# HURRAH FOR THE C.R.E.

Good morning Mr. Stevens and windy Notchy Knight, Hurrah for the C.R.E. We're working very hard down at Upnor Hard, Hurrah for the C.R.E. You make fast, I make fast, make fast the dinghy, Make fast the dinghy, make fast the dinghy. You make fast, I make fast, make fast the dinghy, Make fast the dinghy pontoon. For we're marching on to Laffan's Plain, To Laffan's Plain, to Laffan's Plain, Yes we're marching on to Laffan's Plain, Where they don't know mud from clay. Ah, ah, ah, ah, ah, ah, ah, ah, Oshta, oshta, oshta, oshta. Ikona malee, picaninny skoff, Ma-ninga sabenza, here's another off. Oolum-da cried Matabele, Oolum-da, away we go. Ah, ah, ah, ah, ah, ah, ah, Shuush ---- Whoow!

# THE CORPS OF ROYAL ENGINEERS

J.S. Harinster



Prices Single copies 6d. Post free in U.K. 12 ,, 5/- ,, ,, ,, ,, 100 ,, 40/- ,, ,, ,, ,,

PUBLISHED BY THE INSTITUTION OF ROYAL ENGINEERS CHATHAM.

# COLONEL-IN-CHIEF

His Majesty the King is Colonel-in-Chief of the Corps. The Chief Royal Engineer, a selected eminent retired officer, reports to him on Corps matters.



#### R.E. FLAG

Flags will be of the same colour and design as the sealed pattern of the Corps Ribbon. The size of the flag is optional, but the stripes will be in proportion to those on the Corps Ribbon, and flown *horizontally*. Units may, if they wish, add a distinguishing figure or cypher, the colour of which is optional.

# INTRODUCTORY

This little book has been arranged primarily for use by recruits. It is necessarily very brief, and the history of the Corps in greater detail can be found in the following:

History of the Royal Engineers, Vols. I and II, by Major-General Porter.

History of the Royal Engineers, Vol. III, by Colonel Sir C. M. Watson.

History of the Royal Sappers and Miners, Vols. I and II by Captain Connolly.

School of Military Engineering, 1812-1909; by Colonel B. R. Ward.

The Military Engineer in India, Vols. I and II, by Lieut.-Colonel E. W. C. Sandes.

The Royal Engineers in Egypt and the Sudan, by Lieut.-Colonel E. W. C. Sandes.

Follow the Sapper, by Lieut.-Colonel Kealy. (An account of the Engineers in the Peninsular War.) Typescript kept in office of the Institution of R.E.

and in the official histories of the various wars and campaigns in which the British Army has taken part.

Instructors must realize that in most cases the recruits' previous knowledge of history and geography is scanty. When lecturing on Corps History a suitable map should be hung up on which the positions of places named can be pointed out, and their strategic or other importance explained. This will not only help the recruit to unde stand his Corps History, but also provide him w knowledge useful later when studying Army and Em for Second Class Certificate of Education.

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# COLO FACET COMPLEXITY

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#### CHAPTER I

#### MOTTOES AND BADGES

Early in the nineteenth century each private soldier wore a leather sling over each shoulder—one carrying his cartridge pouch and one carrying his bayonet. Where these two slings crossed in front of the man's breast it was usual to have a metal plate with an ornamental badge on it. In 1823 such a breastplate was introduced for the Royal Sappers and Miners and the badge thereon was similar to the present cap badge.

In 1832 two Latin mottoes were granted to the Corps by William IV to be borne on all appointments and banners—" *Ubique*," meaning " Everywhere," and " *Quo Fas et Gloria Ducunt*," meaning " Where Right and Clory Lead." These serve not only as mottoes but epitomize the services of the Corps.

The crest granted to the Corps was "The Royal Arms and Supporters, with a Cannon—' Ubique' over the gun, and 'Quo Fas et Gloria Ducunt' below it." This crest was identical with that of the Royal Regiment of Artillery, and it was not until 1868 that the gun was dropped. Since then the actual drawing of the Royal Arms has been somewhat modified and the present crest as approved by the College of Heralds is shown above. The Royal Arms are encircled by the Garter with its French motto "Honi Soit Qui Mal y Pense," which means "Evil be to him who evil thinks." Below is the French motto—" Dieu et Mon Droit"—which means "God and my Right." A sealed pattern giving the exact details and colourings is kept in the R.E. Museum, Brompton Barracks, Chatham. The Corps crest was worn on the front of the blue helmets, which both officers and other ranks wore on ceremonial parades until 1014.

Troops sent to South Africa in 1899 to take part in the war were equipped with khaki sun helmets, and the present cap badge was officially issued to all ranks of the Corps for wear on the front of these helmets.

By 1903 the use of khaki caps had become general throughout the Army, and authority was given for the wearing of the cap badge with them. The Beret is now the universal head dress.

The grenades now worn on the collar were originally fixed to the coat tail when this form of dress was introduced in 1825. The R.E. grenades differ from those worn by the R.A. in having nine flames.

#### CHAPTER II

#### THE DEVELOPMENT OF THE CORPS OF ROYAL ENGINEERS

#### (see Chart on page 9)

The Romans were skilled in engineering and after their invasion of England they constructed a network of military roads, of which some, such as "Watling Street" from Dover through Chatham and London to Chester, and "The Fosseway," from Lincoln to Exeter, are familiar to many people to-day. Some of their fortifications still exist: Agricola's Wall from the Firth of Forth to the Firth of Clyde, and Hadrian's Wall from Newcastle to Carlisle, are examples, while the names of towns and cities ending in "caster," "chester," usually serve as evidence of the site of a Roman camp.

In Offa's Dyke, an earthwork which stretches from Chester to Chepstow, we have evidence of Saxon engineering.

There was no permanent standing army in England until after the Restoration of Charles II in 1660. Before this, troops were raised as required for particular campaigns only. Pioneers and artificers were raised like other troops, and the officers and engineers over them were employed as such only for as long as their services were required.

À few engineers, however, were employed permanently by the King from early times chiefly for fortification work. There was one "ingeniator" Waldivus, mentioned in the Doomsday Book of 1086. The number of permanent "King's Engineers" gradually increased, and there were twelve (nine in England and three in Ireland) in 1700. These officers had engineer grades, such as Chief Engineer, Second Engineer, Third Engineer, and even on active service did not normally have army rank. The title of the senior officers has changed from time to time as below :----

1078-1642 King's Chief Engineer.
1642-1660 Parliament's Chief Engineer.
1660-1802 Chief Engineer of England.
1802-1904 Inspector-General of Fortifications.
1904-1943 Director of Fortification and Works.
1943 to date, Engineer-in-Chief.

After the invention of gunpowder, cannon and mines came into use in the fourteenth century. All cannon in a war were under the command of a "Master of Ordnance." who was sometimes an engineer. as in the case of the Scottish War of 1513, including the battle of Flodden. Guns became more efficient and more numerous, and in the seventeenth century "Ordnance Trains" began to be formed for service in various campaigns: they included all that we now know as artillery, engineer and ordnance personnel. They were often commanded by a permanent engineer, e.g., at Blenheim. Engineers engaged for service during the existence of a particular Ordnance Train were known as "Train Engineers." Each-Ordnance Train was organized as considered most suitable for the campaign in which it was to be employed, and broken up when the campaign ended.

1698. The first Ordnance Train to be maintained in peace was formed. This included 10 engineers. These were in addition to the 12 permanent engineers.

1716. The Artillery was given a separate establishment of two companies and a regular "Corps of Engineers" was formed, consisting of 28 engineers. Rank and file for the Corps continued to be raised as required for each campaign.

1757. Officers of the Corps were given military rank, but the engineer grades were still retained in addition till 1782.

Gibraltar had been captured from the Spanish in 1704 and it was important to improve its fortifications. The work was carried out, under the supervision of engineers, by civilian artificers obtained from the Continent and England. They were found unsatisfactory and the Chief Engineer at Gibraltar, Lieut.-Colonel William Green, suggested their replacement by soldier artificers who would be subject to military discipline.

1772. First Company of Soldier Artificers was raised at Gibraltar by transfers of suitable men from the regiments of the Garrison. This company was gradually increased in strength, and became two companies in 1786.

1787. Corps of Engineers were granted the title of "Royal." Formation of Corps of Royal Military Artificers was authorized and six companies were raised, primarily for work on fortifications at home ports. Six more companies were raised expressly for active service in 1793. All these companies were officered by the Corps of Royal Engineers.

1797. The two companies of Soldier Artificers at Gibraltar were incorporated in the Royal Military Artificers.

1813. As a result of the increased importance of military fieldworks and the good work done in the Peninsula by the Royal Military Artificers, their name was changed to Royal Sappers and Miners.

1856. After the Crimean War, the Royal Sappers and Miners became one Corps with the existing Corps of Royal Engineers. Designation "Sapper" was substituted for that of "Private."

1862. Over 300 engineer officers of Hon. East India Company. in the Madras, Bengal, and Bombay Engineers, amalgamated with the 384 officers of the R.E. in consequence of the assumption of the Government of India by the Crown. The three existing Indian Corps of Sappers and Miners remained separate; having Indian personnel under British officers. Their titles were varied slightly from time to time, eventually being known as Queen Victoria's Own Madras Sappers and Miners, King George V's Own Bengal Sappers and Miners and Royal Bombay Sappers and Miners.

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1947. The Indian Sappers and Miners Corps became independent Dominion Troops of India and Pakistan (see below).

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Miners.

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East India Company's

Gurkha Div. Engineers formed for service in 1948. Malaya.

Other Engineer Corps within the Empire are as follows :---

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Corps of Royal Canadian Engineers. Corps of Royal Australian Engineers. Corps of Royal New Zealand Engineers. South African Engineer Corps. Corps of Engineers (India). Corps of Royal Pakistan Engineers. Southern Rhodesian Engineers. East African Engineers. West African Engineers. Malta Fortress Engineer Sqn.

#### CHAPTER III

#### "SAPS" AND "SAPPERS"

In olden times fortresses had very strong walls round them, and in order to capture a fortress it was necessary either to surround it and wait until the defenders were starved into submission, or to make a breach in the walls through which the infantry could assault. Walls were breached either by mining underneath them and exploding a large charge of gunpowder there, or else by battering them down with artillery fire.

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The method of attacking fortresses gradually became stereotyped and when it had been decided on which side one was to be attacked, the "First Parallel" was opened. The "First Parallel" was a trench dug roughly parallel to the exterior of the fortress, and sited out of musket range but within artillery range. Emplacements for the attackers' guns were constructed along the front of the "First Parallel" which formed a lateral communication trench between them. Approach trenches, and later further " parallels," had next to be constructed ; while the artillery began bombarding the defences.

These approach trenches obviously could not be run directly towards the fortress as this would expose them to enfilade fire, particularly when they reached within musket range of the defenders. They were therefore made zig-zag in plan, lengths being made in alternate directions running outside the edges of the fortress so as not to be under enfilade fire. These approach trenches could not be dug in the normal way by men digging downwards from ground level as such men would be exposed to the fire of the defenders. They were therefore excavated by "Sapping."

The modern definition of a "Sap" (as given in the *Manual of Field Engineering*, Vol. I, 1933) is "A trench dug by men working at the bottom and constantly

extending the end towards the enemy." One or two men standing in the bottom of the trench excavate the "face " in front of them, and being below ground level, are safe from the enemy's rifle fire. In the eighteenth century, "Sapping" was very much more complicated than it is to-day and the definition of a "Sap" then (as given in Muller's Attack and Defence of Fortified Places, 1791) was "A trench made and carried on under cover with gabions and fascines on the flank, and a stuffed gabion at the front." Each "Sapper" (i.e., maker of a "Sap") carried not only a pick and shovel when going to work, but also two empty gabions. By placing these gabions on the exposed flank of the trench being excavated, and filling them with earth, the leading "Sapper" could work in only a very shallow trench and yet have sufficient cover on the flank. To give him cover at the exposed end of the trench, the leading "Sapper" used a "stuffed gabion" or "Sap roller" which he pushed forward as the work advanced. The "stuffed gabion " was of larger diameter than the normal and stuffed with faggots or brushwood.

