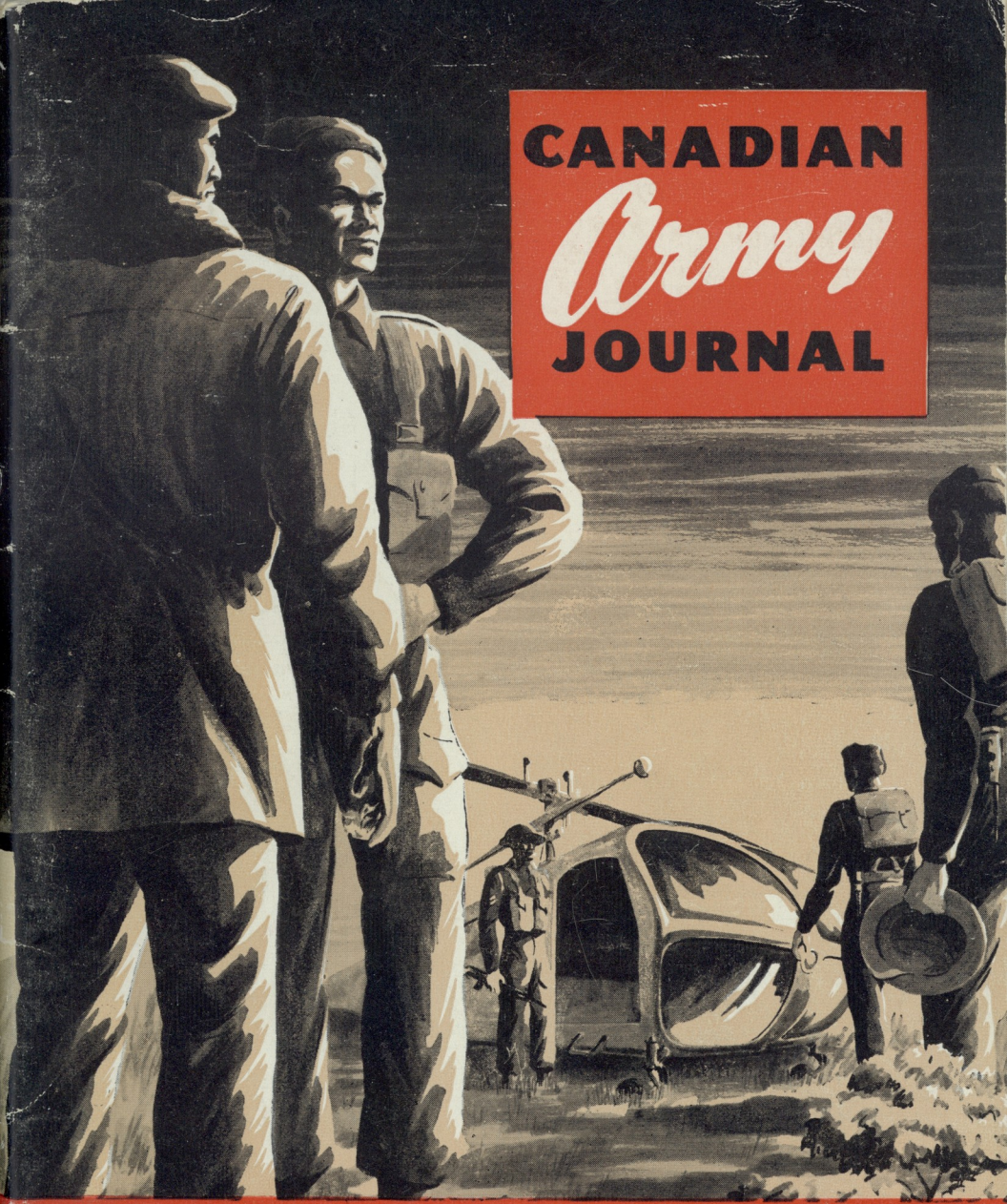
CANADIAN Army JOURNAL



VOLUME 4 NUMBER 9 FEBRUARY 1951

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The Cover
Troops embarking in a helicopter.

CANADIAN Army JOURNAL

The object of the Canadian Army Journal, which is published by the Directorate of Military Training under authority of the Chief of the General Staff, is to provide officers of the Active, Reserve and Supplementary Reserve Forces with information designed to keep them abreast of current military trends and topics, and to stimulate interest in current military affairs.

