Norwich)



Members of 290 BD  
Squadron RE (AER)  
assisted by civilian  
members of 2 Troop,  
Bomb Disposal Unit  
(UK) recover a German  
500 kg bomb in Fareham,  
Hants, Summer 1954



290 BDE Squadron



RE officers surveying in  
the Antarctic



A consignment of mail  
bags arriving at Port  
Said

Antarctic

A diver preparing to go underwater at the RE Port, Marchwood. (By courtesy of the Trustees of the Imperial War Museum)



A 170-ton diesel-powered lighter ferrying a tank ashore at Singapore



Port Marchwood



A "Spider" hut in  
Morval Barracks, Cove,  
November 1948

The RE patrol team at the 1951 British Army Ski championships



A Spider - Morvel Barracks

anchorage complex covered an area of approximately 900 yards radius with asphalt roads and hard standings equivalent to about 11 miles of 12-foot roadway. The main anchorage area consisted of a central 42-ton anchor block with over twenty other anchorages, varying in strength from 20 to 25 tons, located in a circular area of 200 yards diameter. Each anchorage was of high quality coral concrete enclosing heavy steel reinforcement and was cast in the ground so that the top was flush with the asphalt surfacing in order not to impede the movement of balloon winch lorries. Anchor blocks were designed to provide the desired anchorage loading by dead weight, hence the action of ground friction added to the factor of safety. In all 100 tons of pre-fabricated steel-work and 300 cubic yards of reinforced concrete were used. Elaborate earthing was an obvious requirement. The complex had also to be provided with area flood-lighting to enable balloon flying to be carried out during darkness. Another operational task was the construction of observation towers and target indicators for practice bombing runs using conventional explosives.

Engineer work was also required to support detachments of the Task Force engaged in meteorological and test recording duties on Fanning and Malden Islands. This covered such diverse tasks as the laying of beach roadways, the erection of telecommunications facilities, the provision of electric power and water supply and also roadmaking with a modicum of bridge building in timber construction. Plant had to be transported by sea from Christmas Island where it was always in much demand and the problem was to phase this work so that there was the least interference with other projects.

Close support to the RAF and to scientific groups throughout the test firings was another important commitment and the provision of reliable electric power supplies during the firing stage was clearly essential to operate telecommunications, electronic recording equipment and vital air conditioning plant. In rear areas this requirement was a continuous one since the associated equipment had to function during the firing and thereafter. In the target area generating sets and cooling plant had to operate up to the moment of recording a particular effect after which they were put out of action by the test explosion. There were about 100 generating sets at different locations which had to be put into operation shortly before a firing by their Sapper attendants, many of whom were field engineers trained locally, and it is much to their credit that no failures occurred.

Rehabilitation of the target area in preparation for the next firing was always a race against time, often only a few days were available

and hence the operation had to be pre-planned in very considerable detail. In spite of much of the explosive effect being calculable beforehand, there were obviously some imponderables and contingency plans were required to cope with any eventuality. The work included the re-opening of roads, rebuilding of shelter revetments, the erection of masts, instrument lanes, and telemetry facilities to replace those destroyed during firing; repair of control cables and general rehabilitation.

The roads on Christmas Island up to 1958 had consisted of a consolidated coral mud carpet laid over a formation of coral gravel. Coral mud when laid and compacted at optimum moisture content sets into a very hard surface, and in winning it from lagoons care has to be taken to avoid plant becoming bogged. Owing to the heavy traffic conditions imposed by the operations and in spite of considerable effort being devoted to road maintenance, surfaces became potholed or corrugated with alarming rapidity. This deterioration was accelerated by periods of intensive tropical rainfall which alternated with periods of prolonged drought, when dust created a driving hazard and interfered with the operation of scientific equipment. Valuable time was lost in transporting men and materials and the maintenance effort was approaching the unacceptable. Accordingly in March 1958, the CE decided to embark on a bituminous surfacing programme of the main road network from which a further bonus would be a reduction in the number of inter-communication helicopters. The considerable resources required were made available by switching priority from re-surfacing of the main airfield planned to start at that time. When he made this decision the CE was well aware he was taking a calculated risk; fortunately the vital runway stood up well to the rigours of the remaining test series, thanks to the shoestring of a minimal effort devoted to constant inspection and timely judicious patching of the surface. The bituminous mix for road surfacing was produced at a Starmix 40 plant erected about three miles from the main quarry supported by a bitumen heating tank farm. Because of the high moisture content of the coral aggregate, which was never less than 10%, the Starmix drier had to be intensified by blowing in compressed air and stepping up the heating capacity. The surface was laid to an average depth of 2½ inches and the mix selected was 28.2% coarse aggregate, 28.2% medium grade, 11.7% quarry rejects, 23.4% fines, 2.5% cement and 6% bitumen. The resultant surface wore extremely well, the edges of the carpet set hard and this was important as there were no kerbs or containing shoulders. On a double width roadway

the bituminous surface was laid in two strips each of 12 foot leaving 6-foot wide berms on either side. The rate of laying which averaged three quarters of a mile of single strip per day was dictated by the rate of production of the bituminous mix and the Barber Greene layers were never extended to full capacity for any appreciable time. Work started in April 1958 and by October it was possible to drive from the port to the South East tip over a continuous asphalt surface. In all fifty-five miles of asphalt roadway were built, of which just over twenty miles were double width. An entirely new coral mud road, twelve miles in length, was built down the centre of the island to facilitate access to the balloon complex.

Another major task was a tenfold increase of asphalt surface hard standings at the main airfield to approximately a million feet super, and clearly the laying called for a higher degree of accuracy than for roads. The most satisfactory sequence of rolling, and the only way of avoiding camber, was to roll from the inside outwards and wooden blocks were surveyed at approximately thirty foot intervals to guide levels. Then an entirely new air strip, Aeon Field, had to be built on virgin ground in the South East area of the island capable of operating V bombers to provide a diversionary landing ground to meet flying safety requirements. This project was first mooted in July 1958. Preliminary survey, planning, final site selection and detailed ground survey were completed in time to allow work to begin within two months. Good natural drainage was achieved by siting the strip along a low ridge giving a cross fall of 1 in 100. The specification was a minimum of six inches of compacted lagoon mud surfaced with three inches of asphalt (two inches binder course and one inch surface). The shallow vegetable layer was first removed and the surface levelled roughly using fourteen cubic yard Euclid motorised scrapers. Lagoon mud was then laid, levelled and compacted in layers of final depth of three inches, using graders and rollers. The mud, which was won entirely from below the water table from nearby borrow pits using drag line excavators, contained a lower proportion of sand and its natural lime content resulted in a chemical cementing action when compacted. The wet mud was transported to the laying site in 10-ton tipper lorries and Euclid scrapers and roughly graded into place and compacted with wobbly wheel rollers towed by Size 4 tractors. These rollers were unballasted initially, loaded to half ballast as the moisture content reduced and finally fully ballasted. Final grading followed by surface rolling using smooth-wheeled 8-ton rollers began about twenty-four hours later when the moisture content had reduced to

about 15%. Average CBR values of 70 were attained and at times readings were as high as 140. In spite of inevitable interruptions to this work through test firings the foundation for this diversionary airstrip was completed by one plant troop within three months. Two coral mud airstrips on Christmas Island, situated about twenty miles apart, and a similar airstrip on Malden Island had to be maintained for the operation of Hastings and Dakota aircraft and, during 1958 one of these strips on Christmas Island was extended by 600 yards.

A major project in the development of the base was the construction of a hutted camp to house approximately 3,000 all ranks replacing the tented accommodation which was costly to maintain. Inevitably it was a long term project and only such engineer effort as could be spared from operational requirements was committed to it. Construction was principally in pre-fabricated timber hutting most of which was manufactured in the UK and priority was given to providing communal messing facilities. At the hospital an air-conditioned operating theatre and X-Ray department were built together with some 8,000 square feet of ward accommodation. New facilities were also provided for the laundry, bakery and service workshops. A Junior Ranks Club of 25,000 square feet incorporating a restaurant, tavern and lounge was completed within eight weeks. Communal mess buildings were sited in open squares overlooking the beach and hutted accommodation was located to take full advantage of the prevailing wind. Installed kitchen equipment included 72-inch oil fired ranges with fully automatic control equipment; and steam for boiling pans, serving counters and calorifiers was provided by a district low-pressure system. The project also included the installation of a water-borne sewage system. Ablution blocks to serve the occupants of each group of ten huts were built and the plumbing load was increased by the necessity to provide alternative systems for using either fresh or raw water because of the widely varying yield of both types from time to time. The building of one ablation block took about six troop weeks to complete. With the ground being so flat and the water table relatively high the maximum distance over which gravity drainage was feasible was about 240 feet with a fall of 1 in 80. Thus sewage had to be pumped under pressure through a series of collecting tanks and discharged, untreated, through an outfall built over the reef at about two miles from the camp perimeter where it was carried well away from the shore by the littoral drift. Garbage was burned and buried at a disposal area several miles down-wind of the main camp using a drag line excavator and a dozer. Flies and mosquitoes were kept much under control by both air and



ground spraying of insecticides over a wide area. By December 1958 about 80,000 square feet of communal mess buildings had been built in addition to sleeping huts for 1,000 all ranks with associated ablution blocks. Because the ground was so flat, and peak periods of rainfall so intensive, drainage was always a major concern, as increased asphalt surfaces accelerated run-off and needed elaborate soak pits. Emphasis was placed on the provision of recreational facilities. Asphalt surfaced hockey pitches, tennis courts and basketball pitches were laid for the use of all ranks, aggregating some 50,000 square feet, and floodlighting was provided, as the sun set at seven o'clock. An open-air cinema at the main camp was reconstructed and empty cement drums filled with coral sand and stacked end-on in rows produced an economical tiered amphitheatre. The two churches were rebuilt by volunteer labour and the replacement of the atup sides with coral stone walling gave a very pleasing and appropriate finish.

As scientific and base facilities built up so the requirements for power and light increased greatly. A new power station of eight English Electric three-Phase 300 kW diesel generator sets was installed at the main camp. Because of the distances involved a change-over from LT to HT distribution (3.3kV) was initiated. Shortage of fresh water was probably the chief reason why the island remained unoccupied for so long; fresh water for the American forces throughout their stay was provided entirely from distillation plants. The source of drinking water on Christmas Island was shallow wells scooped to a maximum depth of about six feet and covered over to reduce growth of algae and evaporation loss. A fresh water layer, in places only a few inches in depth, lay on top of the salt water table, the height of which was affected by tidal movement. Rigid control of the rate of extraction pumping was vital, otherwise intrusion of saline water could contaminate the fresh water and once so could remain for months. At peak strength the Task Force consumed approximately 500,000 gallons of water a week, the bulk of which was pumped to the user through a piped distribution system of 6-inch and 4-inch victualic piping. Salinity averaged 50 parts per million, compared with 1500 parts per million in the Tobruk wells used by the besieged garrison in World War II. Ground water sources were supplemented by three vapour compression diesel-driven distillation plants as there was a scientific requirement for this type of water. At the port two 50-ton cold stores were erected to economise in refrigeration space afloat. One 50-ton cold store could be completed by twelve men in nine weeks.

In the tank farm adjacent to the port there was a requirement for

bolted steel section storage tanks three storeys high each of 3,000 barrel capacity; one tank including foundations could be erected in nine weeks by eighteen sappers. On existing tanks local modifications were made to draw off the moisture condensate. Leaks had been induced by sprung joints due to settlement or distortion of the tanks caused by the blast waves of test explosions, Bostik 1752 eventually proved to be the most satisfactory sealant. Six-inch victualic pipes were laid from the wharf side so that fuel could be pumped direct from the lighters. With a view to reducing the number of distribution bowsers the feasibility of laying a pipeline from the port tank farm to the main airfield was investigated but the amounts consumed, although considerable, did not justify the cost and effort involved. Construction of POL points on the island with kerbside pumps greatly reduced the distribution effort which previously had involved jerrican handling.

Engineer effort had to be devoted to the maintenance of existing structures and installations, the life of corrugated iron sheeting even when protected was very limited and it always paid to replace this with aluminium sheeting which had added advantage of coolness due to its reflectivity and the higher initial cost much offset by the lower shipping freight charge. Port maintenance included the implementation of both anti-silting and coast erosion measures. The existing channel into the port had to be dredged regularly both by seaborne dredger and drag line excavator operated from the shore. The behaviour of currents and drift was investigated over a period by plotting the movement of a variety of specially coloured stones placed at selected points along the beach and this determined the location of groynes to counteract erosion and consequent silting<sup>6</sup>. Six-inch mesh fabric was bent and spot welded to form rectangular baskets which were secured in position by iron pickets and filled with coral stone to form groynes which under certain conditions can be as effective as pile driven ones, they were much quicker to produce and required no plant or skilled labour on the site.

Impacting on practically all construction and a key engineer activity was the production of crushed coral aggregate by the four Parker crushing and screening plants located at the beach quarry at the North East point. Two-shift working was normal and a maximum daily output of 1400 tons was finally achieved and this was only just adequate to meet the needs. Experiments by the Americans in the Marshall Islands had indicated that coral from the windward side of an atoll is to be preferred for concrete construction, the aggregate having a higher specific gravity and a lower percentage absorption.

On Christmas Island maximum strength recorded at twenty-eight days was 5000lbs per square inch. Concrete was laid at an average rate of forty cubic yards a day at individual sites.

#### POST TEST PERIOD

Engineer requirements after the tests in September 1958 included the completion of Aeon Field in the South East corner of Christmas Island which has already been mentioned. It was started by 38 Regiment who completed the foundation before its return to the UK in November 1958, 36 Regiment began asphalt surfacing in December, finishing the project in March 1959. Colonel R O H Clarver took over from Colonel Muir as CE in October 1958 and, consequent on the political decision to suspend nuclear testing, the scope of the Christmas Island engineer project was reviewed at that time, involving a reduction which enabled 36 Regiment to complete essential work and return to the UK in November 1959. A major residual item was the re-surfacing of the main airfield which as explained, had been postponed during the trials; the Regiment started asphaltting the runway in April 1959 and completed the work by August. Another post-test requirement was a three storey air traffic control tower with a reinforced concrete frame, completed in fourteen troop weeks, to the credit of 2 Troop 24 Field Squadron. An interesting task was the construction by 57 Field Squadron of a slipway at the port designed for 125-ton vessels by the Admiralty. Major repairs were also carried out to the wharf.

For the duration of the tests the small Gilbertese labour force had been diverted from their normal work on the coconut plantations and as soon as the tests were ended effort was devoted to assistance in rehabilitating the copra industry. Bulldozers and graders worked through the plantation roads clearing debris and re-grading and driving new access roads and a number of buildings were erected in the area of London, the Gilbertese village. The village distribution system of electric wiring was almost completely renewed and improvements were made to the water supply system. A football pitch of consolidated lagoon mud was provided for use by the villagers. Before the Army Task Group disbanded in November 1959 the CE received this message from the District Commissioner: "I am writing to say thank you on behalf of the Colonial Government, the plantation and the people of London Village for all that your men have done to help improve conditions on Christmas. I know that the knowledge that you leave behind you a thriving community which has every expectation of a happy future will constitute sufficient thanks for all that you have

done". When the decision was taken to close down, Lieut Colonel J P Asher took over as CRE and Commander Army Garrison which included 17 Independent Field Squadron and a stevedore detachment of 51 Port Operating Squadron. 17 Squadron had been sent to the island after special training to carry out the task of packing and preservation of equipment prior to back-loading as much as possible to the UK. By March 1960 some 4000 tons had been back-loaded and the island was evacuated in May 1960, except for 73 (Christmas Island) Squadron which assumed a care and maintenance role under command of the RAF. This Squadron in turn finally left the island in July 1964, with the distinction of a unique record of seven years vital support in operating base utilities<sup>7</sup>.

#### DAMAGE CONTROL

For each test the CE set up a damage control HQ incorporating cells for monitoring, medical, fire fighting, engineer reconnaissance and engineer rehabilitation. Both radio and line communications were used to control these activities. Installations, buildings and essential utilities were categorized beforehand in accordance with their particular function to ensure that post remedial action was taken strictly in accordance with operational priorities. High priority items included communications connected with personnel or aircraft safety, essential medical and messing services, and scientific facilities on which the success of the test depended. A comprehensive personnel safety plan was implemented by the Joint Task Force HQ to cover all eventualities, and rehearsals of the plan were clearly essential. The entire Gilbertese population was evacuated from the island each time in HMS *Narvik*, a universally popular exercise for the village, and the Gilbertese much enjoyed the film shows arranged for them whilst afloat. Everyone on the island had to be within hearing distance of the countdown and the countup which were relayed over a tannoy system set up for the occasion. Flash protective clothing was worn as required; at the time of burst all personnel had their backs to ground zero with eyes covered to avoid flash damage to the retina of the eye and were alerted when to brace themselves against the blast waves. Re-entry into possible contaminated areas was strictly controlled and was always preceded by scientific monitoring teams; the first task was to erect road blocks and demarcation barriers isolating physically any contaminated ground. Decontamination facilities also were set up speedily in support of the Health Physics Group. There were no personnel casualties as a result of any test explosion. The immediate target area was isolated beforehand

by dozing a fire lane across the island. Even so, flash induced fires occurred which burned the luscious green vegetation with surprising ferocity. In preventing these fires from spreading to occupied areas, reconnaissance by helicopter was invaluable. In the event no difficulty was experienced in keeping induced fires under control in occupied areas which were covered adequately by fire hydrant ring mains.

Clearly the most economic method of avoiding blast damage to buildings and installations was to take this factor into account at the design stage and a few key buildings were made blast proof by building them in concrete. Siting a building end-on to the explosion could reduce the blast effect. A number of high priority buildings, such as weapon assembly sheds and laboratories, were designed so that panels could be removed just before the time of burst and then quickly reinstated, but this exercise was complicated by air conditioning requirements. The effort to vent existing buildings, to provide 30% open space on walls, partitions and ceilings was quite considerable but it paid handsomely in avoiding wholesale structural damage. Certain buildings were strengthened and additional anchorages provided for high structures. The weapon assembly building for the kiloton weapons fired from balloons was necessarily very close to ground zero and thus there was no question of being able to avoid its complete destruction. However the effort required on preparatory work for each subsequent low yield test was much reduced by arranging that stanchion holding-down bolts were disconnected immediately before an explosion. The result was that the structure was blown clear of the concrete foundation and floor, and with very little remedial work a new weapon assembly building could be erected on the same site. Other precautions included ensuring that large fuel and water storage tanks were at least three-quarters full to minimise differential pressure effects; plant and vehicles were positioned end-on to ground zero and loose materials were stacked and weighed down. For high-yield tests all serviceable aircraft were airborne at the time of burst. Immediately after the all clear RE reconnaissance parties made a survey of high-priority installations and reconstruction first-aid parties were called forward as required.

#### FACTORS AFFECTING EXECUTION

It was of the greatest assistance that the CE exercised local financial as well as technical control and, because he was also the Chief Military Planner and Commander Army Task Group, decisions could be taken quickly but it is hoped never lightly. These GRAPPLE operations had similarity to operations in war with the time factor being very

tight indeed. A project typifying the prevailing tempo was the installation of lead-in lights to the main airfield, a requirement arising from a hazardous, but successful, aircraft landing in extremely poor visibility during a sudden tropical storm: fortuitously lights of suitable intensity were available on the island from stores used for temporary floodlighting of working areas; these lights were erected on a series of towers which reduced progressively in height to ground level, starting from 1000 yards from each end of the runway; the installation was operational within three days of its first being conceived.

Morale was clearly the most important single influence and its maintenance helped by the inherent challenge and a very demonstrable end result. Soldiers knew why they were carrying out a task and how it contributed to the success of each test. Nearly all the administrative overheads that had to be borne by regiments elsewhere were undertaken by the RAF; duties such as guards were practically non-existent, nor were individuals away on courses and only a very small number on leave. The result was that effective working numbers were much higher than a unit could produce in normal peacetime conditions. Emphasis was placed on man management and junior officers took a keen interest in their men's welfare on the island and their families left at home. The mail service which clearly had a big impact on morale was maintained at a high level of efficiency. A daily news sheet had a wide circulation. The scale of rations was better than at any other station for British troops and catering by the RAF was of a high standard. Health was good and the all-in sick rate including both hospital and casual sick cases averaged 0.9% for the Army Task Group. Although there were no regular drill parades standards of turn-out, bearing and drill were always of a high order on the few occasions when military ceremonies were staged such as the Queen's Birthday Parade and guards of honour. One such guard of honour was mounted for HRH The Duke of Edinburgh who visited the Island in June 1959 with the High Commissioner for West Pacific Sir John Gutch and Lady Gutch. They arrived in the Royal Yacht and stayed a couple of days, during which time Prince Philip saw the facilities and met many members of the Task Force.

The CE when visiting work sites would often ask an individual what single thing in his opinion would further improve conditions on the island and not surprisingly received a wide variety of answers. One young Sapper said immediately "bring the families out" and being asked where his wife was living replied "Oh! I'm not married." Every effort was made to ensure that all ranks had a minimum of one

week's leave from the island during their tour and this was taken at Hawaii, Fiji or the adjacent islands, but except during brief stand-downs, nobody had more than one day off work per week. A large variety of recreational pursuits were taken full advantage of by all ranks and these included soccer, hockey, cricket, tennis, volley ball, swimming, dinghy sailing<sup>2</sup>, fishing and water skiing. Hobby activities were also provided for and photography and bird watching were popular. A Christmas Island broadcasting service was introduced and its nightly programme, run on entirely voluntary lines, had wide and appreciative audiences.

All materials except coral had to be imported by sea either from the UK or Australia and this called for a considerable degree of forward planning based at times on the crystal ball. Even that infinitely adaptable commodity, bamboo, was not grown on the island but a number of bamboo plants from Fiji were planted during 1958 as an experiment, it would have been invaluable for temporary works. Indents for stores such as timber, cement and bitumen had to be finalised a minimum of six months ahead and procurement of pre-fabricated stores averaged about nine months. Delivery dates had to be synchronised with shipping movements. Each ship required about three weeks of hard work to unload and about a further two weeks were occupied in distributing cargo on the island. A number of small stores and spares were imported by air but clearly this line of supply had to be used sparingly as freight costs approximated £1 Sterling for each pound by weight. A keystone in military engineering activities was plant and scaling of plant and vehicle spares was all important because the attrition rate was high. The tempo demanded shift work and thus plant and vehicles were worked for around sixteen hours a day for six days a week. Climatic conditions induced heavy corrosion and dust caused abrasion of moving parts, salt water was liable to seep into bearings and emulsify lubricating oil. The majority of operators had to be trained on the job, adding inescapably to wear and tear. The only antidote was constant insistence on preventative maintenance; much of routine daily maintenance on plant and vehicles was carried out by special teams working during the night, and mobile fitter teams serviced plant at working sites.

#### MARALINGA

A SERIES of atomic trials took place in Australia under code names TOTEM, BUFFALO and ANTLER. The TOTEM series in 1953 were comparatively small yield detonations, without any military

participation, in the Emu fields North of Maralinga and Woomera in the deserts of South Australia. The BUFFALO test series in 1956 consisted of four kiloton range devices detonated in the Maralinga area, with the aim of studying the level of damage caused to military equipment exposed to nuclear explosion. The equipments included tanks, weapons, ammunition and explosives, radios and a number of other items including two heavy girder bridges. A permanent staff on the Maralinga Range was provided jointly by the British and Australians; all three Services were involved, augmented during the actual trial. The British Army contributed some 120 all ranks, about one half of whom were Sappers, including the Commander of the Army Element, Lieut Colonel J R Blomfield who was also Deputy Range Commandant and Range CE. The Maralinga trials took place in September and October 1956. The low yield ground burst was viewed from a range of less than two miles; the air dropped weapon produced very spectacular effects of heat and light and a considerable ground blast. The final test, a tower mounted weapon, was at night, with low cloud present; the flash effect was less than had been expected but the weather inversion caused a very severe blast and rumblings which went on for some minutes. An "indoctrinee force" of several hundred officers from all services and including Commonwealth forces observed the BUFFALO tests. Swathed in protective clothing and respirators, they went forward within hours of the blast to see the effects on equipments and buildings. Most memorable from the personal viewpoint of Brigadier R W Dowdall, who as a Sapper Captain indoctrinee was present at the first explosion, were the realistic dummy soldiers which had been scorched and thrown clear of the guns they had been manning.

Subsequently, in 1957, a further three atomic devices were exploded at Maralinga in the ANTLER tests. The military range staff was not intimately concerned with these tests although it continued to provide and maintain the base facilities. Maralinga continued to be used for an experimental programme with a Sapper presence at reduced strength.

#### TAILPIECE

ONCE again, as so often in history, the Royal Engineers, playing the predominant army role, had been in on the ground floor of a momentous new development, which was to have the widest political and military repercussions. The Corps tradition for excellence had been sustained; at times the well-nigh impossible was attained under challenging



conditions. All ranks had made their own special and individual contribution to success and generally counted themselves fortunate to have participated. Full records of the work were kept by photography for tasks of special importance and a film record was also produced during the last months on Christmas Island. Brigadier R B Muir's personal impressions are of interest<sup>9</sup>. 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. There was not much difference between the blast of high yield and low yield weapons, probably because of inherent limitations of the ear and also because the observer position could be closer to the ground zero of the smaller explosion. 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 a 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 in complete contrast to a cloudless blue sky of a few minutes before, marred then only by the condensation trails of a Valiant bomber, seemingly almost overhead and about to drop the weapon. On one occasion a distinguished observer, an American nuclear scientist, remarked with an ever-so-slight tremor in his voice: "Gee, you guys drop these H-bombs at your feet". No praise is high enough for the RAF's precision bombing.

Finally, as a matter of minor history, at the invitation of the Institution of Royal Engineers, Brigadier R B Muir subsequently presented a paper entitled "Engineer Support to the Christmas Island Nuclear Trials" at the HQ of the Institution of Civil Engineers in London on 2 February 1961. The occasion was the first joint professional meeting to be held between the Institution of Civil Engineers and the Institution of Royal Engineers and was attended by General Sir Kenneth Crawford, the Chief Royal Engineer. It became the fore-runner in the years following of many other joint meetings throughout the UK between the Institution of Royal Engineers and all the major engineering institutions providing a very worthwhile continuing link between the military engineer and his civilian counterparts to mutual professional advantage.

## FOOTNOTES TO CHAPTER X

1. The engineer work for the equivalent United States nuclear tests at Eniwetok was carried out by specialist civilian contractors.
2. A Court Martial Warrant was held in the name of Commander Army Task Group to convene and confirm Military Courts Martial. This authority, exceptional for an officer of the rank, had to be exercised only twice and the offences were unrelated to operational activities; the consistently high standard of behaviour of troops was very much to their credit.
3. Whole coconuts, addressed and stamped, were accepted for postage unwrapped, usually embellished with highly colourful local scenes.
4. When planning for relief of 25 Field Engineer Regiment, Lieut Colonel Gatford realised that there would be space to spare on the troopship which was to bring out the relieving 38 Corps Engineer Regiment. His proposal to the War Office was accepted that families should be permitted indulgence passages to rejoin their husbands in Christmas Island and travel home with them. The venture was a great success with good publicity value for the Corps and the Army. Twenty-one wives and thirty-three children made the ten week round trip at a cost of £30 each (half price for children). A popular daily newspaper ran a headline: "Hap-Hap-Happy Dreamboat" with a comment from the Master of the troopship *MV Dunera* "... this is the happiest trip I've ever known".
5. It was fitting that the Corps with its tradition as the founder of military aviation should resume a close association with an RAF balloon unit and find itself, once again, involved in constructing balloon anchorages.
6. The initial plotted results were incomprehensible until it was realised that nobody had briefed the Gilbertese children who naturally enough had welcomed the gaily coloured pebbles as new playthings.
7. There was a sequel to the Christmas Island operations after the time frame of this volume. The Americans made use of the base again some years after the maintenance force had withdrawn. They reported that the facilities were excellent and that the preservation work had been extraordinarily successful.
8. Dinghy sailing enthusiasts much benefited from having on the island in 1958 Lieutenant Stewart Jardine who later represented Britain in this sport in the Olympics.
9. Brigadier Muir also wrote: "On reflection perhaps the outstanding personal impression from nuclear weapon explosions was the reality of the horrific overkill propensity".

## CHAPTER XI

### SPECIAL ESTABLISHMENTS

**BOMB DISPOSAL**—Beach Minelands—Recovery of Wartime Bombs—Ammunition Clearance—Overseas—Reserve BD Forces—Bomb Disposal School. **SURVEY**—School of Military Survey—Training—Map Production—Developments. **ENGINEER STORES, TRANSPORTATION**—Strategic Reserve Role—Modifications of Role—Diving. **POSTAL AND COMMUNICATIONS**—Home Postal Depot.

THE several branches of the Corps have invariably required specialist establishments, which have varied over the years; in the post-war period both Survey and Transportation ran their own centres and, as well as Bomb Disposal, ran special schools. They also managed separate permanent cadres for Supplementary Reserve (SR) units; as also did the Postal branch of the Corps with their own, rather exclusive, Depot. The resources organisation was established with its own Directorate to control the UK base activities, even though engineer stores and equipment are an essential ingredient to every engineer task.

The precedence of these special activities of the Corps has not been clearly defined but most are shown within the overall staff precedent lists of the Army. Hence the sequence within this chapter follows the best available guide as to precedence.

In addition to its own specialities, the Corps retained connections and deep involvement in certain interservice and all arms establishments. There was always a strong Sapper interest in Combined Operations, Brigadier L E C M Perowne was Commandant of the School of Combined Operations in 1947 and 1948, and the Corps was always well represented at the Combined Operations Experimental Establishment (COXE) and provided the Commandant there, Colonel C M MacLachlan, in 1953. In similar vein, the Corps continued to have positive interest in airborne exploits and provided Colonels A D Hunter and P M Bennett as Commandants of the Army Air Transport Training and Development Centre (AATDC), as well as other staff. Other activities which, almost traditionally, drew on sapper expertise were those of the Joint Services Nuclear, Biological and Chemical Warfare (JSNBC) School, where Colonels J Constant and D G Fletcher were Commandants, and the Visual Inter Service Training

and Research Establishment (VISTRE) where Colonel E L Marsh-Kellett was followed as Commandant by Colonel G D McK Sutherland in 1952, when the name changed to the Joint Concealment Centre and in 1955 by Colonel G C Richards. Another occupational speciality for Sappers during this period was in military intelligence staff and the Corps provided three Directors of Military Intelligence. The concern of this Chapter is, however, the RE Special Establishments.