In rear of the first Sapper, a second Sapper dug the trench deeper, and in rear of him a third, fourth and fifth Sapper each worked at slightly different levels on deepening the trench. Also as soon as the gabions on the flanks had been filled, fascines were placed on top to raise the height of the cover.

Intelligent "Sappers" were essential in order that the work should go on rapidly without casualties or accidents. Privates of the Royal Military Artificers were employed on sapping and mining work during the Napoleonic Wars, and were present at such sieges as Badajoz, Ciudad Rodrigo, Burgos, San Sebastian and Pamplona in the Peninsula.

Sapping and mining work became so important that in 1812 the Royal Engineer Establishment was formed at Chatham, primarily for training in fieldworks. In the following year the name of the Royal Military Artificers was changed to the Royal Sappers and Miners.

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#### CHAPTER IV

# CHIEF WARS IN WHICH THE CORPS HAS TAKEN PART

# The Siege of Gibraltar, 1779–1783.

The Company of Soldier Artificers formed in 1772 was to receive its "baptism of fire" a few years later at the station at which it was formed.

On the revolt of the British North American Colonies against the Mother Country, France, Spain and Holland declared war against England, and Spain with the assistance of France besieged Gibraltar. Colonel Green was still Chief Engineer, and General Elliot, who had served many years as an Engineer, was Governor. During the earlier stages of the siege a successful sortie by the garrison was effected. The Company of Soldier Artificers, supported by a body of infantry and sailors, penetrated four lines of the Spanish trenches and destroyed an enormous quantity of Spanish stores and guns.

The Spanish besieging forces were provided with a considerable number of guns and did much damage to our fortifications; repairs were completed in every case by the Company of Soldier Artificers, often under heavy fire.

The Galleries, a notable feature of the Rock, were started during the siege in order to obtain flanking fire on the Spanish trenches. Serjt.-Major Ince, of the Artificers, suggested the construction of these galleries.

In 1782, the Spanish bombarded Gibraltar with unprecedented vigour, but the garrison retaliated with red-hot shot prepared by the Artificer Company, kilns for the heating of these missiles being erected in various places.

The combined fleets of France and Spain appeared before Gibraltar and the besieging forces were strengthened by troops moved from Minorca. In addition to the two fleets, 10 floating batteries mounting 212 guns were also brought up, which with the land batteries of 200 guns of large calibre commenced an intensive bombardment of the Rock. This was countered by an equally intensive bombardment by the garrison, using red-hot shot, with the result that the floating batteries were destroyed and the attack discontinued.

The Spanish now made preparations to blow up the North Front in order to effect a breach by which to enter. They therefore started mining operations in a cave. News of this was brought in by a deserter, but was received with incredulity. Serjt. Jackson of the Artificers, however, climbed down a rock known as the Devil's Tower and discovered that the information was correct. The operations of the Spaniards in this direction were thenceforward hindered by hurling over rocks and grenades. Supplies and reinforcements were brought in by Lord Howe, and in 1783 peace was proclaimed.

# Napoleonic Wars, 1805-15.

# PENINSULAR WAR, 1808-14.

The Royal Military Artificers were called into service against the attempts of Napoleon Bonaparte to conquer the civilized world. In 1808 Napoleon's intention was to subdue Spain, place his brother Joseph on the throne at Madrid, and march across to invade Portugal.

As we were friendly with Portugal we sent an army to protect Lisbon and to drive the French army back to France. Owing to superior numbers, Napoleon's army compelled Sir John Moore to retreat from the Spanish borders, north to Corunna.

The English Government planned another expedition and sent more troops and supplies to Lisbon under the Duke of Wellington. He organized his army to defend the base and ordered three huge entrenchments around Lisbon. These works, called the Lines of Torres Vedras, were dug across country and were 25 miles in length. His C.R.E., Sir Richard Fletcher, organized and executed

this brilliant work. He was later killed before San Sebastian in 1813. The Artificers did excellent work. They supervised the making of roads and the construction of the lines by the Portuguese peasants, and although there were only about twenty Artificers in the Peninsula, and sometimes one Artificer controlled as many as five hundred workers, they were praised by Wellington himself.

The Engineers were always charged with the duty of leading the assaults on fortified places. Their task was to breach the defence works and the Senior R.E. Subaltern had the honour of front place in the attack.

They also greatly distinguished themselves in bridging feats, with inadequate and improvised materials.

Towards the end of the Peninsular War (1812) Wellington pressed for further training of Artificers, and a fieldworks school was established at Chatham named the R.E. Establishment (later the S.M.E.) under the directorship of Lieut.-Colonel Sir Charles Pasley. He held this post for 29 years, and in memory of whom a road near the S.M.E. has been named Pasley Road. Some of the men who had been instructed at Chatham were present at San Sebastian and received the nickname "Pasley's Cadets."

After numerous defeats the French were driven from Portugal and Spain, back into France, and Napoleon was exiled to the Isle of Elba in the Mediterranean Sea.

WATERLOO.

In 1815, Napoleon escaped, formed an army and advanced into Belgium near Brussels. Lieut.-Colonel Carmichael Smith, C.R.E. of the Army of Occupation in the Netherlands, was ordered to prepare a map of the country between Brussels and the French frontier, and although it had not been completed, Wellington used this in his preparations for the Battle of Waterloo. The map was once nearly lost when the Officer carrying it was unhorsed in an engagement with the French, but it was safely delivered to Sir William de Lancy, Wellington's Quartermaster-General, who was mortally wounded whilst it was in his possession. The map is now preserved in the R.E. Museum, stained with his blood but still in a fair condition.

No complete unit of the Royal Sappers and Miners was present at Waterloo, though there was a properly constituted Engineer Company with each Division and a pontoon train with the Expeditionary Force. Twelve medals were awarded to officers of the Corps, of which two are now to be seen in the R.E. Museum.

Thus our Corps grew in strength and knowledge after having successfully carried out its training in rock and stone at Gibraltar, and in earth and other field fortifications during the Napoleonic Wars.

# The Crimean War, 1854-56.

In 1854 the Tsar of Russia claimed certain rights for members of the Greek Church in Palestine, but the Sultan refused and Russian troops invaded Turkey. Britain was anxious that Russia should not seize Constantinople and thus gain entrance to the Mediterranean Sea. Britain, France and Sardinia allied with Turkey against Russian aggression.

In the Baltic the Royal Sappers and Miners served in co-operation with the French Army and a fleet under the command of Brigadier-General Harry Jones, R.E., who had seen service in the Peninsular War, under Wellington. At Bomarsund the Sappers distinguished themselves at Forts Tzee and Nottich and effected the demolition of these and other forts after their capture.

In Turkey the 7th Company constructed lines at Gallipoli and Bulair, whilst other detachments proceeded to Varna, on the Black Sea Coast. In an attack by the Turks on a Russian Force holding a position on the Danube, near Rustchuk, Captain Bent and Lieut. Burke led Turkish units, and Cpl. Swann and Pte. Anderson greatly distinguished themselves, the latter killing 14 Russians himself and taking command of a portion of the

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Turkish forces. For these services he received the Order of the Mediidie.

The Russians afterwards withdrew their forces from the line of the Danube and the greater portion of the British forces was also withdrawn from this area, in order to co-operate with their allies in an attack on Sebastopol, a strong fortress on the Crimean Peninsula. The landing was effected at Kalamite Bay, superintended by Sir John Burgoyne, Director-General of Fortifications. This officer also supervised all British siege works until retired on account of age and ill-health; he was succeeded by Sir Harry Jones.

In their march against Sebastopol, the Allies were opposed by the Russians at the Alma, but inflicted a defeat upon them.

During the siege the Royal Sappers and Miners performed invaluable work. They acted as supervisors to the British and Turkish working parties and were distinguished from the other troops by a white band round their forage caps. They constructed a landing-place at Balaclava, and it was in an attempt by the Russians to cut our communications that the famous Battle of Balaclava took place. They also laid the first field telegraph used on active service, consisting of 25 miles of line with eight stations.

The fire of the Russian guns played havoc with our works and fortifications. This necessitated the constant attention of the Sappers and Miners who worked with the greatest gallantry and devotion, winning the admiration of both French and English officers. "Follow the Sapper" became a favourite phrase among the troops.

On one occasion the Russians made a desperate sortie under cover of night, and at Inkerman, the "Soldiers' Battle," 14,000 French and British troops routed over 60,000 Russians.

After several bombardments, followed by desperate attacks on the part of the Allied forces, the Russians, under cover of night, withdrew their troops from Sebastopol. The withdrawal was discovered by Cpl. John Ross while searching for a wounded comrade near the Redan. The Allies then occupied the town, and its fortifications were destroyed by the Royal Sappers and Miners.

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At the end of this war, in October, 1856, the Royal Sappers and Miners were incorporated with the officers of the Royal Engineers and known thenceforward as the Corps of Royal Engineers. The 2nd, 3rd, 4th, 7th, 8th, 9th, 10th, 11th, 23rd, 25th, 26th Companies took part in the campaign.

# The Indian Mutiny, 1857-58.

India in 1857 was governed by the East India Company, originally a trading organization, which maintained its own army of white and native troops. The latter became discontented and a mutiny broke out at Meerut, while massacres of white people took place at Cawnpore and elsewhere. The mutineers marched on Delhi and occupied it. A force of white troops and loyal Sepoys was sent in pursuit. Major Baird Smith, of the Bengal Engineers, became Chief Engineer. He advised an immediate attack on the city, but his advice was not followed. He was then ordered to draw up the necessary plans for a siege.

Delhi was protected on one side by the river, while the rest of it was provided with a strong wall, pierced by the Kashmir and Lahore gates. The two gates, together with the Kashmir Bastion and the Water Bastion, were to be the main points of the attack.

# THE BLOWING IN OF THE KASHMIR GATE.

This gallant deed was effected by Lieut. Home and Lieut. Salkeld, of the Bengal Engineers, with Serjts. Burgess, Carmichael and Smith, of the Bengal Sappers and Miners. Home advanced towards the gate followed by four soldiers carrying bags of powder on their heads. Salkeld led a similar detachment, while a storming party of 150 was to

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rush the gate as soon as it was demolished. Home and his party reached the gate, deposited their powder and dropped safely into the ditch. Salkeld's party was received by a storm of bullets, but laid their powder, and Salkeld was about to ignite the fuze when he was wounded in the arm and leg. He handed the portfire to Serit. Burgess, but the latter was shot dead. Serit. Carmichael then took the portfire and ignited the fuze, but he, too, was mortally wounded. Salkeld had been helped into the ditch by Bugler Hawthorne of the 52nd L.I. who accompanied the party. At the explosion of the charge the gate was shaftered, the bugler sounded the charge, and the storming party rushed the gate.

Elsewhere the attack had been successful and Delhi was captured.

#### LUCKNOW.

During the early days of the mutiny Sir Henry Lawrence held part of Lucknow, against the rebels, with 700 white troops, 1,300 loval Sepoys, including seven officers of the Bengal Engineers. The rebels attempted to mine our position, but successful countermining operations were effected. Havelock and Outram forced their way into the city, but were unable to evacuate the garrison. Eventually Sir Colin Campbell evacuated the garrison, leaving Outram outside the city to observe the movement of the rebels. The following year (1858) Sir Colin Campbell returned with a larger force and recaptured Lucknow.

The Engineers played a very important part in these operations, more especially the 4th and 23rd Companies. which were present at the relief and recapture of Lucknow. The 23rd Company erected a semaphore on the Dilkoosha, by means of which Sir Colin Campbell was enabled to communicate with the besieged forces in the residency: they were also successful in planting the British flag on the Palace of Moti Mahal. After the relief of Lucknow they took part in the battle of Cawnpore.