VOLUME 4 NUMBER 9 FEBRUARY, 1951

CHIEF OF THE GENERAL STAFF

Lieutenant General G. G. Simonds, CB, CBE, DSO

BIOGRAPHY OF THE NEW CGS

Lieutenant General Guy Granville Simonds, CB, CBE, DSO, was born in England (April 24, 1903) and educated in Canada. He was a top student at the Royal Military College from which he graduated in 1925.

Thereafter he served with the Canadian Permanent Force, being immediately appointed to a commission in the Royal Canadian Artillery. He attended the Gunnery Staff Course in England and the Staff College at Camberley and subsequently served at RMC as instructor in tactics.

On mobilization in 1939 he was appointed to the headquarters staff of the 1st Canadian Infantry Division in the rank of major. Shortly after arrival in the United Kingdom he became a lieutenant-colonel on taking command of an artillery regiment.

On the organization of the first Canadian Junior War Staff Course, General Simonds was chosen to command, and from this appointment he was later posted to a succession of senior staff tasks at Corps and at Army Headquarters. One of the Canadian officer observers to proceed to North Africa in 1943, then in the rank of brigadier, he witnessed the capture of the Mareth Line by Montgomery's Eighth Army. Recalled to England, he took command of a Canadian Infantry Division, the 2nd, which had been commanded by Major General J. H. Roberts.

Two weeks later Major General H. L. N. Salmon was killed in an airplane crash and General Simonds was appointed to succeed him in command of the 1st Canadian Infantry Division, which had been training for the attack on Sicily (in July 1943). General Simonds led the division with great success through this operation and again commanded it during the invasion of Italy in September of that year.

By November 1943, the Canadian troops in Italy had been reinforced by the 5th Canadian Armoured Division. For two months (November and December 1943) General Simonds commanded this Division, and at the end of January 1944 was promoted to his present rank and appointed to command the 2nd Canadian Corps, then in England training for its appointed task of storming the Normandy beaches.

He commanded this Corps in the Normandy campaign and for a period in the autumn of 1944 was temporarily in command of the First Canadian Army while General H. D. G. Crerar was on sick leave. On General Crerar's return to duty, General Simonds resumed command of 2nd Corps and led it through the furious final campaign across the Rhine and to the collapse of the German Armies.

After hostilities ceased he was appointed to command the Canadian

THE NORMANDY ASSAULT 1944

PREPARED BY THE HISTORICAL SECTION, ARMY HEADQUARTERS, OTTAWA

The Normandy landings of June 1944 were one of the most decisive operations of the Second World War and, indeed, one of the most significant in modern military history. The invasion of North-West Europe marked the beginning of the final phase of the war with Germany and led, less than a year later, to the final German collapse. Canadian forces played an important part in the operation, which was tremendously complicated and on a vast scale.

About This Series

This is the third and final article in a series on Military History prepared by the Historical Section, the other two being "The Defence of Upper Canada" (1812), published in the December issue of the Journal, and "The Battle of Amiens, 1918", published in the January number. In addition to those books listed with each of the three episodes, the attention of the reader is drawn to the bibliography on page 15 of this issue, which contains other titles dealing with various military subjects and campaigns. These lists were compiled by the Historical Section.—Editor.

Development of the Plan

In the summer of 1940 British forces were expelled from the continent of Europe, and Britain and the Commonwealth were thrown back on the defensive. The entry of the United States into the war

BIOGRAPHY OF THE NEW CGS

(Continued from preceding page)

Forces in the Netherlands, and remained there until the last troops had started their journey homewards. Then, after a period of leave, he was notified to attend the Imperial Defence College and later, in 1946, was appointed Senior Instructor there.

In April 1949 General Simonds relinquished his appointment in the United Kingdom to accept the command in Canada of the National Defence College and the Canadian Army Staff College at Kingston, Ont., effective August 1949.

His present appointment as Chief of the General Staff was announced in February 1951. He succeeds Lieutenant General Charles Foulkes, CB, CBE, DSO, who has been appointed Chairman of the Chiefs of Staff Committee.

late in 1941 made it possible to accelerate planning for a return to the continent, and American strategists were anxious to invade North-West Europe at the earliest possible date. During 1942, however, neither trained divisions nor landing craft were available in sufficient numbers to launch such an operation successfully, even though hard-pressed Russia was urgently demanding a "Second Front" in the west. Instead, available forces were diverted to North Africa where victory was achieved in 1943.