### BOMB DISPOSAL

It has already been mentioned in Chapter I how the Directorate of Bomb Disposal was removed from HQ E-in-C in 1948 to a new establishment, reduced from its wartime ceiling of twenty-seven companies, each of ten sections, and titled HQ BD Unit (UK), remaining in London under Colonel A Cleghorn, with nine BD squadrons under operational command. There had been a rapid rundown of the BD organisation, many units were disbanded and German POW labour was brought in as replacements for British troops in the remaining squadrons, but repatriation of POW resulted in two squadrons being disbanded in June 1948, three more in August 1949, and a complete reorganisation took place in 1950. In August, the HQ commanded by Lieut Colonel M G MacLagan moved from Ashley Gardens, Victoria to Horsham and the establishment was restructured to an HQ, with five independent operational BD troops and one plant troop. A manpower ceiling of sixty British all ranks had been imposed; the working strength of ninety per troop was made up by civilians, many of whom were ex-POW, particularly those of non-German nationality.

### BEACH MINEFIELDS

Even though bombs were no longer being dropped on Britain there were considerable clearing-up operations to be undertaken, furthermore the clearance of beach minefields had been made a BD responsibility.

An award of the General Service Medal with the clasp "Bomb and Mine Clearance 1945-49" was made to those who spent 180 days active engagement on operations during the period May 1945 to December 1949. This was the first campaign medal awarded for service entirely within the UK.

Two thousand minefields had been laid, mostly in East Anglia with a total of 350,000 mines. From 1943 up to February 1948 all but fourteen minefields had been cleared and 338,500 mines had been

recovered; during the rest of 1948, seven more minefields were cleared, leaving an estimated 1,037 mines unaccounted for. Not surprisingly, the most difficult minefields were left to last. While the new BD establishment was evolving, the disbanding squadrons were completing work on minefield clearance as a matter of urgency to restore the beaches for public use. Many methods of clearance were tried; they included water-jetting, sweeping with the No 4A mine detector and with the Electrical Research Association (ERA) locator.

Perhaps the most difficult case was the minefield at Trimmingham in Norfolk. It had been laid in 1940 on the cliffs above a beach as an urgent anti-invasion measure and in the "Hurry had not been fully recorded; even the plan was plotted on a 1906 map which had not been up-dated, and the exact number of mines laid was not known. Since the cliffs erode at an approximate rate of six feet a year even the boundaries of the minefield were suspect. After some exploration into methods of clearance, it was considered that the risks were too great and the minefield area was closed by the War Office in 1947. By 1951, mines were being found on the beaches to the South of Trimmingham, in places where clearance had already been completed or even where no mines had been laid; it was clear that mines from Trimmingham were coming down as the cliff eroded and were being washed out to sea to return elsewhere. In consequence 1 Minefield Troop was sent to Mundesley for a projected three year stay and started clearance in March 1953. An estimate of 1,000 mines remaining within the minefield had been given, but detection was complicated by the fact that several places along the cliff had been used for dumping scrap metal. During mine clearing operations in May 1953 two NCOs were killed; the troop commander, Captain R II Hough and troop sergeant major, WO2 Thomas crawled across the minefield to recover the bodies, as a result of which they were awarded the GM and BEM respectively. 484 mines were recovered during the period up to 1958. 39 Corps Engineer Regiment provided a detachment at one stage to help clear the area but it could not be fully opened to the public until 1972.

A large crop of mines was thrown up by the freak weather conditions on the East Coast in 1953, the total of stray mines disposed of was 400 in that year. An emergency sea defence wall was also constructed at Shoeburyness against the excessive high tides caused at the time, built of steel piling by a team sent from HQ BD Unit at Horsham. Another mixed bag of about 200 mines was cleared by a troop of 35 Corps Engineer Regiment from a two mile stretch of shingle bank at Gley

next the Sea, Norfolk. The other remaining minefields were checked and rechecked and opened to the public by 1958 under a conditional certificate stipulating that despite all efforts to ensure clearance it could not be guaranteed. Even so in a number of places mines continued to be exposed, or washed up on beaches and BD detachments around the country maintained a call-out readiness. There were sometimes conflicting demands from local authorities for complete re-sweeps of beaches while, at the same time, ensuring that the confidence of potential holidaymakers was not disturbed. All this work had not been without price to the BD Units; the peacetime casualties were four officers, twenty-six other ranks and three civilians killed, and a total of nineteen wounded.

#### RECOVERY OF WARTIME BOMBS

In addition to mine reports, it seemed that people became increasingly bomb conscious through the publicity given to BD by radio and later TV programmes. Furthermore, the post-war building boom uncovered a number of suspicious holes which warranted investigation as suspect UXB; there were also cases where UXBs which had fallen during heavy raids had never been reported, or at least not to anybody in authority. All records were brought in as the squadrons disbanded so that a full and thorough bomb and mine recording system could be run from the new HQ, it was fortunate that an experienced BD officer, Major A B Hartley who had been involved extensively with BD for a number of years was available as 2IC over the period of reorganisation. The actual bomb disposal work was carried out by two troops; 1 Troop based on Whetstone, London; 2 Troop at Portsmouth. Inevitably the number of UXB reported fell year by year, from 633 bombs, in the five immediate post war years, to some 140 in the next ten years. But, as with minefields, the really difficult disposal problems, some of which had been abandoned at first attempt, were tackled as time and resources allowed. An example was a 250 kilogram bomb at Avonmouth lying in shilling, waterlogged sand; eventually narrow shafts were drilled on each side of the bomb and liquid cement was pumped in to immobilize the bomb on a concrete bed so that it became accessible for fuse immunisation and recovery. The uncertainty of UXBs was illustrated by an explosion in August 1948 in front of the Vickers Supermarine Works at Southampton. Subsequent research diagnosed the cause of explosion as probably a 250 kilogram bomb fitted with a No 17 long delay clockwork fuse dropped in an air-raid in 1940.

### AMMUNITION CLEARANCE

A battle area clearance unit had been formed at Newhaven and was given the responsibilities of clearing the battle area training grounds, field firing areas and ranges used by the Army; the unit was incorporated into the BD Units in 1962, bringing a number of ex-POW Ukrainians who have become loyal, long-serving members of BD. Disposal of stray ammunition was, and continued to be an RAOC responsibility, however the disposal of ammunition unearthed during the course of bomb recovery was the responsibility of the BD Unit and, combined with a natural public tendency to describe any explosive object as a bomb, provided a significant though small part of the unit's activity.

### OVERSEAS

A combined RE/RAOC Bomb Disposal Troop had been formed in 1948 in South East Asia and carried out clearance work in Jesselton North Borneo from April to October and then disbanded. Periodic BD tasks continued in several theatres for many years and involved BD troops; a locally recruited BD Troop was formed in Hong Kong in 1948; the massive residual BD commitment in Malta was undertaken by the Malta Fortress Squadron; in Korea, a small amount of BD was carried out, but the main responsibility was undertaken by US troops. An earlier Sapper responsibility had been to train German POW in MELF for the mine-clearance tasks in Egypt and the desert battlefields.

Subsequently the management of this mine clearance was undertaken by the RAOC, with RE on call for problems, or for special occasions such as the particular demands of specific training exercises. A long running task involved the disposal of a Japanese bomb and mine storage dump in Penang; large stocks remained in tunnels and periodic efforts were made to reduce the quantity when other priorities on Sapper commitments allowed. Two men of 11 Independent Field Squadron were killed on this task in 1957 and it was not until a specialist BD team was sent out from UK in 1967 that the job was completed.

### RESERVE BD FORCES

No provision was made for BD units when the Reserve Army was restructured after the war, but six TA squadrons were converted to a BD role in 1950. In the same year a BD regiment was formed in the Supplementary Reserve under HQ SR (Field and Works) at

Ripon. 137 BD Regiment, as it was named, had only one squadron and absorbed a large number of "Z" reservists for its first annual camp in 1951, which was directed by HQ BD Unit; the numbers for training necessitated forming overflow squadrons and extending the training area from Horsham to Wouldham. However by 1952, when responsibility for the, by then, AER BD units had passed from Ripon to HQ BD Unit, 137 Regiment was a going concern; many ex-BD officers rallied round as volunteers after the first CO, Lieut Colonel R O St J Marshall, had written an appeal in the Daily Telegraph, and three more squadrons were raised within the regiment. Technical training was a problem for TA units with a BD role and as a result, 142 BD Regiment AER was formed in 1953 to maintain a BD capability; two years later three more AER squadrons were raised from TA BD squadrons to form 144 BD Regiment; 579 and 583 Independent BD Squadrons remained in the TA.

#### THE BOMB DISPOSAL SCHOOL

The RE BD School had been part of the SME at Ripon and it moved with the SME to Gordon Barracks, Gillingham in 1949. Subsequently it moved again, in late 1951, to join the BD Unit which had been established at Broadbridge Heath, Horsham. The school charter was to provide individual training for the BD units and also to run special courses for RN Clearance Divers; BD training was also provided for Commonwealth and foreign students. Consultation between the RE and RAF in 1957 was initiated to study amalgamation of their two training organisations, as a result the Joint Services Bomb Disposal School was established at Broadbridge Heath in January 1959.

#### SURVEY

THE earlier chapters have recorded that survey field units were employed continuously overseas during the period. However, specialist survey training, map and aeronautical chart production and field surveys at home required units in the UK at the hub of the wheel.

#### SCHOOL OF MILITARY SURVEY

In 1948, the Survey Training Centre, renamed the School of Military Survey on 1 January 1949, was in an ex-American hospital in Langley Park near Warminster, an area now occupied by lions; early in 1949, the search started for a permanent home so that the park could be



returned to the Marquis of Bath. Before the war the school had been part of the SME, and a return to Chatham was considered; but after much deliberation, the School of Military Survey commanded at the time by Lieut Colonel M O Collins, moved to Hermitage near Newbury in the Winter of 1949. The new camp was in poor condition and had no married quarters, however, it was steadily improved, largely by self help which included the laying of a cricket ground, turf by turf. Quarters were built in 1954 and new instructional blocks in 1955. The school was organised into two squadrons, one administrative and one holding, and an instructional wing and was commanded by a lieut colonel.

### TRAINING

Officer training carried out during this period fell into three categories: firstly, there was the Long Survey Course (renamed the Army Survey Course in 1958) which lasted for twelve months, designed to train regular RE officers for their first appointment with Survey, and colonial probationers for service with the Directorate of Colonial Surveys; it was also attended by many foreign and commonwealth survey officers and civilians: secondly, national service officers were given some seven months survey training or six months training in printing as appropriate to their planned employment: thirdly, all regular young officers attended the School of Military Survey as part of their general Corps training. Officers taking degrees at Cambridge and non-degree officers were given a short introduction to engineering survey and basic topographic survey, while the survey training for those attending the Military College of Science was specifically geared to the needs of their degree courses.

During the 1950s, the increased sophistication in survey techniques necessitated the training of a proportion of survey officers in specialised disciplines. This was achieved by introducing the advanced courses, of a year's duration, in printing at the London College of Printing (started in 1950), photogrammetry at London University (1955) and geodesy at Oxford University (1956).

A major commitment of the School of Military Survey was the training of national service men; an annual intake of some 250-300 soldiers came direct to the school after a short period of basic training at a training regiment. The majority of regular recruits joined the survey service from the Army Apprentice School but the remainder were trained with the national service men. Upgrading to class II trade was normally carried out in units; upgrading for class I was provided

at the school. The Survey Apprentice Tradesmen Company, which had been part of the Survey Training Centre, was absorbed into the Army Apprentice School organisation in 1948. Initially at Taunton, survey apprentice training moved to the school at Harrogate in 1949 and remained there until moving to Chepstow in 1961. Initially, only field and drawing trades were taught to apprentices but in 1956 training started in the printing trades as well.

The reserve survey units also needed training. 13 Field Survey Squadron which had disbanded in Fayid in 1948, was reformed in a static role in 1950 from 1 Survey Computing Unit, moving in 1951 to Fernhurst Camp, Haslemere, where it remained for nearly thirteen years. Its main role during the Summer months was the training of the SR, and later AER Survey Units. However, it also sent detachments to a variety of locations including North Borneo, the Seychelles Islands and Christmas Island. It was involved in the survey support for Operation MUSKETEEER to Port Said, and in 1958 started geodetic surveys for the installation of nuclear missile sites, a task that was to last some four years.

#### MAP PRODUCTION

Map production and reprinting was carried out by survey units in overseas theatres, but the principal production units were the Survey Production Centres supported by the Ordnance Survey who carried out much routine printing for Military Survey. 1 Survey Production Centre, had been formed in 1942 when the Geographical Section, General Staff was split into two parts, one becoming the Directorate of Military Survey, the staff branches, and the other the Survey Production Centre, the map production agency. By 1948, it was located at Park Royal in London. 2 Survey Production Centre (Air), or SPC "Hillside" as it was known until the Air Ministry handed it over in 1952 to the War Office, was located at Bushy Park, Teddington. It had developed from a branch of air intelligence but had always had close connections with RE Survey who provided technical advice and staff. Both units moved to Feltham in 1962 and amalgamated to form the Survey Production Centre, now known as the Mapping and Charting Establishment RE.

The work of the two production centres was closely co-ordinated. 1 Survey Production Centre was responsible for computation, air survey and the drawing, compilation and reproduction of land maps and aeronautical charts. 2 Survey Production Centre was involved in the compilation and printing of approach and landing charts and radio

facility documents for the Air Ministry and the Ministry of Transport and Civil Aviation.

Bulk stocks of maps were held in 8 Field Survey (WO) Map Depot at Ascot which also held survey expendable stores. There was considerable movement of bulk stocks of maps between overseas theatre depots and 8 Depot during the early post-war years, whilst worldwide holdings were being rationalised to reflect the post war requirements.

6 Radar Air Survey Liaison Section, which had spent much of the period from 1948 to 1952 supporting the RAF in flying air photography for mapping in Africa, returned to the UK in 1952. In 1953, it moved to RAF Wyton to support the photographic reconnaissance unit of the RAF for all survey flying, both at home and overseas, mounted from the UK.

#### DEVELOPMENTS

During the war there had been appreciable developments in surveying and printing equipment, and much of the wartime equipment continued in service for many years. However, there were three major developments which had a profound effect on survey techniques. Firstly, the development of electronic distance measuring equipment provided a method of measuring distances up to some 100 kilometres to a high degree of accuracy and as quickly as taking comparable angular measurements. Secondly, studies into the applications of computers for military survey were started in 1957, which resulted in a Ferranti Pegasus computer being obtained for 1 Survey Production Centre: although slow and cumbersome by modern standards, it gave eleven years good service and was the forerunner of the greatly extended computer applications used in military survey today. Lastly, there was considerable development in stereographic air survey plotting machinery. In map reproduction, dry plate photography replaced wet plates; and, at various stages, increasing use was made of plastics.

#### ENGINEER STORES

THE Director of Engineer Stores (DES) was responsible to the E-in-C for the provision of engineer stores for all commands and for the establishment and training of the engineer resources support units of both the regular and the reserve army. His duties entailed estimating and controlling the expenditure on engineer resources, and the production of publications governing his organisation's activities. There were three War Office controlled depots: 1 Engineer Stores Depot at Long Marston and 2 Engineer Stores Depot at Liphook which held

plant. The third, 5 Engineer Stores Depot at Longmoor, originally specialising in transportation stores, became a spares sub-depot of 2 Engineer Stores Depot during this period. In addition, there were stores depots and workshops in all commands under the respective CEs.

Command of the three main depots was transferred in 1949 to a newly established Commander Engineer Stores Establishment (UK) (ESE) set up in Dean Stanley Street, London, when the Engineer Stores Directorate was pruned as part of general measures to reduce the size of the War Office. The new Commander Brigadier W W Boggs was Inspector of Engineer Stores and Depots as well as being responsible for provision of stores for all commands, and the training of resources personnel. The Directorate remaining in HQ E-in-C was reduced in size to some fifty strong and retained responsibilities for War Office controlled stores, estimating, publications, establishments and unit training. Further reductions in 1958 resulted in the abolition of the Directorate as such: its responsibilities being transferred, partly to a new section (E3) in HQ E-in-C, and partly to the Engineer Stores Establishment. In effect this left the Commander ESE responsible to the E-in-C for all engineer resources matters other than policy, finance and establishments.

The main commitments during this period occurred in connection with operations in Korea, Malaya, Kenya and the Middle East as well as the Christmas Island project, but a major resources effort was required consistently to support RE works services. Operational and training requirements were provisioned mainly from the large stocks of military equipment in hand at the end of the war. In 1957 and 1958 a programme was initiated to identify and dispose of surplus stock, this programme together with the transfer of C vehicle repair to REME and a policy of "supply and fix" contracting by works services, allowed a reduction in the number of stores depots in the UK from twenty-five to fifteen. Transfer of works services from the Corps and the rundown of overseas stations eventually resulted in the closure of a further twenty depots at home and overseas. Apart from reductions, a change of emphasis in the organisation became apparent as the holdings of works stores reduced and military equipments became the major part of the work, even though a contingency works provision capability was maintained. 1 Engineer Stores Depot at Long Marston throughout remained the major resources centre and the centre of reserve army administration and training; in 1959 it represented the Corps at the granting of the Freedom of Stratford on Avon.

## TRANSPORTATION

Despite a rundown of Transportation responsibilities the world wide commitments left the available resources stretched to the limit following the post-war demobilisation. Transportation units were deployed overseas from the Far East to Malta and Movement Control troops wider still. As the wartime soldiers disappeared and the pre-war regulars became time expired, the training machine came under pressure to supply the reinforcements needed to meet the commitments; at the same time the future had to be looked to. The Long Railway Course had been suspended at the outbreak of war, and although a short version of the course had been introduced only a few officers had been able to take advantage of it; lack of expertise had not been felt during the war, because of the abundance of qualified and experienced transportation men called up for service, but after the war few had thoughts beyond returning to their homes and picking up again the threads of their civilian occupations. A minority elected to remain in uniform in response to a short service commission scheme introduced in 1946, but it was clear that there was going to be a grave shortage of trained officers of the rank of major and below. Moreover, the emphasis of transportation work had changed considerably; the importance of shipping and port handling in the war prompted a re-assessment of priorities, port training and the development of maritime trades had become important for the regular army. Consequently, when the Long Transportation Course was introduced again in 1947, it was redesigned as a two year course, roughly half devoted to railways and bridging, and half to ports and IWT, with periods of attachments to civilian firms and the nationalised industries. The courses attracted many experienced Sapper officers, as well as those given regular commissions under a new regular entry scheme introduced in 1946. A new series of courses for other ranks was introduced, developed from the Port Operating Technical Training curriculum which had been running at Cairnryan in the latter stages of the war.

Also in 1947 steps were taken to revive the SR, which became the AER in 1952, and a manpower ceiling of 12,000 all ranks was allotted to Transportation, within which were formed three railway groups, three port regiments, one IWT regiment and five movement control groups; pools of officers for transportation duties were also created. The reserve units were administered from Longmoor and training was carried out at both Longmoor and Marchwood depending on the particular role of the unit. The two centres were also responsible for

the training of regular and national service recruits who received a basic military training at a training regiment before being sent to their specialist unit.

Marchwood on Southampton Water became the permanent home of the port and IWT units. Late in 1945, when the Holding Depot for port units at Faslane closed down, together with the Port Operating Technical Training Wing at Cairnryan, both units moved to Marchwood to become the Port Wing of the Transportation Training Centre (TTC). The area had been selected as a stores, repair and construction centre in 1943 and had been used for construction of parts of the Mulberry Harbour. When Arromanches Harbour closed many port stores returned from there and other places to Marchwood; a major initial task was to sort and dispose of the equipment which seemed to cover the waterfront. At Longmoor the massive organisation built up during the war was also gradually reduced. A regimental organisation with the title 5 Railway Training Regiment was formed but lasted only a short time, being renumbered 16 Railway Training Regiment. Of the squadron numbers, only 49 was inherited from 5 Regiment, the remainder (8, 10 and 53) coming from overseas. 53 had been a port squadron and became so again in FARELF in 1958.

The process of retrenchment produced a curious situation. It was decided that the Army requirement for a Transportation Service could not justify both Director of Transportation (DTn) and Commandant of the Transportation Training Centre, (TTC) and the two appointments were combined into one. The DTn thus had to answer to the GOC Aldershot District for matters of command in Longmoor and Marchwood, to the QMG for the efficient running of the Transportation Service, and to the E-in-C for all Corps matters. This system continued until 1953 when, towards the end of Brigadier C E M Herbert's term, the DTn was re-established in the War Office and the Commandant of the TTC was made a separate brigadier's appointment.

The Longmoor units, meantime, had settled down to some measure of stability; 8 Squadron returned from Germany, where it had been retained during 1946 and 1947, and joined 49 Squadron and 83 Depot Squadron under the overall command of 16 Railway Training Regiment. 17 Port Training Regiment had been formed at Marchwood to run the Port Wing of the Transportation Training Centre with 51 and 52 Squadrons and received a much needed lift in morale by the building of McMullen Barracks and a fair allocation of married quarters, as well as a considerable improvement in its technical

accommodation and facilities. A Movements School at Longmoor, successor to the MC (Trade Training and Depot) Battalion profited by a new charter extending its teaching into the ranks of NATO, and began a new series of Joint Services Senior Officers Movements Courses.

As planning started for the move of HQ MELF to Cyprus, both 10 Squadron, which had been established as a composite railway squadron, and 53 Port Squadron also working in a composite role, were recalled in 1955 to Longmoor, where 53 Squadron took over the function of Railway Depot Squadron from 83 Squadron and 10 Squadron began to reform as a port squadron for eventual deployment to Singapore. In 1956, both 8 and 10 Squadrons celebrated their 150th anniversary, marked by a parade inspected by General Sir Edwin L Morris, Chief Royal Engineer. It was barely in time for the coming of the Suez crisis, which was to change aspects of port planning and functions.

#### STRATEGIC RESERVE ROLE

The Suez crisis, in 1956, actively involved the whole of the AER port strength, in that both categories of the AER were called up. It affected the Longmoor training organisations, not only to mobilise the reservists but also to provide training to other units of the Corps allotted to reinforce the port organisations. It revealed also, the weakness of the regular transportation establishment to support operations of any size. 51 Port Squadron, the operational unit at Marchwood, had to deploy half its complement to Cyprus in advance of the AER call-up, since the EOKA troubles in the island ruled out employment of civilian labour; subsequently the whole squadron was employed in Cyprus, where it remained for more than a year after the AER units had returned home. 10 Squadron had, by this time, been despatched to Singapore, where it was integrated into FARELF and was not available to provide reinforcements to other theatres.

Irrespective of the arguments for and against military intervention in Port Said, the value of the port units was amply proved. The proposal by Brigadier C H Barnett, DTn, to form a strategic reserve port regiment was approved but it had to be achieved within the existing manpower cover. In 1958, 17 Port Regiment was reorganised with four squadrons, 10 Squadron in Singapore, 51 recalled from Cyprus, 52 which was already in Marchwood and 53 Squadron transferred from Longmoor. Left in Longmoor, in 16 Railway Regiment, were 8 Squadron which became the strategic reserve railway

unit and 49 Squadron which took over as Depot and Training Squadron.

In the closing stages of the 1940s an attempt had been made in the War Office to introduce a Transportation Corps. Kitchener's proposal of 1902/3 had even more to commend it in 1948. The American Army had a Transportation Corps in 1942, and, although far from perfect, it provided a pattern to follow. A War Office Committee under Major General E M Bastyan studied the problems and recommended the creation of a Transportation Corps; at Longmoor and the overseas stations opinion divided over the issue, the younger element being in favour, and the older members equally firmly against. In a sense it was a case of tradition versus innovation, but the prevailing economic conditions discouraged any change which involved expense.

#### MODIFICATIONS OF ROLE

Railway and port construction were civil engineering functions which any engineer regiment should be capable of undertaking with a minimum of previous special training, and in the streamlining process for an all regular Army, Transportation was required to retain the maintenance responsibility only. With emphasis in the War Office on rationalisation the Corps abolished the appointment of DTn and merged his functions and relationship with the QMG into the new post of Brigadier E (Q Services), under whom the Transportation representative would be known as the Colonel E(4); the event took place at the end of 1959, and Brigadier C H Barnett, who retired as DTn at that time, acquired the distinction of being the last of the line. At the same time the new post of Deputy Commandant, a colonel, was created at the TTC simultaneously with the appointment of a non Tn trained officer, Brigadier A G P Leahy as Commandant; he was followed by Brigadier F H Lowman a former commander of 2 Port Task Force who was thus able to bring considerable transportation knowledge and experience to the post.

The port units had been reorganised to bring them more into line with the new logistic doctrine; a new port task force concept was produced which, first of all established one port task force within the Strategic Reserve, and secondly reduced the number of port task forces overall from four to three; so that Scottish Command retained No 4 Port Task Force, based on 80 (Scottish) Port Regiment (TA), and the home forces retained No 1 Port Task Force, based on 81 Port Regiment (AER). No 3 Port Task Force, allotted to the Strategic Reserve, became a mixed regular and AER formation based on 17 Port



Regiment and 18 Water Transport Company RASC. The development of this concept, which in essence was aimed at providing comprehensive port support for limited war, was largely influenced by a major re-organisation, which took place in 1960, of the AER. Within the concept a fundamental unit re-organisation took place on the basis of the troop brick, so that by deploying any combination of troop bricks the port task force itself could be scaled to any size of limited war operation, and thus could produce a number of port task groups while retaining its own integrity.

Inherent in the new concept was the principle that Transportation and Movement Control should exist and operate as one service, within the sphere of authority of the commander, and officer training at Longmoor was adapted to provide basic training in movements for all officers on the Long Transportation Course. The Directorate of Movements was reluctant to accept Movement Control coming under command of an organisation other than Q Movements, and a search was made for a formula acceptable to all. Agreement might well have been reached had not events been overtaken by the report, published in January 1964, of the committee chaired by General Sir Roderick McLeod which reviewed logistic support for the Army and proposed the establishment of a Transport Corps.

These were fruitful years for Transportation. Not only in the field of ideas, but particularly in the field of research and development, considerable progress was made. A Technical Policy Wing produced specifications and designs for new equipments. Included in the research was a new craft to replace the wartime Z Craft, resulting in the Ramped Powered Lighter (RPL). A floating causeway was also produced in conjunction with MEXE from the American NL (Naval Landing) Pontoon which was tested in Malta in 1953; a Uniflote ferry was taken into limited service, later an improved design, called the Mexeflote was developed. In the railway field new developments were less dramatic but both new locomotives and track maintenance equipment made their appearance and a sectional truss railway bridge was developed for railway use at MEXE.

## DIVING

Diving courses were included in the curriculum of the TTC and were carried out at Marchwood under the aegis of 17 Port Training Regiment. A Diving Training Centre had been established and a diving tank was built in which the students could carry out underwater tasks such as oxy-acetylene burning, supervised by instructors through

windows from outside. Instructors were trained at the Royal Navy Diving School at HMS Vernon. The emphasis on the diver training was for support of port operations and for the diver to work for considerable periods under water in a limited area; mobility was of lower priority and the method of diving employed was that of air pumped from above to a more or less static diver in a diving suit with a non-compressible helmet-hard hat diving.

Mobile warfare, the need to cross rivers quickly and the introduction of amphibious vehicles to be used in the tactical battle, as well as innovations in diving equipment, brought a requirement for RE divers who could be more mobile. The emphasis for diving began to change from sustained work and included underwater reconnaissance, so the need for self contained breathing apparatus developed. Following trials by the SME at Upnor in 1953, two RE students were accepted in May 1955 on a shallow water diving course run by HMS *Vernon*, and thereafter a small number of shallow water RE divers were trained by the RN. Investigation began into the role, equipment and training of RE divers and it became apparent that the requirements for the RN clearance diver did not fully meet those of the Army.

The history of the RE Diving School as it developed is outside the time frame of this Volume but its seeds were germinating when, on 6 February 1960, 2nd Lieutenant D F Jones was commissioned as a National Service officer and sent to Marchwood for diving duties; he stayed there for fourteen years and did much to develop equipment and drills for the future.

### POSTAL AND COURIER COMMUNICATIONS

THE Army Post Office, always painstakingly built up in wartime, has a history of being reduced to a very attenuated force in peace. When World War II ended large numbers of men were needed to act as occupation troops in ex-enemy countries; there was a continuing commitment to maintain a sizeable presence in Western Europe against a growing threat of aggression from the East and there was an additional requirement for troops to cover the outbreaks of terrorism which seemed invariably to accompany the moves towards independence in many of the colonies of the British Empire. There was no doubt about the need to provide a postal service for the forces overseas, the question was who was to be responsible for it. During the run down of the occupation troops it was sensible to retain the wartime organisation for posts but subsequently it appeared to be taken for

granted that military mail would ultimately be handled by the General Post Office as it always had been in peacetime. Indeed in 1948 correspondence addressed to men in the Far East was diverted to the civil post and with secure lines of communication from the UK there seemed good reason to suppose that the system would be extended to all areas except perhaps places like Korea and Cyprus where, later on, active service or near active service conditions made it necessary to keep a military post office in existence. There were moves from time to time to hand over parts of the service to the civil authority, the Home Depot was always a favourite for this treatment, and another manifestation of the trend was the appointment of a civilian employee of the GPO to the post of Director of Army Postal Services on a part time basis. There was also at least one take over bid by another Corps interested in the communications business but, to the surprise of most people, the RE Postal Services survived and indeed prospered despite it all.

In 1950, steps were taken to recruit a new reserve force to back up the permanent establishment, itself made up of national servicemen and others on short service engagements. The reservists, drawn mainly from the GPO who had served with the Army Post Office in the war were experienced men well able to meet their training and exercise duties, and what is more, capable of taking on an active service role as they did at the time of Suez. That they should have been called upon to do so is an indication of the not altogether satisfactory arrangements made to provide for the day to day work of the Army Post Office, and the difficulty of attracting recruits from the GPO where pay and conditions of service were generally better than in the Army.

However by 1958 the situation had improved and all the signs were that the post of Director of Army Postal Services would once again become a full time military appointment and equally significant that a regular cadre of officers would be formed. The new arrangement, if it came to pass, was expected to contribute to a much better relationship between Army Postal Services and other military establishments without weakening the traditional affinity with the GPO.