In the operations leading up to the recapture of Lucknow the 4th and 23rd Companies R.E. were incorporated in the Engineer Brigade under Napier, and built two cask bridges over the Goomti.

While pursuing Nana Sahib, who had been responsible for the massacre at Cawnpore, the 23rd Company took part on 31st December, 1858, in what was practically the last engagement in the campaign.

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In addition to the 4th and 23rd Companies, mention must be made of the 21st Company R.E., which, with the Madras and Bombay Sappers and Miners, was attached to the Central India Field Force. In an attack on the fortress of Jhansi this unit played a prominent part, Engineer officers leading the storming parties. It was here that Cpl. Sleavon won his V.C.

# The Abyssinian Campaign, 1867-68.

This campaign, which was brought about by the refusal of King Theodore of Abyssinia to release several British prisoners, is of particular interest to the Corps.

Firstly, Sir Robert Napier, afterwards Lord Napier of Magdala, was in command, thus being the first officer of Engineers to command British forces in the field. Secondly, the campaign was essentially an engineering one. The Abyssinian soldiers were untrained and inexperienced, so that they could not be expected to offer much resistance to our troops, but difficulties due to the country were very great, and Magdala, the capital, which was the objective, was situated in the midst of very mountainous country. The bulk of the work therefore fell to the Royal Engineers. This was, in fact, the first campaign in which the demands on the Royal Engineers took the form of serious civil engineering, of which the pattern is now familiar to us. Ă reconnaissance party in which were three Engineer

officers was sent to choose a landing-place. This they 19

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found at Zula in the Gulf of Aden. Two landing piers, one of fascines and later one of stones, were built and a tramline laid on the beach. A mile inland a camp was established to which a road was made. Twenty wells were sunk, storehouses were erected, and a water shoot 480 feet long was made to convey water from H.M.S. *Satellite* to store tanks on shore.

The next step towards reaching Magdala was the building of a railway to Kumayli at the foot of the hills. This was ten miles long, rose 350 feet, and necessitated the building of eight girder bridges. A road was also constructed from Zula to Senafe, a distance of 60 miles, and this, too, involved a tremendous amount of work. Ramps had to be made over boulders that could not be moved, and in parts the road was cut in the mountainside. It rose from sea level to 7,400 feet.

Other Engineer activities included the sinking of wells along the route and the provision of chain and lift and force pumps. A telegraph was erected and maintained, and flag signalling was also used for the first time in the British Army. A special party of Sappers trained in flag signalling was sent out from Chatham for this purpose. Photographers, too, were used in this campaign. Having disembarked at Zula in November, 1867, the forces reached the outskirts of Magdala, King Theodore's stronghold, on the 10th April, 1868. The city was situated in an almost inaccessible position and could only be entered by one of the gates. An attempt to persuade the King to make terms was unsuccessful, so artillery was brought up, and the Engineers were instructed to blow up one of the gates after a bombardment lasting half an hour. This plan succeeded and an assault was then made, but the defenders fled, leaving the King, who was found to have killed himself. The British prisoners were released and the city burned to the ground.

As a reward for his excellent services Sir Robert Napier was made Lord Napier of Magdala. The Engineer units employed were the 10th Company, Royal Engineers, three companies of the Madras Sappers and Miners and four companies of the Bombay Sappers and Miners.

# Egypt and the Sudan.

Egypt, which has many associations with Biblical history, was from 1914 to 1922 a British Protectorate. It is now an Independent State, but we made certain reservations and still keep there a military force.

The Turks held Egypt from the year 1715, and its ruler was the Khedive, who ruled on behalf of the Sultan of Turkey. In 1869 the Suez Canal was opened thus giving a shorter route to India and the Far East. The Canal was built by Ferdinand de Lesseps, a Frenchman, the French having obtained a lease of the country through which it was made. Large sums of money had been borrowed from Great Britain and France by the Khedive, and it appeared that there was little hope of the money being repaid, so Great Britain and France took over a "Dual Financial Control" of Egypt. This proved unpopular among the Egyptians, and caused bad feeling that would obviously lead to unrest. France then withdrew from the dual control, leaving Great Britain virtually to rule Egypt and the Sudan.

In 1882, the threatened revolt under the leadership of Arabi Pasha broke out, and an expedition was sent out under General Sir Garnet Wolseley.

One of the first incidents of the campaign was the murder of Captain Gill, R.E. and two companions who were ordered to cut the telegraph line between Cairo and Syria. The party went out into the desert to do this, and were never heard of again.

Sir Garnet Wolseley landed at Alexandria on the 15th March, 1882, and reached Ismailia in August. The rebels, under Arabi Pasha, were defeated at Kassassin by Major-General Graham, R.E., who had won the V.C. in the Crimean War. Wolseley then carried out his celebrated march across the desert to Tel-el-Kebir, and completely

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defeated Arabi Pasha. The chief Corps interest in this march is the fact that simultaneously with its advance an electric telegraph line was erected, and the 8th Railway Company controlled and maintained the railway line and ran the trains.

This telegraph line enabled Wolseley to report his victory direct to Queen Victoria and the War Office in London, and it is interesting to note that this was the first time a commander of British forces was able to telegraph the news of a campaign direct from the field.

1884. The British were now practically rulers of Egypt, and this involved a measure of interest in the Sudan, a large territory south of Egypt. At this time the tribes of the Sudan revolted under the leadership of the Mahdi, a religious fanatic, and the British were faced with the task of the relief of the Egyptian garrisons in the Sudan. Major-General Gordon, R.E. was sent to Khartoum and Major-General Graham, R.E., led an expedition to crush the revolt around Suakim.

Graham's expedition was successful. The 26th Field Company which took part in it, besides its engineering work of water supply and the construction of zeribas, helped to form "Square" against the rebels' attacks on two occasions. General Gordon having reached Khartoum was besieged there by the forces of the Mahdi before he had completed the evacuation of the garrison.

1885. A force under Sir Garnet Wolseley, in which were the 8th Railway Company and the 11th and 12th Field Companies, was sent up the Nile to relieve Gordon at Khartoum. This force was delayed by the state of the Nile, the river boats being unable to negotiate the cataracts.

About two days before its arrival at Khartoum the Mahdi's forces entered the city and Gordon was killed on the Palace steps. The siege had lasted ten and a half months.

In 1892, Lord Kitchener, Sirdar of the Egyptian Army

and also an Engineer officer, who had been in the relief force to save Gordon, started to train and reorganize the Egyptian Army, with a view to the re-conquest of the Sudan, and to avenge the death of Gordon.

The problem of keeping up communication with Cairo now arose. There was a railway as far as Wadi Halfa, but from there Kitchener decided not to follow the Nile, whose course makes a great loop to the west, but to cut across 230 miles of desert to Abu Hamed, there rejoining the river. Constructing a railway from Wadi Halfa to Abu Hamed was considered an almost impossible task by both civil and military engineers, as it meant laying a railway over unsurveyed and waterless desert. The scheme was proceeded with, however, and Lieut. Girouard, R.E., organized the work. Kitchener drove the Dervishes southwards a few miles at a time, holding each position until the railway was built up to him. Eventually our forces advanced and the railway was laid as far as Berber, 150 miles farther than originally planned.

At Atbara, Kitchener defeated the Dervishes, and then waited four months for the Nile to rise, before making the final advance in 1898 to Omdurman, where he practically destroyed the Dervish forces, having before the battle urged his men to "Remember Gordon."

Soon afterwards our forces marched into Khartoum and the Union Jack was hoisted and a simple religious ceremony held in memory of General Gordon. Kitchener afterwards took the title of Lord Kitchener of Khartoum.

# Wars in South Africa, 1879-1902.

#### THE ZULU WAR, 1879.

The main Corps interest in the campaign centres in the catastrophe of Isandlwana and the defence of Rorke's Drift. In the former Colonel A. Durnford, R.E., met his glorious death, fighting against enormous odds to cover the retirement of the main column, and at the latter Lieut. Chard, R.E., made an equally glorious, and at the

same time successful, resistance to an attack by an overwhelming number of Zulus. Lieut. Chard was awarded the V.C.

The 2nd, 5th, 30th and 7th Companies, R.E., took part in this campaign.

#### BOER WAR, 1898-1902.

In this war the R.E. expanded considerably, and the following types of units were employed :----

(a) Field Companies, employed mostly on works of defence, construction of batteries, magazines and light bridges.

(b) Fortress Companies, some of which were used as Field Companies and some to supplement the Railway Companies.

(c) Balloon Sections, whose work was to observe enemy movement, and to direct artillery fire.

(d) Bridging Battalions, for the construction of pontoon and heavy bridges.

(e) Telegraph Divisions, for signal communication generally.

(f) Railway Battalions. Their job was to work and control railways in British territories, rapidly repair the lines damaged by the enemy, and to control and work lines in Boer territory when captured by us.

(g) Steam Road Transport (now developed as M.T. and controlled by the R.A.S.C.).

(h) Searchlight and Survey Sections.

The chief Sapper units at the Siege of Ladysmith were the 23rd Field Company and 2nd Balloon Section. With the rest of the garrison they suffered great privations owing to the lack of provisions, and at length it became necessary to transport the Sappers by wagon when travelling any distance over a quarter of a mile.

Lieut. Digby Jones, R.E., when in charge of a night working party at Wagon Hill, near Ladysmith, was surprised by the Boers. He extended his men and held the hill until relieved in the morning. At midday the Boers broke the infantry line and Lieut. Digby Jones, instead of retiring, ordered his men to fix bayonets and charge. Unfortunately this gallant officer was killed later in the day, but a posthumous award of the V.C. was made.

With the relief of our besieged forces in Ladysmith, Kimberley and Mafeking, came the conclusion of regular fighting, but for two years guerrilla warfare went on and when Lord Roberts returned to England, Lord Kitchener, who had been his Chief of Staff, was given supreme command to round up the Boers.

#### The First World War, 1914-1918.

#### CAUSES OF THE WAR.

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(i) Germany as an industrial power needed producing grounds for raw materials under her own flag; she coveted colonies. Wherever Germany looked for colonies she found that France or Britain had forestalled her. Her only possessions before the war were German South-West Africa, German East Africa, a few islands in the Pacific and a few possessions in West Africa.

(*ii*) Two alliances had grown up: Germany, Austria and Italy were known as the Triple Alliance, whilst opposed to this was the Triple Entente of Great Britain, France and Russia, who were brought together by growing fear of Germany.

(*iii*) Germany also wanted sea-power to protect the colonies which she hoped to form, and thus worked for our Navy's destruction.

(iv) By 1914, Germany had enormously increased her army and navy. Other countries, afraid of her, did likewise. Thus Europe was like a powder magazine, only waiting for a match to be applied for it to explode.

(v) The lighted match was the assassination of the Archduke Ferdinand of Austria by a Serbian. Austria demanded ridiculous terms from Serbia who refused to

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comply. As a result, Austria, backed by Germany, declared war on Serbia. Russia then began to mobilize in order to protect Serbia. Germany ordered Russia to stop mobilization and on her refusal declared war. France backed Russia. Germany began by invading Belgium without warning and then declared war. The violation of Belgian neutrality caused the British Empire to declare war on Germany on 4th August, 1914.

MAIN THEATRES OF WAR.

- Western Front. Britain, France, Belgium, and from June, 1917, America, fought against the Germans.
- Eastern Front. Russia fought against Germany and Austria.

Britain fought against Turkey. Mesopotamia.

The British made a landing and fought Gallipoli. the Turks with a view to establishing communication with Russia through the Black Sea.

Italy fought against Austria.

- Italy. Britain, France, Serbia, Rumania and The Balkans. Greece fought against Austria, Turkey and Bulgaria.
- As a safeguard against the Turks and Palestine. Germans obtaining the Suez Canal the British penetrated into Palestine.

Britain against Germany. East Africa.

In 1917 Russia dropped out of the war on account of internal revolution, and the United States of America joined the Allies.

Finally Marshal Foch led the Allied Forces to victory. Germany, after all her Allies had sued for peace, was forced to sign an Armistice on 11th November, 1918, and the war ended.