At the Casablanca Conference in January 1943 the decision was taken that the build-up of men and material for an assault upon North-West Europe should be resumed. Lt.-Gen. F. E. Morgan, a British officer, was appointed "Chief of Staff to the Supreme Allied Commander (Designate)" in March, and under him an Anglo-American planning staff began work on a broad operational plan for the great invasion. The target date for the operation was 1 May 1944.

The first task facing the COSSAC planners was the selection of the area to be assaulted. Command of the sea enabled the Allies to strike almost anywhere, but short-range fighter aircraft based on England could maintain command of the air only over the enemy-held coastal sector between Flushing and Cherbourg. Study of the beaches on this coast soon narrowed the choice to two main areas: the Pas de Calais (Strait of Dover) and that from Caen to Cherbourg. Although direct assault on the Cotentin peninsula would bring the Allies the valuable port of Cherbourg, this area lacked suitable airfields and might become a dead end since the enemy could hold the neck of the peninsula with relatively light forces. The Pas de Calais offered a sea crossing of only twenty miles, good beaches, a quick turn-around for shipping and optimum air support; here, however, the German defences were at their most formidable. This left only the Bay of the Seine, where defences were light and the beaches of high capacity and sheltered from the prevailing winds. Its distance from the south of England would make air support less easy but the terrain, especially south-east of Caen, was suitable for airfield development. Therefore the Caen area was selected for the initial assault, the intention being to expand the foothold into a "lodgement area" to include Cherbourg and the Brittany ports.

It had long been believed that the immediate capture of a major port was essential to the success of an invasion operation; but the Dieppe raid had shown how difficult such capture was likely to be, and experience in the assault on

Sicily had encouraged Allied planners to rely on the possibility of maintaining an invasion force over open beaches. In the English Channel, however, it is always necessary to count on the possibility of bad weather; and with this in view General Morgan reported that in the absence of a major port it would be necessary to improvise sheltered water somehow. He recommended that two artificial ports be made by sinking blockships. This was the origin of the famous "Mulberry" harbour.

The availability of landing craft would limit the size of the assaulting force, and General Morgan had been told that he must plan on the basis of an assault by three divisions. He aimed to land these on a front of roughly 35 miles from Caen to Grandcamp, with three tank brigades and an extra infantry brigade following on the same day. A similar shortage of transport aircraft determined that only two-thirds of an airborne division* could be dropped; its main object was to be the capture of Caen. Assuming the best possible weather conditions the fifth day after the assault would find nine Allied divisions, with a proportion of armour, in the brigdehead. It was hoped that by D plus 14 about 18 divisions would have been landed, Cherbourg captured and the bridgehead expanded some sixty miles inland from Caen. On this basis General Morgan completed an outline plan during July 1943, and the Combined Chiefs of Staff approved it at the Quebec Conference in August.

No Supreme Commander had yet been appointed; but in December 1943 General Dwight D. Eisenhower, the American officer who had been commanding the Allied forces in the Mediterranean, was named to this post. His ground commander for the assault phase was to be the C.-in-C., 21st Army Group, General Sir Bernard L. Montgomery. Both these officers were convinced that under the COSSAC plan the initial assaulting forces were too weak and committed on too narrow a front. On his arrival in London the Supreme Commander approved changes suggested by General Montgomery; subsequently these were ratified by the Combined Chiefs of Staff. To enable more landing craft to be available from production, the target date was put back to 31 May; subsequently a simultaneous landing which had been planned for the south coast of France was postponed until August. This made it possible to increase the initial assault force to five divisions supported by two follow-up divisions pre-loaded on landing craft.

Although two had been made available.

The front to be assaulted was widened. On the west, it now included the beaches beyond the Vire estuary on the Cotentin peninsula, behind which it was planned to drop two American airborne divisions to speed the capture of Cherbourg; eastward it was extended somewhat to facilitate the seizure of Caen and the vital airfields in its vicinity. A British airborne division was to be dropped here to seize the crossing over the river Orne. The D Day objectives on the British flank included Caen and Bayeux; on the American side the plan was to penetrate to the vicinity of Carentan. Thereafter, as reported later by the Supreme Commander,

> . . . our forces were to advance on Brittany with the object of capturing the ports southward to Nantes. Our next main aim was to drive east on the line of the Loire in the general direction of Paris and north across the Seine, with the purpose of destroying as many as possible of the German forces in this area of the west.