A marked change in the fortunes of the Army Post Office took place in 1953 when they became involved in the operation of the Courier Service. In 1920 it was decided to make the signals service responsible for carrying classified documents, allegedly because signals had more bicycles, and although this tale is probably apocryphal, the Royal Corps of Signals was responsible for the carriage of classified material

until 1953. Because of a manpower shortage in the Royal Signals in Germany, the Postal Services was asked to take over the Courier Service in BAOR; it did so, and a system was introduced which was based on the High Value Packet Service used by the GPO, an arrangement providing for the classified documents to be handed over at transfer points against individual receipt and clearly identifying the person last to handle a document at any stage of its journey. The system, called the Security Courier Service, was relatively inexpensive because it was carried on the back of the ordinary postal service and used the same accommodation, personnel and transport. A point not lost on the new operators was that the immediate commitment to provide a fairly easily organised system in peacetime also carried with it the responsibility to give a back-up service for the very sophisticated military radio and telecommunications channels in war, and it would not be difficult to imagine situations in which a courier service would be the only means left for the distribution of messages.

The handling of Army mail remained almost unaltered although one noticeable but hardly significant change was the introduction of the British Forces Post Office number in place of the old *Command style* form of address, which incidentally, dated back at least to the Peninsular War when it was British Forces in Portugal. The new arrangement owed less to the need for greater security than to the chance it gave to simplify sorting arrangements for relatively small forces engaged in almost static roles.

The Corps motto remained wholly applicable to the Postal Service, they were engaged literally everywhere, actively in Korea, and the insurgency campaigns, in important static roles in BAOR and the UK and in small detachments in many places such as Christmas Island, certain British embassies and elsewhere. More detailed accounts of their activities are covered in the various chapters of this history, however, in general terms the work of this branch of the Corps does not excite much comment; unless it is absent.

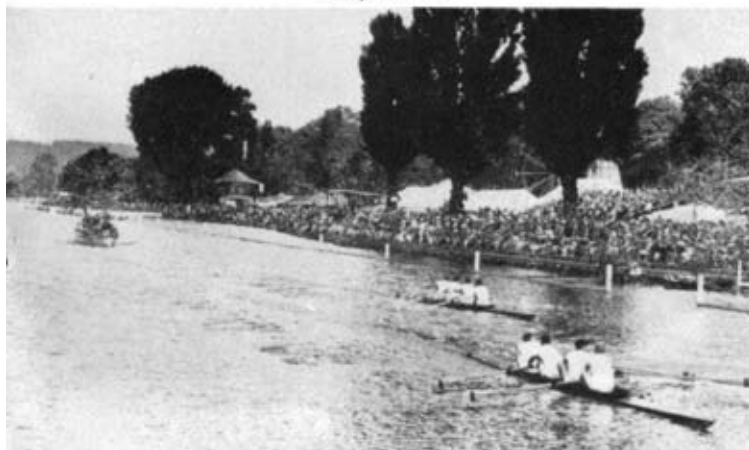
#### HOME POSTAL DEPOT

The Home Postal Depot moved to Sutton Coldfield from its wartime location in Nottingham in 1947, but the stay there was short lived. It became increasingly obvious that the only place in which the Depot could operate successfully was at the centre of postal communications, London. It was, therefore decided to move to the Princes Club in Knightsbridge, premises at that time occupied by No 1 Army Postal Distribution Centre, accepting that the building was uniquely unsuit-



Meander in the Great Bitter Lake 1953

Henley Royal Regatta 1950  
The Royal Engineers pass the finish in the final of the Wyfold Cup 1½ lengths ahead of the Royal Air Force



Meander 1953 & Henley Royal Regatta



Giant Viper being fired from a Churchill AVRE

Churchill Mark 7 AVRE



Giant Viper & Churchill Mark 7 AVRE



**Heavy Ferry on trials in Southampton Water. The docks can be seen in the background, with a troopship in harbour.**

*(By courtesy of the Military Vehicle and Engineering Establishment, Christchurch)*



**Class 30 Light Assault Floating Bridge. Pontoon being launched**



**Class 30 Light Assault Floating Bridge complete, Hameln 1953**

**Heavy Ferry on trials in Southampton Water & Class 30 Light Assault Floating Bridge.**



Coles 7-ton crane unloading stores in the field

Experimental work in rapid road surfacing. Two Howard trains, left and background, and a Brugen train being demonstrated on Somerford Airfield, Christchurch. (By courtesy of the Military Vehicles and Engineering Establishment, Christchurch)



Coles 7-ton crane



able; there was no natural light, the artificial lighting system was poor and overloaded, and moreover there was really insufficient room. Nevertheless it was crucial that the move should be made despite the disadvantages and it took place in April 1948. The staff were billeted in requisitioned houses among the embassies in Eaton Square and elsewhere, and to add spice to their existence, the new recruits were accommodated next door to the home of the CIGS who, legend has it, was a kind and understanding neighbour. It was hoped of course that the move having been made, new and more suitable premises would be found fairly quickly but in the event eight years were to pass before the staff of the Depot emerged from their troglodytic surroundings.

Once established in Knightsbridge, routine work went on without noticeable incident and correspondence for the Army and Royal Air Force overseas was collected into the Home Depot for sorting and despatch, except for those units in BAOR whose mail was sent directly to the Zone Depot in Herford, Westphalia by the civil post. Despatches were made in association with the GPO and the bags were conveyed to airports, docks or railway termini in either depot or civil transport as was most convenient. Towards the end of 1952 a number of WRAC personnel from B Company 12 Battalion WRAC based at Kingston Gate Camp, Richmond Park were employed on general postal duties on the basis of three women for every two male posts; hindsight suggests that this provision was generous.

The search for new premises continued but in 1951 a small but important step forward was made when the General Correspondence Branch and the Postal Training School, along with HQ Army Emergency Reserve (Postal) moved into accommodation at Inglis Barracks, Mill Hill, Depot of the Middlesex Regiment. In March 1956 the Knightsbridge building was vacated, the sorting office then went to modern factory premises in Gorst Road, North Acton, the officers mess remained in the West End, but all other elements of the unit were transferred to an anti-aircraft regiment hatted establishment known as Gunsite Camp. It was very much better accommodation and morale was given a boost; situated alongside HM Prison at Wormwood Scrubs, it was suggested that the troops felt even more cut off from their neighbours there than they had in Belgravia!

After the move to Gorst Road, the Zone Depot in Germany began to hand over the work of sorting BAOR mail to the Depot in UK, but the first phase only of this operation had been completed when a great deal of additional work came the way of the Home Depot as a result of the Suez crisis in 1956. The increase in traffic and a reduction in

despatching outlets caused short term accommodation difficulties at Gorst Road but reasonably satisfactory ad hoc arrangements were made to meet the active service needs. When the Suez affair was over, the final phases of the BAOR take over were completed and by April 1957 the Depot was despatching to over forty destinations in Western Europe.

It was expected that the Gunsite Camp, Gorst Road arrangement would be of about twelve months duration as there was a scheme afoot to provide purpose built accommodation at Whetstone but this idea was overtaken by economy cuts which were indirectly to settle the final location of the Home Depot. The reorganisation of the Infantry which led to the vacating by the Middlesex Regiment of their Depot at Mill Hill, created space which would enable the Postal organisation to come together at Inglis Barracks; the prospect of concentrating almost literally under one roof was exciting and planning began in 1958. It was, however, sad that the opportunity to do so was given by the ultimate disappearance of the Regiment which had fathered the original Army Postal Corps when in 1882 it first saw the light of day as M Company, 24 Battalion, Middlesex Regiment. The wheel had indeed turned full circle.

## CHAPTER XII

### THE RESERVE ARMY

RECONSTITUTION OF THE RESERVE. MILITIA. SUPPLEMENTARY RESERVE AND ARMY EMERGENCY RESERVE. TERRITORIAL ARMY Build up—Changes in Role—TA Golden Jubilee.

#### RECONSTITUTION OF THE RESERVE

A DIRECTOR Territorial Army had been appointed at the War Office shortly after the end of the war and plans were produced for reconstituting a Reserve Army. Account had been taken of both the centres of population as potential recruiting areas as well as of the traditional distribution of Territorial Army centres and units. The Territorial Army began to reform in January 1947; the new organisation consisted of two armoured, six infantry and one airborne divisions which, together with several infantry and one beach brigade, were grouped into three corps.

Thirty-four engineer regiments formed part of the initial order of battle; there were in addition a number of independent squadrons. There were nine divisional engineer regiments in support of the TA divisions, the other units, except for the independent field squadrons supporting independent brigade groups, were formed into eight engineer groups comprising corps, army and construction engineers and commanded by group HQs. The majority of newly formed units were able to draw strength and inspiration from the long traditions of volunteer service in old established units. Most could trace their ties with their pre-war counterparts even if their role had been changed, and some units were able to draw on the pre-1939 volunteers to fill their ranks. A case in point was 101 (London) Field Engineer Regiment, now to be 56 (London) Armoured Division RE and at that time the senior RE TA unit, reformed with 220, 221 and 222 Field Squadrons, successors to the pre-war field companies with the same numbers, and 223 Field Park Squadron. The first CO, Lieut Colonel A R Mais, who subsequently became a Group Commander AER and was Lord Mayor of London in 1972, wrote to officers who had served previously in the units and by June 1947 all senior appointments had

been filled. Nearly all the officers reverted in rank to join, including a captain who had been a wartime CRE of an Indian division. One sapper in 220 Field Squadron who had joined before the war, and who had served throughout the war years in the same company, rejoined his old unit as a Territorial. Other units which had no place in the pre-war TA were raised such as 131 Airborne Engineer Regiment, whose four squadrons were spread throughout Britain; in these cases volunteers were obtained through the energy and enthusiasm of their commanders. Local organisations including branches of the RE Association, many of which were actually started by individuals in TA units, were a useful source of recruits; even so large numbers of volunteers had no previous Sapper experience. The first camps took place in 1948 but overall numbers in many units were still small.

At the end of 1947 the Army Council also approved the raising of Supplementary Reserve (SR) units. Running a SR unit presented a different problem than did a TA unit because the SR had no corporate existence out of camp. Nevertheless for specialised functions it was more satisfactory to maintain a SR unit because the correct balance of trade skills could more easily be obtained from a dispersed area rather than relying upon what could be achieved in the area of a TA drill hall. Many of the SR units raised by the Corps in 1948 were recruited from the railways and large firms. One such unit was 83 Inland Water Transport Regiment manned mainly by Tate and Lyle lightermen. A valuable contribution was made by the Engineer and Railway Staff Corps through whom an appeal was made for applications for SR commissions.

*The Engineer and Railway Staff Corps.* Although this Corps had been overlooked when the Territorial Army was absorbed into the Regular Army in 1939, it continued in existence and in 1943 the function of the Corps was amended "to provide a body of skilled engineers and transportation experts to advise the War Office on such engineering and transportation matters as may be put before it". After the war the Corps set up a technical committee, which produced a draft specification for improved road construction and maintenance. A number of other matters, such as pile driving equipment and the storage and distribution of cement in the field were also referred to the Corps for advice. Although the establishment of the Corps has remained at sixty officers, the expertise within the Corps has been widened to cover more engineering disciplines, and thereby be able to provide advice on almost any engineering or transportation problem that may be put before it. This source of professional expertise which it would be difficult, if not

impossible, to have so readily available by any other means, continued to provide an adjunct of unrivalled value to the Royal Engineers.

Not all reserves were required as formed bodies of troops and, in addition to units, categories of individual reservists were established. There were at this time large numbers of experienced wartime ex-soldiers and a general category, the Z Reserve, was specified to include them. Other categories included the Regular Army Reserve and a Supplementary Reserve of individuals, who volunteered for a recall liability without proclamation. They did not wait long to prove their readiness; reservists were recalled to the colours to go to Korea in 1950, Egypt in 1951 and to Port Said in 1956 as well as for less dramatic occasions.

It is perhaps hardly surprising that the Reserve Army Order of Battle saw modification as time went by; there was a certain amount of adjustment in 1950 after the initial experiences of reconstitution and other changes during the following years reflected the Army's requirement. A comparatively significant policy shift in disbanding the Coastal Artillery Branch in 1957, was to the benefit of the Corps, who were permitted to absorb some of the disbanding Gunner units. Meanwhile in 1952 the name of Supplementary Reserve was changed to Army Emergency Reserve (AER) as being more explicit of the role; it was, however, not until the end of the decade that a major reorganisation began. Designations and lineage of RE reserve units is given at Annex C to this Volume, while a summary of their activities is given in the succeeding pages.

Reserve Army units were well trained and were given active roles in training. The strength of the Reserve was large as their numbers were swelled by national servicemen carrying out their five year part-time training commitment, and in two years, 1950 and 1951, by men of the Z Reserve. Almost all volunteers had seen war service and, later, many national servicemen remained as volunteers so that recruit training as such was hardly necessary and units were geared to plunge straight into major formation exercises, including participation by TA divisions in Exercise SURPRISE PACKET which was mentioned in Chapter I.

## THE MILITIA

THE Royal Monmouthshire Royal Engineers (Militia) has a history going back to 1660 and a record of action in every major war since then. It became a unit of the RE in 1878 and was authorised its own cap badge bearing the Prince's Feathers and two crowns corresponding

to the two Royals in the Regimental title; it remained the senior unit of the Reserve Army, a precedence recognised in Queens Regulations. It did not form part of the reconstituted TA in 1947 but was reformed as SR early in 1948 with 100, 101 and 111 Field Squadrons, even though SR it was administered by the Monmouthshire TA Association, and became TA in 1953, retaining the title Militia. Its late entry into the Order of Battle caused a number of difficulties, not least by having to borrow accommodation, because all drill halls had already been allocated. Determination and perseverance built up its status, helped in 1953 by the granting of the freedom of the Borough of Monmouth.

#### SUPPLEMENTARY RESERVE AND ARMY EMERGENCY RESERVE

THE SR and its successor the AER remained regimentally senior to the TA, as already mentioned. However the units presented a problem because they really existed only when assembled for annual camp; units and pools were therefore grouped under regular HQs tasked with raising, training and administering them. Initial responsibilities were:

Field and Works, and Bomb Disposal until 1952, under the SR Permanent Cadre, at Ripon and administered by HQ 22 Engineer Group TA;

Bomb Disposal, after 1952, with HQ BD Unit, at Horsham;

Resources under 1 Engineer Supply Depot, at Long Marston;

Survey with 13 Field Survey Squadron, at Fernhurst;

Transportation and Movement Control, under the Transportation Training Centre, at Longmoor;

Postal with HQ AER (Postal Services) at Inglis Barracks, Mill Hill.

At about the same time as it shed its BD responsibilities, the SR Permanent Cadre amalgamated with the Engineer Training Centre at Ripon which changed its name to become ETC and HQ AER. In 1959 HQ AER (Field and Works) moved from Ripon to Morval Barracks, Cove and amalgamated with HQ Training Brigade RE.

Apart from the special case of the Royal Monmouthshire Royal Engineers, the first field SR regiment raised was 116 Army Engineer Regiment TA. At about the same time 130 Construction Regiment was formed with Z reservists taking its number from the TA unit which had amalgamated in July 1950 with 107 Corps Engineer Regiment TA. Indeed part of the aim of the SR units raised at that

time appears to have been to provide adequate training for both the Z reservists and the numbers of national servicemen coming forward for their part-time commitment; equally obvious was the anticipated national need for a large reserve as explained in Chapter I. Annual SR camps started at Urebank Camp, Ripon in 1951 and units continued to train there until the move to Cove in 1959. There was a gradual expansion of the SR and units were formed throughout the early 1950's — they are listed in Annex C para 4. A number of smaller units were also raised including works sections and in 1953, two Cs RE (Works).

Two of the Field and Works AER units were mobilised to take part in Operation MUSKETEEER in 1956. 323 Electrical and Mechanical Squadron and 119 Works Section both saw service in Port Said as mentioned in Chapter IV and showed once again the value and necessity of the Reserve Army in an emergency.

In 1957 a further modification of Reserve Order of Battle transferred HQ 25 Engineer Group from the TA to AER to command 116, 139 and 251 Army Engineer Regiments and 570 Army Field Park Squadron. At the same time 126 and 139 Stores Regiments were reorganised to Army Engineer Regiments and 40 CRE Works was formed from 401 Well Boring Troop. By this stage the AER was becoming dependent on volunteer strengths alone because the part-time commitment for national servicemen had been suspended. Following the example of Transportation and Postal AER, units based on sponsorship by civilian organisations were introduced and both Esso in 1957 and BP in 1958 raised bulk petroleum specialist teams in the AER.

Two railway groups, a railway workshops regiment, two port regiments and one inland water transport regiment had been raised as Transportation SR units in 1948 as well as a movement control staff and transportation staff increments. A HQ (Tn and MC) was established at Longmoor for administration; training of these units was centred on Longmoor and Marchwood, though movement control elements also visited various ports in the UK and on the continent. Perhaps the first post-war occasion on which a complete reserve unit carried out its annual training overseas was in 1954 when 264 (Scottish) Beach Brigade TA exercised at Zeebrugge, supported by 167 Port Operating Squadron AER.

The strength of the Transportation reserve had, in the meantime, grown with the formation of 276 Port Regiment in 1952 and the allocation in 1950 of 136 Construction Regiment to a specialist role for railway and port construction.

In 1956 the Suez Canal crisis saw a large scale recall of transportation reservists; the Movement Control staff increment produced 9 Movement Control Group which was deployed to various parts of the Mediterranean area; 81, 82 and 276 Port Regiments were assembled at Longmoor and Marchwood; together with 174 Inland Water Transport (IWT) Squadron and 176 IWT Workshops Squadron of 83 Regiment, port units were deployed to Cyprus, Libya and Malta. 167 Squadron, 81 Regiment was the first unit to leave in August when it was sent to Famagusta, Cyprus, where its first task was the discharge of French ships; soon afterwards 165 and 172 Squadrons of 81 Regiment, were flown to Tripoli and Tobruk respectively. Eventually the whole of 81 Regiment assembled at Famagusta by various routes; there they loaded the vehicles and stores required for Operation MUSKETEER and in due course unloaded them on their return to Cyprus. 82 Port Regiment remained at Longmoor in an air of uncertainty until late October, when the RHQ and a detachment from 173 Squadron left by air followed soon afterwards by the remainder of 173 Squadron by sea; 168 and 169 Squadrons, also moved by sea but did not reach Port Said and were diverted to Cyprus. In Port Said, Lieut Colonel D M Fletcher was appointed Port Superintendent, as well as commanding 82 Regiment, composed of 165, 168 and 169 Squadrons (81 Regiment), 173 Squadron (82 Regiment) and 174 Squadron (83 Regiment). The third AER port regiment, 276 Regiment amalgamated with 35 Corps Engineer Regiment to form a docks operating force as recorded in Chapter IV.

Following MUSKETEER, came a reorganisation to form Port Task Forces (PTF) in both the AER and TA; four PTFs, which were commanded by a colonel were raised, the HQ of 1 and 3 being AER, 2 and 4 were TA, while their units were a mixture of both. 4 PTF was developed from the Scottish Beach Brigade which was a TA formation of all arms under the Amphibious Warfare School, but retained the name Scottish in its title.

The Port Task Forces depended largely on RE units of the AER and TA but included units of many other arms as well. The first to be formed was 2 PTF in January 1957 as a TA unit under Colonel F H Lowman. The outline composition and probable roles had been worked out in the War Office but there was little real experience to fall back on. An extract from a contemporary report read: "Port Task Forces present problems of command and control that are without parallel in the Reserve Army". HQ 2 PTF was given command of both 105 Corps Engineer Regiment TA, destined for 1 PTF, and of



132 Corps Engineer Regiment TA. Despite early difficulties with establishments, equipment tables and training requirements, HQ 2 PTF was ready by August to assume responsibility for all the TA units of other arms and services but there was insufficient time to organise collective training at annual camp. Nevertheless Colonel Lowman ran a weekend study period in May 1957 for officers of both 1 and 2 PTF and further exercises followed in October and November. The whole of 2 PTF camped together at Marchwood in June 1958 mustering over 950 all ranks from thirteen different units. During a three day exercise some 630 tons were off loaded from ships, both at Marchwood Military Port and over Stonepoint Reach, and loaded on rail, or conveyed by road, to transit areas. The ability of the PTF to carry out its role both in the working of small ports and emergency shipment over beaches had been amply demonstrated. A modified concept started in 1959 reduced the PTFs to three in number establishing 3 PTF as part of the UK Strategic Reserve as a mixed regular and AER formation based on the reorganised 17 Port Regiment. 1 PTF based on 81 Port Regiment AER and 4 PTF based on 80 (Scottish) Port Regiment TA, which had reformed from 80 Railway Workshop Regiment in 1956, remained.

The first Engineer Stores Regiment to be formed in the SR was in 1951 followed by others in that year and 1952; several minor units were also raised as part of the Engineer Resources organisation; 751 and 752 Quarrying Squadrons, 401 and 402 Well Boring Troops all came into active existence for the first time with Z reservist training in 1951. Also in that year a resources staff increment was formed with the role of providing a reserve cadre for an Engineer Stores HQ; in 1955 this increment, renamed the Resources Staff Pool, was extended to include men liable for recall in emergency without proclamation. The difficulty of providing really interesting training for an engineer stores unit can be readily appreciated and considerable ingenuity went into special arrangements to find worthwhile tasks. Even so numbers reduced significantly after 1956, which was the last year in which the national service part-time training was enforced; in 1957, units consisted mainly of officers, warrant officers and senior NCOs, with few rank and file. From 1958 all resources units including the staff pool were concentrated for their annual training together.

Other specialist SR units were formed from 1949 onwards for Bomb Disposal, Survey and Postal; none had been included in the initial structure of the Reserve Army.

135 Survey Engineer Regiment TA was raised in London in 1949

as well as two TA independent field survey squadrons. In 1950, six TA field and engineer squadrons were converted to a BD role, and at the same time a regimental HQ and one BD squadron was formed in the SR. Recruiting also started in 1950 for a Postal SR, mainly from the General Post Office which enabled forty SR Postal units to be formed by 1951. Five field survey depots, two field survey sections, three map reproduction troops and 560 Field Survey Squadron were formed in the SR in 1951. 520 and 529 Independent Field Survey Squadrons were transferred from TA to AER in 1953. Training was mostly carried out at Fernhurst with 13 Field Survey Squadron, which was responsible for their administration, but attachment of individuals to the School of Military Survey, or to 135 Regiment during camp, was also arranged. The Survey AER was reduced in 1957 to three field survey depots and two map reproduction troops. One unit, 551 Field Survey Depot was mobilised for Operation MUSKETEER, but the manpower came mainly from 13 Squadron and only one reservist was actually involved.

It had become clear by 1952, when HQ BD Unit UK took over responsibility for AER BD units that the esoteric appeal of BD was not a great recruiting draw in the TA, technical training was a problem, and direction of training by Engineer Group HQs was not easy. Three new AER BD squadrons were raised in 1952 and placed under command of 137 Regiment which had been formed in 1950, and 142 BD Regiment was formed in 1953 with 290 Squadron transferred from the TA and two new squadrons. Two years later three more squadrons were transferred but renumbered; 243 BD Squadron TA transferred almost *en bloc* to become 546 BD Squadron AER; in contrast 272 Squadron, which at the same time converted to a TA construction squadron provided only one volunteer for 548 BD Squadron AER; 572 Squadron TA founded 550 BD Squadron AER; these three squadrons formed 144 BD Regiment leaving only two independent BD squadrons in the TA. Realistic BD training took place during annual camps and live BD tasks were undertaken in 1953 at Marlow where a succession of BD troops from each of the squadrons found and recovered unexploded bombs from a river meadow; again in 1954, 290 Squadron helped in dealing with a large UXB near Portsmouth. Reversion to an all-volunteer status in 1957 provided a stimulus to recruiting.

The AER Postal Section continued to hold a long established popularity in the General Post Office which provided the bulk of the volunteers; in addition a significant number of national servicemen

also volunteered during their part-time service. 289 postal reservists were mobilised for Operation MUSKETEEER to form 371 Postal Unit for 3 Commando Brigade, 372 Postal Unit for 16 Parachute Brigade, 113, 123, 203 and 208 Postal Units and 1 Command Postal Depot. Field Post Offices were established in Port Said, and to reinforce existing facilities in Malta and Cyprus; their work was much appreciated and well commended.

## TERRITORIAL ARMY

### BUILD UP

TA training got into its stride with the first camp in 1948, numbers in units were frequently small and officer working parties were common; in many cases training depended on close liaison with a regular unit, particularly where a specialised role was involved. 113 Assault Engineer Regiment TA, for example, attended annual camp for its first four years with its regular counterpart, 32 Assault Engineer Regiment at Perham Down. Wyke Regis and Halton Bridging Camps were in demand for camps, but new ground was broken for training. A parachute training area used by 131 Airborne Engineer Regiment was Wormwood Scrubs where from the balloon cage a view inside the walls of the prison was possible; on one occasion, in 1948, as part of a national recruiting campaign the regiment parachuted into Hyde Park. All units were concerned with recruiting efforts in the early years and every opportunity was seized to take part in regional shows. 109 Construction Regiment built foot-bridges in 1949 at the Royal Welsh Show at Carmarthen and at Cardiff for the Bath and West Show. 115 Construction Regiment erected a temporary 100 foot span suspension bridge prior to restoration work on Clapper Bridge at Tarr Steps on Exmoor. There were good opportunities too for demolition training in removing many of the wartime defence structures. 105 Corps Engineer Regiment over a period of three years carried out demolitions to improve and extend Middleton St George and Sillioth Airfields and to enable the runway to be extended at Newcastle Airport. In general the press, particularly the local press, gave good publicity to territorial units: one ambitious exercise in 1948 involved 103 Field Engineer Regiment and the Tyne Division RNVF in amphibious landings from a Fisheries Protection cruiser; the first party ashore was unobserved by the assembled press reporters, and were asked to repeat their landing. The build up of the Territorial Army from 1950 onwards was greatly reinforced by national servicemen and

more ambitious training was undertaken as the units swelled to full establishments.

Involvement of RE units in disaster relief has already been mentioned in Chapter I and the TA took a full share of the tasks. 121 Army Engineer Regiment built a bridge at Barbrook, to open the road to Lynmouth in 1952, while 102 Corps Engineer Regiment overbridged the gap in the centre of the former bridge near Winsford in Somerset and built a skeleton bridge at Dulverton for sewage and water mains. In 1953 the East Coast flooding made demands on a number of units; 134 Corps Engineer Regiment and two squadrons of 122 Corps Engineer Regiment were able to give assistance in the repair of flood damage at Aldeburgh.

The training was not only confined to the usual engineer tasks, large scale formation exercises were staged by the TA with all arms participation, including full brigade parachute drops complete with heavy equipment, thanks to the assistance of the US Air Force. Lieut General Sir Philip Neame was Lieutenant Governor of Guernsey, and invited a contingent of 131 Regiment of which he was Honorary Colonel to parachute onto the airport in 1951, as part of the liberation celebrations; thereafter a similar drop was arranged each year but became a water jump into the sea off St Peter Port because of airport congestion. Another unusual task was that of 127 Construction Regiment in relaying and maintaining the historic narrow gauge railway track between Towyn and Tal-y-llyn in 1953. While in the same year 115 Construction Regiment built temporary piers for landing stages in connection with the Coronation Naval Review at Spithead. Many other units took part in local parades and demonstrations for the Coronation and in practical construction of stands and other work in connection with the celebrations.

In 1954, the first cycle of national service part-time training ended and most units had reached their peak strengths, as had the TA as a whole, but recruiting of volunteers remained a high priority and demonstrations featured in most unit programmes. In the Southport Military Tattoo in 1954, 113 Assault Engineer Regiment repeated a most successful display of AVREs in action which they had staged at Chester in 1953 and Liverpool before that. On the same occasion 107 Corps Engineer Regiment demonstrated bridging and minelaying.

#### CHANGES IN ROLE

In 1955 and succeeding years the role of the TA was re-examined in the light of possible nuclear war; the threat of mass air attack had

diminished, but the devastation following a nuclear strike would be out of all proportion to that caused by conventional bombing. There were other considerations including a foreseen end of National Service, the shortening time frame for mobilisation and rundown of the war time reserves of equipment. Anti-Aircraft Command was the first major reduction in 1955; followed by the disbandment of 16 Airborne Division in 1956; except for 44 Independent Parachute Brigade Group (TA) which was retained. Coastal Artillery was disbanded in 1956, and the two armoured divisions of the TA were converted to the infantry role in 1957. It became clear however, that the tasks to be expected of all Sapper units became of greater importance and complexity whether in support of formations overseas or of the Civil Defence in the UK, and Sapper units flourished under the new responsibilities.

The Airborne Engineers had established a reputation and recruiting record which enabled them to survive intact the reduction of the TA Airborne Forces, indeed they extended their sub unit locations to nine, with squadrons in Glasgow, Croydon, Hull and Hendon and troops in Edinburgh, Liverpool, Doncaster, Birmingham and Farnham: the RHQ remained in Chelsea but changed its title from Airborne to Parachute.

New units came to the RE TA from the disbanding formations and regiments; rebadging created problems but such was the enthusiasm for TA service that the training effort for such volunteers was amply repaid. A number of Gunner units became Sapper units and these are listed at Annex C. In Northern Ireland for example 146 (Antrim Artillery) Field Engineer Regiment TA was formed from the disbanding 429 (Antrim) Coast Regiment. The new regiment earned praise for its quick conversion to the Sapper role and at camp in 1957 was told by Lieut General Sir Brian Kimmins late RA, a previous Director of the TA, that the regiment was "jolly good as Gunners; as Sappers you are even better".

Another new TA unit formed in 1956 was 143 Plant Regiment assuming command of 215 and 276 Plant Squadrons from 127 and 115 Regiments respectively, and 291 Plant Park Squadron on conversion from a corps field park squadron in 125 Regiment.

#### TA GOLDEN JUBILEE

With the end of obligatory part-time National Service, units found themselves dependent on volunteer strengths alone; at first this came as rather a shock to many units which had become accustomed to full

establishments; on the other hand, the return to an all volunteer TA was widely welcomed. During 1958, which year was the TA Golden Jubilee, volunteer strengths increased and many regiments had begun to build up towards establishment again. All units became involved in local or national celebrations, the form of local recognition being left much to the discretion of the County TA Associations. In Staffordshire, the Freedom of the Borough of Smethwick was accorded to 127 Construction Regiment TA; in London, the City and County of London T & AF Associations, combined to present a display entitled "Trumpet Voluntary" at the Duke of York's HQ in Chelsea; detachments from 101 Field Engineer Regiment featured Sappers in the Boer War and the mining of Hill 60 at Messines Ridge in the First World War. Displays were given in the arena by 114 and 121 Army and 131 Parachute Engineer Regiments. Static displays were manned by 219 Army Field Park Squadron and 339 Lithographic Squadron.