WORK OF THE ROYAL ENGINEERS.

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The increasing complexity of weapons, speed of transport vehicles and power of explosive projectiles all lead to vastly greater calls on the Royal Engineers. At the outset of the war, the most immediate demands on them were as front line troops, and Field Companies were employed continuously on erecting obstacles protecting the forward positions held by our hard pressed infantry in France and Belgium, and enabled them to hold the German attacks in autumn 1914. Casualties were unavoidably very heavy.

While the demands on divisional engineers remained more than they could meet throughout the war (the number of field companies in a Division was increased from two to three very early), the civil engineering work on the L. of C. and in Base areas exceeded anything previously contemplated. This feature merits separate study.

Again, with the increased use of artillery. particularly on indirect fire, survey work for the artillery grew and R.E. Survey Battalions were formed to carry out the tasks of fixing guns and targets and producing large-scale maps.

Among the outstanding exploits of the Royal Engineers during the war (though not necessarily the most difficult) may be mentioned :

(a) The bridging of the Tigris at the Shumran Bend, which enabled General Maude to inflict a crushing defeat on the Turks in Mesopotamia and virtually decided that campaign.

(b) The greatest military mining operation in history was carried out as a preliminary to the capture of the Messines Ridge in June, 1917. Charges containing nearly a million pounds of explosives were fired under the German lines.

(c) In the Palestine campaign, a pipe-line was laid across the Sinai Desert and filtered Nile water was delivered to British Troops 150 miles away.

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(d) Royal Engineer units were invariably used for con-

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solidating gains made in attacks on the closely entrenched positions which were the main feature of this war. This involved following up the leading assaulting infantry and working under very heavy fire and often in very confused battle situations. Time and again the R.E. consolidating parties became involved in fighting as infantry, as an incidental part of carrying out the task allotted to them. There were countless instances of extreme gallantry on such occasions.

(e) In the final advance in France and Belgium in the late summer and autumn 1918, the Royal Engineers were suddenly called upon to carry out feats of bridging. Fortunately they had kept their training in this work up to date, throughout all the monotonous years of trench warfare. But even so, exceptional ingenuity and skill were called for to meet unexpected situations. Assault bridging parties often found themselves working under close enemy fire, and it was the determination, following the best traditions of the Corps, to " see the job through," whatever the opposition from the enemy or nature, that enabled them to complete the tasks.

#### The Second World War, 1939-1945.

#### CAUSE OF THE WAR.

Germany, under Hitler, had become a National Socialist State in which all opposition to the Authoritarian government was ruthlessly suppressed, and the doctrine of the pre-eminence of the German race was intensively inculcated. The foreign policy of the Nazi leaders was first the elimination of the terms of the Treaty of Versailles, and then the domination by Germany of neighbouring states with a view to ultimate world power. Closely allied to Germany was the Fascist state of Italy, led by Mussolini, whose policy was almost identical, as far as internal government was concerned, with that of Hitler's Germany. In spite of the diplomatic remonstrances of Great Britain

and France, both of whom adopted a policy of appeasement partly from a desire for peace and also because they were militarily unprepared for war. Germany in turn annexed Austria and Czechoslovakia. But when in spite of a final warning Hitler invaded Poland. the British Empire and France declared war on 3rd September. 1939. Poland was rapidly conquered, and in May, 1940, Germany turned her attention to the West. over-ran Holland. Denmark and Norway, and isolated the British and French forces in Flanders which were evacuated at Dunkirk. Britain itself was then threatened with invasion which never eventuated. Meanwhile Italy. who had at first remained passive, joined Germany and threatened our position in the Middle East. where the Germans came to their assistance. In December, 1941, Japan, whose political ideas were in sympathy with those of Germany. attacked and over-ran our Far Eastern possessions and bombed the American fleet at Pearl Harbour, thus bringing the latter country into the war on the side of Britain. Germany then made War on Russia and so that country came into the War with what were now called the United Nations.

From the end of 1942, the tide turned in favour of the United Nations. Germans and Italians were driven out of Africa. Italy surrendered and joined the United Nations when British and American forces landed in their country, through which the Germans were driven back. Eventually British, American and Free French forces landed in Normandy and Southern France and swept forward up to and across the Rhine eventually joining hands with the Russian Armies advancing from the East. The German forces surrendered unconditionally on 7th May, 1945.

Meanwhile the Japanese had been checked and driven back in Burma and the islands of the S.W. Pacific, and surrendered just as British Empire and American forces were about to invade their country, and shortly after two atomic bombs had been dropped.

#### WORK OF THE ROYAL ENGINEERS.

The characteristics of modern warfare, arising from heavier and more powerful equipments, mentioned in the notes on World War I, developed progressively. So did the demands on and difficulties to be met by the Sappers. Stores, labour and transport were needed in unprecedented quantities. Entirely new problems had to be dealt with.

The speed of modern warfare, particularly by the extended use of armoured mobile forces, involved very rapid building of heavy bridges, which became of vital importance. Anti-tank and anti-personnel mine warfare far exceeded anything foreseen before 1939, while the construction of forward airfields in rapidly moving operations was often a governing factor in the rate of progress of our advance. The extensive use of mechanical plant produced quite a new conception of military engineering.

The task of the R.E. Survey had also become greater. The war was no longer confined to a few parts of the world, but was likely to spread to any part of the world thereby greatly increasing the new mapping required to satisfy not only the ground forces but also the air forces. The survey data which the gunner wanted in the First World War was now wanted by the Air Force bombers not only for navigation but also for finding the target.

Never has the Corps lived more up to its motto "Ubique." In every theatre of operations, from the front line positions to the Base areas, in airborne operations and raids, there were Sappers and never enough of them. Both a higher fighting skill and a more advanced engineering skill were expected of them than ever before.

In all the vast and complex tasks which they were called upon to perform, the following brief (and necessarily inadequate) examples may be mentioned :

(a) In the retirement of the B.E.F. in France in May/ June, 1940, demolitions had to be undertaken by every imaginable type of R.E. unit, though several of the Base and L. of C. units had never been trained in such work. Over 620 bridges were destroyed. There is no doubt that their efforts gave the rest of the Army more breathing space than would otherwise have been the case.

(b) The clearance of lanes through the intense German minefields at the battle of El Alamein enabled the supporting weapons and armour to penetrate the enemy defences. The achievement of this apparently impossible task earned the admiration of the whole Army. It was in the direct tradition of the Corps in leading the breaching parties in the assaults on fortified places of the Peninsular War. This subsequently became a normal task, while the "delousing" of enemy booby traps and mined areas threw a wellnigh unbearable nervous strain on field company Sappers.

(c) Bridging through Italy and N. W. Europe was an unparalleled achievement. The Bailey Bridge in design excelled anything produced by any other army, while the rapid and smooth construction of these bridges was a triumph of organization and dogged endurance. In all, over 4,000 Bailey Bridges were built in these theatres, many of them to take the heaviest tanks and many of a considerable length.

(d) Base construction, particularly in the Middle East, involved civil engineering skill of every kind. New ports, entirely new townships with all public utilities and communications, extensive water supplies, new railway construction and oil pipe-lines all dwarfed anything previously envisaged.

(e) In the difficult terrain of Burma, with its sodden jungles and steep mountains, roads for intensive traffic were driven. In this road construction and in airfield construction, a new technique was developed to produce surfaces in as many hours as it had taken weeks in peace-time.

(f) R.E. units operated in armoured fighting vehicles for the first time in the invasion of Normandy. Assault Vehicles R.E. were designed with the purpose of hurling demolition charges to destroy concrete works and to lay crossing devices to pass over other obstacles. This they

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achieved in fine style, though at the cost of heavy casualties.

(g) Mention has been made above of airfield construction. This developed into a major commitment, as the number, speed and size of aircraft increased. It was vital that the readiness of airfields should not hamper the operations of the Army and R.A.F. This called for the highest possible degree of engineering skill and organization. Recce parties immediately followed the leading troops in order to avoid loss of time.

(h) Survey units operated in all theatres making new maps, bringing old maps up to date, and in general providing survey data which the Army and the Air Forces wanted.

In this short space it is impossible to give any adequate idea of the efforts of the Corps in all theatres. As always, besides their tireless work, R.E. units were constantly called upon to take up their weapons and to fight as infantry either in the course of executing their tasks or in critical defence situations.

Their services may be summed up in the words of the Commander of the 8th Army: "The Sappers really need no tribute from me; their reward lies in the glory of their achievement. The more science intervenes in warfare, the more will be the need for engineers in the field armies; in the late war there were never enough Sappers at any time. Their special tasks involved the upkeep and repair of communications; roads, bridges, railways, canals, minesweeping. The Sappers rose to great heights in World War II and their contribution to victory was beyond all calculations."

One of the outstanding events of the war was the fortitude of the population of Malta under intensive and continuous air bombardment until the 8th Army's victories cleared the northern coast of Africa. This was undoubtedly inspired by the invigorating personality and high sense of duty of the Governor, Lieut.-General Sir William Dobbie, a Royal Engineer officer.

#### CHAPTER V

#### EXPANSION OF THE CORPS

From the R.E. are expected new ideas and improvements in the methods of waging war; it may truly be said that most technical developments are born and bred in the Corps. When they have grown up they are sent out to a separate life in the Service, as can be seen from the following examples.

#### SIGNALLING.

During the Crimean War the first field telegraph was used; from this were derived the Airline, Cable and Wireless Companies. In 1911 these were known as the Army Signal Services R.E., and in 1914–18 became the Divisional Signal Companies R.E. After World War I these units were formed into a separate Corps known as the Royal Corps of Signals.

#### SUBMARINE MINING.

Companies were formed in 1871 for coast defence by means of submerged charges which were fired electrically from the shore. In 1905, these Companies were abolished and their work handed over to the Royal Navy.

#### AERONAUTICS.

Balloons were first used in Bechuanaland for observation purposes in 1884. Training was carried out at Chatham until the R.E. Balloon Depot was formed at Aldershot in 1890. Aeroplanes were developed at the beginning of the present century and in 1911 an Air Battalion R.E. was formed, which was taken over by the Royal Flying Corps in 1912. Later this was combined with the Royal Naval Air Service, to form the R.A.F.

#### MECHANICAL TRANSPORT.

Steam road transport, the forerunner of the present mechanical transport, was first used by the 45th Company R.E. in the South African War. It was handed over to what is now known as the R.A.S.C.

#### TANKS.

The conception of the idea of the tanks is due to an R.E. officer, Lieut.-Colonel E. D. Swinton, R.E. Although they were organized as a separate arm, they were commanded by this officer in their first attack in 1916, and later by Lieut.-Colonel H. J. Elles, R.E. In 1917 they became the Tank Corps.

## THE WORLD WAR I 1914-1918.

Many new specialist units of the Corps were raised during the war, to take over duties not normally or previously handled by the Corps in peace, e.g., such units as Forestry, Artisan Works, Tunnelling, and other specialist Coys. The Railway Bn., R.E., became the nucleus of the Transportation Branch of the Corps which not only took over the construction, maintenance, and operating of all railways under military control but also controlled the port, harbour and inland water transport work, building new docks as well as operating existing ones. Some Specialist Units operated only in France but the others were engaged on all remaining battle fronts and lines of communication.

The strength of the Royal Engineers at the outbreak of war in 1914 was about 26,000; in 1918 it mustered 340,000. These figures give some idea of the magnitude of the work that had to be undertaken. There was practically no limit to its variety.

# INDIAN SAPPERS AND MINERS IN THE WORLD WAR I.

Although the three Corps of Sappers and Miners were composed of Indian personnel recruited from various parts of India, mention should be made of the British R.E. Officers and N.C.O.s who helped to raise and train the units of these Corps in the great expansion which they underwent in the two World Wars. Beginning with the 2nd Field Troop of Madras Sappers who served in France in 1914, these units played a great part in most theatres and in addition to the British officers of the units, one R.E. Warrant Officer and one Serjeant served with each Company. These British personnel were specially selected from the Corps at home and often elected to spend all their service in India.