The immediate purpose, however, and the one we are concerned with here, was the establishment of bridgeheads, connected into a continuous lodgement area, to accommodate follow-up troops. This initial assault phase was known by the code name "Neptune." The great liberation operation as a whole was called "Overlord." General Eisenhower's international headquarters, which absorbed the COSSAC organization, became known as SHAEF (Supreme Headquarters Allied Expeditionary Force).

The Enemy Situation

Allied Intelligence had been able to provide a picture of German dispositions in the west which proved, in the main, to be accurate. By 3 June enemy strength in the Low Countries and France had been increased to some 60 divisions. This included troops on the Biscay coast and the Riviera. All these formations were under the Commander-in-Chief West, Field-Marshal von Rundstedt. Army Group "B", commanded by Field-Marshal Rommel, included the Fifteenth Army, covering the Pas de Calais, where most German strategists believed invasion would come, and the somewhat smaller Seventh Army in Normandy and Brittany. The divisions holding the beach defences were not of high category and had limited transport. Thus German plans to defeat invasion in the north were chiefly built around seven panzer or panzer grenadier divisions which were held in reserve. The plans have usually been considered a compromise between the views of Rundstedt, who favoured defence in depth, supported by strong mobile reserves and those of Rommel, who believed that the place to defeat invasion was on the beaches and therefore favoured placing the reserves close up to

the coast.

Hitler's "Atlantic Wall," though he had ordered its construction in 1942, was still far from completion as 1944 opened. Attention had been directed mainly to the ports and the Pas de Calais. After Rommel took command of Army Group "B" early in the year the defences of other areas began to be reinforced with underwater obstacles, mines and more concrete; but in June much still remained to be done. The garrison of the assault area was also somewhat reinforced; shortly before D Day a good field division appeared in the American sector. One coastal division manned almost the whole of the beaches allotted for British and Canadian assault; however, one panzer division was actually in the Caen area and two others were within a few hours' march.

The Final Preparations

Since the middle of 1943 the air assault by R.A.F. Bomber Command and the U.S. Eighth Air Force against German war industry (particularly aircraft production) had been gaining momentum and, at the same time, decimating the enemy fighter force which tried to oppose this strategic bombing. About three months before D Day the air forces also began to strike at the French and Belgian railway systems to reduce enemy mobility all over North-West Europe. Somewhat later still attacks began on tunnels and bridges* with the purpose of isolating the battlefield from the rest of France. Attacks upon enemy airfields within a radius of 130 miles from the assault area began by D minus 21, to force the removal of German fighters to more distant bases. In order to delude the enemy, however, only a part of the bombing effort was expended against the intended assault area; the Pas de Calais and other possible landing areas continued to receive attention.

These preliminary air operations had a vital effect upon the great Allied enterprise. To them must be attributed the almost total failure of the German air force either to attack the great pre-invasion concentrations of men and material in Southern England or to offer opposition to the actual assault. "Our D Day experience," General Eisenhower wrote later in his report, "was to convince us that the carefully laid plans of the German Command to oppose 'Overlord' with an efficient air force in great strength were completely frustrated by the strategic bombing operations. Without the

*The Seine bridges were particularly heavily hit. Those over the Loire were left alone until after D Day. As the Seine bridges would have been equally important had we landed in the Pas de Calais, these attacks did not give the plan away.