The Royal Review was held in Hyde Park on 22 June 1958 when representatives from all RE TA units marched past in their command and formation contingents. The torrential downpour which started as the last contingent approached the saluting base could not detract from the impressive display of loyalty and voluntary service.

Other Royal Reviews were held in Scotland when 124 Field Engineer Regiment provided the largest contingent, and, in Northern Ireland; 146 Field Engineer Regiment and 591 Independent Field Squadron took part in the special celebration at which TA units commemorated their own 21st Birthday, as well as the TA Jubilee. The massed bands including 146 Regiment's pipe band beat retreat in Belfast on 3 May and played at the Royal Review when the salute was taken by Her Majesty The Queen. The Jubilee year forms a suitable break in the history of the TA; the history of its Sapper units over the post-war years up to that date serves to confirm the contribution they make to the national defence and to show confidence in their ability to face challenges which lay ahead.

## CHAPTER XIII

### ROYAL ENGINEER EQUIPMENT

THE MILITARY ENGINEERING EXPERIMENTAL ESTABLISHMENT. ASSAULT ENGINEER EQUIPMENT—The Armoured Vehicle Royal Engineers—Assault Bridging. BRIDGING—Light Assault Floating Bridge—Heavy Assault Floating Bridge—Heavy Ferry—Motor Tugs—Extra Wide Bailey Bridge—Heavy Girder Bridge. ENGINEER CONSTRUCTION PLANT—High Speed Crawler Tractors—Challenger Tractors—Medium Wheeled Tractors—Light Wheeled Tractors—Paving Machinery—Soil Stabilization Equipment—Coles Bridging Crane. MINES AND DEMOLITIONS—Anti-Mine Shoe—Anti-Personnel Mines—Mine Anti-Tank No 7—Mechanical Mine Layer—Vipers—Rapid Demolition Devices. WATER SUPPLY AND POLLUTION EQUIPMENT. OTHER EQUIPMENTS—RE Machinery Lorry—27.5kVA Field Generating Set—Pescara-Muniz Air Compressor—Twynham Hut.

This chapter highlights some of the more important Sapper equipments that were either under development or came into service during the period 1948–1960. The difficulties of attempting to cover the complete equipment spectrum are evident when the April 1955 MEEX At Home brochure is examined; the brochure runs to seventy-two foolscap pages of typescript, and includes references to no less than sixty-seven items of equipment under development at that point in time. Equipments that were already in service at the beginning of the period have not been included in the survey.

#### THE MILITARY ENGINEERING EXPERIMENTAL ESTABLISHMENT

Throughout the period, the responsibility for development of engineer equipment rested mainly with the Military Engineering Experimental Establishment (MEEX). The Establishment formed part of the Ministry of Supply having been established at Christchurch in 1919, on the bank of the River Stour, firstly as the Experimental Bridging Company RE, subsequently as the Experimental Bridging Establishment (EBE), and finally since March 1946, as MEEX. At the beginning of the period the Establishment was organised into four groups, the Bridging Group, the Roads and Airfields Group, the Electrical and Mechanical Group, and the Explosives Group, (the

latter working closely with ADE, subsequently ARDE, and then RARDE, at Fort Halstead). Internal reorganisation into two wings and the Explosive Group took place in the early 50's; by 1958 MEXE had expanded to include four wings (Bridging, Structures, Mechanical Equipment, and Pavement Construction) and two groups (Explosives and Research) with corresponding increases in workshop and drawing office facilities.

Chief Superintendents/Directors of MEXE during the period were:

Brigadier G R McMeekan DSO, OBE	Mar 1946-Apr 1950
Brigadier Sir Millis R Jefferis KBE, MC, ADC	Apr 1950-Jul 1953
Brigadier L R E Fayle DSO, OBE	Jul 1953-Dec 1956
Sir Donald C Bailey, Kt, OBE, JP	Jan 1957-Sep 1962

### ASSAULT ENGINEER EQUIPMENT

#### THE ARMoured VEHICLE ROYAL ENGINEERS

To present a complete picture, it is worthwhile, in the case of the Armoured Vehicle Royal Engineers (AVRE), to consider the situation immediately before the period covered by this history.

The AVRE originated as a proposal in 1942 by Lt J J Donovan RCE, following the Dieppe raid. The Churchill tank was considered the most suitable base vehicle for development and subsequently Churchill AVREs were produced combined with: a fascine launching system; an SGB assault bridge launcher, the bridge being carried in front of the AVRE, like a drawbridge; a Bailey Mobile Bridge; or with an 8-ton derrick. A large number of Churchill AVREs were used in Normandy in 1944, and reports on their performance were excellent. Use of the Churchill AVRE and Churchill Bridgelayers with Tank Bridges No 2, No 3, and No 3 MK 2 will be considered in subsequent paragraphs on Assault Bridging.

By 1946 the concept of a unified cruiser/infantry tank was formalized in the requirement for a universal tank, and the A45 was chosen as the basis for a series of AFVs under the designation of FV 201. Sapper variants were to include the following:

- FV 202—A45 AVRE (T)—(turretted);
- FV 203—A45 AVRE (L)—(load-carrying);
- FV 208—Bridgelayers.

By late 1948, the development programme delays were such that it was considered that when the FV 201 entered service it would be incapable of meeting the potential Soviet threat, and the FV 201 series



programme was cancelled in favour of retention of the Centurion, which had entered service in December 1946; the FV 208-Bridgelayer had in any case proved too big to fit into the LCT 8 then in service. Two variants in the series did survive; one was the FV 214-Conqueror, which was a heavy gun (120mm) version, developed to engage an enemy at ranges beyond that of Centurion capability; the Conqueror entered service in 1956, and was the heaviest and biggest gun-tank ever produced in the UK; it weighed sixty-eight tons, and thus directly influenced our military bridge design over a period. The second variant developed was the FV 219-ARV.

With the demise of the FV 202/203 project, work continued on an improved AVRE based upon the Churchill MK 7, and this AVRE underwent troop trial in 1950 with first off production planned for 1952. In fact the AVRE Churchill MK 7 did not come into service until 1954, and in the following year development started at FVRDE on a Centurion AVRE.

The Centurion AVRE basic design was approved in July 1955, the prototype vehicle being delivered in August 1957. The original AVRE was a modified Centurion MK 7 gun tank, with an Ordnance BL 165mm (6.5in) AVRE L9A1 gun capable of firing a powerful projectile with accuracy up to 2000 yards. The 65lb demolition charge projectile contained almost 31½lb of PE4 explosive. The AVRE mounted a hydraulically operated dozer blade, identical to that of the Centurion MK 5 Dozer, with an output in excess of the Caterpillar D8. It could additionally carry a fascine, could haul a 7½ ton four-wheeled trailer (for a fascine or mines) or a Giant Viper trailer, and had a 1½ ton hydraulic winch.

User trials of the Centurion AVRE took place in the late 1950s, but since MK 7 chassis were not available, further trials using the MK 5 took place in the early 1960s. The Centurion MK 5 AVRE entered service with the Sappers in 1963.

#### ASSAULT BRIDGING

As with the AVRE, it is necessary to consider first the period immediately prior to 1948. With the advent of the successful Churchill Tank in the early 1940s, the 34ft (30ft span), Class 60 (T), No 2 Tank Bridge was designed for launching by a Churchill bridgelayer; this was to replace the Covenantor/Valentine scissor launched, Class 30 (T) No 1 Tank Bridge. The No 2 Tank Bridge came into service in 1942 and was launched horizontally, using a pivot arm connected to the centre of the bridge, rather like a javelin.

In 1945 development of the No 3 Tank Bridge was put in hand. This bridge was to be launched in a similar way to the No 2, and indeed was very similar to it, but the width increased from 9ft 6in to 10ft 8in overall, in order to carry the new width tanks. It was further intended to utilize the No 3 bridge for carriage by the Churchill AVRE, to be used and launched in a similar manner to the Mk 2 SBG assault bridge, which had been in service in Normandy. It was intended that the bridge could be towed behind the AVRE using standard axles and suspension, for road towing, and then transferred to the "drawbridge" position at the front of the tank for the assault mode. The twin tracks of the bridge were spaced in order to enable a Jeep to cross the bridge without use of in-fill panels. A limited number of sets of equipment were produced, and in the early 1950s a Mark 2 version of the No 3 Tank Bridge was produced; this version had a road way width increased to 12ft 1in and was classified as Class 80(T).

Meanwhile development of the No 6 Tank Bridge, to be launched by the Centurion tank, was put in hand in 1950. The bridge had an overall length of 52ft, giving a clear span capability of about 45ft; it was 14ft wide and weighed about 6½ tons, being designed to take Class 80(T) loads. It was the first tank bridge to make use of riveted aluminium alloy plate girders, although the material had been used in the experimental 34ft No 4 Tank Bridge in the late 1940s. The bridge was carried on the tank upside down and was launched by rotating the bridge through 180°, in an up and over manner. The gap between the two trackways could then be filled with in-fill panels if required, to provide a fully decked bridge.

The prototype Centurion bridgelay, produced in 1956, was built on a Centurion Mark 7 chassis, but production versions used the Mark 5 chassis, as used for the Centurion AVRE. Deployment and use of the bridge will not be considered here since the bridge did not enter service until 1963.

Brief comment should be made of the Churchill ARK (an acronym for Armoured Ramp Carrier), one of the first specific assault vehicles to be based upon the Churchill tank chassis. In the ARK, steel trackways were fitted to the chassis above the vehicle tracks so that tanks or vehicles could travel over the positioned Churchill chassis and thus clear an obstacle. In the Mark 1 ARK, hinged access ramps were fitted at the rear of the chassis, being used in drawbridge fashion. In the later Mark II version additional hinged ramps were fitted at the front of the chassis and the left hand trackway and ramps were widened

to enable smaller vehicles to cross the deployed ARK. Both Mark I and Mark II ARKs were used in World War II and in Italy the Mark II was produced locally by REME Workshops; since this version differed considerably in detail from those used in NW Europe it was designated ARK Mark II (Italian Pattern), the other being known as ARK Mark II (UK Pattern).

Both versions of the Churchill ARK Mark II were thus in use after the war, but in the late 1940s the proposed development of the FV 202 and FV 203 AVREs included proposals for an ARK version of the new AVRE (L). Unfortunately this project came to nothing when the FV 201 series programme was cancelled in late 1948.

Meanwhile designs for a Churchill ARK Mark III were produced in 1945, but it was not until 1955, ten years later that the Churchill Linked ARK was accepted for production; by 1958 development was put in hand for an ARK based upon the Centurion chassis, and the Centurion ARK (FV 4016) duly came into service in 1965.

## BRIDGING

Immediately after the War, the British Army had in service a number of excellent bridging equipments: such as the Bailey Bridge, used as a fixed bridge, a floating bridge, and even a suspension bridge; the Close Support Raft; the Class 50/60 Raft; the Churchill Tank Bridge No 3; and Folding Boat Equipment.

Further development during the period 1948-58 was influenced mainly by three factors:

(a) a growing consciousness of the advantage afforded the designer by the use of aluminium alloy components for military bridges;

(b) the development of a replacement for the Centurion tank, based upon the FV 200 series, and subsequently known as the Conqueror; At a battle weight of 68 tons, the Conqueror weighed some 18 tons more than its predecessor, and its size and weight made many equipments, such as the Class 50/60 Raft and Standard Widened Bailey Bridge (SWBB) obsolescent; and

(c) to a lesser extent, the advent and use in forward areas of the bridging crane, which influenced the maximum size and weight of equipment components, and speeds of construction.

During the period the emphasis was on development of new floating equipments, with the object of reducing the lengthy construction times for Floating Bailey Bridge and Rafts. Thus the Heavy Ferry and the Light Assault Floating Bridge went into production during the period,

with Heavy Assault Floating Bridge not far behind. The Heavy Girder Bridge, intended chiefly for use on main supply routes, was in production by 1952, and work on a new tank bridge, the Centurion Tank Bridge No 6, was well advanced during the period—all in all an excellent and comprehensive range of new bridging equipments.

#### LIGHT ASSAULT FLOATING BRIDGE (LAFB)

In early 1947 a number of designs for a new Class 24 floating bridge were submitted to the Engineer-in-Chief for his consideration. The bridge was to be rapidly erected over a wet gap to take infantry divisional weapons and light SP anti-tank artillery. In November the Engineer-in-Chief accepted proposals for a through panel bridge type of construction, using bipartite piers at 12ft 6in centres. This early concept was developed subsequently as a Class 30 Light Assault Floating Bridge.

LAFB was carried on 3-ton GS vehicles and special single axle LAFB trailers, each truck and trailer carrying two pontoons, to form one floating pier, complete with panel girder superstructure and decking. Thus each complete transport load provided 25ft of floating bridge. Girders were carried folded down on top of the pontoons, and were raised at 13ft 6in centres before complete piers were launched, thus providing an 11ft wide roadway between kerbs. 2ft 6in wide footwalks were also provided. A special truck and trailer load was required to construct each of the two 27ft 6in landing bays for the bridge. LAFB was the first military bridge to use hydraulic articulators to raise and lower the ramps of a ferry and to adjust landing bays in the floating bridge; in the latter case the landing bay could articulate freely under slow changes of water level, but was locked automatically by the articulator whenever a vehicle crossed. A monorail system was also developed with the object of assisting the transport of equipment to the launching site in cases of difficult terrain.

A Light Assault Raft (LAR) could be formed from the equipment, either at Class 30 (seven close coupled piers), or at Class 12 (four close coupled piers); rafts were propelled by outboard motors.

After mock-up trials at MEXE in 1948, most of the CAD (issue of a CAD signifies a Certificate of Approval of Design, and thus approval of quantity production) action had been completed by 1953, and extensive troop trials in BAOR and Canada followed in 1954. After the inevitable delays the first nine sets of equipment were delivered by March 1958.

Full details of the equipment can be found in *ME Volume III Part VII Light Floating Bridge (1964)*, noting that by the 1960s the term Assault had been dropped from the name, which became LFB.

#### HEAVY ASSAULT FLOATING BRIDGE (HAFB)

Work on HAFB started in the early 1950s, with the object of providing a bridge to cross wet gaps that could supplement the LAFB (at Class 30) and the HF (at Class 80). Thus, the bridge was intended to carry, at Class 80, all divisional transport, and additionally, with some restriction on current speeds and vehicle spacing, Class 100 vehicles.

The bridge was a through-type bridge, with light alloy girders at 18ft centres, carried on tripartite piers, themselves spaced at 17ft centres. The roadway width between kerbs was 15ft, and at each end of bridge 38ft long landing bays, with hydraulic articulators, could cope with a 5ft variation of water level during use. The centre pontoon of each pier was of aluminium construction and was carried, complete with superstructure, on a 10-ton GS truck. The two bow pontoons, originally of plywood construction, but subsequently made of steel, were carried one on top of the other, on a twin axle trailer.

In general, the methods of assembly, launching piers and bridge formation followed very much those of LAFB; the construction sequence could be likened to the factory assembly line, much of the work being completed in pre-assembly areas, using bridging cranes before H hour, thus helping to avoid troop and vehicle concentration at the bridge site, although the landing bays had to be constructed on site. CAD for the pontoons and superstructures was issued in early 1959, and full details of the equipment can be found in *ME Volume III Part VIII, Heavy Floating Bridge (1967)*, noting that, as with LFB, the term Assault had been dropped from the name of the equipment in the 1960s.

#### HEAVY FERRY

The Heavy Ferry was first considered in detail in 1947, as a Class 70 Heavy Raft. It was decided that a bow loading raft had many advantages over a side loading raft and by 1950 construction of a pilot model Class 80 Heavy Ferry was well under way at MEXE. Troop trials followed through until 1955, after delays for various reasons, and first off production was in December 1957.

The raft consisted of:

- (a) four centre pontoons, with hydraulic ramps permanently attached;

- (b) four bow pontoons, each housing a propulsion unit; and
- (c) four buoyancy pontoons.

The various sections were connected together in the water using spring loaded, self actuating linkages to form a free ranging ferry with a 15ft wide roadway, 109ft long from ramp end to ramp end. Four 10-ton GS trucks each carried one bow pontoon, whilst towing one centre (or main) pontoon on a twin axle HAFB trailer. Two 3-ton GS trucks each carried two buoyancy pontoons.

Three different systems of propulsion were tested: the Hotchkiss system; the Gill system; and the Multiple Jet Centrifugal Pump system. That finally adopted was the Gill system, a water jet propulsion unit rotatable through 360°, and driven by a standard Rolls-Royce B80 Mark 5L engine, driving a retractable shaft through a clutch and reduction gearbox.

Full details of the equipment, finally rated at MLC 80(T)/65(W), can be found in *ME Volume III Part IX Heavy Ferry, 1964*.

#### MOTOR TUGS

*The Mark 5 Tug.* This tug was conceived originally in early 1944, to provide a much more powerful replacement for the Mark 3 Tug, mainly for use in the Far East. It was therefore designed around two 30HP Ford V8 engines instead of the one previously used. To make the 22ft long craft air-portable it was made of aluminium alloy, to be broken down into three sections, the two stern portions each containing an engine, drive, and propeller, and a bow portion containing the forward cockpit and controls. Although a prototype was ready for acceptance by 1945, the end of the war removed the urgency and the War Office did not accept the tug for troop trials until 1948, when twelve were ordered. However the engine was outside the post-war standardisation range of engines and did not prove powerful enough for new equipments under development. Gearbox overheating and other problems virtually finished the project and the limited production planned did not materialise.

*The Mark 6 Tug.* This tug was longer (29ft) and more powerful (two Rolls-Royce B80 petrol engines) than the Mark 5, and was developed shortly after, to overcome some of the Mark 5 problems. The Mark 6 was also designed in aluminium alloy, the work being carried out by Messrs Aldous Successors Ltd of Brightlingsea, under a development contract let in 1947. The prototype was planned for early 1949 but was considerably hampered by production delays for some of the light alloy castings and drawings were not finally sealed until 1954.

*The Mark 7 Tug.* This tug meanwhile came up from behind, with acceptance trials completed by January 1953, full CAD by July 1955, and firm orders for twenty tugs placed by April 1957, with a further order for twenty planned. The first four of these excellent tugs were eventually delivered by early 1958. The Mark 7 Tug was of welded steel construction, unlike the aluminium construction used for the Mark 5 and 6 Tugs. Its 25ft 8in length was less than the Mark 6 and it was powered by a single Rolls-Royce B80 Mk 5C petrol engine (120 shp), which gave a maximum speed of 10.7 knots; it was carried on a twin axle trailer, designed to be backed down a ramp into the water until the boat floated off.

#### EXTRA WIDE BAILEY BRIDGE (EWBB)

Early in 1949 it was appreciated that the date of introduction of the new FV 200 Series tank might precede the introduction into service of the Heavy Girder Bridge, work on which had started in 1946. A paper scheme for an improved Bailey Bridge was therefore prepared, and in October 1949 the War Office decided that this new and wider version of the Bailey Bridge would supplant the Standard Widened Bailey Bridge (SWBB) and become the interim period bridge. The bridge was designed at Class 30 and Class 80 for the fixed version and Class 80 only for the floating version.

The bridge, 13ft 9in wide between ribands and 15ft 8in between girders, was a widened version of the standard widened bridge, which became obsolescent, and was made from normal Bailey parts, modified standard widened parts and some specials. Widening was effected by eliminating use of the inner of four girder positions possible with SWBB and introducing an extra line of stringers in the bridge deck. New long chesses and longer swaybraces were introduced, but SWBB transoms were retained, modified to take the extra line of stringers. The deck was strengthened by staggering the position of the stringers which necessitated special long stringers at the ends of the bridge.

The floating bridge (EWBPB) was a widened version of the SWBPB and employed the EWBB as a superstructure on Mark 5 and Mark 6 pontoons.

By 1951 a Certificate of Approval of Design (CAD) had been issued for all new components required, Provisional User Handbooks (PUH) had been produced, and EWBB became the standard equipment bridge for the Army. A full description of the bridge can be found in *ME Volume III Part V Extra Wide Bailey Bridge (1955)*.

### HEAVY GIRDER BRIDGE (HGB)

This bridge was designed to meet the needs of heavy military or civilian traffic on main supply routes. The GS specification was issued in May 1946, and after careful consideration of many different designs, the prototype design was approved in outline in March 1948, to enable detailed design to proceed. MEXE trials commenced in May 1950 and by 1955 forty production bridge sets had been issued, with sixty more sets on order.

The 18ft 10in wide roadway, consisting of alloy deck units supported on high yield steel cross girders, took one lane of Class 100 W/80T traffic, or two lanes of Class 50 vehicles over gaps up to 300ft wide.

Each longitudinal girder was made of high tensile steel panels 12ft 6in long by 6ft deep, connected end to end. Multiple girders could be assembled, and if necessary built in storeys, one above the other, the actual arrangement and number used depending upon the girder strength required. The equipment had the flexibility of a Meccano set and by supplementing it with relatively few special parts it was possible to construct the following:

(a) multi-span bridges consisting of a succession of bridges pinned together at their end posts and supported on a series of intermediate piers;

(b) intermediate piers up to 100ft high;

(c) Class 100 floating bridges.

In daylight, on a reasonable site, a party of thirty men with a crane could have a 100ft bridge built and open to traffic in four hours although two hours has been achieved in a demonstration build.

Trials were completed on the floating version of HGB, using steel quadripartite piers, but eventually it was decided that Storey Uniflote steel pontoons would be utilised to form quadripartite piers if required.

Although in many respects HGB appeared to be a scaled up Bailey Bridge, it introduced a number of improvements:

(a) larger modules allowed faster assembly although a bridging crane was required (but was not essential);

(b) a simple guide system was introduced for rapid alignment of pin holes;

(c) all stores were packaged and banded for rapid handling by crane;

(d) the grillages were much simplified using steel sleepers and adjustable packing.

Full details of the equipment can be found in *ME Volume III Part IV, Heavy Girder Bridge (1979)*.



## ENGINEER CONSTRUCTION PLANT

The requirements for engineer construction plant by the Corps, during World War II and after, were very considerable indeed. However most of the plant procured for the Army is little different to that already in daily use in the civilian construction industry, because of the basic similarity between many military and civilian construction projects. Against that background, the role of MEXE in the plant field involved the testing of civilian equipments to assess their suitability for use in a military environment, recommending suitable modifications, where absolutely necessary; the supervision of development contracts with industry for such modified equipments, including their subsequent testing; and, occasionally, the development of what might be termed "military specials", such as the Medium Wheeled Tractor (MWT) and, in a later period, the Rough Terrain Crane. These brief notes mention some of the items of plant tested at MEXE and subsequently procured for the Army.

### HIGH SPEED CRAWLER TRACTORS

In an effort to produce a crawler tractor capable of travelling at speeds of up to 15mph on roads and whilst moving about airfields, trials were carried out in the late 1940s on a modified International TD Class 2 Tractor and on a modified Allis Chalmers HD 14 Tractor. The modifications to the Allis Chalmers included gearbox modification and the fitting of both spring type and rubber type track pads. In the main the trials were unsuccessful, the tractor proving to be under-powered at higher speeds and also subject to excessive vibration.

Meanwhile, in January 1949, a development contract was placed with Vickers Armstrong to produce a military pilot model of a then new Vickers commercial Size 2 medium crawler tractor. The intention was to make it capable of road speeds of from 12 to 15mph and thus eliminate the need for transporters. In the event the road speeds envisaged were not achieved, but the design evolved and a limited number of direct-transmission versions of what became the Vickers Vigor Tractor (a heavy crawler) were purchased for Army use. A torque converter version of the Vigor was also trialled at MEXE; this had an all-up weight, with angle dozer blade and CCU, of 19.6 tons; was powered by a Rolls-Royce six-cylinder supercharged diesel engine developing 190bhp; used a three-stage torque converter transmission; and had a maximum road speed of 8.8mph.

## CHALLENGER TRACTORS

During the period 1948-58 a number of Challenger Tractors, manufactured by John Fowler Ltd of Leeds, were tested at MEXE and subsequently purchased for Sapper use. Outline details of some models are given below:

Challenger Model	2	3	32	3M3
Bare tractor weight (tons)	6.6	10.3	12.6	12.5
Wt with ancillaries (tons)	8.4	12.5	15.8	15.8
Engine	Leyland 350	Leyland 6 cyl	Leyland 6 cyl	Leyland 6 cyl
Engine (bhp)	65	95	105	115
Transmission	Conventional clutch & 6 speed gearbox	Conventional clutch	Fluid flywheel semi-auto gearbox	Rockford clutch and crash gearbox
Max speed (mph)	7.25	5.7	6.8	6.8

The Challenger 2 tractor was a commercial machine tested as a possible light crawler machine for Army use in the late 1950s. The Challenger 3 was a medium size machine of which a considerable number were purchased by the Army; a development of this machine was the Challenger 32, produced in prototype form in the mid 1950s, and including a fluid flywheel and semi-automatic epicyclic gearbox, similar to that used on the MWT. The Challenger 3M3 was produced as a successor to the 95bhp Challenger 3M2, over which it had several improvements; the more powerful engine and more robust main clutch, hydraulically adjusted tracks and improved engine cooling, air filtration and fuel tankage. Purchase of forty of these machines was planned for the late 1950s.

## MEDIUM WHEELED TRACTORS

The Medium Wheeled Tractor (MWT) was developed with the intention of providing the Royal Engineers with a plant capability that could move at speed with squadron vehicles, without the need to rely on cumbersome transporters.

It was intended as a highly mobile earth moving equipment, capable of operating as a dozer, with performance comparable to that of a Caterpillar D6 tractor; or with a shovel, or of towing a 6-cubic yard scraper. The tractor was developed by MEXE in collaboration with the Daimler Company. Outline details of the early prototypes, which were used on Exercise HOLDFAST, in BAOR in Autumn of 1952,

and also in the reclamation and reconstruction work following the Lynmouth floods in 1953, are given below:

Weight (bare machine)	10 tons
Weight with front end equipments	12½ tons
Overall length	14ft 8in
Engine (diesel, with fluid flywheel and pre-selector gearbox)	Daimler 130bhp
Maximum road speed	30mph

Various delays arose in arranging production and by 1958 Daimler had decided not to proceed with further development or production of the tractor, which was then taken over by Marshalls of Gainsborough. Fifty tractors were ordered, the first ten being fitted with cable operated ancillaries, the remaining forty being capable of accommodating either cable or hydraulic operated ancillaries. The engine was at that time changed to the Leyland 680, developing 117bhp.

#### LIGHT WHEELED TRACTORS

The Light Wheeled Tractor (LWT) was a logical development of the MWT; it was developed to meet a field squadron need for a machine to be used at troop level to assist in a wide range of engineer tasks, such as lifting and moving engineer stores in the field, loading tippers and dumpers, digging field defences, and light dozing.

The Brayloader 430, a commercial 4-wheel drive machine went a long way towards meeting the Sapper requirement, and was sent out for troop trials as a contender for the role of LWT Mark 1, in the late 1950s. Its front end shovel attachment could be used for loading, light dozing and wide excavation, and could be replaced by 25cwt capacity forks or a 22cwt capacity crane hook. For trenching and other excavation the machine was modified to take a commercial hydraulic backacter, the Shawnee Scout, easily removed and replaced in a few minutes.

	Brayloader 430	Brayloader 460
Weight (tons)	6.7 incl Shawnee	8.9
Max speed (mph)	15	22
Engine	Fordson Major Diesel	Fordson 6 cyl Diesel
Engine bhp	55	86
Transmission	—	Torque converter and epicyclic gearbox
Shovel capacity (cu yd)	1.0	1.25

To meet the operational requirement in full, a faster and more powerful machine was needed. This was to be designated as the LWT Mark 2, the only all-British contender for the role being the Brayloader 460; this commercial machine was tested in the late 1950s. Brief details of both machines are given on the previous page.

#### PAVING MACHINERY

Various items of paving machinery were developed in the 1950s, the need to a large extent arising from commitments for the Christmas Island operations. Some of these items are described in outline below.

#### CRUSHING PLANTS

By the early 1950s both Goodwin Barsby Ltd and Frederick Parker Ltd had produced mobile crushing plants, accepted as suitable for service use as possible replacements for outdated American equipments. The machines were extremely large and each of the two component parts needed towing by a vehicle of Diamond T or Matador calibre. The Parker machine was capable of crushing material of up to 14in maximum dimension and then screening it into three grades, over  $\frac{3}{4}$ in,  $\frac{3}{4}$  to  $\frac{1}{2}$ in, and under  $\frac{1}{2}$ in. The output was over twenty-five tons per hour.

A fifteen ton per hour mobile crusher, in a single unit, was also tested, for use in the air portable role. This was the Telesmith crusher, used by the US Army, and manufactured under licence by Pegson Ltd. The machine weighed less than seven tons and yet could handle stone up to 12in in size, crushing down to a minimum of  $1\frac{1}{2}$ in all-in. There was no provision for screening.

#### TARMACADAM PLANTS

To meet the military requirement for a mobile tarmacadam plant capable of producing an output between 30 and 80 tons per hour, various plants were tested at MEXE. Outline details of some are given opposite.

A low capacity plant, the Parker Spotmix (5-9 tons per hour) was accepted for military use, after a number of modifications had been incorporated at MEXE request. This self-contained machine was intended for pot-hole and similar repairs, and was designed to mix either when hitched to its towing vehicle proposed as the 10-ton 3-way tipper, by loading from it, or as a stationary unit, loaded from the ground or by wheeled shovel.

	Parker Starmix 38	Parker Starmix 40	Barber Greene 843
Capacity	30-50tph	50-80tph	30-40tph
Units	Mixer Section (25t)	Mixer trailer (12t)	Aggregate trailer (5t)
	Drier section (10t)	Drier trailer (18t)	Drier/dust collector (8t)
	Fines feed trailer (1½t)	Screen and bin unit (8t)	Gradation unit (7t)
	Ancillaries (4½t)	Ancillaries (2 × 10 ton vehicles)	Mixer trailer (6t)
Power Source	-	One diesel engine	Two diesel engines
Comments	Erected in 12 hrs. Automatic electric control system	Erected in 2-3 days. Tar boiler required (2500 gallons).	Bitumen boiler of 1000 gallons needed.

### PAVERS

Two pavers warrant brief mention. The first is the Barber-Greene-Olding Junior Laying and Finishing Machine; this was developed by MEXE in conjunction with the parent firm, to meet a requirement for a mechanical paver narrower than existing commercial machines; the 9½ ton tracked machine had a travelling trim of only 7ft 6in with air transportability in mind. The second is the Blaw Knox Paver PF 90; the main interest in this machine, from the military standpoint, was its mounting on four pneumatic wheels, thus making it more mobile than conventional tracked pavers; the machine could lay at rates of up to 31 feet per minute, at depths up to 10in, and at a width between 8 and 13 feet.