#### 1918-1939.

The return of peace once more saw the Corps reduced to its normal size and composition, although the advent of mechanization replaced horses by motor transport. Specialist units were disbanded or went on to a reserve basis until required again. The control of Searchlights, both Coast Defence and Anti-Aircraft, was found to be more of an Artillery responsibility than an Engineer one and the hand-over of this old established branch was going on when World War II broke out.

# THE SECOND WORLD WAR 1939-1945.

From the very beginning of the War the expansion of the Corps was rapid, and rose from a figure of 54,000 at the start to a peak of over 280,000, exclusive of the large numbers of Indian and Dominion Sappers. The nature of the War was such that results on a large scale had to be achieved at the maximum speed, and for this reason mechanical science was called in for assistance, and there was considerable expansion in the use of mechanical equipment of all kinds, more especially for the construction of roads and aerodromes. Mechanical excavators, bulldozers, graders, etc., were used in large quantities. The necessity for the rapid construction of bridges to take heavy tanks led to the introduction of new types of bridging equipment,

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the most noticeable being the Bailey Bridge, many thousands of which were erected in the course of the war. To meet the special requirements of the forces new types of R.E. units such as Bomb Disposal Units, Mechanical Equipment Units, General Construction Companies, Airfield Construction Groups, etc., were formed, and many which had appeared in World War I and which had disappeared in peace, such as Artisan Works Companies, Road Construction Companies, Forestry, Quarrying, and Tunnelling Companies, were revived; and many special types of unit in connexion with Survey and Transportation were formed. Also, for the special work in connexion with landings on defended beaches, and for duty with Airborne Forces, Assault Units R.E. armed with Armoured Vehicles R.E., and Parachute and Airborne Units respectively came into being.

Existing units were modernized and re-equipped to fit them for the highly technical work which they had to perform.

In all there were over 200 different types of R.E. Units in the Army and over 100 different types of unit in which there were specified R.E. personnel.

The Indian Sappers and Miners, later called the Corps of Royal Indian Engineers, played a notable part in N. Africa, Italy and Burma.

#### . Empire Engineers.

Though not forming part of the Royal Engineers, but closely allied to the Corps are the Engineers of the Dominion forces. The Royal Canadian Engineers, the Royal Australian Engineers, Royal New Zealand Engineers, and the South African Engineer Corps. All of these made a fine contribution to the Empire effort in both World Wars, and the Corps are proud to be associated with such fine and efficient Comrades.

These corps, together with others formed since the war, are included in the list given on page 8.

In November, 1950, the 55th Independent Field Squadron R.E. landed in Korea to give engineer support to the British 29 Infantry Brigade Group, which formed part of the United Nations Force sent to halt Communist aggression. In addition certain R.E. Works and Stores personnel were sent to the theatre.

In June, 1951, the 1st Commonwealth Division was formed. This was the first time in the history of the British Army that an integrated Commonwealth Division has been in action. The divisional engineers consisted of the 11th and 55th Field Squadrons (British), the 57th Field Squadron (Canadian) and the 64th Field Park Squadron (mixed British and Canadian).

REORGANIZATION AFTER THE SECOND WORLD WAR.

Engineer tasks tend to grow in scope and size, though manpower available does not increase. There has therefore been a reorganization in most Engineer units designed to increase the number of machines employed and available, and reduce the number of men.

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#### CHAPTER VI

#### CIVIL WORKS

The Corps has been responsible for much Civil Engineering work at home and abroad as a part of its training, but only a very brief account can be given here. India has been the chief scene of civil work.

The work may be classed under the following headings :

(1) Survey.

(2) Roads.

(3) Railways.

(4) Irrigation.

(5) Other public works.

#### (I) Survey.

The Military Survey Service remained after the Second World War as an integral part of the peace-time Army, with the task of providing the Army and the R.A.F. with the survey data and maps which they require in peace or threat of war in any part of the world.

The Corps is also concerned with the Ordnance Survey and the Colonial Survey.

The Ordnance Survey of Great Britain is responsible for the mapping of Great Britain and to it are seconded for duty, officers of the Corps. It has a long history. At one time it was staffed almost entirely from the Corps, but now the staff is mainly civilian.

Great Britain is covered by the most accurate and complete system of maps and plans of any country in the world. Credit for this is due to the Ordnance Survey, the staff of which was, in the early days, provided almost entirely from the Corps. In recent years the military element of the staff has rapidly decreased and at the present time only some 35 R.E. Officers are employed on this work.

The systematic mapping of the country was started in the Highlands as a result of the Rebellion in 1745. It was not until 1791, however, that the Ordnance Survey was set up. The initial task was the production of a One-Inch map of the country primarily for military purposes. The scale of survey was later changed to 6 in. to the mile, and in 1856, to 1/2500.

The main tasks of the Ordnance Survey are now (1951) as follows:

1. The re-survey at a scale of 1/1250, of the large towns ;

2. The revision and overhaul of the 1/2500 plans;

- 3. The production of new editions of the 6 in., 1/25,000, r in. and 1 in. maps of the country as a result of the re-survey and revision carried out at the large scales:
- 4. As an interim measure, the revision of the present series 6 in., 1/25,000, 1 in. and  $\frac{1}{4}$  in. maps from air photographs and other sources.

The development of the British Empire has necessitated the accurate mapping of large areas of land. In nearly all cases the preliminary work, and in many cases the whole work, has been done by the Corps. In Africa alone boundary commissions, chiefly composed of Royal Engineers, have now mapped over 15,000 miles of frontier.

The survey of India is a work of purely European origin. Until the end of the eighteenth century a map produced from route surveys and astronomical observations by Major Rennell, of the Bengal Engineers, had been the only survey of the country.

It was found that the only accurate way of mapping a country was by means of a trigonometrical survey. The Grand Trigonometrical Survey of India was commenced in 1802 by Major Lambton of the 33rd Regiment. The principal triangulation was completed in 1882. Most of the time it had been under control of Engineer officers of whom the following became Surveyor-General—Major Everest and Colonels Waugh and Walker. Mount Everest, the highest mountain in the world, was named after Major Everest.

With the independence of India and Pakistan, the 39

Survey of India was divided into the Survey of India and the Survey of Pakistan. Royal Engineer Officers are continuing as Surveyors General of these two new countries until such time as the countries are able to produce suitable Surveyor Generals for themselves.

The Directorate of Colonial Survey was created after the Second World War to carry out the mapping of the Colonial Empire at a scale of about half an inch to r mile. It is a civil organization in the Colonial Office which has undertaken within its responsibility those Colonial taks which used to fall to Sappers in various parts of the world up to the Second World War. The Corps, however, still retains a place in this organization by secondment of Sappers to it for tours of duty.

#### (2) Roads.

When the British occupation started, India did not have any roads worthy of the name. There were only a number of fair weather tracks. Roadmaking on a large scale was started in 1849. Now Grand Trunk Roads connect all the principal stations, the most important one being that which runs through Calcutta to Peshawar with a branch from Agra to Bombay; the part between Lahore and Peshawar is named Taylor's Road after Sir A. Taylor, R.E., who constructed it. Most of these roads were constructed by Sapper officers, notably General Sir A. Taylor, R.E., Lord Napier of Magdala and Major-General Sir J. Browne, R.E.

There is an excellent system of metalled roads in the North-West Frontier for the construction of which Sappers have been almost entirely responsible.

#### (3) Railways.

During the last century many R.E. officers used to be employed on the railway staffs in India, but the number diminished with the flow of civil engineers to that country, though a few are still employed on this work. The most notable achievement was the construction of the railway from Sibi to Pishin and Quetta by Sir James Browne, R.E. The engineering difficulties encountered in the construction of this railway, which had a total length of 224 miles, were very great, and the tunnels, bridges and cuttings through the mountain gorges were a masterpiece of railway design.

# (4) Irrigation.

In order that crops may be cultivated during the dry season in India, irrigation of the land is necessary, and many R.E. officers have been employed on irrigation works. Prior to British occupation only an uncertain system of irrigation had been in operation. The first big irrigation work, the West Jumna Canal, was started in 1819. Sir A. T. Cotton, R.E., one of the greatest hydraulic engineers of all times, drew up the projects for the Godavary Delta, the Kistna and Orissa irrigation systems. Shortly described, these consist of gigantic dams thrown across rivers from one to four miles wide with sandy beds, the water rising in times of flood from 30 ft. to 40 ft. at the side of the dams.

# (5) Other Works.

The energy, skill and resourcefulness of members of the Corps have not been confined only to those works mentioned; they have also been responsible for the work in connexion with water supply in towns, the electric telegraph, harbour works and public buildings of all kinds.

The Royal Engineers will always remain the most adaptable engineering organization to cope with an emergency such as flood damage or other national disaster. Time and again, R.E. units have been called upon to rise to such occasions and they have never failed. The nature of their duties is varied and diverse, but the Sapper must be able to meet whatever duty comes his way.

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#### CHAPTER VII

#### SOME DISTINGUISHED OFFICERS OF THE CORPS

#### Field-Marshal Sir John Fox Burgoyne.

The name of Sir John Fox Burgoyne is endeared to the R.E. more than any other name in the history of the Corps; he had seventy years of service. His war service began at Malta in the year 1800, and continued through the Napoleonic Wars until the Crimean War, 1855. He was sent out to the Crimea, but recalled on account of his ill-health and advanced age, as he was then seventyone. On his return to England he was appointed to the office of Inspector-General of Fortifications, and held this post until his resignation in 1868, in which year he was promoted to Field-Marshal, the first R.E. officer to reach this rank. Nine years later he died at the age of eightynine.

#### Field-Marshal Lord Napier of Magdala.

In 1826 Lord Napier received his commission in the Bengal Engineers. He was Lieut.-Colonel of the Engineers at the Siege of Lucknow and commanded a Division in the Chinese War in 1860.

His brilliant services in the Indian Mutiny paved the way for his appointment to the command of the British forces in the Abyssinian War, 1867-68, and the storming of Magdala. Later, in the year 1870, he was appointed Commander-in-Chief of the Indian forces. In the year 1883, he was promoted Field-Marshal and died seven years later at the age of eighty.

#### Field-Marshal Sir Lintorn Simmons.

Sir Lintorn Simmons was commissioned in the Royal Engineers in 1837. As a young officer he served in Canada, and later was appointed Inspector of Railways at home. During the Crimean War he commanded a

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Turkish cavalry force and later became British Commissioner with the Turkish Army. In this capacity he was noted for his power of command and strategy. After the Crimean War he was appointed Director of the R.E. Establishment. This post he held for three years, and subsequently he was Governor of the Royal Military Academy. His active service came to an end in 1888, but in 1890 he was promoted Field-Marshal. Thirteen years later he died.

# Field-Marshal Lord Nicholson of Roundhay.

In 1865 Nicholson was commissioned in the Royal Engineers. Six years later he went to India, where he spent about the next twenty-five years of his service. For most of the time he was employed on military works in the Punjab and N.W. Frontier and as secretary of the Defence Committee; but he served with distinction as a Field Engineer in the Afghan War of 1878, with the Indian Contingent in the Egyptian Campaign of 1882, and as a staff officer in the Afridi War of 1897.

In 1898 he was promoted to be Adjutant-General in India. He had hardly settled down before he was again called to active service in South Africa, where he became Military Secretary to Lord Roberts and Director of Transport.

In 1905 he became Q.M.G. at home and three years later was appointed to be C.I.G.S., the highest position in the army in peace. He held this post for four years until he retired in 1912. In 1911 he was promoted to be Field-Marshal, and died in 1918.

# Field-Marshal Lord Kitchener of Khartoum.

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As a young man he entered in 1868 the Military Academy at Woolwich, where he gave no particular promise of future distinction. During the Franco-Prussian War he absented himself from the Academy and joined the French Army as a private. In 1871 he left Woolwich and received his commission in the Royal Engineers.