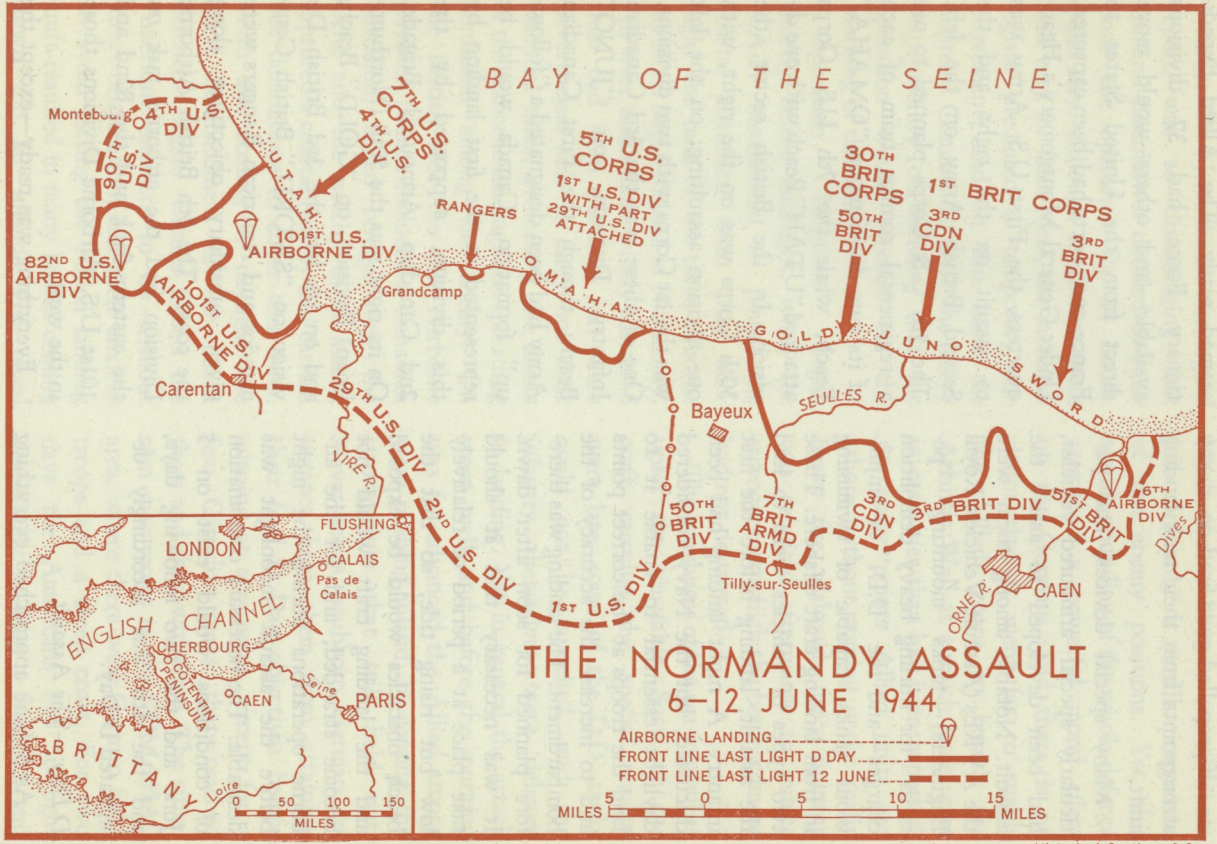
overwhelming mastery of the air which we attained by that time our assault against the Continent would have been a most hazardous, if not impossible undertaking."

It was essential to mislead the Germans as to the time and place of the Allied attack. Elaborate security precautions, including the prohibition of travel out of Britain and even the denial to ambassadors of the use of uncensored diplomatic bags, were taken to prevent information reaching the enemy; and a cover plan was adopted to encourage him to think that we were going to attack the Pas de Calais. As part of this, Canadian formations were moved into the Dover area. Arrangements were made for naval and air diversions in the Channel to give the same impression.

The administrative preparations required were enormous. It was planned to land more than 175,000 men or more than 20,000 vehicles and guns in the first two days; and the requirements of the invading force in ammunition, food and supplies of every sort would be great from the beginning and would increase steadily as more troops landed. Since every unit and every item had to have a place in some ship or craft, and such a place as would enable it to perform its assigned function on the other side, very detailed administrative orders were required. To protect the camps and the depots near the embarkation ports, special air precautions and a special deployment of anti-aircraft guns were necessary; however, as we have mentioned, the anticipated enemy air attacks did not come.

The Plan of Assault

The greatest lesson drawn from the Dieppe raid of 1942 had been the necessity of overwhelming fire support for any opposed landing on a fortified coast; and the 3rd Canadian Division, in a series of exercises with the Royal Navy, had helped to work out a "combined fire plan" suitable for the task. As used on D Day, the plan was as follows. During the night before the assault, the R.A.F. Bomber Command attacked the ten main coastal batteries that could fire on our ships. Immediately before the landings, the U.S. Eighth Air Force attacked the beach defences. In each case, over 1000 aircraft were used. Then the Allied Expeditionary Air Force "swarmed in to attack individual targets." Naval gunfire began at dawn, the bombarding force including five battleships, two monitors, 19 cruisers and numerous destroyers; naval rockets increased the storm just before the first troops touched down, and small craft gave close gunfire support. In addition, the Army made its own contribution;



Historical Section, G.S.

its self-propelled guns fired on enemy strongpoints from their tank landing craft.