### THE HIGH SPEED GRITTER—OR HIGH SPEED ROAD SURFACING UNIT

A test rig of this machine, designed to sweep, tar spray and grit roads, in one operation, was demonstrated in the late 1950s. The machine worked at a speed of 15mph, using special spray bars and metering devices to automatically regulate the quantity of tar and grit dispensed. Drawings were produced for a production model, to be mounted on a Scammell chassis, capable of surface dressing over ½ mile of 6ft wide carriageway, at one filling, in under six minutes.

### SOIL STABILIZATION EQUIPMENT

Soil stabilization was a comparatively new science in the 1940's; since the process appeared to offer an enormous step forward in the rapid

production of airfields, airstrips and roads, a project was initiated in December 1948 to develop equipment that could successfully stabilize soil in a single pass.

Initial work involved an American machine known as the P & H Single Pass Stabiliser, which could, with varying degrees of success, stabilize most soils to a depth of six to eight inches; it used either cement or bitumen for stabilization and thus needed support from cement lorries and water tankers, or bitumen tankers. Ancillary equipment used in these early trials included a portable CBR apparatus (CBR is the abbreviation for Californian Bearing Ratio, an empirical measurement of ability to carry traffic), a traffic simulator (used to simulate the passage of loaded 3-ton vehicles over materials to be tested), and a mobile soils laboratory extensively equipped to carry out a whole range of soil tests.

By July 1953 a UK manufactured prototype mixing train had been produced, with troop trials planned for the following year. The train was developed by MEXE in conjunction with Messrs Rotary Hoes Ltd, and in its final form, which was intended for cement stabilization, it included the following components:

- (a) a suitable prime mover, eg Size 2 tractor, operating in very low gear at between 4 and 14ft per minute;
- (b) a primary mixing trailer, to break up the soil to a depth of up to 8in, mix an automatically metered quantity of cement and, if necessary, a metered quantity of water;
- (c) a secondary mixing and impact compacting machine, which included a screed board to level material to required finish and crossfall, and a dropping weights compactor;
- (d) supporting water bowser and cement truck.

At a single pass the train could produce a 6ft wide lane of stabilized soil, 8in deep, at a rate of about 500–700 square yards per hour, depending upon soil conditions. The finished surface required curing for up to seven days and needed protection with a surface dressing or thin carpet of asphalt.

During the period, development of airfield construction equipment and expedients was dominated by the quest to produce good soil stabilization equipment.

Other work for the airfield role included trials on a Pierced Steel Plank (PSP) landing mat, for which a CAD was issued in August 1952, and some development of Prefabricated Bituminous Surfacing (PBS).

### COLES BRIDGING CRANE

The advent of cranes intended specifically for bridging did much to speed up construction times for equipment bridges. Although the use of a crane was not absolutely essential for construction of single storey HGB, its use to handle HF units was essential, and use of cranes enabled considerable pre-assembly of LAFB and HAFF to be carried out away from the bridging site.

The crane in common use was the Coles Crane mounted on the AEC 10-ton 6 X 6 GS chassis. The 30ft jib crane could be slewed through 360°, with a capacity of 7 tons at 9ft 6in radius, or 1¼ tons at 30ft radius. The crane was powered by a diesel engine coupled to a variable speed generator mounted on the crane superstructure. The vehicle introduced an innovation in that it could be steered and driven forward and backward at slow speed from the crane driver's cab in the revolving superstructure, a sight which caused much amusement at demonstrations when the vehicle driver climbed down from the moving vehicle and walked away.

## MINE WARFARE AND DEMOLITIONS

### ANTI-MINE SHOE

The Anti-Mine Shoe was developed to give immunity to a man walking over known types of anti-personnel mines. The shoe was to achieve its effect by distributing the soldier's weight to such an extent that the pressure exerted by the shoe was below that required to actuate the mine.

Various designs were tested during the later stages of World War II and the following years; the result was the Shoe, Anti-Mine, Mk 1. Each shoe weighed about 6lb when dry and had a sole area of about 240 sq in. It was constructed in the general shape of the Canadian racing snow shoe, and had a one inch thick latex foam sole and a stiffened light alloy top plate with a ski boot type attachment to allow the foot to articulate when walking. The sole and top plates were separated by a pneumatic cushion about 2in deep. CAD was issued on 2 June 1954 and the Anti-Mine Shoe was in production by 1955.

### ANTI-PERSONNEL MINES

Initial work on the AP Mine No 6 was confined to improving a war-time design known as the AP No 1, and was not successful, in that early prototypes were easily detected by prodding. The stick type of mine was developed by 1948, relying on the narrowness of the mine

to defeat the prodger. This design, containing 5oz of explosive and being only 1½-1¾in in diameter, went into production in 1950 and quantity production in 1952. Work on the Mk II mine, intended to meet the temperature range clause in the War Office Specification, followed. The height of the mine, including its three activating prongs, was eight inches.

The AP Mine No 7, or Dingbat, was intended to fill the need for a small, low cost mine, that could be rapidly laid in large numbers by hand, on foot or from a vehicle. The mine took the form of a small tin canister, 2¼in in diameter and 1in high; it weighed about 4oz, of which about 2oz was the TNT charge. The exterior was covered with irregular shaped patches of a rough-surfaced neutral coloured material, to break up the outline of the mine and offered a measure of concealment. By 1955 a pre-production run of 10,000 mines had undergone fifteen months of trials and the mine was accepted for service.

#### MINE ANTI-TANK MARK 7

The Mark 7 anti-tank mine was developed with the object of producing a mine that could cut the heaviest known tank track with half the mine only covered by the track, and would at the same time be highly resistant to all known methods of minefield breaching, other of course than hand-breaching.

The mine was of metallic construction, contact operated by a load of approximately 500lb and capable of being laid by hand or mechanical means. The mine was 12½in in diameter and 5½ high, weighing about 30lb, including its 20lb of TNT filling.

A rapid production programme was completed as follows:

Preliminary investigations	Jul 1949
Fuze investigation	Jul 1949-Jun 1951
Explosive trials	Jan-Jun 1950
War Office acceptance trials	Jul-Nov 1951
Production commenced	Mar 1952

*Fuzes.* The mine was used originally with the Fuze, Mine Anti-Tank No 5, a purely mechanical device embodying a time/fuze system actuated by pressure; two operations were needed to fire the fuze, the first bogie of the tank arming the fuze and the second bogie firing it. This two-stage system prevented the firing of the mine by flail, line charge, or mine roller clearance systems. Work was also initiated on a tilt fuze, to produce a firing mechanism operating over the whole width of the tank.



### MECHANICAL MINELAYER

An analysis of effort expended on the various stages of the hand-laying of anti-tank mines showed clearly that by far the greatest proportion of effort was spent in digging the mine hole. With this in mind the development of a mechanical minelayer was put in hand in the late 1940s.

The minelayer developed was a towed machine, consisting of a single axle, two-wheeled chassis, carrying a hollow plough, which could be raised from and lowered into the ground by raising or lowering the chassis itself; this was done through a hydraulic gear driven by a small petrol engine. The plough cut a trench, whilst the mines were fed onto a conveyor belt, armed, and thence down a chute, through the hollow plough, and into the trench; loose soil was returned to the trench by an angled blade at the rear of the machine.

The machine was towed behind a 3-ton supply lorry, carrying 200 mines; this provided enough mines for about thirteen minutes laying, at a rate of one mine every four seconds, the mines being spaced between three yards and twelve yards apart, as required. The supply lorry itself required towing to provide the extra tractive effort, and a Class 2 tractor was used for this purpose. The maximum speed of laying was about 3mph although speeds of up to 30mph could be achieved during road towing.

The original Mark I minelayer was designed to lay the Anti-tank Mark 7 mine only, but the design was subsequently modified in the mid-1950s to ensure that mines of different sizes, including American mines, could be laid.

### VIPERS

Development of various forms of line charge was in progress at the end of World War II. The charges were intended to clear a gap through anti-tank and anti-personnel minefields by making use of explosive blast to detonate the mines.

The official nomenclature for the equipments was the Charge, Line, Mine Clearing No 1 (known as Baby Viper) and Charge, Line, Mine Clearing No 2 (known as Giant Viper). Brief details of the equipments are given on next page.

The Baby Viper Mark I was intended for use against AP mines; it was already in service in 1948, and the Mark II version, modified to eradicate various faults reported by user units, was in production by 1954. Development work on the Giant Viper ceased after World War II, but was resumed in 1948; many initial problems proved

	Baby Viper Mk I	Giant Viper Mk I
Hose diameter	0.625in (id)	2.6in
Hose length	600ft	750ft
Explosive filling	CE/TNT	Aluminized PE2
Filled wt of hose	300lb	3300lb
Explosive wt	28lb	2770lb
Projection method	1 nos 5in rocket motor	8 nos 5in No 9 rocket motors
Width of cleared lane	-	24ft

difficult to solve, but the Giant Viper Mark I was given a CAD in January 1953. Experimental work was then initiated on a Mark II version, to use one 8in Rocket Motor in place of the eight 5in rocket motors used in the Mark I.

#### RAPID DEMOLITION DEVICES

The object of Rapid Demolition Devices (RDD) was to produce means whereby any type of bridge could be effectively cut in the shortest possible time. Two such devices came into service, the RDD (concrete) and the RDD (steel bridges).

The RDD (concrete) relied upon use of a massive overcharge of explosive, using 770lb of standard explosive in a purpose made crate, approximately 5ft X 2ft 3in X 1ft high. The crates or cradles were fitted with rollers and ropes to ease handling problems, and five crates, which formed a 3-ton lorry load, could be placed across a bridge in two minutes; to do this, use was made of a special ramp fitted to the back of the lorry.

The RDD (steel bridges) made use of the demolition charge No 14, known as the Hayrick; this linear shaped charge was 9½in long, 5¼in wide and 10in high; it consisted of a light steel container, filled with 11lb of RDX/TNT, with a shaped mild steel liner. The Hayricks were joined together using 6in nails, RDD Adjustable Links and RDD Clamps, to form a necklace that could be strung around the main girders of a steel bridge, and then initiated using cordtex and safety fuse to cut the bridge members.

The various components of the two types of RDD were given CAD in 1951 and 1952.

#### WATER SUPPLY AND POL EQUIPMENT

ALTHOUGH research and development on various components for Water Supply and POL installations continued during the 1948-1958

period, few major advances were achieved, and these notes do no more than comment on selected items of equipment.

#### 1000GPH LIGHT WEIGHT WATER PURIFICATION PLANT

This equipment was intended for use in the airtransportable role and to be dropped, with its towing vehicle, on the medium stressed platform. It was carried in the ½-ton two-wheeled trailer. Various alternative components for incorporation into the proposed plant, intended to pump, sterilize and filter water, were trialled during the period. These included:

(a) the Clorocel unit, in which chlorine (in the form of sodium-hypochlorite), free oxygen, and a filter powder were injected into the water, the filter powder forming a filter bed on the wire wound filter units, when circulated by the pump;

(b) the Mono pump, which was a self-priming pump with a helicoid steel rotor working in a rubber stator; and

(c) the Megator pump, which was in effect a three-throw single acting ram pump.

Both the latter were driven originally by an ABC light-weight petrol engine, but because of the complexity of this engine and high wear rates on the pumps, the final version used a Coventry Victor Midget engine driving a multi-stage centrifugal pump.

#### LIGHT ALLOY NESTING TANKS

These tanks were produced in the late 1940s, although the actual CAD was not issued until 1955. These conically shaped tanks were made of welded aluminium alloy, and each could hold 500 gallons of water. The 4ft 1in high tanks, weighing 295lb, could be nested, five or six together, for transportation; hoses, stop cocks and other minor items were carried in a separate transport case. The tanks were intended for storage, in the field, of water and petrol, with a dual purpose nozzle suitable for delivery of either.

#### GAS TURBINE PUMPING SET

This prototype pumping set consisted of a centrifugal pump driven by a 60hp Rover gas turbine. This gave a delivery of 300gpm at 100psi, and the set was thus able to discharge over 100 tons of fuel per hour. The total weight of the equipment was about 300lb, about one-sixth that of a conventional pumping set, but fuel consumption was high and the set was very noisy in use.

**LIGHTWEIGHT PIPES**

Various lightweight pipes were examined, with the object of reducing the logistic load and speeding up laying rates. The following table gives some idea of the weight savings achievable by the various alternatives considered, weights being given for twenty foot lengths of pipe.

Pipe Size	Material	Weight
6in	Standard steel	378lb
6in	Light weight steel	146lb
6in	Aluminium Alloy	78lb
6in	Plastic	66lb

The biggest disadvantage of the light alloy pipe was of course its greatly increased cost.

**TEMPORARY STORAGE TANKS**

Perhaps the most interesting development during the period was that of the 10,000 gallon pillow tank. The collapsible fabric tank was developed for the temporary storage of fuel at pipe heads, forward airfields and in maintenance areas. The rubberized nylon fabric material was bonded at the edges to produce a pillow shaped tank when filled, about 40ft long, 14ft wide and some 3ft 9in high. The empty tank weighed about 925lb, and was fitted with vent valves and a filling connector. The CAD for the tank was issued in 1962.

**SHIP TO SHORE LINE**

One last item of POL equipment warranting mention is the Ship to Shore Line, developed to provide a submarine pipeline for the discharge of tankers, from their anchorage into storage tanks on shore. The 8in (id) flexible hose operated at a working pressure of 200psi. It was produced in 25ft lengths, each weighing about 1000lb, and was buoyant when empty so that it could be towed into position and then sunk by pumping fuel through it. It was accepted into service in 1957.

**OTHER EQUIPMENTS****RE MACHINERY LORRY (FV 11102)**

Work on the machinery lorry was started in March 1949 although mock-ups of a proposed layout had been produced in 1947. The object

was to provide a mobile workshop, for production and repair work by Sappers in the field, both forward and in rear areas.

The workshop was mounted on the 10-ton 6 × 4 GS (Albion) chassis; it was completely insulated and could be air-conditioned and/or heated to suit climatic conditions. The main items of equipment installed included:

- (a) a Denham 6½–7in lathe;
- (b) a Pacera 1½in pillar drilling machine;
- (c) a Velox 6in power hacksaw;
- (d) a Grinding machine (8in);
- (e) a Mandrel press (12in);
- (f) a Gas welding kit.

In addition, there were sundry vices, pipe cutters, tools, dies, and so on amounting in all to some 600 items.

The installed equipment was intended to be operated on the new standard voltage range planned for the 3-phase AC towed generating sets, although lighting could be provided from the internal twenty-four volt supply. A CAD was issued in October 1953 with a planned in-service date of late 1955.

#### 27.5kVA FIELD GENERATING SET

The requirements of all three Services for transportable electric power generation had hitherto been met by purchase of generators from trade sources, which often proved unsatisfactory in reliability, capacity and electrical characteristics. With this in mind a wide range of specifications for new generator sets were examined in the late 1940s and early 1950s; this included 2½ and 10kVA single phase sets, a range of 3-phase sets from 2½ to 125kVA capacity, and 3kW, 10kW and 50kW distribution kits.

Not all of these generating sets went to development; work on some started, but was subsequently cancelled (for example the development of the 62.5kVA set was cancelled in 1957), and in some cases commercial sets were purchased to meet the requirement. Some details of the 27.5kVA set are given below as being typical.

The 27.5 kVA three phase generating set was developed to produce a set capable of operating at a wide range of temperatures and altitudes. The set operated at either 50 or 60 cycles, and at 415/240 or 208/120 volts. It was a skid mounted set, suitable for use on the ground, or on its 2-ton 4-wheeled trailer. It was powered by a Meadows four cylinder

diesel engine with an output of 63bhp at 1500rpm, driving a Macfarlane single bearing alternator, flange mounted to the engine.

#### PESCARA-MUNTZ AIR COMPRESSOR

By 1947 two prototypes of a novel type of compressor had been manufactured in UK, and one of these prototypes was tested at Christchurch for use as a possible replacement for existing service equipments. The Pescara-Muntz compressor was originally developed in France; it worked on the free piston principle, employing two opposed pistons in a single diesel cylinder, linked together and each transmitting power direct to a compressor piston. This system of compression resulted in a compact light weight self-contained compressor, able to provide a constant air pressure and thereby increasing efficiency of pneumatic tools.

The first models produced for troop trial in 1950 were developed from the P42 Pescara, a trailer mounted machine producing 100cfm of air at 100psi. The machine was lighter than the TS20 compressor that it was intended to replace and was capable of operation at temperatures from 125°F down to -15°F, or -65°F if arcticised. The early versions used a direct engine drive for the ancillary equipments such as the lubricating oil pump, but subsequently an exhaust gas turbine was used for the secondary drive.

The compressor was issued widely to Sapper units, but although early development work on a large 400cfm, 100psi, lorry mounted Pescara S85 compressor was carried out, the 1958 production of a larger equipment was of the Meadows-Airpump trailer mounted 315cfm compressor.

#### TWYNHAM HUT

The Twynham Hut was developed in the mid 1950s to meet Army requirements for a light hut for semi-permanent accommodation and to replace Nissen, Romney and semi-Romney hutting.

The hut used steel RSJ portal frames, either hot dip galvanised or aluminium sprayed and spaced at 8ft centres to produce the required length. Two span sizes were available, 20ft and 30ft span. Cladding was either of 24swg galvanised steel, 22swg aluminum, or could be improvised using for example, CGI sheeting or canvas. Doors and windows could be placed with simple variation, as required; walls were lined with chipboard, the ceilings with insulation board, and a timber floor was also provided.

Two versions of the hut were produced; the Temperate (or standard)

Hut and the Tropical Hut, which included louvre windows and a verandah. A considerable number of 20ft span huts were produced, but comparatively few of the 30ft span huts, which were to be fitted with roller shutter doors, for use as stores, small workshops etc, were made. It is interesting to note that TWYNHAM was the ancient name for Christchurch.

## CHAPTER XIV

### CORPS SPORTS AND GAMES

Team Games—Water Sports—Athletics—Saddle Club and Drag—Flying and Gliding—Skiing and Mountaineering—Individual Achievements—Rifle Association.

THE war naturally brought many changes to the Army's way of life, but much of the traditional pattern of sports and games, although interrupted, took up again once the war ended. Opportunities for team games had of course continued throughout the war years though the higher levels of competition had to be foregone; even so most theatres ran divisional and other representative teams; there were however no Army, or National competitions. It was the more individual sports and those dependent on special equipment or facilities which suffered most from the war and special efforts were made to get them going again.

During the immediate post-war years the Services in general achieved a very high reputation in sport, helped by national servicemen who not only swelled the overall numbers but included sportsmen of quality. Also during this period official blessing was given to the development of the individual in sporting activities in the widest sense; this long acknowledged factor was given recognition to the extent of providing funds for adventurous training, and opportunities were thereby extended for a greater participation in a wider variety of sporting activities and in particular for the more expensive ones. The trend for a greater breadth of recognised sports was international, but the Corps was in the forefront of many innovations.

It is perhaps invidious to pick out highlights but special mention should be made of three sporting activities and one unit. RE rowing crews won the Wyfold Cup at Henley in coxless fours, three times in seven years (1950, 54 and 56), being the first service crew ever to win in 1950; and in 1954 the RE crew who again won the Wyfold Cup went on to represent Great Britain in the coxed fours in the European Championships at Amsterdam, being beaten in the semi-finals. Corps hockey continued to uphold its pre-war reputation of providing one of the best teams in Britain, three hockey players, D M R Eagan, W



O Green and F O Reynolds were selected to represent Great Britain in the Olympic Games. A sailing event was the venture by J W Bossard who built himself an auxiliary cutter, the *Yam Seng*, in Singapore and sailed it home in a six month trip in 1948; ocean sailing has since become more commonplace but this trip was a considerable enterprise at the time. Finally, the sporting versatility of a small but very athletic unit, 9 Independent Parachute Squadron deserves special acknowledgement; competing at major unit level, the unit consistently reached the closing stages of various Army and command championships.

#### TEAM GAMES

The long established Corps teams in cricket, hockey, rugby and soccer lost little time in restarting and the first post-war fixtures were played in 1946, Figure 1/XIV gives a table of results. The sporting rivalry between the Sappers and Gunners had continued for many years, Figure 2/XIV gives an abstract of results of matches against them including golf, squash rackets, rackets and tennis. It was not often that a Corps soccer team was fielded; the RE Association Football Club ceased to play representative matches in 1952, but unit teams achieved considerable success; the outstanding achievement being the winning of the Army Challenge Cup in 1947 by the RE Depot with a team which included six professional players doing their National Service, Goodson and Kenny of Sheffield Wednesday, Smith of Blackburn Rovers, Boswell and Russell of Gillingham and Shaw of Torquay United, it also included F O Reynolds already mentioned as an Olympic hockey player. RE teams were runners up in the Army Rugby Cup in 1947 and in 1948 but had yet to win the cup. The Corps was invariably well represented in United Services teams, particularly United Services Chatham which had been resuscitated after the war largely by the enthusiasm of the Sappers at Chatham. The Aldershot Services and the Military College of Science teams were also well supported by Corps members.

#### WATER SPORTS

The Corps role required training in watermanship, and a long established competition was the Warren Shield race on the River Medway, in twelve oar cutters, against the Royal Navy. The annual race was started again in 1950 with a variation of the rules to allow the RAF to compete. Results are given in Figure 3/XIV.

In 1950 the RE Rowing Club was established for more sophisticated

rowing and, its successes in the Wyfold Cup have already been mentioned. In addition to racing fours, an RE eight entered the Head of the River Race from Mortlake to Putney in 1957 and 1958. An officer who played a big part in RE Rowing was Colonel P A Adams who was President of the Club for five years from 1953, took part in running the Empire Games rowing in 1958 and became team manager for the British crews to the European Championships in the same year.

Yachting, long a Sapper speciality, had been halted during the war but developed again quickly with the two pre-war Royal Engineers Yacht Club (REYC) yachts, *Ilex* and *Sandia* and four Admiralty prizes of war, *Husky of Gibraltar*, *Overlord*, *Avalanche of Aldershot* and *Torch of Chatham*, on loan. Abroad, the British Kiel Yacht Club had been set up with an ever active RE participation, and the 20-ton ketch *Meander* was available in the Middle East. Marchwood was established as the South Coast REYC centre in addition to the traditional home at Upnor. Furthermore a number of 14-foot RNSA dinghies were becoming available, notably at Chatham and Marchwood and sailing in these and other dinghies became popular. The Clutterbuck Trophy races against the RAYC for small craft were revived in 1949. Both in the offshore racing programme with the Club yachts, in which an impressive record of prizes was achieved, and in dinghy sailing there was much activity. New competitions were introduced; the Fryer Cup for a champion helmsman in the REYC was started in 1952 and sailed at Seaview in Mermaids; the Turner Cup competition started the same year for racing 14-foot RNSA and 12-foot dinghies. In 1954, a new competition for 14-foot RNSA dinghy racing was started at Chatham between the Royal Navy and the Corps, for the *Ilex* Trophy, a silver model of *Ilex* presented to the Corps by HMS *Ilex* in 1937. Other competitions were entered and four Sapper officers sailed a naval whaler from Sheerness to Calais in 1952 in an attempt on the Nelson Trophy awarded annually by the Royal Navy for the best week-end cruise in a ships boat; a mishap on the French coast and gale force winds in the English Channel prevented their return to the Medway within the time limit of the week-end thereby forfeiting their entry.

The REYC fleet was improved by the transfer of *Maglona* from REYC Gibraltar in 1949, and the purchase of new racers: *Right Royal* in 1951, *Saga of Chatham* in 1954 and *Annasona* in 1955. Two of the ex-German Admiralty prize yachts were handed over, *Husky* was returned to the Admiralty, *Overlord* to the RASC; and the other

two were transferred to the REYC Germany, where they continued to be sailed by Sapper crews in the Baltic under the auspices of the British Kiel Yacht Club. A table of the REYC yachts and racing results is shown in Figure 3/XIV.

As well as their enthusiasm for rowing and sailing there were a number of individual Sapper representatives for swimming and water polo at Army level, but there were no successes in the team swimming, diving or water polo events.

#### ATHLETICS

In the Olympic Games of 1948, R A Morris ran in the 1500 metres and D C Pugh in both the 400 metres and the 4 × 110 metres relay. Morris represented the British Empire that year against the United States in the one mile relay; he also won the Army mile in 1949 and 1950.

Road walking was started in the Army as an athletic event in 1946, but discontinued in 1950 because of lack of support. It is interesting to note that WO1 A Pullen, subsequently Editor of *The Sapper* for many years, took up this sport although over forty years of age at the time and won the Army 7 miles road walk three years in succession from 1948 to 1950, establishing an Army record of 55 minutes 10.4 seconds for the event. Another noteworthy performance was that of E W Denison who in the Reading Marathon in 1950 was 2nd to that great runner J T Holden of Tipton Harriers. Denison was the Inter-Varsity 3 mile champion in 1931, and Army 3 mile champion in 1933-34; he represented England in the European Games Marathon at Brussels in August 1958, at the age of 49, a remarkable tribute to his fitness.

The Corps had few team victories in athletics; 3 Training Regiment was runner-up in the Inter-Unit Athletic Championships both in 1953 and 1958. However, perhaps even more important was a remarkably consistent level of representation towards the top of the league. For example, in 1952, out of eight teams in the finals of the Army Athletics at Aldershot, five teams were Sappers. That versatile unit 9 Independent Airborne Squadron won the BAOR Tug of War in 1948-49.

#### SADDLE CLUB AND DRAG

Riding was started again at Chatham in 1949 under two great enthusiasts, the Commandant, B C Davey, and A Collins when the Corps Saddle Club bought twelve horses. The following year the RE Drag was revived; its opening meet taking place on 7 November 1950,

and its first Point to Point, at Hollingbourne in March 1952. In 1958 the Saddle Club entered a team for the Royal Tournament show jumping competition and one member, N H Thompson, completed the fastest clear round of the day. In Germany too, riding was an active Corps sport and the RE Hunt BAOR was formed at Osnabrück in 1951; it became a Drag after the restoration of Sovereignty to Germany in 1955 when it became illegal to hunt foxes.

### FLYING AND GLIDING

There was much enthusiasm for both flying and gliding after the war and as an initiative to build up a flying club, subsidies of £10 were offered by the Games Fund to any member of the RE Flying Club who obtained his "A" licence, the sum represented about a quarter of the cost in those days. In June 1949 the Corps bought its first aircraft a Miles Magister which was housed at Rochester. This aircraft was replaced by an Auster Autocrat *George Fox* in 1953 and a second aircraft a Tiger, *Fox Charlie*, bought from the RAF for £50 was acquired later that year; it was lent to BAOR to 23 Field Engineer Regiment at Dortmund. Corps pilots were both active and adventurous and it was not long before *George Fox* became well known in both Paris and Le Touquet. In 1954 it became the first foreign aircraft to finish in the Foire de Paris Air Rally and also won *L'Escale*, the International Challenge Cup at Le Touquet.

An illustration of liaison between the RE Sports and Games Clubs arose in 1953 when the skipper of *Right Royal* for the Dartmouth to Benodet Race fell sick just before the start. The only other available skipper, W H G Hamilton was at sea in *Overlord*; J H S Bowring, also incidentally an REYC skipper, flew a Flying Club aircraft to find *Overlord* at sea and dropped a message in a bottle; *Overlord* put into port and *Right Royal* got her skipper in time for the race, it is gratifying that she then won.

Gliding also started, first at Topcliffe, and then when the SME re-established at Chatham, the Gliding Club moved to Detling: in Germany an RE Gliding Club was formed at Hameln. Initial training was carried out by solo flights from scratch by means of ground slides graduating on to Kirby Kadet gliders. The Club also owned a Gull for the more advanced students. It was not until 1952 that a two-seater Prefect was acquired and dual instruction could be undertaken. Over fifty members obtained their "A" and "B" certificates and a sprinkling of "C" certificates were achieved.

In 1950, and 1951 the Flying and Gliding Clubs combined to run

an RE Air Day at Detling the first year, and a more ambitious venture at Rochester in 1951. Over 7000 spectators turned up at Rochester to watch demonstrations of flying, gliding, aerobatics, air supply and parachuting.

There were however considerable financial difficulties with the high costs of maintenance of aircraft and in June 1955, Short Brothers at Rochester terminated the maintenance agreement. The aircraft were sold and the system of subsidies by the Games Fund to prospective pilots was reinstituted. The financial draught which reduced the Flying Club activities in 1955 also had its affect on gliding and an amalgamation was achieved with the Kent Gliding Club so that gliding remained an option to members of the Corps.

#### SKI AND MOUNTAINEERING

The Ski and Mountaineering Club was formed in 1948 to encourage exploration in mountain and arctic regions and to organise activity in mountaineering and skiing. The spirit of the club was found in numerous meets in Scotland and in Wales, but the real achievements during this period were perhaps in arctic exploration. M I Sparrow accompanied an expedition to Ellesmere Island in the Canadian Arctic, G R Fletcher to North Greenland and W Scott-Monterieff and P J Hunt with Oxford University expeditions to North East Land and to Spitzbergen; there were many others, too numerous to list, indeed it seemed almost that a Sapper was an essential ingredient to a well found expedition. An adventurous attempt was led by Major General H Williams, then E-in-C of the Indian Army to climb Mount Kamet (25,447 feet) the second highest mountain in India; this attempt in 1952 failed, the party were halted 600 feet from the summit by very bad snow conditions. In October 1951 R F Finch and A E L de Watteville climbed the fourteen 4,000 foot peaks in the Grampians in twenty hours, breaking the previous record by over one hour. RE teams entered the Army Ski Championships regularly from the first meeting in 1948, and in 1952 A W Petrie captained the Army Team in the Inter-Services events.

#### INDIVIDUAL ACHIEVEMENTS

In a number of other sports there were notable achievements both in individual success and in representative meets and games. It would be of little general interest to detail each sport in turn but a list of individual successes and of those who represented the Army and were in National teams at their sport is shown in Figure 4/XIV.