One of his first commissions was a survey of the Holy Land, and its ancient monuments. Later, he was promoted Captain in an Egyptian cavalry regiment. He was with Lord Wolseley's relief force in its attempt to save General Gordon. After holding many administrative posts in Egypt, he was made Sirdar (Commander-in-Chief) of the Egyptian Army. His great feat as Sirdar was the conquest of the Sudan, where in 1898, at both Atbara and Omdurman, he routed the Dervishes and completely broke the power of Mahdism.

Kitchener in 1900 became Chief of Staff to Lord Roberts, whom later he succeeded as Commander-in-Chief of the South African Forces. In the last two years of this war he demoralized the organized guerrilla warfare of the Boers by a system of blockhouses and drives.

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The next post he held was Commander-in-Chief in India. He remained there for seven years during which time he completely reorganized the Army in India. In the year 1909 he was promoted Field-Marshal.

In 1914 he was made Secretary of State for War. (This is the only time that a soldier has held this post.) In this capacity he raised the well-known Kitchener's Armies. On Monday, 5th June, 1916, he and his staff embarked on the armoured cruiser *Hampshire* en route for Russia. The object of the visit was to hold a consultation with the Tsar and Russian military authorities. Unfortunately the *Hampshire* struck a mine and sank; Kitchener and his staff were drowned.

#### General Charles Gordon, 1833-1885.

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"Chinese Gordon," as he was commonly called, was an officer whose disregard of danger crowded his career with adventures. One of the secrets of his extraordinary career was his genius for leadership.

Charles George Gordon received his Commission in the Royal Engineers in June, 1852, and spent the first two years of his service under instruction at Chatham. In 1854, he proceeded to the Crimea, where he greatly distinguished himself by his zeal and bravery. After the Crimean War, Gordon was appointed to the Turko-Russian Boundary Commission, surveying portions of the Russian frontiers in Europe and Asia. He then returned to Chatham as Adjutant and Fieldworks Instructor. In 1860, he commanded the 8th Company in China and was present at the burning of the Summer Palace, from which was taken a magnificent carved throne, now in the H.Q. Officers' Mess at Chatham.

Later he was appointed to the command of a Chinese force known as the "Ever Victorious Army," which was engaged in suppressing the Tai-Ping Rebellion. Under Gordon's command this army fought 33 victorious engagements, and killed and wounded over fifteen times its own number. For these services he was made a Mandarin of the Yellow Jacket—the highest Chinese Order. He then returned to England and, having been promoted Lieut.-Colonel, became C.R.E. Gravesend, reorganizing the Thames defences and building Shornmead Fort.

In 1873 Gordon was appointed Governor-General of the Equatorial Provinces, but failing to obtain support from the Governor-General of the Sudan in suppressing the slave trade, he resigned. He was later appointed Governor-General of the Sudan and neighbouring provinces, and was successful in breaking the back of the slave trade in those districts. He was forced to resign this position on account of ill-health.

After holding several administrative posts, Gordon was given in 1884 the difficult task of evacuating the Egyptian garrison from the Sudan, which at that time was threatened with annihilation by the Mahdi, a religious fanatic, and his followers. Gordon went to Khartoum, the metropolis of the Sudan, where he found that without further assistance the garrison could not be evacuated. After much delay a relief column under Wolseley was dispatched, but it was too late. The troops of the Mahdi, attacking the city from the river, on its weakest side, had

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captured Khartoum, and Gordon had met his death on the steps of the Palace.

Of all our Corps heroes none, with the exception of Lord Kitchener, has attained so high a place in the public estimation. Gordon lived and died for humanity; he was a man for whom the honours of this world held no charm and whose aim was the benefaction of his kind.

#### General Sir Charles William Pasley.

Pasley began his service in the Royal Engineers in 1798. For the next twelve years he was almost continually on active service in the Napoleonic Wars, until he was seriously wounded at Flushing. He received a bayonet thrust in the thigh and was afterwards shot through the body, the bullet injuring his spine.

Completely incapacitated by his wounds from further active service, he devoted his energies to the improvement of the Corps. Whilst in command of the Company of Royal Military Artificers at Plymouth, Pasley began that system of instruction in fieldworks which was destined to prove of so much value. On the advice of the Duke of Wellington, the R.E. Establishment was formed at Chatham in 1812. Pasley was appointed the first Director, and organized during his twenty-nine years' residence improved systems of telegraphy, fieldworks, pontooning and demolitions, and introduced courses in construction and surveying.

The first Sappers trained at Chatham took part in the siege of San Sebastian in the Peninsular War, but the real results of Pasley's work made themselves seen in the Crimea, where the operations assumed the character of one great siege, with the consequent heavy demands upon the skill and energy of the Corps.

(In 1870 the name of the Establishment was changed to the School of Military Engineering.)

In 1841 Pasley was appointed Inspector-General of Railways, a post which he held for five years. He died in 1861 at the age of eighty years.

#### General Sir Brian Robertson.

General Sir Brian. Robertson was commissioned into the Royal Engineers from R.M.A., Woolwich, in November, 1914. He served in France during World War I from 1914 to 1918 and was awarded the D.S.O. and M.C. and mentioned in despatches. Posted to the K.G.O. Bengal Sappers and Miners in 1920, he commanded 3 Field Cov.. S. and M. during operations on the N.W. frontier in 1022 and 1923 and was promoted brevet Major. He graduated at Staff College, Camberley, in 1927 and held important staff appointments at the War Office, involving delicate negotiations at the League of Nations. In 1933 he resigned his commission and entered business which took him to South Africa. Rejoining in 1939, he accompanied the South African Forces to East Africa, where his brilliant handling of the supply and transport organization was one of the chief contributory factors to the rapid and overwhelming defeat of the Italian Army in Somaliland and Abyssinia in the Spring 1941. He joined 8th Army as Senior Administrative Officer in 1942 and his outstanding ability and foresight made possible, to a large extent. General (later Field-Marshal) Montgomery's unbroken succession of victories in Libva and General (later Field-Marshal) Alexander's steady advances in Sicily and Italy. In 1946 he was appointed Military Governor, British Zone Allied Occupation Forces in Germany. His penetrating vision and determination, combined with patience and sincerity, successfully guided the allied governments and commanders through one of the most difficult situations (including the airlift supply to Berlin to overcome the Russian blockade) which could confront a Commander. On the institution of the West German Government in 1949, he became British High Commissioner in Germany.

In 1950 he was appointed C.-in-C. Middle East Land Forces.

## CHAPTER VIII

# ROYAL ENGINEERS, AND THE VICTORIA CROSS

The Victoria Cross was instituted by Queen Victoria in 1856.

It is awarded for conspicuous bravery in the presence of the enemy, and has been won by the following :---

Crimean War		Lennox, Lieut. W. O Lendrim, Cpl. W. T McDonald, ColSerjt. H. Elphinstone, Capt. H. C. Graham, Lieut. G Leitch, ColSerjt. P Perie, Private J Ross, Cpl. J	· · · · · · · · · · · · · · · ·	1857 1857 1858 1858 1857 1858 1857 1857
Indian Mutiny	•••	Home, Lieut. D. G Salkeld, Lieut. P Smith, Serjt. J Thackeray, Lieut. E. T. Prendergast, Lieut. H. N. D. Innes, Lieut. J. J. McL. Sleavon, Cpl. M Goodfellow, Lieut. C. A.	••••	1858 1858 1858 1862 1859 1858 1859 1858
Bhootan	•••	Trevor, Major W. S Dundas, Lieut. J. •	•••	1867 1867
Ashantee	•••	Bell, Lieut. M. S	•••	1874
Zululand	•••	Chard, Lieut. J. R. M.	•••	1879
Afghanistan	•••	Hart, Lieut. R. C Leach, Capt. E. P		1879 1879
Hunza-Nagar	•••	Aylmer, Capt. F. J.	•••	1892

N.W. Frontier	Watson, Lieut. T. C.	• • •	1898
	Colvin, Lieut. J. M. C.	•••	1898
South Africa	Iones, Lieut. R. J. T. D.		1900
<i>oomin 12</i> ,770	Kirby, Cpl. F. H	•••	1900
1st World War	Wright, Capt. T	•••	1914
	Jarvis, LceCpl. C. A		1914
	Johnston, Capt. W. E.	••• • ·	1914
	Neame, Lieut. P	•••	1915
. •	Martin, Lieut. C. G	•••	1915
	Johnston, Temp.2nd-Lieut.		
	F. H	• • •	1915
	Dawson, Cpl. J. L.	• • •	1915
•	Hawker, Capt. L. G	•••	1915
	Bassett, Cpl. C. R. G	•••	1915
	Hackett, Sapper W	• • •	1916
•	Coffin, C., LtCol. (Temp. Bri	g	
	Gen.)	•••	1917
	Knox, 2nd-Lieut. C. L.		1918
· .	Forsyth, Serjt. S.		1918
	Mitchell, Capt. C. N	•••	1918
•	McPhie, Cpl. J	•••	1918
	Archibald, Sapper A	•••	1918
, к •	Waters, Major A. H. S.	•••	1918
	Cloutman, Major B. Mc. K.	•••	1918
	Findlay, Major G. de C. E.	•••	1918
	Mannock, Major E	•••	1918
2nd World War	Bhagat, A/Capt. P. S. (R.I.E.	)	¨ 1940
	Durrant, Serjt. T. F	• • •	1942
· . ·	Raymond Lieut C.		τ045

"Full many a flower is born to blush unseen."

The gallant deeds for which the N.C.O.s and men in the foregoing list were awarded the Victoria Cross are as follows:—

Crimea, 1854–1856.

Cpl. Lendrim, W. J. (Royal S. & M.).

"Intrepidity-getting on the top of a mazagine and extinguishing sandbags which were burning, and making

good the breach under fire, on April 11th, 1855. For courage and praiseworthy example in superintending 150 French Chasseurs on February 14th, 1855, in building No. 9 Battery, Left Attack, and replacing the whole of the capsized gabions under heavy fire. Was one of the four volunteers for destroying the farthest rifle pit, on April 20th."-(London Gazette, 24th February, 1857.)

#### Colour-Serit. McDonald, H. (Royal S. & M.).

"For gallant conduct when engaged in effecting a lodgment in the Enemy's Rifle Pits in front of the Left Advance of the Right Attack at Sebastopol and for subsequent valour when, by the Engineer Officers being disabled from wounds, the command devolved upon him, and he determinately persisted in carrying on the sap, notwithstanding the repeated attacks of the enemy. April 19th, 1855."-(London Gazette, 2nd June, 1858.)

#### Colour-Serit. Leitch, P. (Royal S. & M.).

"For conspicuous gallantry in the assault on the Redan, when, after approaching it with the leading ladders, he formed a caponnière across the ditch, as well as a ramp, by fearlessly tearing down gabions from the parapet, and placing them and filling them until he was disabled from wounds. 18th June, 1855."—(London Gazette, 2nd June, 1858.)

#### Private Perie, J. (Royal S. & M.).

"Conspicuous valour in leading the sailors with the ladders to the storming of the Redan on June 18th, 1855. He was invaluable on that day. Devoted conduct in rescuing a wounded man from the open although he himself had just previously been wounded by a bullet in the side."  $-(London \ Gazette, 24th \ February, 1857.)$  Cpl. Ross, J. (Royal S. & M.).

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"Distinguished conduct on July 21st, 1855, in connecting the 4th Parallel Right Attack with an old Russian Rifle Pit in front. Extremely creditable conduct on August 23rd, 1855, in charge of the advance from the 5th Parallel Right Attack on the Redan in placing and filling 25 gabions under a very heavy fire, whilst annoyed by the presence of light balls. Intrepid and devoted conduct in creeping to the Redan in the night of September 8th, 1855, and reporting its evacuation, on which its occupation by the English took place."—(London Gazette, 24th February, 1857.)