Many special devices, and particularly special armoured vehicles, had been developed to assist the assault. Notable among them were the AVREs (Assault Vehicles, Royal Engineers)—tanks mounting "petards" for hurling heavy demolition charges—and the "D.D." or amphibious tanks, capable of swimming in from landing craft offshore. These two types of vehicles were to lead the assault, landing before the first infantry. A night landing had been discussed, but the Navy considered daylight essential to enable it to land the troops at the correct points and to increase the accuracy of the bombardment. The landing was therefore planned for soon after dawn. It was necessary that it should take place at a period of relatively low but rising tide, so that the beach obstacles would be exposed and the landing craft would not become stranded; and for the airborne operations during the night before the assault moonlight was desirable. The necessary combination of conditions would exist on 5 June and the two following days, and the 5th was accordingly designated D Day.

D Day:—The Assault

As 5 June approached everything seemed ready. The Allied Expeditionary Force had 37 divisions available—and others would move direct from the United States to France once ports had been captured. Under General Montgomery's Headquarters, the First U.S. Army was to assault on the right and the Second British Army on the left. The 5th U.S. Corps planned to use a regimental combat team of each of its two divisions on "OMAHA" Beach, while the 7th U.S. Corps attacked "UTAH" Beach with one division. In the British sector, the 30th Corps was on the right, with one division assaulting; on the left was the 1st Corps with two divisions. One of these was the 3rd Canadian Infantry Division, on "JUNO" Beach; though the First Canadian Army had been designated a "follow-up" formation, Canada would be represented in the first landing by this division, supported by the 2nd Canadian Armoured Brigade. On its right was the 50th (Northumbrian) Division, on "GOLD" Beach, and on its left the 3rd British Division on "SWORD." British Commandos and American Rangers were given subsidiary objectives along the coast. The 6th British Airborne Division had the airborne task on the eastern flank and the 82nd and 101st U.S. Airborne Divisions those in the west.

Everything was ready—except the

weather. On 4 June the meteorological report was so discouraging that General Eisenhower decided to postpone the operation for 24 hours. Next day, although conditions were still very far from ideal, the meteorologists predicted a temporary improvement; and on this basis the Supreme Commander took the heavy responsibility of deciding that the operation would proceed on the morning of the 6th.

Operation "Neptune" began shortly before midnight, when the R.A.F. commenced to pound the coastal batteries. Soon after midnight the men of the three airborne divisions began to land in Normandy. All were much more widely scattered than had been planned, but were nevertheless able to carry out their essential tasks, protecting the flanks of the seaborne landings and spreading confusion among the enemy. On the British side the 6th Airborne Division (which included a Canadian battalion) seized bridges over the Orne and the nearby canal intact, captured a coastal battery and carried out demolitions to cover this flank. With the coming of daylight the great bombardment of the beach defences began. Clouds forced the American bombers to do without direct observation, and their anxiety to avoid hitting the Allied landing craft resulted in many bombs coming down too far inland. The naval bombardment likewise scored direct hits on only a small proportion of the enemy positions. Yet this terrific pounding of the whole defence area had a powerful moral effect on the Germans, and there is no doubt that it went far to enable the Allied troops to breach the Atlantic Wall at a much lower cost in casualties than had been expected. At many points Allied units got ashore without coming under really heavy fire, although fierce fighting was required afterwards to reduce strongpoints which the bombardment had not destroyed.

The roughness of the sea somewhat upset the timetable. Some of the craft carrying the special armour were late, some of the D.D. tanks could not be launched, and the infantry themselves were delayed in landing. Yet in general the attack went well, and before the morning was far advanced the Allied troops were pushing inland, by-passing the strongpoints that still held out. Nevertheless, stubborn German resistance kept them from attaining their final D Day objectives before evening at any point, except for a few Canadian tanks that reached them and then withdrew. The situation was worst in the "OMAHA" area, where there were German field troops and a steep coast. For two days the Americans had to fight desperately to keep a foothold, and

casualties here were three times what they were elsewhere. The Canadian seaborne force had fewer than 1000 casualties on D Day, and only 335 of these were fatal.