## RIFLE ASSOCIATION

Skill-at-Arms is a separate activity from the Army Sports Control Board. It is nevertheless correct to include activities and successes of the RE Rifle Association in this chapter. The first post-war Corps Rifle Meeting was held at Longmoor in 1948: there were 230 entries and A J Whitcombe became the first individual champion. The Corps then sent twenty competitors to the Army Rifle Association meeting at Bisley, of whom six won their way into the Army Hundred; and 1 Training Regiment took third place in the Britannia Trophy. R E H Finch was Captain of the Cambridge University Rifle Team in that year, and in 1949 he distinguished himself further at the National Rifle Association Meeting at Bisley by getting top score for the Army—142 out of 150 points. In 1950, the entry for the Corps Rifle Meeting at Longmoor increased to 410 as well as forty-two squadron teams; Mitchell of 2 ESD won the individual championship this time. Again the Corps entered the ARA Meeting at Bisley, gaining eight places in the Army Hundred; the SME team took 2nd place both in the Britannia Trophy and Brooke Bond Cup. In 1953 and 1954, D C Merry represented the Army in the Inter-Services matches and qualified for the Queen's Hundred in the NRA Meeting at Bisley.

During this period in BAOR the standard of Corps shooting was very high; 37 Corps Engineer Regiment won the Wavell Cup and Northern Army Group Shield in 1954 and 1955. There were also five RE members, including the captain, R S Rowlands, in the Northern Army Group VIII which won the Small Bore Championship in 1954.

In the ARA Meeting in 1953, C M Ellis won the Cup for the Champion Young Officer of the Army: J S Symons emulated this feat in 1955. I Fitzgerald won the XXX Cup for pistol shooting the same year, and J R Hill carried on the good work by retaining it for the Corps in 1956. But undoubtedly the outstanding Corps rifle shot for very many years was R Dann of the SME who finished 2nd in the Army Championship at Bisley in 1954, a feat not equalled since 1922. He also won the Regular and Territorial Army Cup at the NRA Meeting, and shot for the Army in the Inter-Services matches.

## 1. TABLES OF RESULTS. CORPS TEAM MATCHES

SEASON	CRICKET			RUGBY FOOTBALL			HOCKEY		
	Won	Lost	Drawn	Won	Lost	Drawn	Won	Lost	Drawn
1946	2	1	2	3	1	-	4	2	0
1947	2	3	6	3	3	-	13	6	2
1948	5	1	3	5	2	-	14	7	1
1949	8	1	2	4	2	1	10	14	10
1950	4	3	4	3	1	2	15	4	9
1951	6	3	2	2	5	-	18	5	4
1952	6	-	7	2	1	-	21	3	6
1953	3	3	5	2	4	-	18	3	8
1954	2	5	2	3	1	1	17	10	2
1955	4	3	4	4	2	1	13	11	5
1956	2	3	4	4	2	1	13	8	10
1957	2	2	4	2	3	-	9	13	7
1958	5	1	5	2	2	-	13	11	3

## 2. MAJOR COMPETITION SUCCESS BY RE UNITS AND TEAMS

1946	Unit Challenge Cup Golf	RE Northern Command
1947	Army Challenge Cup Association Football	RE Depot
	BAOR Rugby Cup and finalists Army Rugby Cup	RE Hameln
1948	Army Inter Unit Hockey Tournament	10 Headquarters Regiment
	BAOR Rugby Cup and finalists Army Rugby Cup	9 Airborne Squadron
1949	Caribbean Area Hockey Cup	RE Works Caribbean (average team age 38)
	Inter Regimental Tennis Doubles	
1950	Boys Army Football Association Cup	RE Boys Aldershot (total unit strength 30)
	Wyfold Cup (Coxless fours), Henley	
	Inter Regimental Tennis Doubles	
1951	Boys Army Football Association Cup	RE Boys Aldershot
	Inter Regimental Tennis Doubles	
	Corps Team Championship Skiing	RE British Troops Austria
1952	MELF Rugby Cup	9 Airborne Squadron
	MELF Hockey Cup (shared after two periods of extra time)	9 Airborne Squadron
1953	Fencing Team Championships	3 Training Regiment
	MELF Hockey Cup	Engineer Base Group
	Unit Slalom Skiing	RE British Troops Austria
	440 yards Relay Army Athletics	3 Training Regiment

- |      |  |  |
|------|--|--|
| 1954 | Wyfold Cup, Henley<br>Army Golf Challenge Cup  | RE BAOR  |
| 1956 | Wyfold Cup, Henley<br>Dismounted Units Team Riding Event BAOR<br>Army 100 miles Cycling Race   | 21 Field Engineer Regiment<br>4 Training Regiment                            |
| 1957 | Cycling, Army Inter Unit Challenge Cup and<br>25 mile, 100 mile and Cross Country Army<br>Races<br>BAOR Association Football Cup<br>Aldershot Football Association Cup (open to<br>civilian teams) | 1 Engineer Stores Depot<br>23 Field Engineer Regiment<br>6 Training Regiment |
| 1958 | Cycling, Army Inter Unit Challenge Cup, 25<br>mile, race and hill climb  | 12 SMF Regiment  |
| 1958 | Cycling, Army 50 mile and 100 mile races<br>Aldershot Senior League Association Football<br>Challenge Cup  | 1 Engineer Stores Depot<br>3 Training Regiment                               |



*Figure 2/XIV*

## ABSTRACT OF RESULTS OF MATCHES AGAINST THE ROYAL ARTILLERY

## 1. MATCHES UP TO 1958 SEASON

First Match	RUGBY			GOLF	LAWN		SQUASH
	CRICKET	FOOTBALL	HOCKEY		TENNIS	RACQUETS	RACQUETS
	1864	1887	1912	1895	1949	1930	1894
Played	125	36	35	52	7	23	35
Won	37	19	24	30	3	5	19
Lost	41	14	4	19	2	18	16
Drawn	47	3	7	3	1*	0	0

\*(Abandoned)

## 2. POST WAR RESULTS

## SEASON

1946	D	L	W	-	-	W	-
1947	D	W	W	W	.	W	.
1948	D	W	D	W	.	L	.
1949	W	D	D	W	L	W	W
1950	D	W	W	W	.	L	W
1951	D	L	W	W	.	L	-
1952	D	W	W	W	-	W	-
1953	O	L	W	W	-	L	-
1954	L	W	W	L	L	L	-
1955	D	L	W	W	W	L	-
1956	L	L	D	L	W	L	-
1957	D	L	L	L	W	L	-
1958	D	W	O	L	Rained off	L	.

Note: For the Winner Sports the year of the season is the year in which the season starts, eg 1949 season covers the Winter 1949/50

## 1. REYC YACHTS (HOME AND GERMANY)

YACHT	IN REYC		DESIGNER	DIMENSIONS				
	BUILT	SERVICE		Tons TM	Length WL	OA	Beam	Draft
<i>Annasona</i>	1955	1955-	Robert Clark	7	24.1	32.5	8.0	5.8
* <i>Avalanche of</i>								
<i>Aldershot</i>	1936	1947-	Kroger	26	39.1	56.0	11.3	7.5
* <i>Husky of</i>								
<i>Gibraltar</i>	1937	1947-1950	van Hacht	34	42.2	60.2	13.2	8.1
<i>Ilex</i>	1899	1926-1950	C E Nicholson	20	41.5	51.0	10.4	7.5
<i>Maglona</i>	1923	1949-	G A Lennox	5	21.0	29.5	7.6	4.2
* <i>Overlord</i>	1936	1947-1954	Rasmussen	27	38.7	58.0	11.4	7.3
<i>Right Royal</i>	1951	1951-	Robert Clark	11	28.6	39.2	9.0	6.5
<i>Saga of Chatham</i>	1926	1954-	Wm Fife	5	23.1	35.5	6.6	5.3
<i>Sandha</i>	1936	1936-1954	D Hillyard	4	19.9	21.0	9.0	3.5
* <i>Torch of</i>								
<i>Chatham</i>	1936	1947-	Gruber	10	28.0	40.8	8.5	5.7

\*Denotes prize yacht

Note: In addition *Asgard* and *Koenigin* were requisitioned for REYC Germany.

## 2. ROYAL OCEAN RACING CLUB POINTS CHAMPIONSHIPS

YEAR	CHAMPIONSHIP POSITION OF		POSITION OF REYC CLUB YACHTS		
	REYC	CLASS I	CLASS II	CLASS III	
1949	3				
1950	1	<i>Overlord</i> 2nd			
1951	4	<i>Overlord</i> 5th			<i>Right Royal</i> 3rd
1952	1	<i>Overlord</i> 2nd			<i>Right Royal</i> 1st
1953	6				<i>Right Royal</i> 3rd
1954	4	<i>Overlord</i> 4th			<i>Right Royal</i> 1st
1955	3				<i>Annasona</i> 3rd
1956	2		<i>Right Royal</i> 4th		<i>Annasona</i> 5th
1957	12				
1958	15		<i>Right Royal</i> 5th		

Note: REYC Yachts only mentioned if they were within the first six positions in the individual points championship.

## 3. SUMMARY OF OCEAN RACING RESULTS 1948-58

YACHT	OPEN DIVISION PRIZES				OCEAN RACING MILES SAILED
	1ST	2ND	3RD	4TH	
<i>Annasona</i>	2	-	1	1	3,300
<i>Avalanche of Aldershot</i>	3	-	1	2	3,900
<i>Overlord</i>	1	4	4	1	8,800
<i>Right Royal</i>	6	5	4	2	10,700
<i>Torch of Chatham</i>	2	1	-	1	2,800
<i>Requisitioned Yachts</i>	-	1	-	2	1,000
<b>TOTAL</b>	<b>14</b>	<b>11</b>	<b>10</b>	<b>9</b>	<b>30,500</b>
<b>PREVIOUS TOTAL UP TO 1948</b>	<b>3</b>	<b>3</b>	<b>7</b>	<b>1</b>	<b>16,200</b>

## 4. OCEAN RACING PRIZES, OPEN DIVISION WON BY REYC CLUB YACHTS 1948-58

YACHT	YEAR	RACE	PRIZE CLASS		SKIPPER
<i>Annasona</i>	1955	Plymouth to La Rochelle	1st	III	M E Tickell
do	1955	La Rochelle to Benodet	1st	III	M E Tickell
do	1956	Cowes to Plymouth	1st	III	P R Chaworth-Musters
do	1958	West Mersea to Ostend	3rd	II	R L Meyler
<i>Asgard</i>	1950	Copenhagen to Kiel	4th	I	A B Bayton-Evans
do	1951	Kiel to Copenhagen	4th	I	W G Fryer
<i>Avalanche</i>	1949	Fastnet	4th	I	E F Parker
do	1950	Portsmouth to Harwich	1st	I	R G H Phillimore
do	1950	Cowes to Dinard	4th	I	L R E Fayle
do	1952	Marstrand to Copenhagen	3rd	I	G W Duke
do	1952	Copenhagen to Kiel	3rd	I	G W Duke
do	1953	Kiel to Skagen	1st	I	J C F MacCarthy-Morrogh
do	1955	Kiel to Marstrand	1st	I	K N Wylie
<i>Königin</i>	1950	Arendal to Copenhagen	2nd	I	E F Parker
<i>Overlord</i>	1948	Harwich to Kristiansand	2nd	I	E F Price
do	1948	Cowes to Dinard	4th	I	D W Price
do	1949	North Sea	3rd	I	E F Parker
do	1949	Ostend to Solent	3rd	I	H S Francis
do	1949	Plymouth to La Rochelle	3rd	I	J H Gillington
do	1950	Solent to Plymouth	2nd	I	K N Wylie
do	1950	Plymouth to Santander	3rd	I	D W Price
do	1950	Santander to Belle Ile	2nd	I	D W Price
do	1954	Cowes to Dinard	1st	I	G B Napier
<i>Right Royal</i>	1951	Bournemouth to Cherbourg	3rd	III	E F Parker
do	1951	Channel	3rd	III	J C Woollett
do	1951	La Rochelle to Benodet	1st	III	M E Tickell

do	1952	Southsea to Harwich	1st	III	J C Woollett
do	1952	Cowes to Dinard	3rd	III	W V Temple
do	1952	Southsea to Brixham	1st	III	L R E Fayle
do	1952	Brixham to Santander	2nd	III	J G Winkles
do	1952	Santander to Belle Ile	4th	III	J G Winkles
do	1953	Southsea to Harwich	1st	III	J C Woollett
do	1953	Dartmouth to Benodet	1st	III	W H G Hamilton
do	1954	Channel	2nd	III	L R E Fayle
do	1954	Wolf Rock	1st	III	L R H Coney
do	1954	Brixham to Belle Ile	2nd	III	M E Tickell
do	1955	Southsea to Cherbourg	2nd	III	H Carington Smith
do	1956	Cowes to Dinard	3rd	II	P H Brazier
do	1958	Channel	4th	II	K N Wylie
do	1958	Ryde to Brixham	2nd	II	W G Fryer
<i>Torch</i>	1948	Plymouth to Belle Ile	4th	II	P N M Moore
do	1950	Channel	2nd	II	M E Tickell
do	1951	North Sea	1st	II	R C Orgill
do	1955	Kiel to Marstrand	1st	II	R P H Langrishe

## 5. WARREN SHIELD RESULTS

1950	HMS <i>Neptune</i>
1951	HMS <i>Neptune</i>
1952	11 (SME) Regiment
1953	33 Junior Officers Course SME
1954	11 (SME) Regiment
1955	11 (SME) Regiment
1956	Officer Cadet Squadron SME
1957	RN Gunnery School
1958	HMS <i>Pembroke</i>

*Figure 4/XIV*

## 1. INDIVIDUAL SPORTING SUCCESS. ARMY COMPETITIONS

1946	Squash Rackets	G O M Jameson
	Athletics—Putting the Weight }	E Hudson Bennett
	Athletics—Javelin	
1947	Squash Rackets	D I Burnett
1948	Downhill Skiing	S Parkinson
	Athletics—440 yards	A Scott
	Athletics—7 miles road walk	A Pullen
	Swimming—440 yards free style	E Hill
	Army Plate Tennis	D H Wheeler
1949	Squash Rackets	D I Burnett
	Athletics—1 mile	R A Morris
	Athletics—7 miles road walk	A Pullen
	100 yards free style swimming (Boys)	B Humphries
1950	Golf	W H H Aitken
	Army Plate Tennis	J E L Ainsley
	Inter Regimental Tennis Doubles	{ M D MacLagan
		{ R H Marshall
	Squash Rackets	D I Burnett
	Athletics—1 mile	R A Morris
	Athletics—7 mile road walk	A Pullen
	100 yards free style swimming (Boys)	B Humphries
1951	Athletics—Javelin	R Stead
	Inter Regimental Tennis Doubles	{ M D MacLagan
		{ R H Marshall
	Cycling 1000 metre Track Time Trial and Sprint	R F Brotherton
1952	Middleweight Boxing (Officers)	F J Edwards
	Featherweight Boxing (Boys)	D Lockett
	Inter Regimental Tennis Doubles	{ D W Reid
		{ J M S Cole
	Veterans Tennis Singles	G O M Jameson
	Athletics—120 yards hurdles }	A J Symons
	Athletics—220 yards hurdles }	
	Athletics—440 yards hurdles	B A R Thomas
	Athletics—880 yards (under 17½)	J White
	Cycling Sprint	P R Smith
1953	Best All-rounder Skiing	L J Blackburn
	Golf	K H Stevens
1954	Athletics—100 yards	C B Naylor
	Athletics—Hammer	W R Russell
	Athletics—440 yards hurdles	B A R Thomas
	Veterans Tennis Singles }	G O M Jameson
	Veterans Squash Rackets }	

1955	Athletics—100 yards	A Breaker
	Athletics—1 mile	L A C Cheesman
	Athletics—220 yards	B A R Thomas
	Athletics—440 yards hurdles }	
	Veterans Tennis Singles	G O M Jameson
1956	Light Middleweight Boxing	T Batterham
	Flyweight Boxing	A Ambrose
	Army Plate Tennis	J E L Ainsley
	Veterans Tennis Singles }	G O M Jameson
	Veterans Squash Rackets }	
1957	Lightweight Boxing	A Peacock
	Bantamweight Boxing	A Ambrose
	Veterans Squash Rackets	G O M Jameson
1958	Light Middleweight Boxing	N Axeford
	Athletics—Putting the Weight	R Guest
	Athletics—1500 metre steeplechase (Junior)	R Kenny
	Veterans Squash Rackets	G O M Jameson

## 2. MEMBERS OF THE ROYAL ENGINEERS REPRESENTING NATIONAL AND ARMY SPORT

(Those serving at the RMA Sandhurst or Army Apprentice Schools at the time are not included)

### a. REPRESENTING GREAT BRITAIN IN OLYMPICS

1948	W O Green	Hockey
	R A Morris	Athletics
	D C Pugh	Athletics
	F O Reynolds	Hockey
1952	D M R Eagan	Hockey

### b. NATIONAL REPRESENTATION

1948	W O Green	England	Hockey
	(also 1949 1950 1951)		
	F O Reynolds	England	Hockey
	(also 1949 1950 1954)		
1954	T M Ailee	Great Britain	Coxed Fours
	R Barrett		
	D H McLellan		
	M S Atkins		
	T St J Yates (cox)		
1955	R C Bazley	England	Rugby

1956	D McKay	Scotland	Football
	E J S Michie	Scotland	Rugby
	R Webb	England	Basketball
1958	E W Denison	England	Marathon
	B F Gerhard	Wales	Hockey
	E Scalley	Scotland	Cycling
	M L Turner	England	Hockey
	D Wilson	Scotland	Football (under 23)

*Note:* Also in 1958, F O Reynolds was made Team Manager for the British Hockey Board, and P A Adams Team Manager of the British rowing crews to the European Championships that year.

## c. BLUES

F R Beringer	Rugby	H J H Gatford	Rugby
P L Dell	Shooting	R J N Leonard	Rugby
B C Elgood	Cricket	N C G Raffle	Rugby
B C Elgood	Fives	J G Vaux	Rugby
B C Elgood	Squash	D H Wheeler	Tennis

## d. ARMY REPRESENTATIVES

<i>Athletics</i>	P G West	F W Simpson
A Breaker	C H Wickes	W J N Wichall
J Bromley	D F Williams	
L A C Cheeseman		<i>Cross Country</i>
A Clough	<i>Association Football</i>	B W Lemon
J Coverman	C Holton	R A Morris
E W Denison	D McKay	J Rattigan
B Dockray	G Williams	
K Flockton	D Wilson	<i>Cycling</i>
J Gibson		G R Barnbrook
E Hudson-Bennett		S P Boyd
R S J Ireland	<i>Basketball</i>	R F Brotherton
G R Lawrence	J E Guinn	D J Collins
A Morgan	R Webb	C Dury
R A Morris		J T Hockley
D A Morrison		D Kirton
C B Naylor	<i>Cricket</i>	J T Murray
C G Nott-Bower	G Atkins	R Scally
W C Patrick	G J Bryan	P R Smith
T J Porter	G Clarke	D R Tweddell
D C Pugh	A Eato	M H W Well
P G Richardson	B C Elgood	G S Wilson
A W Scott	D Goodson	
W Smillie	P Hearn	
A J Symons	J R Rawlence	<i>Fencing</i>
B A R Thomas	K B Standring	T A Bentley
P Watt	M J Stewart	T R M Pulverman

*Golf*

W H H Anken  
W B J Armstrong  
J V C Moberly  
J G T Polley  
K H Stevens

*Hockey*

L F H Busk  
G W Duke  
D M R Eagan  
J Glaskin  
W O Green  
R S J Ireland  
E G M Pearce  
R T Procter  
F O Reynolds  
R P Ronaldson  
M L Turner  
E R Valder

*Sailing*

A Jardine  
S Jardine  
W W Ker  
J I Purser

*Skating*

L J Blackburn  
A W Petrie

*Squash*

D I Burnett  
B C Elgood  
J B Hourcroft  
G O M Jameson

*Swimming, Diving  
and Water Polo*

L Baker  
J O Band  
G Cox  
S Cuthbert  
S G Daniels  
C R Dean  
P Gurnewich  
R Hackett  
A J Harrington  
G Hill  
J MacLeod  
W Martin

R J Mogg  
J Taylor

*Rugby*

J T Barlett  
R C Bazley  
K R Bearne  
F R Beringer  
D Greenwood  
M J Hartley  
A G C Jones  
R W D Marques  
E J S Michie  
J R Phillips  
K Pontin  
N C G Raffle  
G G Roach  
A Whitehorn

*Tennis*

J E L Ainsley  
M W Biggs  
E C Fraser  
G O M Jameson  
M D MacLagan



## ANNEX A

### CAMPAIGN DECORATIONS AND HONOURS AWARDED TO ROYAL ENGINEERS 1945 TO 1960

#### **GC 2nd Lieutenant M P Benner**

In Austria during the summer of 1957, 2nd Lieutenant Benner was in command of a party of non-commissioned officers and men training in moving and living in mountainous country. On the 1st July, after a week in the mountains, he led six of his men on a traverse of the 12,400 ft Grossglockner. The summit was successfully reached at 6pm after the long ascent but a storm had caused delay and made conditions unexpectedly difficult. In preparation for a descent by the ordinary route, which is normally not difficult, the party unroped.

2nd Lieutenant Benner led the way down a ridge closely followed by Sapper Phillips. The storm and the lateness of the hour made the steps, kicked in the snow, icy and slippery. Sapper Phillips missed his foothold and began to slide down a fairly steep snow slope. Seeing this, Benner jumped out of his own secure foothold on to the open slope and caught the falling man, holding him with one hand and endeavouring with the other to dig his ice axe into the snow. This he could not succeed in doing. Both men slid down the slope together until they disappeared in their death over the steep face of the mountain.

In making his attempt to intercept Sapper Phillips this gallant young officer took, as he well knew, a desperate risk. As the two gathered speed down the slope he must have realized that he could save himself only by releasing his grasp of Sapper Phillips' arm but he did not do so. He held on to the last, struggling to obtain a grip in the snow with his feet and axe.

With supreme courage and devotion he sacrificed his life endeavouring to save his companion. (J.C. Supp. 17.6.58)

#### **PALESTINE 1945 TO 1948**

##### **CB**

Brigadier W S Cole CBE DSO

##### **CBE**

Colonel W E Farley OBE

##### **OBE**

Colonel H A Baker MC

##### **MBE**

Major S J Cornfoot

Major F W J Cowtan MC

Major A T Duncan

Captain D R Hacker

Captain H T Griffiths

Major F C O'Callaghan MC

*MALAYA 1948 TO 1960***CBE**

Brigadier W F Anderson MBE MC

Brigadier G J Bryan

Brigadier W G Fryer OBE

Brigadier M C A Henniker DSO OBE  
MC

Brigadier E E G L Searight OBE MC

Brigadier J T S Tutton OBE

**OBE**

Lieut Colonel W R Baverstock

Lieut Colonel L O Beckett

Lieut Colonel J H S Bowring MC

Lieut Colonel C W F Butcher

Major F G Caldwell MBE MC

Lieut Colonel S C Chambers

Lieut Colonel J S Close

Lieut Colonel R L Clutterbuck

Lieut Colonel J M W Howe

Lieut Colonel L G Robinson MBE

Lieut Colonel J K Shepherd DSO

Lieut Colonel J T S Tutton

**MBE**

Major (QGO) Amarbahadu Gurung

2nd Lieutenant Aminudin Bin Bahaudin

Major M J Andrews

Major G A Barnett

Major D H Bowen

Major M J A Campbell MC

Major B J Cope

Major J M Coupland

Major D F Densham-Booth

Major C E H Edwards MC

Major F T Fenn

Major S E M Goodall MC

Major T J Goodman

Major R G Gregory

Major A H Guy

Major F Harrison

Major E Hughes

Major C E Jarrett-Kerr

Major C R O Bray

Major G J Olley

Major P L Pengelley MC

Captain T J Phelps

Warrant Officer II A M Saunders

Major A G T Shave MC

Major E L H Smith MC

Major H E Temple

Major L G S Thomas

Warrant Officer I S G Townsend

Major R J Widgery

**DFC**

Captain M G Badger

**BEM**

Warrant Officer II C N Bates

Staff Sergeant J D Blenkiron

Sergeant W H Burkett

Warrant Officer II H G Gibbs

Staff Sergeant P R Johnson

Sergeant A E Kelly

Sapper I M Kilgour

Sergeant H M Parsons

Sergeant R J Woods

*KOREA 1951 TO 1955***CBE**

Colonel F M Hill

**DSO**Lieut Colonel P N M Moore DSO MC  
(2nd Bar)

Major D G M Fletcher

**OBE**

Lieut Colonel A M Field MC

Lieut Colonel J C Woollett MC

**MBE**

Warrant Officer I R Coulthurst

Major J D Grice

Warrant Officer I S Hacker

Major I A P G Leigh

Major A T Shilland

Major T W A Steadman

Captain E W Turner

Major C W Woods MC

**MC**

Captain H Bayton-Evans MC (Bar)

Captain D E R Cameron

Captain C D Carr

Captain G L C Cooper

Captain J N Cormack

Major S A Frosell

Major V H S Hannay

Captain W D C Holmes

Captain A C James

Captain J H Page

2nd Lieutenant T Palmer

Captain R T D Sullivan

2nd Lieutenant I A D Thompson

**DCM**

Sergeant R A Orton

**MM**

Corporal L E Ford

Corporal W Fox

Lance Corporal R H Griffith

Corporal I C Jenkins

Sergeant L A Neave

Sergeant H S Rankin

Sapper J Smythe

Corporal A Weaver

**BEM**

Warrant Officer II L C Cook

Staff Sergeant D E Goldsmith

Warrant Officer II L G Jones

Corporal W N S Lawson

Sergeant K B Smith

**Silver Star (USA)**

Major A E Younger DSO

**Bronze Star (USA)**

Corporal G Cross

Sapper J Hannon

**KENYA 1952 TO 1960****MBE**

Captain W H Donaldson

**CYPRUS 1955 TO 1960****CBE**

Colonel A P Lavies OBE

**OBE**

Lieut Colonel R Haley

Lieut Colonel E W Kenworthy

Lieut Colonel C E Otway MC

**MBE**

Major R F Parker

Lieutenant J S Nobbs

**GM**

Major B J Coombe

**BEM**

Warrant Officer II R A Orton DCM

Sergeant J S Thomas

*NEAR EAST 1956***CBE**

Colonel J H S Lacey OBE

**OBE**

Lieut Colonel S J Cornfoot MVO MBE

Lieut Colonel G W Shepherd MBE

**ERD**

Lieut Colonel A C Lewis

**MBE**

Major H W L Browne

Major H Kline MC

Warrant Officer II E D G Cavanagh

Major H A T Rosser

Major K D'Alby

Major M G Stevens

**BEM**

Warrant Officer II W A G Farrell

*BOMB DISPOSAL***MBE**

Captain D J W Dalby

Lieutenant F C Smith

Major A B Hartley

**GM**

Captain R H Hough

**BEM**

Corporal F Hole

Warrant Officer II E E Thomas

Staff Sergeant W Mander

Warrant Officer II E F R Young

*OTHER AWARDS FOR GALLANTRY**For brave conduct on the River Findhorn, Scotland, 16 January 1954***MBE** 2nd Lieutenant J Niblock**BEM** Corporal H W Heenan**Queens Commendation** Corporal J Bashford, Corporal D Watson, Lance

Corporal A Waddell

# ANNEX B

## REGULAR ARMY ENGINEER UNITS

*Special Abbreviations:* A Amalgamated with N Numbered or Re-numbered TF Transferred from FS Field Squadron  
 D Disbanded R Reformed or Re-organised TT Transferred to FPS Field Park Squadron  
 F Formed S Suspended/Animation CI Christmas Island