#### Indian Mutiny, 1857-1858.

## Serit. Smith, J. (Bengal S. & M.).

"For conspicuous gallantry in conjunction with Lieuts. Home and Salkeld, in the performance of the desperate duty of blowing in the Kashmir Gate of the Fortress of Delhi in broad daylight, under a heavy and destructive fire of musketry on the morning of the 14th September, 1857, preparatory to the assault."—(London Gazette, 24th April, 1858.)

#### Corpl. Sleavon, M. (21st Coy. R.E.).

"For determined bravery at the attack of the Fort at Jhansi on April 3rd, 1858, in maintaining his position at the head of sap, and continuing the work under a heavy fire with a cool and steady determination worthy of the highest praise."—(London Gazette, 11th November, 1859.)

#### South Africa, 1899–1902.

#### Corpl. Kirby, F. H. (R.E.).

"On the morning of 2nd June, 1900, a party sent to try and cut the Delagoa Bay Railway were retiring, hotly pressed by very superior numbers. During one of the successive retirements of the rearguard, a man whose horse had been shot was seen running after his comrades. He

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way behind the rest of his troop, and was under From among the retiring troop, Corpl. Kirby rode back to the man's assistance. Although e he reached him they were under a heavy fire ge, Corpl. Kirby managed to get the dismounted hind him, and to take him clear over the next y our rearguard. This is the third occasion on ol. Kirby has displayed gallantry in the face of "-(London Gazette, 5th October, 1900.)

#### First World War, 1914-1918.

arvis, C. A. (57th Field Coy. R.E.). eat gallantry at Jemappes on 23rd August, in r  $1\frac{1}{2}$  hours under heavy fire in full view of the nd in successfully firing charges for the of a bridge."—(London Gazette, 16th November,

son, J. L. (187th Coy. R.E.).

ost conspicuous bravery and devotion to duty tober, 1915, at Hohenzollern Redoubt. During k, when the trenches were full of men, he walked and forwards along the parados, fully exposed eavy fire, in order to be the better able to give to his own Sappers, and to clear the infantry sections of the trench that were full of gas. ree leaking gas cylinders, he rolled them some way from the trench again under very heavy hen fired rifle bullets into them to let the gas here is no doubt that the cool gallantry of vson on this occasion saved many men from ed."—(London Gazette, 7th December, 1915.)

ett, C. R. G. (New Zealand Div. Sig. Coy.). ost conspicuous bravery and devotion to duty Bair Ridge in the Gallipoli Peninsula on 7th 15.

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"After the New Zealand Infantry Brigade had and established itself on the ridge, Corpl. Basset daylight and under a continuous and heavy fire, s in laying a telephone line from the old position to one on Chunuk Bair. He has subsequently been to notice for further excellent and most galla connected with the repair of telephone lines by night under heavy fire."—(London Gazette, 15th 1915.)

Sapper Hackett, W. (254th Tunnelling Coy. R.E.)

For most conspicuous bravery when entom four others in a gallery owing to the explosion of mine. After working twenty hours, a hole v through fallen earth and broken timber, and th party was met. Spr. Hackett helped three of through the hole and could easily have follo refused to leave the fourth, who had been seriousl saying, 'I am a tunneller; I must look after t Meantime the hole was getting smaller y first.' refused to leave his injured comrade. Finally t collapsed and though the rescue party worked de for four days the attempt to reach the two m Spr. Hackett well knowing the nature of sliding chances against him, deliberately gave his li comrade."-(London Gazette, 5th August, 1916.

#### Serit. Forsyth, S. (New Zealand Engineers).

"For most conspicuous bravery and devotion in attack. On reaching the objective, his compounder heavy machine-gun fire. Through Sjt. dashing leadership and total disregard of dan machine-gun positions were rushed and the creprisoner before they could inflict many casualties troops. During subsequent advance his compunder heavy fire from several machine-guns, two he located by a daring reconnaissance. In his to gain support from a tank he was wounded

having the wound bandaged, he again got in touch with the tank, which, in the face of very heavy fire from machine-guns, and anti-tank guns, he endeavoured to lead with magnificent coolness to a favourable position. The tank, however, was put out of action. Serjt. Forsyth then organized the tank crew and several of his men into a section, and led them to a position where the machineguns could be outflanked. Always under heavy fire he directed them into positions which brought about a retirement of the enemy machine-guns and enabled the advance to continue. This gallant N.C.O. was at that moment killed by a sniper.

"From the commencement of the attack until the time of his death Sjt. Forsyth's courage and coolness, combined with great power of initiative, proved an invaluable incentive to all who were with him, and he undoubtedly saved many casualties among his comrades."—(London Gazette, 22nd October, 1918.)

#### Corpl. McPhie, J. (416th Field Coy. R.E.).

"For most conspicuous bravery on the 14th October, 1918, when with a party of Sappers maintaining a cork float bridge across the Canal de la Sensee near Aubencheul au Bac.

"The farther end of the bridge was under close machinegun fire and within reach of hand grenades. When infantry, just before dawn, were crossing it, closing up resulted and the bridge began to sink and break. Accompanied by a Sapper he jumped into the water and endeavoured to hold the cork and timber together, but this they failed to do. Corpl. McPhie then swam back and having reported the broken bridge immediately started to collect material for repair. It was now daylight; fully aware that the bridge was under close fire and that the far bank was almost entirely in the hands of the enemy, with the inspiring words, 'It's death or glory work which must be done for the sake of our patrol on the other side,' he led the way, axe in hand, on to the bridge and was at once severely wounded, falling partly into the water, and died after receiving several further wounds. It was due to the magnificent example set by Corpl. McPhie that touch was maintained with the patrol on the enemy bank at a most critical period."—(London Gazette, 31st January, 1918.)

Spr. Archibald, A. (218th Field Coy. R.E.).

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"For most conspicuous bravery and self-sacrifice on the 4th November, 1918, near Ors, when with a party building a floating bridge across the canal.

"He was foremost in the work under a very heavy artillery barrage and machine-gun fire. The latter was directed at him from a few yards' distance while he was working on the cork floats; nevertheless, he persevered in his task, and his example and efforts were such that the bridge, which was essential to the success of the operations, was very quickly completed.

"The supreme devotion to duty of this gallant Sapper, who collapsed from gas poisoning on completion of his work, was beyond all praise."—(London Gazette, 6th January, 1919.)

#### Second World War 1939-1945.

Serjt. Durrant, T. F. (R.E. attached Commandos).

"For great gallantry, skill and devotion to duty when in charge of a Lewis gun in H.M. Motor Launch 306 in the St. Nazaire raid on the 28th March, 1942.

"Motor Launch 306 came under heavy fire while proceeding up the River Loire towards the port. Serjt. Durrant, in his position abaft the bridge, where he had no cover or protection, engaged enemy gun positions and searchlights on shore. During this engagement he was severely wounded in the arm but refused to leave his gun.

"The Motor Launch subsequently went down the river and was attacked by a German destroyer at 50-60 yards range, and often closer. In this action Serjt. Durrant continued to fire at the destroyer's bridge with the greatest

#### CHAPTER IX

#### coolness and with complete disregard of the enemy's fire. The Motor Launch was illuminated by the enemy searchlight and Serjt. Durrant drew on himself the individual attention of the enemy guns, and was again wounded, in many places. Despite these further wounds he stayed in his exposed position, still firing his gun, although after a time only able to support himself by holding on to the gun mounting.

"After a running fight, the Commander of the German destroyer called on the Motor Launch to surrender. Serjt. Durrant's answer was a further burst of fire at the destroyer's bridge. Although now very weak he went on firing, using drums of ammunition as fast as they could be replaced. A renewed attack by the enemy vessel eventually silenced the fire of the Motor Launch but Serjt. Durrant refused to give up until the destroyer came alongside, grappled the Motor Launch and took prisoner those who remained alive.

"Serjt. Durrant's gallant fight was commended by the German officers on boarding the Motor Launch.

"This very gallant Non-Čommissioned Officer later died of the many wounds received in action."—(London Gazette, 19th June, 1945.)

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# ROYAL ENGINEERS AND THE GEORGE CROSS

The George Cross was instituted by King George VI in 1940.

It is awarded only for acts of the greatest heroism or of the most conspicuous courage in circumstances of extreme danger. In the case of the Fighting services awards are confined to actions for which military honours are not normally granted.

Previous awards of the Empire Gallantry Medal were changed to the George Cross in 1940/41.

The George Cross has been won by the following :

	Durton Major H F	T021*
United Kingaom	Burton, Major II. E.	1924
China .	Stewart, LieutCol. J.	26.6.1928*
2nd World War	Button, Serjt. W.	17.9.1940*
	Andrews, 2nd-Lieut. W. L.	17.9.1940*
	Reynolds, Lieut. E. W.	17.9.1940*
	Talbot, 2nd-Lieut. E. E. A.	С.
	-	17.9.1940*
	Davies, Lieut. R.	30.9.1940
•	Wylie, Sapper G. C.	30.9.1940
	Merriman, LieutCol. A. D.	. 3.12.1940
· _ ·	Archer, Lieut. B. S. T.	1941
<i>i</i>	Barefoot, Lieut. H. J. L.	22.1.1941
	Campbell, 2nd-Lieut. A. F.	22.1.1941
	Gibson, Serjt. M.	22.1.1941
14 - 14 - 14 - 14 - 14 - 14 - 14 - 14 -	Blaney, Capt. M. F.	15.4.1941
	Martin, Capt. C. A. J.	11.3.1943
	*Awarded as Empire Galla	ntrv Medal.

\*Awarded as Empire Gananu y Medal, but converted to George Cross by Royal Warrant of 1940/41.

The gallant deeds for which the N.C.O's. and men in the foregoing list were awarded the George Cross are as follows :----

Serjt. W. Button (No 48 Bomb Disposal Section, R.E.)

"On the morning of 18th August, 1940, L/Serjt. Button was ordered with his section to continue the work of excavating an unexploded bomb on the Southern Railway Line near Hook Railway Station. Although he knew well that, owing to the time already spent on excavation, the bomb was liable to explode at any moment, he continued the work of his Section with great coolness. The bomb eventually exploded, killing five Sappers of the Section, and throwing L/Serjt. Button a considerable distance. Although considerably shaken he behaved with great coolness, collected the rest of his Section at a safe distance, ascertained that none of them were injured, notified the First Aid Detachment, and reported to his Section Officer by telephone."

#### Sapper G. C. Wylie

"Sapper Wylie was a member of the Bomb Disposal Section engaged upon the recovery of the bomb which fell in the neighbourhood of St. Paul's Cathedral.

The actual discovery and removal of the bomb fell to him. Sapper Wylie's untiring energy, courage, and disregard for danger were an outstanding example to his comrades." (L.G. 30th Sept. 1940.)

#### Serjt. M. Gibson

"For most conspicuous gallantry in carrying out hazardous work in a very brave manner."

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(L.G. 22nd Jan. 1941.)

CHAPTER X

#### R.E. MUSEUM

An R.E. Museum was first approved in 1875 and a small number of exhibits were collected and were added to at various times, but it was not until 1912 that a well organized Museum, with a full time Curator, was started. About  $f_{2,000}$  was then spent by the Institution of Royal Engineers on altering and re-equipping the old Model Room in Brompton Barracks, Chatham, as a proper Museum.

After the first World War two small rooms were added to house some of the relics of that War, and quite recently two more larger rooms have also been added, so that a Museum well worthy of the traditions of the Corps now exists.

The Museum is laid out in various sections representing the different Campaigns and parts of the World where the Corps has been engaged. For instance, there are sections dealing with the Peninsular War, the Crimean War, Indian Mutiny, Chinese Wars, Campaigns in Egypt, Abyssinia and South Africa, as well as, of course, the two World Wars.

There are several interesting scale models, including the Rock of Gibraltar made at the time of the Great Siege in 1779. This was soon after the time of the formation of the first Military Artificer Companies in 1772, which was the first permanent establishment for the rank and file of the Corps.

In the modern section there are excellent large scale models of the Mulberry Harbour and its many components and also of the various different types of bridges used during World War II.