The Allies had achieved strategic and even tactical surprise; that is, not only had the German high command had no time to reinforce the threatened area, but even the units holding it had no warning until our bombardment opened. However, the German reaction was rapid, even though there was delay in getting Hitler's permission to move some of the reserve panzer divisions. A tank counter-attack on D Day, although beaten back, helped to prevent the 3rd British Division from getting Caen. The next morning the 50th Division took Bayeux, and the 3rd Canadian Division got its right brigade on to the final objective* —the first brigade in the Second Army to do so; but the left brigade was struck by one of the reserve panzer divisions and driven back. The Germans regarded the Caen area from the beginning as the point of greatest danger and the pivot of their defence in Normandy. By throwing their reserves in piecemeal in that area as they came up, they temporarily stabilized the situation there; but they were never able to build up a striking force equal to delivering a large-scale counter-offensive and really threatening the Allied bridgehead. The movement of their reserves was most seriously hampered by the havoc which the air forces had wrought upon their communications, and by continuing air attacks; while the Allies, their sea communications protected by their navies and air forces, poured men and material into the bridgehead, hampered only by unseasonable bad weather. Above all, the Germans had been deceived into the belief that the main Allied attack was still to come—in the Pas de Calais; and there the Fifteenth Army, whose infantry divisions might have turned the scale in Normandy, sat idle while the British and American bridgehead was steadily built up.

Consolidation of the Bridgehead

The days following D Day were spent in linking the various Allied footholds into a continuous and secure lodgement area. With good naval and air support, the hard-pressed Americans on "OMAHA" gradually deepened their penetration and on 9 June they were able to take the offensive effectively. By that time the bridgeheads were linked up all along the front of assault except for a gap between the two American sectors near Carentan. Contact was made across

*In this case, the Caen-Bayeux road and railway.

this the next day, and after stiff fighting Carentan itself was captured on 12–13 June. On the British front the Germans went on throwing in fierce local armoured attacks; on 8 June, for instance, the 7th Canadian Infantry Brigade beat off a serious threat and continued to hold its position on the final D Day objective. Caen remained in German hands, but the eastern flank of the bridgehead, though much more contracted than had been planned, was secure.

By 12 June the first phase of Operation "Overlord" had been successfully completed. The Allies had established a firm foothold on the Continent. Some 325,000 men, 55,000 vehicles and 105,000 tons of stores had already been brought ashore. The construction of the artificial harbours, on a more elaborate plan than that projected by COSSAC, was well advanced. The Germans' plan of defence had failed; they had not driven the invaders into the sea, and had now to prepare for their inevitable attempt to break out from the bridgehead.

Comments

By 1944 the western democracies, unprepared when war broke out, had built up their strength to the point where they could challenge the enemy with confidence. It seemed clear, however, that the only way of obtaining a rapid decision was by defeating the main German armies on a European battlefield. The necessary preliminary to this was the crossing of the Channel and the establishment of a bridgehead, carried out in the teeth of strong defences and an experienced and determined enemy. This was such a hazardous operation that many good judges on the Allied side felt very uncertain about the outcome. That the invasion succeeded was due to the fact that the Allies were able to mobilize sea, land and air power on a vast scale, but even more to the fact that as a result of remarkably skilful and thorough planning they were able to use that power to the best advantage.

Every one of the accepted Principles of War is illustrated in Operation "Neptune." Eisenhower was told to enter Europe and "undertake operations aimed at the heart of Germany and the destruction of her armed forces." The special aim in the assault phase was "to secure a lodgement on the Continent from which further offensive operations can be developed". These great simple objects were never lost sight of and formed the foundation of the whole plan, a good example of sound *Selection and Maintenance of the Aim*. The ultimate object was achieved eleven months after D Day.

It is clear that the achievement of

Surprise played a very great part in the initial success. The enemy was completely deceived as to the Allied intentions, and continued to grope in the dark long after D Day. This helped the Allies to effect a destructive *Concentration of Force* at the decisive point, while great German forces elsewhere waited for attacks that never came. The related principle of *Economy of Effort*, the result of "balanced employment of forces" and "judicious expenditure of all resources," is equally clearly illustrated.