UNIT TITLE	YEAR	LOCATION	SUB UNITS		HIGHER FORMATION	REMARKS	COMMANDING OFFICERS	UNIT ORIGINS
			FD SQNS	FD PARK SQN				
a	b	c	d	e	f	g	h	j
STATIC UNITS IN THE UNITED KINGDOM								
REGIMENTS								
1 Training	F1947 1959	Malvern Cove	27,28,57 Trg Sqns		Trg Bde	F from 1 Trg Bn Jan moved to Cove Feb A 6 Trg Regt May A 9 Trg Regt 27,28 Sqns TF 6 Trg Regt 57 Sqn TF 36 Regt	<i>Lt Colts</i> E F Benjamin R G V Wilbraham D E Holbrook A W Kiggell J B Brown E L H Smith J D Edgar M L Grosthwaite J H S Read	1 Trg Bn moved to Malvern from Clitheroe 1946

a	b	c	d	e	f	g	h	j
2 Training (Officers)	F1947	Newark				F from 140 OCTU RE Ceased to accept officer cadets end 1947 when Offr Cadet Sqn F at SME	Colonel C M MacLachlan	
3 Training	D1948 F1947 1949	Newark Cove Cove			Trg Bde	F from 3 Trg Bn	Lt Col's G O N Thompson S D Calvert H W Kilson M W Biggs A J LeG Jacob I D S Brown B A A Plummer	
4 Training	F1947 1949 1957 1958	Aldershot Aldershot Aldershot Aldershot	55 Trg Sqn 56 MT Sqn		Trg Bde Trg Bde Trg Bde	F from 1 MT Trg Depot TF 28 Regt TF 24 Regt	K W de Wateville J G A O'Farrell J M Griffiths W G A Lawrie R E Thompson	
5 Railway Training	F1947 D1948	Longmoor Longmoor	49.83 Rly Sqns		D Tn	F from Depot, Fdwks Trg and Tech Trg Wings of Tn Trg Centre D became 16 Rly Trg Regt	H G Pottle G H B Moss	

a	b	c	d	e	f	g	h	j
6 Training	F1952 1957	Worcester Cove	28		Trg Bde	Moved to Cove, 28 Sqn TF 27 Regt 28 Sqn TF 21 Regt 1958 A 1 Trg Regt	D W R Walker W R Baverstock J B C Taylor M L Crosthwait	Previous 6 Trg Bn D at Elgin 1946
	D1959	Cove	27, 28					
8 Training	F1947 D1954	Elgin Elgin				F from 8 Trg Bn	H H C Withers E L Marsh- Kellett G L Galloway D C Cameron	
9 Training	F1947 1948 1949 D1959	Portland Cove Cove			Trg Bde Trg Bde	F from 9 Trg Bn Moved to Cove A 1 Trg Regt	W J Cardale F W Houghton K F Daniell A J Le Seilleur H Fitz G Boswell	
10 Headquarters	F1947 1948	Chatham Chatham			SME	F from 10 Depot Bn R as 10 Trades Trg Regt	E E N Sandeman G C Clarke R Kellett N H L Cheshyre F T Stear P A Adams M J J Roit J H Frankau	

a	b	c	d	e	f	g	h	i
11 Headquarters	F1947	Ripon			SME	F from 1 (SME) Depot Bn	A H M Morris	
	1948	Gillingham			SME	Moved to Gillingham, R as 11 (SME) Regt	R A G Binny D R M Orchard G D McK Sutherland	
	D1955	Gillingham				A 12 SME Regt as 11/12 Regt N 12 Regt in 1957	G C L Alexander S T A Raddcliffe	
12 Drafting	F1947	Barton Stacey				F from 2 Drafting Bn	A Gordon-Rogers	
	1948	Barton Stacey				A 13 Holding Regt as RE Depot		
	1948	Chatham			SME	R as 12 SME Regt at Chatham	J M Lambert H T Heard	
	1955	Chatham			SME	A 11 Regt as 11/12 Regt N 12 Regt in 1957	H M Millar A P Smith C B Bennett P S Baines	18 and 40 Sqns previously 37 Regt
	1960	Chatham						
13 Holding	F1947	Barton Stacey				F from 3 Holding Bn	R R Gillespie	
	1948					A 12 Drafting Regt as RE Depot		



a	b	c	d	e	f	g	h	j
16 Railway Training	F1948	Longmoor	49, 83 Rly Sqns		DTn	F from 5 Rly Trg Regt	G H B Moss	
	1948		8, 49, 83 Sqns		DTn	8 Rly Sqn TF—Germany	W H Band	
	1955		8, 10, 49, 53 Sqns		DTn	10 TF Egypt, 53 A 83 Sqn	G C L Alexander	
	1956		8, 49, 53 Sqns		DTn	10 Sqn R as port sqn for FARELF, TT 1956	D C Merry	
	1958		8, 49 Sqns		DTn	53 Sqn TT 17 Regt	E R Patterson	
17 Port Training	F1949	Marchwood	51, 52 Port Sqns		DTn	51 Sqn deployed to Cyprus	G H S Moss	
	1957		52 Sqn		DTn	R with strategic reserve training function	W P Reed	
	1958		10, 51, 52, 53 Sqns		DTn	10 Sqn—Singapore	S H M Battye	
						51 Sqn—recalled from Cyprus	R S Grant	
RE Depot	F1948	Barton Stacey				Rly Trg Regt	D R Stehouse	
						F 12 Drafting 13 Holding Regts	S G Saunders	
							<i>Colonel</i> E F Benjamin <i>Lt Col</i> H W Kitson B B Spirdion C R Nichols J H Frankau	

a	b	c	d	e	f	g	h	j
<b>ENGINEER STORES ESTABLISHMENTS</b>								
1 ESD		Long Marston			DES		<i>Cadocels</i> H A Macdonald E G R Suleman G O N Thompson T Wright W C O Phillips H R Greenwood	
2 ESD		Liphook			DES		<i>Lt Gals</i> C Warren J S Close E Macdonald H Nelson M B Adams	
<b>BOMB DISPOSAL</b>								
HQ Bomb Disposal Unit (UK)	F1950	Horsham	Five indep BD tps One BD Plant tp			F from four remaining BD Sqn: 2 BD Sqn— London 7 BD Sqn— Bristol 16 BD Sqn— Winchester BD Plant Sqn— Horsham	M G MacLagan G V Micklam G C S Coode G O H Slade N H S Barker J H Clarke	Following rundown of wartime org HQ BD was estd in 1948 with nine BD Sqn. HQ moved to Horsham in 1949 followed by complete reorganisation

a	b	c	d	e	f	g	h	j
FIELD UNITS								
REGIMENTS								
21 Field Engineer	F1949	Germany	4, 7, 27	45	7 Armd Div	Manpower from Engr Trg Estb D 7 FS TT 26 Regt F 1950, 48 FS F in place 7 FS 4 FS, 45 FPS remained 5 Div 27 FS TT 6 Trg Regt 48 FS D and R in 38 Regt from 62 FS	W C O Philbbs G W Duke S C Chambers R L France	1947-7 Armd Div RE, composition: 1 FS S, R Malaya from 561 FS 209 FS N 4 FS S 210 FS N 629 N 29 FS S 211 FPS N 145 N 45 FPS S Div RE D to form 1 Engr Trg Estb, Hamelin 27 Indep FS R from B Depot Sqn Engr Trg Estb in 1948
	1951	Germany	4, 27, 48	45				
	D1958	Germany	4, 27, 48	45	R 5 Div			

a	b	c	d	e	f	g	h	j
22 Field Engineer	F1948	Libya	12, 17, 23	6	1 Inf Div	F from 1 Div RE, Spenson 28 Regt for Korea.	A W Kiggell P N M Moore	1947—1 Inf Div RE composition: 23 FS 238 FS N 12 FS 248 FS N 20 A 17 FS 6 FPS
	1951	Libya	3, 17, 23	6	1 Inf Div	12 FS TT 28 Regt, 3 FS F in place of 12 FS	T H Ewill C A O B Compton E M Hall	12 FS previously AB Sqn S 1947 3 FS previously AB Sqn S 1948
	1952	Egypt	3, 17, 23	6	1 Inf Div			
	1955	Libya	3, 17, 23	6	10 Arm'd Div	3 FS Detached to Egypt then Cyprus Detailed for Op MUSKETIER 1956 but 3 FS only took part		
23 Field Engineer	1957	UK Chisleton	3, 17, 23	6				
	1960	UK Chisleton	3, 23	6	3 Inf Div	17 R Indep TT CI 1959		
	F1948	Germany	2, 5, 38	21	2 Inf Div	F from 2 Div RE with 38 FS from 5 Div RE	A H M Morris R F E Stoney J G Carr K H Stevens	1947—53 Div RE N 2 Div RE composition: 244 FS N 2 FS 245 FS N 5 FS 252 FS N 54 then 5 1947 254 FPS N 21 FPS

a	b	c	d	e	f	g	h	j
	D1958	Germany	2, 5, 38	21	2 Inf Div	2 FS remained 2 Div 5 FS TT 4 Div 38 FS TT Berlin Bde 21 FPS TT 40 Regt		Both 5 and 21 Coys had been part of Occupation Force, Japan 5 Div RE Germany D 1948 composition: 11 FS S 1947 24 FS S 1947 38 FS joined 23 Regt on F 105 FPS N 144 N 15 S 1948
24 Field Engineer	F1948	UK (Ripon)	25, 37, 39	46		RHQ from HQRE 3 Div in S Sqns F new units	E F R Slack J G Carr R T Brain	1947—3 Div RE composition: 17 FS A 20 FS
	1949	Hong Kong	25, 37, 50	46	40 Inf Div	39 FS TT 32 Regt on move 50 FS sent to Hong Kong in adv. TF 32 Regt on arrival 24 Regt	A H G Dobson B P Tyrwhitt-Drake	246 FS D 253 FS D 15 FPS TT 5 Div S 1948
	1950	Hong Kong	11, 54, 56	15	40 Inf Div	25 FS N 54 FS 37 FS N 56 FS 50 FS N 11 FS 46 FPS N 15 FPS		

a	b	c	d	e	f	g	h	j
	1951	Hong Kong	54, 56	15	40 Inf Div	11 FS R Indep TT Austria		
	D1958	Hong Kong	54, 56	15		54 FS remained Hong Kong 56 FS TT 4 Trg Regt 15 FPS S 1958 R 38 Regt 1959		
25 Field Engineer	F1950	UK (Maidstone)	37, 39, 50	46	3 Inf Div	Sqns F new units	E F Parker R C Orgill R R L Harradine H J H Galford D G M Fletcher	Sqn numbers TF 24 and 32 Regts when sqns there N
	1951	Egypt	37, 39, 50	46	3 Inf Div			
	1955	UK (Maidstone)	37, 39, 50	46	3 Inf Div	Detailed for Op MUSKETIER 1956 but only RHQ and 37 FS departed UK 50 & 46 Sqns remained in UK		
	1957	CI	37, 39					
	1958	Germany	37, 39, 50		11 Engr Gp	TT 1 (BR) Corps R Corps Engr Regt 46 FPS TT 36 Regt for CI then TT 40 Regt on return		

a	b	c	d	e	f	g	h	i
26 Field Engineer	P1953	Germany	7, 29, 60	43	11 Arm'd Div	7 FS TF 21 Regt 29 Indep FS provided pack up as units for 43 FPS 60 FPS new unit	W H Ay'win J N Thomas R H Walker	20 FS F 1948 Invt A Dejan Sgt 1 Engr 1 Regt 1 lance 60 Sqn previously D1920
	D1958	Germany	7, 29, 60	43	2 Div	11 Div R 4 Div 7 FS TF 5 Div 29 FS remained 4 Div 60 FS D 43 FPS TF 2 Div		Previous 4 Div RE 11 1947 Greene composition 7 FS 42 FS 59 FS 8 1947 18 FPS
	P1953	UK (Devizes)	1, 25, 28	44	5 Arm'd Div	1 FS TF Hong Kong Other Sqs D new unit	J R Shephard K N Wylie E F Kyle	Sqn numbers TF 24 and 32 Regts 28 Sqn S 34 Regt 1948
27 Field Engineer	1951	Germany	1, 25, 28	44	5 Arm'd Div	5 Div A 2 Div 1 FS TF 2 Div 25 FS remained 2 Div		
	D1957	Germany	1, 25, 28	44		28 FS 1 TF 6 Regt 43 FPS TF 4 Div		

a	b	c	d	e	f	g	h	i
28 Field Engineer	F 1951	Libya	12	64		F for Korea under auspices 22 Regt 12 FS TF 22 Regt 64 FPS new unit	P N M Moore A M Field H M Millar J C Woollett T Marquis	64 Sqn D 35 Regt 1950
	1951	Korea	12, 55	64	1 COM-WEL Div	55 FS JT 28 Regt on arrival in Korea Additional RCE Indep FS under op con, in succession 57, 23, 59 (N 4) and 3 FS, RNZRE provided 1d sect for 12 FS		55 FS from 32 Regt R Indep and sent to Korea with 29 Bde 1950
	1955	UK (Devizes)	12, 55, 71	64	1 Inf Div	71 FS TF 39 Regt 55 FS remained det Korea		
	1956 D 1957	CI UK	12, 55, 71 12, 55, 71	64 64		12 FS A 81 Sqn and F Indep for CI 1958 55 FS JT 4 Trg Regt 71 FS and 64 FPS D		



a	b	c	d	e	f	g	h	j
32 Assault Engineer	F1947	Germany	26 Aslt	631 Aslt Pk		N from 42 Armd Engr Regt New units 44 & 50 FS 631 N 31 Aslt Park Sqn	W R G Walker J F D Savage E C W Myers P G Hatch R A Barron B G Bloomer	1947—42 Armd Engr Regt composition: 27 Armd Engr Sqn 203 Armd Park Sqn N 631
	1949	Germany	26 Aslt, 39, 44	31		39 FS TF 24 Regt 50 FS sent to Hong Kong		
	1950	Germany	26 Aslt, 50, 59	31		39 FS N 50 FS 44 FS N 59 FS 55 FS R Indep and sent to Korea		59 Sqn S 4 Div RE, 1947
	1951	Germany	26, 59, 81 Aslt	31		59 R Aslt Sqn (Flail) 81 F HQ Sqn Aslt		
	1954		26, 81 Aslt			59 R Airfd Constr Sqn then TT SME Chatham 31 D 81 R FS 1956		
	D1957	Germany	26 Armd			26 TT Germany 81 A 12 FS for CI		

a	b	c	d	e	f	g	h	j
34 Army Engineer	F1947	Kenya	8, 55, 56	143		From 1 Arm'd Div RE	D R M Orchard	1947—1 Arm'd Div RE,
	1948	Kenya	28, 55, 56	43		8 FS N 28 FS 143 FPS N 43 FPS Regt reduced to Cadre at end of year Sqns S		Palestine N East African Engr
	D1949	UK						
	F1948	UK (Crowborough)	62, 64, 65	63		From 29 Army Tps Engr	J E T Nelson T H F Foulkes J R G Finch J D Sturrock	1947—29 Army Tps Engrs, previously 43 Inf Div RE, composition: 100 FS N 562 N 62 FS 101 FS N 564 N 64 FS 204 FS N 565 N 65 FS 207 FPS N 563 N 63 FPS
35 Army Engineer	1948	Libya	62, 64, 65	63				
	1950	Egypt	16, 30, 42	18		62 FS N 16 FS 64 FS N 42 FS 65 FS N 30 FS 63 FPS N 18 FPS		
	1954	Cyprus	16, 30, 42	18				

a	b	c	d	e	f	g	h	j
	1955	UK (Ripon)	16, 30, 42			Regt trooping 18 FPS TT 37 Regt Cyprus		866 Mech Eqpt Sqn N 56 Plant Sqn S 1948 when 29 Army Tps Engr returned UK from Germany 18 and 42 Sqs S 4 Div RE, 1947 16 previously Fortress Sqn Malta, BD Sqn UK, E & M Coy SEAC 65 FS was in Egypt 1947
	1956	MELF	16, 30, 42			Op MUSKETEER in Part Op role		
	1957	Germany	16, 30, 42		11 Engr Gp	TT 1 (BR) Corps R as Corps Engr Regt		

a	b	c	d	e	f	g	h	j
36 Army Engineer	F1949	UK (Maidstone)	57, 61, 66	20		From 30 Army Tps Engr	P A Easton J M L Gavin J H Gillington B G Rawlins	1947—30 Army Tps Engr, previously 52 Inf Div RE, comprising: 202 FS N 561 N 61 FS 240 FS N 537 N 57 FS 241 FS N 66 FS 243 FPS N 620 N 20 FPS returned to UK from Germany 1948—561 FS sent to Malaya N 1 FS 24 Sqn previously Fortress Sqn Malta
	1950	UK (Maidstone)	24, 57, 58	20		61 FS N 58 FS 66 FS N 24 FS		
	1951	UK (Ripon)	24, 57, 58			20 FPS A Engr Trg Centre Ripon		
	1954	UK (Ripon)	20, 24, 57			58 FS N 20 FS		
	1955	Germany	20, 24, 57		11 Engr Gp	Regt trooping, TT 1 (BR) Corps R as Corps Engr Regt		
	1956	MELF	20, 24, 57		2(BR) Corps	Op MUSKETEER		
	1957	CI	20, 24, 57	46		46 FPS TF 25 Regt		

a	b	c	d	e	f	g	h	j
	1959	UK (Maidstone)	20, 24			57 FS TT 1 Trg Regt 46 FPS TT 40 Regt		
37 Army Engineer	F1949	UK (Crickhowell)	71, 72, 73	74		Sqns F new units	B S Armtage J V B Jervis- Read	72 previously Tunnelling Sqn Gibraltar 1949
	1950	UK (Crickhowell)	33, 34, 40	41		71 FS N 33 FS 72 FS N 34 FS 73 FS N 40 FS 74 FPS N 41 FPS	A C Lewis B A E Maude G R M H More	41 (Malayan) Fortress Sqn R in Singapore 1946 R as Singapore Fortress Sqn 1947
								34 previously Fortress Coy Singapore in 1942
								40 previously Fortress Coy Hong Kong in 1941
	1951	Germany	33, 34, 40	41	11 Engr Gp	TT 1 (BR) Corps R as Corps Engr Regt 41 Engr Park Sqn became the Corps Fd Park Sqn R as Corps Engr Regt 1954		

a	b	c	d	e	f	g	h	j
38 Corps Engineer	1955	Cyprus	33, 34, 40	18	2 (HR) Corps	Regt trooping 18 FPS TF 35 Regt		
	1956	MELF				Op MUSKETIER R as Fd Engr Regt 1955		
	1958	Cyprus	33, 40	18		34 FS R as Indep and TT 24 Bde		
	D1959	Cyprus	33, 40	18		33 remained Cyprus R as Indep TT 3 Bde		
						18 and 40 Sqns S 1959 R 1960 12 SME Regt		
	F1951	Germany	61, 62, 63		11 Engr Gp	Sqns F new units	P A Wood H R Greenwood R L White R L Clutterbuck	62 and 63 Sqns previously 35 Regt 61 Sq previously 36 Regt
	1957	Germany	48, 61, 63		11 Engr Gp	48 FS TF 21 Regt R from 62 Sq		
	1958	CI	48, 59, 61	63		59 FS TF SME 63 FS R as FPS		
	1959	UK (Ripon)	48, 63	15		48 FS A 61 FS 59 FS TT SME A 66 FS 15 FPS R 63 FPS R as FS then N 12 FS 1960		15 FPS S 24 Regt 1958 12 FS S 1959 on return from CI

a	b	c	d	e	f	g	h	j
39 Army Engineer	F1951	UK (Crickhowell)	71, 72, 73	74		Sqns F new units Regt reduced to cadre 1951 to find manpower for Korea 1952-71 FS Monte Bello Islands 71 FS det to SME 71 FS TT 28 Regt 73 FS R as Indep remained Kenya 74 FPS returned to UK to R for Malaya RHQ and 72 FS return to UK to D	G P H Boycott M W Pryne	Sqns previous existence in 37 Regt
	1953 D1955	Kenya	72, 73 72	74				73 FS TT Bahrain 1956 TT UK D 1957 R in CI 1958 74 FPS TT 50 Regt
40 Advanced Engineer Stores	F1952	Germany	339 Plant Park Sqn 80, 1254, 1255 Wksp and Park Sqns 21, 41, 80				R Gregory L E Upton G H E Pincott J D Grice D Kenwright-Cox	F to bring together resources and repair units in BAOR
	1958	Germany				1254 and 1255 Sqns A 21 Sqn TF 23 Regt 41 Sqn TF 11 Engr Gp A 339 Sqn 46 Sqn TF 36 Regt A 80 Sqn		
	1960		21, 41, 46					

a	b	c	d	e	f	g	h	j
42 Survey Engineer	F1948	Egypt	19 Topo Sqn 22 Carto Sqn 32 Litho Sqn			F from 19 Svy Regt 22 and 32 Sqn F new units	C Belfield J W Taylor M H Cobb B St G Irwin A Walmsley- White	19 Topo Sqn R from ME, Fd Svy Coy 22 previously Fortress Coy in Hong Kong 1941
	1955	Cyprus	19 Topo Sqn 22 Carto Sqn 32 Litho Sqn					
	F1952	Hong Kong	67, 68 Gorkha FS 75 Malayan FS 78 Malayan FPS			RHQ in Hong Kong with Gorkha Sqs 2IC in Malaya with Malayan Sqs	F M Hill A N Clark J H Carter J H S Bowring L G S Thomas	67 FS F 1949 68 FS F 1950 75 FS and 75 FPS F 1952 by D Malayan Engr Sqn
50 (Gorkha) Field Engineer	1954	Malaya	67, 68 Gorkha FS 75 Malayan FS 78 Malayan FPS					
	1955	Malaya	67, 68 Gorkha FS		17 Gorkha Div	F Gorkha Engr—no longer RE First CO J H S Bowring 74 FPS Ty 39 Regt after R in UK		
	1957	Malaya	67, 68 Gorkha FS 74 British FPS 67, 68, 69, 70		17 Gorkha Div			
	1960				17 Gorkha Div	69 Gorkha FS and 70 Gorkha FPS F 74 FPS D		



a	b	c	d	e	f	g	h	j
51 Field Engineer	F1955 D1957		75 Malayan FS 78 Malayan FPS 76 Federation FS		1 Fed Div	Sqns TF 50 Regt 1956—76 Fed FS R as 1 FS Fed (later Malaysian) Engr and withdrawn from 51 Regt 1957—Volunteers from 75 and 78 Sqns F 2 FS Fed Engr 75 FS R as 75 FS TF Engr Base Gp, Singapore	J B B Milton R A Blakeway	76 FS F 1954
Fortress Engineer	F1950	Gibraltar	1. 32 Fortress Sqns			F from Fortress Engineers	J F D Savage B A R Smith W M Phillips D C S David W A Lindsett J M H Lewis	1947—Fortress Engr composition: 1 Fortress Sqn 32 Fortress Sqn 72 Tunnelling Sqn D but provided tunnelling up to 32 Sqn— 1949

a	b	c	d	e	f	g	h	j
Singapore Engineer	F1949	Singapore				F from Singapore Fortress Sqn Responsible for Engr Base Installations composed of HQ, Stores, Workshops Plant and MT Sqs	P F White J O'Dwyer R W Obbard J M W Howe J L Nicholson Æ J M Perkins	1945—Base Engr Stores Regt sent to Singapore N Base Cp R.E. 1946 Singapore Fortress Sqn under Comd—1947
	D1960	Singapore				Developed into Engr Base Cp Singapore with under comd: 10 Port Sqn 75 Malayan FS 84 Svy Sqn EBI		
INDEPENDENT SQUADRONS								
9 Parachute	1948	Germany			16 Para Bde	1948 Germany 1949 UK 1951 Egypt 1954 UK 1955 Cyprus 1956 Op MUSKETEER 1958 Jordan		1947—6 AB Div RE composition: 1 AB Sqn 3 AB Sqn—det with 2 Para Bde 9 AB Sqn 12 AB Sqn A 3 Sqn

a	b	c	d	e	f	g	h	i
								286 AB Park Sqn N 249 N 147 Sqns D 1948 in Palestine and R in Germany based on 3 Sqn N 9 Sqn
11 Field	F 1951	Hong Kong			LFHQ BTA 28 COM- WEL Bde	1950 50 FS N 11 FS 1951 Austria 1954 UK 1955 Malaya incl RAE Tp  F for static role from 1 Svy Computing Unit. Provided base for res unit ug and dets for overseas svy tasks.		R as Indep in Hong Kong TF 24 Regt
13 Field Survey	F 1950	UK						13 Fd Svy Sqn D Egypt in 1948
14 Field Survey	1947	Germany			BAOR			Continuous existence
65 Corps Field Park	F 1953	Germany			11 Engr Group	F from 1254 Wksp & Park Sqn, joined 11 Engr Gp as Corps Fd Park Sqn.		

a	b	c	d	e	f	g	h	i
66 Field	F 1953	Trieste			BETFOR	F from 342 Army Tps Sqn, 1951 Trieste 1954 UK 1956 Demonstration Sqn SME 1959 A 59 FS		previous 66 FS in 36 Regt 1950
79 Transportation	F 1953	Germany			BAOR	F to replace both 3 Rly Gp and 250 Port Op Sqn.		
82 Hong Kong	F 1952	Hong Kong			BFHK	F as Hong Kong Engr Sqn, N 82 Indep (Hong Kong) Sqn. D 1958, BD Tp retained in 306 FSD		
84 Field Survey	F 1955	Malaya				F from Gen Svy Sect (FARELF)		
88 Field Survey	F 1953	Kenya				F for mapping of East Africa.		
	D 1959	Kenya				D 1959.		

# ANNEX C

## RESERVE ARMY ENGINEER UNITS

### 1. FORMATION OF THE TERRITORIAL ARMY

NEW DESIGNATION	LOCATION	HIGHER FORMATION	FIRST CO LT COL	SQUADRONS		SENIORITY DERIVED FROM:		REMARKS
				FIELD, ENGR OR CONSTR	PARK OR PLANT	UNIT	DATE	
a	b	c	d	e	f	g	h	j
<i>Engineer Regiments</i>								
101 Field	Chelsea	56 Armd Div	A R Mais	220 221 222	223	1 Middlesex Volunteers	1860	
102 Constr	Paisley	20 Engr Gp	J G Whimster	238 243 276	540	1 Lanarkshire Volunteers	1860	243 Sqn converted to BD role 1950, then founded 546 BD Sqn AER in 1955
103 Field	Newcastle	50 Inf Div	H Wood	232 505 506	235	1 Newcastle-on-Tyne Volunteers	1860	
104 Army	Newcastle	22 Engr Gp	E M Robinson	303 304 305	317	"		104 and 105 Regts amalgamated in 1950 as 105 Regt.
105 Constr	Gateshead	22 Engr Gp	W MacK Walker	233 234 507	508	"		Designated Tyne Electrical Engineers in 1955 when joined by 128 Fd Park Sqn
106 Field	Sheffield	49 Armd Div	W S Tyzack	228 229 230	231	1 Yorkshire (West Riding) Volunteers	1860	

a	b	c	d	e	f	g	h	j
107 Field	St Helens	23 Engr Gp	S M Holloway	252 253 254	255	2 Lancashire Volunteers	1860	Succession from St Helens Engineers joined by TA elements from 128 and 130 Regts in 1949
108 Field	Swansea	53 Inf Div	T I Lloyd	244 245 282	285	1 Gloucestershire	1861	
109 Constr	Cardiff	23 Engr Gp	J V Williams	247 283 284	246	Volunteers		
110 Field	Bath	43 Inf Div	G L Watkinson	204 226 260	207	2 Gloucestershire Volunteers	1861	
111 Field	Bristol	26 Engr Gp	W H Hooper	205 224 349	227	"	1861	1st (South Midland) Div Engr 1908, became SR regt in 1951
112 Constr	Birmingham	22 Engr Gp	E Stanton	225 267 306	318	"		Became SR regt in 1950-225 Sqn transferred to 127 Regt as TA
113 Aslt	Birkenhead	24 Engr Gp	E J Kinvig	622 623	141	1 Cheshire Volunteers	1861	289 Sqn joined from indep in 1948 Converted to army engr regt in 1956
114 Army	Behnal Green	27 Engr Gp	G R Shires	216 217 218	219	East London (Tower Hamlets) Volunteers	1862	Converted to fd engr regt in 1956
115 Constr	Fareham	26 Engr Gp	R F Hawker	127 577 578	576	1 Hampshire Volunteers	1862	

a	b	c	d	e	f	g	h	j
116 Army	Devonport	26 Engr Gp	H A Sawyer	571 572 573	570	1 Devonshire and Somersetshire Volunteers	1862	Became SR regi in 1950 and 572 Sqn converted to BD role, founded 550 BD Sqn AER in 1955
117 Field	Aberdeen	51/52 Inf Div	J P Jeffrey	236 237 277	239	1 Aberdeen Volunteers	1878	
118 Constr	Middlesbrough	21 Engr Gp	C L Bagley	308 541 542	307	Tees Division Submarine Miners	1886	History also traced to Humber Submarine Miners 1884 and to East Riding Fortress RE
119 Field	Brighton	44 Inf Div	F H Foster	208 210 211	209	1 Sussex Volunteers	1890	
120 Constr	Gravesend	25 Engr Gp	R Hazzeldine	312 582 583	321	"		Disbanded and 583 Sqn converted to BD role in 1950. Reformed as SR regt in 1952
121 Constr	Chelsea	27 Engr Gp	R R Fairbairn	316 328 579	323 324	"		323 and 324 E and M Sqn Regt converted Army Engr Regt 1950 and 579 Sqn converted to BD role
122 Field	Cambridge	25 Engr Gp	C C Duchesne	248 250 251	287	1 Bedfordshire Volunteers	1900	

a	b	c	d	e	f	g	h	j
123 Field	Manchester	42 Inf Div	R B Denton	200 201 202	203	3 Lancashire Volunteers	1901	Succession from Manchester Fortress Coy 202 Sqn absorbed 510 Sqn in 1959
124 Field	Motherwell	264 (Scottish) Bde	J Bell	242 278 279	280	2 Lanarkshire Volunteers	1903	
125 Army	Cannock	23 Engr Gp	P T Wood	214 292 293	213	North Midland Div RE	1908	291 Sqn from 127 Regt replaced 292 Sqn—1950
126 Army	Dundee	20 Engr Gp	C J Robinson	240 274 275	320	Dundee Fortress Engr	1908	Became SR regt in 1951
127 Constr	Smethwick	23 Engr Gp	H T Hale	212 290 291	215	North Midland Div RE	1908	Reorg in 1950. 290 Sqn converted to BD role became AER in 1953; 291 Sqn transferred to 125 Regt; Joined by TA elements from 112 Regt in 225 Sqn
128 Field	Liverpool	24 Engr Gp	L Close	256 257 509	258	66 Div RE	1938	Disbanded 1949, 509 Sqn transferred to 107 Regt. Reformed as SR regt in 1951



a	b	c	d	e	f	g	h	i
129 Field	Leeds	21 Engr Gp	A Nixon	270 271 272	273	46 Div RE	1938	Disbanded in 1950: 272 Sqn converted to BD role, formed 548 BD Sqn in 1955 and converted to Constr Sqn Regt reformed in 1955 with 272 Sqn, 307 and 542 Sqns transferred from 118 Regt
130 Constr	Liverpool	24 Engr Gp	T H Pritchard	510 511 580		510 and 511 Coys	1938	Disbanded 1949, 510 and 580 Sqns transferred to 107 Regt. Reformed as SR regt 1950
131 AB	London	16 AB Div	H W Moore	299 300 301	302	New Unit		RHQ Chelsea, 299 Sqn Hull, 200 Sqn Liverpool 301 and 302 Sqns Hendon Regt title changed to para engr regt 1956
132 Field	Sunderland	22 Engr Gp	A P Pittendrigh	333 334 335	336	New Unit		608 Sqn replaced 333 Sqn in 1953
133 Constr	Manchester	24 Engr Gp	E G King	309 310 311		New Unit		Disbanded in 1950
134 Constr	Woodford Green	25 Engr Gp	E W Black	313 314 315		New Unit		

a	b	c	d	e	f	g	h	j
<i>Engineer Group Headquarters</i>								
20	Renfrew		R K Millar					Disbanded 1950
21	Sheffield		H E Pike					Disbanded 1950
22	Gateshead		A Murray					
23	Hereford		L F Heard					
24	Liverpool		A G Wyatt					
25	Colchester		J E Marsh					Reformed as AER in 1957 to command 116, 139, 251 Regts and 570 Army Park Sqn
26	Salisbury		W McM Keane					
27	Chelsea		R P G Anderson					
<i>Independent Squadrons</i>								
206 Field	Loughborough							
241 Field	Lanark							
249 Field	Luton							
289 Field	Birkenhead							
584 Field	Ipswich							
585 Field	Edinburgh							
591 Field	Belfast	107 (Ulster)						Reformed as Crane Op Sqn AER 1957
624 Field	Wallasey	Int Bde Gp						Joined 105 Regt in 1955 as Fd Park Sqn
128 E and M (Tyne Electrical)	Tynemouth							
266 Wksp and Park	Oxford							
322 E and M	Newcastle							

a	b	c	d	e	f	g	h	i	j
325 Wesp and Park	Dumbaron								
326 Wesp and Park	Newark								
327 E and M	Lancaster								
329 Port	Glasgow								
330 Port	Marshall Marshall								
331 Crane	Glasgow								
332 Crane									
333 E and M	Barry								
751 Plant	Carmarthen								