Other exhibits include a most valuable collection of the belongings of General Gordon, including his Yellow Mandarin's Jacket presented to him by the Emperor of

China, and Gordon's own map of the march of his "Ever Victorious Army."

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There are numerous interesting old orders and documents of the Duke of Wellington and Field-Marshal Sir John Burgoyne, including Wellington's map of the Battle of Waterloo. Also documents of many other distinguished officers.

There are a number of very old books on fortifications, including one printed in 1472, which is one of the oldest known printed books with wood cut blocks, as well as obsolete British Military Manuals.

There is a good collection of R.E. Medals. This collection is intended to contain a representative Medal of each campaign and of the bars issued for these campaigns, and is nearly complete in this respect. There are also a number of sets of medals which belonged to distinguished officers, as well as several V.C.s.

Uniforms of various periods are well represented, both with actual uniforms and by a set of coloured models showing types of uniforms worn by Officers and other ranks, dating from 1688 for the Officers and 1786 for the other ranks.

Of special interest to recruits and officers first joining the Corps are the exhibits which exemplify the expansion of the Corps and show how various branches of the Army have originated in the Corps and later on, when more fully developed, they became separate Arms of the service.

In this connexion there are the relics of the *Royal* George and pictures showing how the Sappers carried out the first extensive diving and underwater demolitions between 1839 and 1844. The success of this operation so impressed the Navy that the Corps were then asked to train naval personnel in the technique of diving.

Another activity later taken over by the Navy was that of submarine mining. In 1871 a Submarine Mining company R.E. was formed for laying and controlling submarine mines for the defence of harbours. The controlled mines

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were fired electrically from the shore when a ship reached the exact spot where the mines were located. Samples of the position finder and the firing apparatus can be seen. The former was actually used by the Navy again during the 1939-45 War.

Another weapon used by the Submarine Mining Companies was the controlled Brennan Torpedo which was controlled from the shore by very thin cables, and first used in 1894. One of these torpedoes is in the Museum.

All work in connexion with submarine mining was taken over by the Navy in 1905.

Signalling was started by the Corps with a field telegraph unit in the Crimea in 1855 and expanded rapidly thereafter. It remained a branch of the Royal Engineers until 1922, when the present Corps of Signals was formed. Mechanical Transport was started by the Corps at the

time of the Boer War, when steam traction engines were used to tow heavy guns and heavy bridging vehicles. A model of one of these traction engines is on view.

With the introduction of the petrol engine R.E. Officers did much work in connexion with the design and development of M.T. Lorries, which were then taken over by the -R.A.S.C.

Military flying originated in the Corps in 1878 with a Balloon Factory and School, and balloons were used in Bechuanaland and the Sudan. The first Balloon Section was formed in 1890, later being increased into companies and finally converted to an Air Battalion R.E. in 1910 when the first military aeroplanes were flown by R.E. Officers. A model of the Bleriot type plane in which Lieut. Cammell, R.E., was killed in 1911 is on view.

The Royal Flying Corps was formed in 1912 and took over from the Air Battalion R.E. and at the end of the 1914–18 War became the R.A.F.

Searchlights, both for coast defence work and antiaircraft, were manned by the R.E. until 1939, when they were taken over by the R.A.

The invention of the Tank was largely due to a Sapper

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Officer, Lieut.-Colonel E. D. Swinton (later Major-General Sir Ernest Swinton), and the Commander of the first Tank Battalion in 1916 was a Sapper Officer Lieut.-Colonel H. J. Elles (later General Sir Hugh Elles).

The first Čommander of the Royal Armoured Corps was also a Sapper Officer, Lieut.-General Sir Giffard Martel.

During the 1939-45 War special tanks were designed for the Assault Engineers to clear mines and to breach concrete fortifications. A model of one of the latter tanks is available.

Exhibits of special interest in connexion with the 1939-45 War, in addition to the Mulberry Harbour models already mentioned, include models of the Bailey Bridge, the last link in the oil pipe-line laid from England to the Rhine, the two millionth Jerrican manufactured by R.E. Workshops in the Middle East, the pattern of the inscription made for the Memorial set up on Luneburg Heath to celebrate the surrender of the German Armies to Field-Marshal Montgomery, as well as several other items.

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# CHAPTER XI

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#### HISTORICAL NOTES ON R.E. UNITS EXISTING IN 1939

**1** Fortress Sqn.—As 1st Coy. of Soldier Artificers, was the original company raised in the Corps. It was formed in 1772 as a fortress company at Gibraltar and has remained as such since, except for a period in World War I when it operated as a Base Park Coy.

**1 Fd. Sqn.**—Formed at Aldershot in 1914 and served in B.E.F., France, in World War I with Cavalry Div. In World War II it accompanied 1 Armd. Div. to Libya, N. Africa, Italy and B.A.O.R. As independent 1 Fd. Sqn. served in Malaya and Hong Kong in 1948–49.

2 Coy.—Existed as 2 Coy. in 1802, when numbering was first introduced. A Fortress Coy. up to 1805. Served in Crimean War. Was converted to Fd. Coy. and served in Zulu and 1st Boer War (1881). In World War I, served with 8 Div. It was permanently stationed in Egypt up to 1939. Incorporated in 70 Div. (later 2 Div.), it saw service in Tobruk, India and Burma with the Chindits. It is now in 23 Fd. Engr. Regt.

4 Coy.—Formed as 4 Coy. in 1806 at Portsmouth. Stationed at Malta in the first part of the nineteenth century. Served in Crimean War and transferred to India in 1857. In 1871 it was converted into a Submarine Mining Coy. and 1886 was at Halifax (Nova Scotia) with a section in Bermuda. In 1905 it became the Fortress Coy. for the School of Electric Lighting, Gosport. In World War I, operated as Adv. Pk. Coy. in Salonika and then returned to Gosport. 4 Fd. Sqn. was in 7 Armd. Div. in World War II and served in Western Desert, Libya, Italy and N.W. Europe. Now in 21 Fd. Engr. Regt.

**5 Coy.**—Formed as 5 Fortress Coy. in 1806. Converted to Fd. Coy. and served in Zulu War (1879) and South African War, 1899. To B.E.F. France in 2 Div. in World War I. In World War II also with 2 Div. in France and India (Burma). Now in 23 Fd. Engr. Regt.

in 3 Div. France, 1939/40 and N.W. Europe 1944. Now 17 Fd. Sqn. in 22 Fd. Engr. Regt.

18 Coy.—Formed 1849 and remained Fortress Coy. Falmouth. Converted as cadre 18 Fd. Pk. Coy. in 1926. Served as such in 4 Div. with B.E.F. France, N. Africa, Sicily and Italy. To be 18 Fd. Pk. Sqn. in 35 Army Engr. Regt.

19 Coy.—Formed 1849 as Svy. Coy. Half of it was converted into 46 Adv. Pk. Coy. in World War I. It was raised as a Fd. Svy. Coy. just after World War I and became part of the Survey Battalion of the Ordnance Survey in 1925. It became an independent unit again in 1930. In World War II it served in France 1940, Iceland 1941, Egypt 1942, Persia 1942, Egypt 1943, Italy 1944 and Austria 1945. It disbanded in C.M.F. in 1946 but was reformed in April, 1947, as the 19th Fd. Svy. Topo. Sqn. in 42 Svy. Eng. Regt.

21 Coy.—Formed 1849. Served in India 1857. Submarine Mining Coy. 1884. Fortress Coy. 1905 at Harwich. Was disbanded after World War I but re-introduced as Fd. Pk. Coy. 2 Div. and served as such throughout World War II in B.E.F., India and Burma. Now 21 Fd. Pk. Sqn. (23 Fd. Engr. Regt.).

23 Coy.—Formed 1855 as Mounted Coy. Served in Crimean War, India 1857 and Chinese War 1858–60. Depot for Submarine Miners 1877. Reformed Fd. Coy. 1885. Served in S. Africa 1898–1902. To B.E.F. in 1 Div. (World War I). In same Div. in World War II and served in France, 1939/40, N. Africa and Sicily and Italy. Now 23 Fd. Sqn. of 22 Fd. Engr. Regt.

24 Coy.—Formed in 1855 as Fd. Coy. Converted to Fortress Coy. 1887 at Malta. Served as Base Pk. Coy. in World War I and returned to Malta. Converted to Fd. Coy. in World War II and served in N. Africa and N.W. Europe. Now 24 Engr. Sqn. in 36 Army Engr. Regt. **26 Coy.**—Formed in 1855 as Fd. Coy. Served in Crimean War. World War I, to B.E.F. in France in 1 Div. In same Div. in World War II, and to France 1939/40. Converted 32 Aslt. Coy. 1943 and served in N.W. Europe. Now 26 Aslt. Sqn. in 32 Aslt. Engr. Regt.

**32 Coy.**—Formed 1857 as Fortress Coy. Gibraltar. Served as Base Park Coy. in World War I and disbanded. Reformed as Fortress Coy. Gibraltar and remains there.

**38 Coy.**—Formed 1861 as Depot Coy. Reconstituted as Fd. Coy. 1887. In World War I to B.E.F. France in 6 Div. World War II, in 1 Div. to B.E.F. France. Later transferred to 5 Div. To Madagascar, P.A.I.C., Libya and Italy. Now 38 Fd. Sqn. in 23 Fd. Engr. Regt.

42 Coy.—Raised as 42 (Madras) Coy. India in 1868. Reconstituted as Fortress Coy. 1889. At Gosport 1914. In World War I served as Army Tps. Coy. and converted to Fd. Coy. Was permanently in Egypt between World Wars I and II. Suffered heavily at Crete. Reformed, served with 56 Div. in N. Africa and Italy. Now 42 Engr. Sqn. in 35 Army Engr. Regt.

54 Coy.—Formed in 1900 as Fd. Coy. In World War I, to B.E.F. in 7 Div. World War II, to B.E.F. France in 3 Div. To India with 70 Div. in 1942. Now 54 Fd. Sqn. in 24 Fd. Engr. Regt.

55 Coy.—Formed in 1900 as Fd. Coy. and served in South African War. In World War I, to B.E.F. in 7 Div. and later in Guards Div. Between World Wars, at Catterick. In World War II to Middle East and N. Africa 1943. N.W. Europe. Now 55 Fd. Sqn. in 32 Aslt. Engr. Regt.

56 Coy.—Formed in 1900 as Fd. Coy. In World War I with 3 Div. to B.E.F. In Middle East in World War II. Now 56 Fd. Sqn. in 24 Fd. Engr. Regt.

58 Coy.—Formed in 1900 as Fd. Coy. In World War Chemical Warfare Coy., Porton. Converted to M Eqpt. Coy. 1944. Now 58 Engr. Sqn. in 36 Army Regt.

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59 Cov.—Formed in 1900 as Fd. Cov. In World Way 1 to B.E.F. with 5 Div. At Canterbury. Mobilized in 4 Div. in World War II and to France. Later North Africa. M.E.L.F. and Italy. Now 59 Fd. Sqn. in 32 Aslt. Engr. Regt.

# THE ROYAL ENGINEERS' MARCH

"Wings" was adopted as the R.E. quick march in about 1870 and was officially recognized in 1902. It consists of two tunes combined, the first part being adapted from the air " The Path across the hills," a tune of unknown German origin and the second "Wings" by Dolores (Miss Dickson). The Corps is also entitled to the

"British Grenadiers." The words of "Wings" are as follows :----

Wings to bear me over mountain and vale away; Wings to bathe my spirit in morning's sunny ray. Wings that I may hover at morn above the sea; Wings through life to bear me, and death triumphantly.

Wings like youth's fleet moments which swiftly o'er me Wings like my early visions, too bright, too fair to last; Wings that I might recall them, the loved, the lost, the

Wings that I might fly after the past, long vanished.

Wings to lift me upward, soaring with Eagle flight. Wings to waft me heav'nward to bask in realms of light. Wings to be no more wearied, lulled in eternal rest : Wings to be sweetly folded where Faith and Love are, blessed.

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