## 2. FORMATION OF SUPPLEMENTARY RESERVE UNITS AUTHORISED DECEMBER 1947

UNIT DESIGNATION	DATE FORMED	FIRST CO	SQUADRONS	REMARKS
a	b	c	d	e
Royal Monmouthshire Royal Engineers (Mihua) (RMRE)	1948	E M Everett	100, 101, 111 Fd Sqs	Formed as SR but administered by Monmouthshire TA Association. Transferred to TA in 1953
18 Rly Gp	1948	G R L Rice	151 Rly Maint Sqn 152 Rly Traffic Sqn 154 Loco Running Sqn 158 Rly Svy Sqn	18, 19 and 60 (formed 1952) Rly Gps reorg in 1957 under Col F R L Barnwell to 17 Rly Gp AER consisting of: 18 Rly Regt; 154 and 156 Rly Sqs - affiliated to British Rail 19 Rly Regt; 150 and 153 Rly Sqs - regions: 60 Rly Regt; 152 and 155 Rly Sqs 150 Sqn Eastern
19 Rly Gp	1948	M B Thomas	150 Rly Maint Sqn 153 Rly Traffic Sqn 157 Loco Running Sqn 159 Rly Svy Sqn	1 Rly Tg Sqn R Sigs also control of six Constr Sqs for rly constr. 152 Sqn Scottish 153 Sqn N Eastern 154 Sqn Western 155 Sqn London Midland 156 Sqn Southern
80 Rly Wksp Regt	1948		155 Rly Wksp Sqn	Redesignated 80 Port Regt TA in 1956, transferred to 264 (Scottish) Beach Bde with two TA Sqs (see 4 Port Task Force below)
81 Port Regt	1948	R B Oram	165, 166, 167 Port Op Sqs 172 Port Maint Sqn	

a	b	c	d	e
82 Port Regt	1948	G L Beckett	168, 169, 170, 171 Port Op Sqns 173 Port Maint Sqn	
83 IWT Regt	1948	F A Sudbury	174, 175 IWT Op Sqns 176 IWT Wksp Sqn 156 Engr Stores Sqn	
Mow Control Staff Increment	1948		1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 16, 17, 18 MC Gps	
Transportation Staff	1948			

## 3. ENGINEER &amp; RAILWAY STAFF CORPS

Unbroken Service	List of COs: 1941-47 1948-49 1949-51 1951-56 1956-63
	Colonel Sir James Milne Colonel Sir William Halcrow Colonel Sir Eustace J Missenden Colonel V A M Robertson Colonel Sir John Elliot

## 4. CHANGES IN THE RESERVE ARMY ORDER OF BATTLE

DESIGNATION	DATE	RESERVE CATEGORY	REMARKS
a	b	c	d
135 Svy Engr Regt	1949	TA	Raised in London with 337 Topo, 338 Carto and 339 Litho Sqns. 520 and 529 Fd Svy Sqns TA were formed in Bristol and Birmingham respectively at the same time: they were transferred to AFR in 1953
107 Fd Engr Regt	1949	TA	Amalgamated with disbanding 128 and 130 Regts; Sqns renumbered 252, 509, 510 Fd Sqns and 580 Fd Park Sqn
105 Corps Engr Regt	1950	TA	104 and 105 Regts amalgamated to form 105 (Northumbrian) Corps Engr Regt with 233, 234, 507 Fd Sqns and 508 Corps Fd Park Sqn
116 Army Engr Regt	1950	SR	Formed by disbandment 116 Army Engr Regt TA; 570, 571, 573 Sqns
130 Constr Regt	1950	SR	Formed by disbandment 130 Constr Regt TA to accept Z reservists
136 Constr Regt	1950	SR	Formed and admin in Tn Trg Centre with specialist role in rly and port constr—sub units 343, 344, 345 Constr Sqns
137 BD Regt	1950	SR	Formed in London with 346 BD Sqn. 347, 348 and 549 Sqns raised in 1952
111 Plant Regt	1951	SR	Formed by disbandment of 111 Fd Engr Regt TA
112 Engr Stores Regt	1951	SR	Formed by disbandment of 112 Constr Regt TA
126 Adv Stores Regt	1951	SR	Formed by disbandment of 126 Army Engr Regt TA. Changed role to Army Engr Regt in 1957

a	b	c	d
128 Engr Wksp Regt	1951	SR	Formed by disbandment of 128 Fd Engr Regt TA
138 Plant Park Regt	1951	SR	Formed as Plant Regt converted to Adv Engr Stores Regt 1952 then Plant Park Regt 1957
RE Works Pool	1951	SR	Formed
RE Resources Staff Increment	1951	SR	Formed
590 Fd Svy Sqn	1951	SR	Formed together with ten minor survey units
Postal	1951	SR	Forty minor units formed. DAPS Brigadier F Lane
Change of Title	1952		SR became Army Emergency Reserve (AER)
Postal Staff Pool	1952	AER	Formed
120 Constr Regt	1952	AER	Reformed from 120 Constr Regt TA
139 Adv Engr Stores Regt	1952	AER	Formed. Changed role to Army Engr Regt in 1957
201 Army Engr Regt	1952	AER	Formed
251 Constr Regt	1952	AER	Formed
276 Port Regt	1952	AER	Formed with 171, 653, 655 Port Op Sqns and 678 Port Maint Sqn. 171 Sqn redesignated 654 Sqn 1954
60 Rly Cp	1952	AER	Formed (see Remarks against 18 and 19 Rly Gps above)
142 BD Regt	1953	AER	Formed with 290, 551, 547 BD Sqns
38 and 39 CRE Works	1953	AER	Formed

a	b	c	d
144 BD Regt	1955	AER	Formed with 546, 548, 550 BD Sqns
143 Plant Regt	1956	TA	Formed at Walsall by grouping 215, 276 Plant Sqns and 291 Plant Park Sqns from 102, 125 and 127 Regts
105 Corps Engr Regt	1957	TA	128 Sqn comes under command on conversion to Corps Fd Park Sqn absorbing 508 Sqn and entitling Regt redesignation as Tyne Electrical Engineers
146 Fd Engr Regt	1957	TA	<p>Transferred from 429 Coast Regt RA TA with title 146 (Antirum Artillery) Fd Engr Regt TA. Other conversions from RA units at this time were:</p> <p>356 Med Regt RA TA transferred to 278 Fd Sqn RE TA in 124 Regt</p> <p>406 Coast Regt RA TA transferred to 581 Constr Sqn RE TA in 115 Regt</p> <p>409 Coast Regt RA TA transferred to 409 Indep Fd Sqn RE TA</p> <p>413 Coast Regt RA TA transferred to 586 Fd Sqn RE TA in 124 Regt</p> <p>420 Coast Regt RA TA transferred to 253 Crane Operating Sqn RE TA</p> <p>422 Coast Regt RA TA transferred to 422 Constr Sqn RE TA in 129 Regt</p> <p>426 Coast Regt RA TA transferred to 336 Crane Operating Sqn RE TA</p> <p>856 Mov Lt Bty RA TA amalgamated with 115 Constr Regt RE TA</p> <p>858 Mov Lt Bty RA TA amalgamated with 108 Fd Engr Regt TA</p>
<i>Port Task Forces</i>	1957		Formation of four port task forces each of one corps engr regt, one port regt, one crane op sqn in addition to other arms. Engr units only listed:
1 PTF		AER	105 Corps Engr Regt TA (233, 234, 507 Sqns), 81 Port Regt AER, 624 Crane Operating Sqn AER
2 PTF		TA	132 Corps Engr Regt TA (334, 335, 608 Sqns), 276 Port Regt AER, 409 Indep Fd Sqn TA, 336 Crane Operating Sqn TA
3 PTF		AER	107 Corps Engr Regt TA (509, 513, 252 Sqns), 82 Port Regt AER, 253 Crane Operating Sqn TA
4 PTF		TA	102 Corps Engr Regt TA (276, 277, 650 Sqns), 80 Port Regt TA (329 Port Operating Sqn TA, 331 Crane Operating Sqn TA), 654 and 656 Port Sqns AER and 677 Port Maint Sqn AER



## ANNEX D

### SENIOR APPOINTMENTS FILLED BY OFFICERS OF THE CORPS OF ROYAL ENGINEERS, 1947 to 1959

#### *CHIEF ROYAL ENGINEERS*

- 1946 General Sir Guy C Williams KCB CMG DSO  
1951 General Sir Edwin L Morris KCB OBE MC  
1958 General Sir Kenneth N Crawford KCB MC

#### *INTERNATIONAL AND GOVERNMENT APPOINTMENTS*

- 1949 British High Commissioner for Germany  
General Sir Brian H Robertson Bt GBE KCMG KCVO CB DSO MC  
1949 Controller of Munitions, Ministry of Supply  
Lieut General Sir Kenneth N Crawford KCB MC  
1955 Chairman British Joint Service Mission, Washington  
General Sir John F M Whiteley KCB CBE MC  
1956 Commander in Chief Allied Forces Northern Europe  
Lieut General Sir Cecil S Sugden KCB CBE  
1957 Controller of Munitions, Ministry of Supply  
Lieut General Sir John G Cowley KBE CB AM  
1959 Director of Combined Military Planning Staff, Baghdad Pact Organisation  
Major General C P Jones CB CBE MC

#### *MAJOR COMMAND APPOINTMENTS*

- 1946 GOC British Troops Greece  
Lieut General K N Crawford CB MC  
1947 C-in-C British Forces Germany and Military Governor British Zone  
General Sir Brian H Robertson Bt KCMG KCVO CB CBE DSO MC  
1948 GOC Western Command  
Lieut General Sir Frank E W Simpson KBE CB DSO  
1948 GOC Northern Ireland  
Lieut General O L Roberts CB CBE DSO  
1949 GOC-in-C Southern Command  
Lieut General Sir Ouvry L Roberts KBE CB DSO  
1950 C-in-C Middle East Land Forces  
General Sir Brian H Robertson Bt GBE KCMG KCVO CB DSO MC  
1951 GOC East Africa Command  
Lieut General Sir Alexander M Cameron KBE CB MC  
1952 GOC Rhine District  
Major General S Lamplugh CBE  
1953 GOC North West District and 42 Infantry Division TA  
Major General W H Stratton CB CVO CBE DSO

- 1954 Commander British Forces Hong Kong  
Lieut General C S Sugden CB CBE
- 1954 GOC Aldershot District  
Major General A D Campbell CB CBE DSO MC
- 1955 Commander British Forces Hong Kong  
Lieut General Sir W H Stratton KCB CVO CBE DSO
- 1958 GOC Singapore District  
Major General C L Richardson CB CBE DSO

#### *DIVISIONAL COMMANDERS*

- 1947 GOC 53 (Welsh) Infantry Division  
Major General C G Woolner CB MC
- 1951 GOC 7 Armoured Division  
Major General C P Jones CB OBE MC
- 1952 GOC 17 Gurkha Division  
Major General L E C M Perowne CB CBE

#### *BRIGADE COMMANDERS*

- 1946 33 Independent Infantry Brigade  
Brigadier E H W Cobb CBE
- 1947 161 Independent Brigade TA  
Brigadier J R T Aldous CBE MC
- 1948 2 Infantry Brigade  
Brigadier C P Jones OBE MC
- 1949 151 Infantry Brigade  
Brigadier L E C M Perowne CBE
- 1952 63 Gurkha Infantry Brigade  
Brigadier M C A Henniker DSO OBE MC
- 1953 35 Infantry Brigade  
Brigadier R W Urquhart DSO
- 1954 61 Lorried Infantry Brigade  
Brigadier C L Richardson CBE DSO
- 1955 28 Commonwealth Brigade Group  
Brigadier P N M Moore DSO MC

#### *MAJOR WAR OFFICE APPOINTMENTS*

- 1946 VCIGS Lieut General Sir Frank E W Simpson KBE CB DSO
- 1947 DCIGS General Sir Kenneth N Crawford KCB MC
- 1948 DPA Major General J E C McCandlish CB CBE
- 1949 DCIGS Lieut General Sir John F M Whiteley KCB CBE MC
- 1950 VCIGS Lieut General N C D Brownjohn CB CMG OBE MC
- 1950 MS Lieut General K G McLean CB
- 1950 DMP Major General H Bainbridge CB CBE
- 1950 DPA Major General C S Sugden CB CBE
- 1951 Chief Staff Officer to the Ministry of Defence  
Lieut General Sir Kenneth G McLean KBE CB
- 1952 QMG General Sir Ouvry L Roberts GCB KBE DSO

- 1952 Chief Staff Officer to Ministry of Defence  
Lieut General Sir E Ian C Jacob KBE CB
- 1952 DMP Major General E H W Cobb CBE
- 1953 Chief Staff Officer to Ministry of Defence  
General Sir Nevil C D Brownjohn KCB CMG OBE MC
- 1953 DQ Major General A J H Dove CB CBE
- 1956 QMG General Sir Nevil C D Brownjohn KCB CMG OBE MC
- 1956 DMO Major General J R C Hamilton CB CBE DSO
- 1957 VCIGS Lieut General Sir William H Stratton KCB CVO CBE DSO
- 1958 QMG General Sir Cecil S Sugden KCB CBE
- 1959 DPS Major General G W Duke CBE DSO

*Directors of Movements*

- 1946 Major General W D A Williams CB CBE
- 1949 Major General C G B Greaves CB CBE
- 1952 Major General A T de Rhé-Philippe CB OBE
- 1956 Major General R W Ewbank CBE DSO
- 1958 Major General S H M Battye

*Directors of Military Intelligence*

- 1949 Major General A C Shortt CB OBE
- 1956 Major General C R Price CB CBE
- 1959 Major General R E Lloyd CBE DSO

*COMMANDANTS OF ALL ARMS TRAINING ESTABLISHMENTS*

- 1947 Canadian Joint Services Staff College  
Major General J F M Whiteley CB CBE MC
- 1947 School of Combined Operations  
Brigadier L E C M Perowne CBE
- 1949 Joint Services Staff College  
Major General W H Stratton CB CVO CBE DSO
- 1951 Military College of Science  
Major General B C Davey CB CBE
- 1952 Imperial Defence College  
General Sir Frank E W Simpson KCB KBE DSO
- 1954 Royal Military College of Science  
Major General E H W Cobb CB CBE
- 1954 Staff College Camberley  
Major General C P Jones CB CBE MC
- 1955 Royal Military College of Science  
Major General C L Richardson CBE DSO
- 1956 Royal Military Academy Sandhurst  
Major General R W Urquhart CB DSO

*PRINCIPAL ROYAL ENGINEERS APPOINTMENTS**Engineers-in-Chief*

- 1946 Major General Sir Eustace F Tickell KBE CB MC
- 1948 Major General A D Campbell CBE DSO MC

- 1952 Major General G N Tuck CB OBE
- 1954 Major General J C Walkey CB CBE
- 1957 Major General Sir Henry H C Sugden KBE CB DSO

*Directors of Fortifications and Works*

- 1947 Brigadier D Harrison CB DSO
- 1949 Brigadier H de L Panet CBE
- 1949 Major General L D Grand CB CIE CBE (appointment upgraded from Brigadier 1950)
- 1952 Major General D C T Swan CB CBE
- 1955 Major General G A T Prichard CBE
- 1958 Major General J H Amers OBE

*Directors of Ordnance Survey*

- 1947 Major General G Cheetham CB DSO MC
- 1949 Major General R L Brown CB CBE
- 1953 Major General J C T Willis CB CBE
- 1957 Major General L F de V Carey CB CBE

*Directors of Military Survey*

- 1946 Brigadier R L Brown CBE
- 1949 Brigadier J C T Willis OBE
- 1953 Brigadier L F de V Carey CBE
- 1957 Brigadier A H Dowson OBE

*Directors of Transportation*

- 1946 Brigadier R F O'D Gage CBE MC
- 1948 \*Brigadier R Gardiner CBE
- 1950 \*Brigadier C E M Herbert CBE
- 1953 Brigadier C J Bryan CBE
- 1956 Brigadier C H Barnett
- \*also Commandant Transportation Training Centre

*Directors of Engineer Stores*

- 1947 Brigadier N L Hammond CBE
- 1949 Brigadier I L H Mackillop CBE
- 1950 Brigadier R Gardiner CBE
- 1953 Brigadier C E M Herbert CBE
- 1956 Brigadier H P Drayson

*Directors Army Postal Services*

- 1944 Brigadier F Lane CBE
- 1950 Brigadier K S Holmes CB CBE
- 1959 Brigadier J N Drew CBE

(Directors before 1959 were employed by the General Post Office and seconded to the War Office)

*Commanders Training Brigade RE*

- 1949 Brigadier L F Heard CBE  
 1951 Brigadier R P G Anderson  
 1954 Brigadier F W Houghton DSO MC  
 1957 Brigadier G L Galloway DSO OBE GM

*Commandant School of Military Engineering*

- 1945 Brigadier B T Godfrey-Faussett CB DSO OBE MC  
 1948 Brigadier B C Davey CBE  
 1951 Brigadier C E A Browning CBE MC  
 1954 Brigadier H C W Eking CBE DSO  
 1956 Brigadier G W Duke CBE DSO  
 1959 Brigadier E F Parker CBE

*Commander Engineer Stores Group/Establishment*

- 1947 Brigadier H E Horsfield CBE MC  
 1949 Brigadier W W Boggs CBE  
 1952 Brigadier K MacKay DSO OBE  
 1955 Brigadier O J R Orr OBE  
 1957 Brigadier R M Jones CBE

*Commandant Transportation Training Centre*

- 1948 Brigadier R Gardiner CBE  
 1950 Brigadier C E M Herbert CBE  
 1953 Brigadier C H Barnett  
 1956 Brigadier P D G Buchanan  
 1959 Brigadier A G P Leahy OBE

*Chief Superintendent MEXE*

- 1946 Brigadier G R McMeekan DSO OBE  
 1950 Brigadier Sir Millis R Jefferis KBE MC  
 1953 Brigadier L R E Fayle DSO OBE  
 (Post designated Director MEXE in 1956)  
 1956 Sir Donald Bailey Kt OBE

*Chief Engineers UK Commands**Eastern*

- 1947 Brigadier E E Read CBE MC  
 1948 Brigadier A B D Edwards CBE  
 MC  
 1951 Brigadier J H D Bennett CBE  
 1954 Brigadier E C R Stileman CBE  
 1957 Brigadier R A G Binny OBE  
 1959 Brigadier A H G Dobson OBE  
 MC

*Southern*

- 1947 Brigadier J S W Stone CBE MC  
 1948 Brigadier J F D Steedman CBE  
 MC  
 1951 Brigadier W G Fryer CBE  
 1954 Brigadier G A T Prichard CBE  
 1957 Brigadier W J Cardale OBE  
 1958 Brigadier T H F Foulkes OBE

<i>Northern</i>	<i>Western</i>
1947 Brigadier W D M Christie	1947 Brigadier B E C Dixon CB
1949 Brigadier H H C Sugden CBE DSO	CBE MC
1952 Brigadier H P Clavendish CBE DSO	1951 Brigadier F C Nottingham DSO CBE
1953 Brigadier R N Foster DSO OBE	1954 Brigadier A M Anstruther CB CBE
1957 Brigadier W F Anderson CBE MC	1956 Brigadier C H R Smith
1959 Brigadier J G Carr CBE	1959 Brigadier W H Aylwin
<i>Scottish</i>	
1947 Brigadier B B Edwards CBE MC	
1949 Brigadier H T S King OBE	
1951 Brigadier R K Millar DSO	
1953 Brigadier I G Loch OBE	
1957 Brigadier The Lord Napier of Magdala OBE	

## OVERSEAS ROYAL ENGINEERS APPOINTMENTS

### BRITISH ARMY OF THE RHINE

#### Chief Engineer BAOR

- 1947 Brigadier W M Broomhall DSO OBE  
1949 Brigadier D C T Swan CBE

#### Chief Engineer NORTHAG and BAOR

- 1953 Major General D C T Swan CB CBE  
1953 Major General H H C Sugden CB CBE DSO  
1957 Major General H C W Eking CB CBE DSO  
1959 Major General I H F Boyd CR CBE

#### Commander Corps Royal Engineers 1 (BR) Corps

- 1951 Brigadier H E Pike CBE DSO  
1952 Brigadier D R Guinness OBE  
1955 Brigadier Sir Mark C A Henniker Bt CBE DSO MC  
1958 Brigadier J K Shepherd DSO OBE

### MIDDLE EAST LAND FORCES

#### Chief Engineer MELF

(Appointment was E-in-C MELF until 1948)

- 1947 Major General A D Campbell CBE DSO MC  
1948 Major General W M Broomhall DSO OBE  
1951 Major General J C Watkey CBE  
1954 Major General W G Fryer CB CBE  
1957 Brigadier T H F Foulkes OBE  
1958 Brigadier C E H Sparrow OBE MC  
1959 Colonel J Constant

*Commander Corps Royal Engineers 2 (BR) Corps*

1956 Brigadier Sir Mark C A Henniker Bt CBE DSO MC

*Chief Engineer British Troops Egypt*

1947 Brigadier M Luby DSO MC

1948 Brigadier C L Fox CBE

1950 Brigadier A M Anstruther OBE

1952 Brigadier E H T Gayer CBE

1955 Brigadier E C W Myers CBE DSO  
(HQ disbanded on move to Cyprus)

*Chief Engineer Malta*

1947 Colonel C G W S Heaton-Armstrong OBE

1948 Colonel J T Godfrey  
(Appointment transferred to Libya 1948)

*Commander Royal Engineers Malta*

1948 Lieut Colonel G D McK Sutherland

1951 Lieut Colonel W M S Lillie

1953 Lieut Colonel R H Reynolds OBE

1954 Lieut Colonel W H Bond

1957 Lieut Colonel G O H Slade

*Chief Engineer Palestine and Transjordan*

1947 Brigadier R H Perry CBE MC  
(HQ disbanded in 1948)

*Chief Engineer Cyprus*

1951 Colonel G A T Prichard CBE

1952 Colonel B E Whitman

1954 Brigadier C G Phipps OBE

1956 Brigadier D R Guinness OBE

1957 Brigadier A G H Brousson  
(Appointment merged with CE MELF 1958)

*Chief Engineer Libya*

1948 Colonel J T Godfrey  
(Appointment changed to Commander Engineer Group Cyrenaica)

1949 Colonel J V C Moberley DSO OBE  
(Appointment lapsed 1951)

1956 Colonel H R Greenwood  
(Appointment ended in 1957)

*Chief Engineer East Africa Command*

1947 Brigadier W D M Christie

1950 Colonel N A M Swettenham OBE  
(Appointment ended in 1951)

*Chief Engineer (Works) East Africa*

- 1947 Colonel C Topham OBE MC  
(Appointment merged with CE East Africa 1949)

*Chief Engineer Mackinnon Road*

- 1947 Colonel R E Wood CBE  
1948 Colonel H M Taylor  
1949 Colonel J E T Nelson DSO  
(Appointment ended in 1950)

*Commander Royal Engineers East Africa*

- 1953 Lieut Colonel G J Godfrey  
1954 Lieut Colonel E A May  
1957 Major G M Noble  
1958 Lieut Colonel C E Otway OBE MC

*Chief Engineer British Troops Greece*

- 1947 Brigadier H de L Panet CBE  
(HQ disbanded in 1947)

*Director of Survey MELF*

- 1947 Brigadier H A L Shewell OBE  
1949 Brigadier V E H Sanceau OBE  
1952 Brigadier S G Hudson CBE  
(Changed to Deputy Director)  
1953 Colonel L H Harris OBE  
1955 Colonel R A Gardiner MBE  
1958 Colonel R C A Edge MBE

*Director of Movements and Transportation MELF*

- 1947 Brigadier J S Payne  
1948 Brigadier G J Bryan  
(Changed to Deputy Director)  
1949 Colonel W P Reed OBE  
1952 Colonel C H Barnett  
1953 Colonel R G Jackson

*FAR EAST LAND FORCES**Chief Engineer FARELF*

- (Appointment was CE SEAC until 1948)  
1947 Major General P A Ullman CB OBE  
1948 Brigadier W G R Nutt CBE MC  
1951 Brigadier M R R Prentice CBE  
1954 Brigadier B E Whitham  
1957 Brigadier I H F Boyd CBE  
1959 Brigadier R A G Binny CBE



*Chief Engineer Singapore Base District*

- 1947 Brigadier A M Anstruther OBE
- 1948 Brigadier A C Baillic OBE MC
- 1950 Brigadier W G Fryer OBE
- 1951 Brigadier A MacG Stewart
- 1953 Colonel H L Chesshyre
- 1955 Colonel N H L Chesshyre OBE
- 1957 Colonel J W Bossard MBE

*Chief Engineer Malaya District and Command*

- 1947 Brigadier E V Bowra OBE
- 1949 Brigadier C D Reed
- 1952 Brigadier G J Bryan CBE
- 1953 Brigadier W P Anderson CBE MC
- 1956 Brigadier J T S Tutson OBE
- (Appointment changed to CE OCIF on Malayan Independence 1957)

*Chief Engineer Hong Kong Land Forces*

- 1949 Colonel A de G Best OBE (May-June)
- 1949 Colonel E F Benjamin OBE (July-December)
- 1950 Brigadier H P Cavendish CBE DSO
- 1952 Colonel E N Bickford (February-May)
- 1952 Colonel E C R Stileman OBE
- 1954 Colonel D R M Orchard
- 1957 Colonel C A R Fawcus OBE

**INDEPENDENT OVERSEAS GARRISONS**

*Chief Engineer Gibraltar*

- 1947 Colonel R L C Colvill
- 1948 Colonel J H D Bennett OBE
- 1951 Colonel W R Healing
- 1954 Colonel D M Eley
- 1957 Colonel C R Nicholls MBE
- (Appointment ended in 1959)

*Commander Royal Engineers Gibraltar*

- 1959 Lieut Colonel J M H Lewis OBE

*Chief Engineer West Africa Command*

- 1947 Colonel H W Blakeney MC
- 1948 Colonel F C W Forbery
- 1949 Colonel L I Jacques CBE MC
- 1951 Colonel E S de Brett
- 1954 Colonel E W L Whitehorn
- 1956 Colonel A G H Brousson
- (Appointment ended in 1957)

*Commander Royal Engineers British Troops Austria*

- 1948 Lieut Colonel J A B Grylls (on formation)  
1951 Lieut Colonel H L Chesshyre  
1952 Lieut Colonel J M Guyon  
(HQ disbanded in 1955)

*Commander Royal Engineers British Element Trieste Force*

- 1947 Lieut Colonel E W Denison OBE  
1948 Lieut Colonel H E M Cotton OBE  
1951 Lieut Colonel J A B Grylls OBE  
1951 Lieut Colonel A H C Brousson OBE  
1953 Lieut Colonel H W Kitson  
(HQ disbanded in 1954)

*Commander Royal Engineers Caribbean*

- 1948 Lieut Colonel R Clayton OBE (on amalgamation North and South Caribbean Areas)  
1953 Lieut Colonel A G White  
1955 Lieut Colonel P W E L Dunsterville  
1958 Lieut Colonel H Nelson OBE

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**ABBREVIATIONS**

AAC	Army Air Corps
AATDC	Army Airtransport Training and Development Centre
AD	Assistant Director
ADW	Assistant Director Works
AER	Army Emergency Reserve
APO	Army Post Office
ASL	Above Sea Level
AVGAS	Aviation Gasoline
AVRE	Armoured Vehicle Royal Engineers
AW	Artizan Works
AWRE	Atomic Weapons Research Establishment
BAOR	British Army of the Rhine
BD	Bomb Disposal
BETFOR	British Element Trieste Force
BFAP	British Forces Aden Peninsula
BRITCOM	British Commonwealth
BSI	British Standards Institution
BTA	British Troops Austria
BTE	British Troops Egypt
CRR	California Bearing Ratio
CE	Chief Engineer
CENTO	Central Treaty Organisation
CESD	Command Engineer Stores Depot
CGI	Corrugated Galvanised Iron
CIGS	Chief of the Imperial General Staff
C-in-C	Commander in Chief
CO	Commanding Officer
CPD	Command Postal Depot
CRE	Commander Royal Engineers
DAD	Deputy Assistant Director
DCRF	Deputy Commander Royal Engineers
DD	Deputy Director
DDW	Deputy Director Works
DES	Director of Engineer Stores
DFW	Director of Fortifications and Works
DMP	Director of Manpower Planning
DMZ	Demilitarized Zone
DPA	Director Personnel Administration

DQ	Director of Quartering
DTn	Director of Transportation
E&M	Electrical and Mechanical
E-in-C	Engineer-in-Chief
ESD	Engineer Stores Depot
ESE	Engineer Stores Establishment
ESSE	Engineer Services Specialist Establishments
FARELF	Far East Land Forces
GHQ	General Headquarters
GOC	General Officer Commanding
GS	General Service
HKLF	Hong Kong Land Forces
HIT	High Tension
IWT	Inland Water Transport
JSNBC	Joint Services Nuclear Biological and Chemical
JO	Junior Officer
kVA	kilovolt amp
KSC	Korean Service Corps
kV	kilovolt
kW	kilowatt
LCM	Landing Craft Medium
LCN	Load Classification Number
LCT	Landing Craft Tank
LST	Landing Ship Tank
LT	Low Tension
MELF	Middle East Land Forces
MEXE	Military Engineering Experimental Establishment
MGA	Major General Administration
MMG	Medium Machine Gun
MRLA	Malayan Races Liberation Army
MS	Mild Steel
MSM	Mechanist Sergeant Major
MT	Military Training and Motor Transport
NATO	North Atlantic Treaty Organisation
NCO	Non-Commissioned Officer
NL	Naval Landing
OC	Officer Commanding
OP	Observation Post
Orbat	Order of Battle
PBS	Prefabricated Bitumen Surfacing
PCCU	Postal and Courier Communications Unit

POL	Petrol and Lubricants
POW	Prisoner of War
PSP	Pierced Steel Plank
PWD	Public Works Department
QMG	Quartermaster General
RAE	Royal Australian Engineers
RAF	Royal Air Force
RB	Ruston Bucyrus
RCE	Royal Canadian Engineers
REA	Royal Engineers Association
REOCA	Royal Engineers Old Comrades Association
RHQ	Regimental Headquarters
RMA	Royal Military Academy
RMAS	Royal Military Academy, Sandhurst
RMC	Royal Military College
RN	Royal Navy
RNZE	Royal New Zealand Engineers
ROK	Republic of Korea
R&R	Rest and Recuperation
SEAC	South East Asia Command
SEATO	South East Asia Treaty Organisation
SMT	Square Mesh Track
SR	Supplementary Reserve
TA	Territorial Army
UTM	Universal Transverse Mercator
UN	United Nations
UXB	Unexploded Bomb
VISTRE	Visual Inter-Service Training and Research Establishment
WO	Warrant Officer
WOCCI	War Office Central Card Index
WOPT	War Office Planning Team
WVS	Womens Voluntary Service
YO	Young Officer