Where could a better example of *Co-operation* be found than in "Neptune?" The victory won on the coast of Lower Normandy was the result of the efforts of the three fighting services of three different nations, working smoothly in combination under a Supreme Commander acknowledged to have a special genius for co-ordination. The point does not require to be laboured. "Goodwill and the desire to co-operate" paid their usual dividends, on this as on lesser occasions.

Similarly, it is clear that the Allied victory was largely a triumph of *Administration*. To get the invading force to France, and to maintain it when there, required, as we have seen, extraordinarily thorough administrative planning and a tremendous mobilization of human and material resources. The prefabricated harbours, brought across the Channel and assembled on the invasion coast, may stand as symbols of the administrative ingenuity which made such a great contribution to this epoch-making victory.

Other principles can be briefly dealt with. *Offensive Action* speaks for itself. "Neptune" is the very embodiment of it. As for *Maintenance of Morale*, only troops of high morale could have carried out the task, for it was actually more formidable in prospect than it turned out to be in reality; on the other hand, the famous Atlantic Wall once broken, success, as always, encouraged the Allied troops to push on to further victories. *Security* of the base and the lines of communication was well provided for by the navy, the air forces and the anti-aircraft gunners; however, as it turned out, the enemy was in no state to threaten them. Similarly, *Flexibility* was less important in this operation in that the plan as written succeeded so well; it appears chiefly in the use of those very flexible weapons, naval and air power, to support the troops ashore at any point during the bridgehead campaign where they found themselves hard pressed.

Books on the Campaign

General of the Army Dwight D. Eisenhower, *Crusade in Europe* (New York, 1948), and *Report by the Supreme Commander to the Combined Chiefs of Staff on the Operations in Europe of the Allied Ex-*

peditionary Force 6 June 1944 to 8 May 1945 (London and Washington, 1946).
Field-Marshal Viscount Montgomery, *Normandy to the Baltic* (London, 1947).
Major-General Sir Francis de Guingand, *Operation Victory* (London, 1947).
Lieutenant-General Sir Frederick Morgan, *Overture to Overlord* (London, 1950).
Colonel C. P. Stacey, *Canada's Battle in Normandy* (Ottawa, 1946).
American Forces in Action Series: *Omaha Beachhead* (*6 June—13 June 1944*) (Washington, 1945) and *Utah Beach to Cherbourg* (*6 June—27 June 1944*) (Washington, 1947).

Books for Military Reading

Books dealing with the particular episodes described in this series have been listed following the accounts of the campaigns and are not repeated here. The list below is designed to call attention to a few other books dealing with various subjects and campaigns which any Canadian student can read with profit.

This list is, of course, very far from exhaustive; there are many good books not included in it. But all the volumes in it might usefully find a place in every Canadian military library, and most large libraries will have them. Some are out of print, but can be obtained with a little trouble in the second-hand market. Specialized books on naval and air subjects have been omitted, not because it is not desirable that army officers should study them, for it is, but in the interest of keeping the list short. Regimental and corps histories and (with a few distinguished exceptions) the reminiscences of individuals, have also been omitted.

General and Miscellaneous

A. H. Burne, *The Art of War on Land* (London, Methuen, 1944).
Carl von Clausewitz, *On War* (various editions).
E. M. Earle, *Makers of Modern Strategy* (Princeton University Press, 1944).
Sir J. Fortescue, *History of the British Army* (London, Macmillan, 13 vols. in 14 plus maps, 1899-1930).
D. S. Freeman, *R. E. Lee, A Biography* (New York, Scribner, 4 vols., 1935) and *Lee's Lieutenants, A Study in Command* (New York, Scribner, 3 vols., 1944).
J. F. C. Fuller, *Armament and History* (London, Eyre & Spottiswoode, 1946).
Sir E. B. Hamley, *The Operations of War Explained and Illustrated* (new ed., Edinburgh & London, Blackwood, 1923).
G. F. R. Henderson, *Stonewall Jackson and the American Civil War* (one-volume edition, New York, Longmans, 1936).
Sir H. Richmond, *British Strategy, Military & Economic* (Cambridge University Press, 1944).
E. W. Sheppard, *A Short History of the British Army* (new ed., London, Constable, 1950).
O. L. Spaulding, *The United States Army in War and Peace* (New York, Putnam, 1937).
C. P. Stacey, *The Military Problems of Canada* (Toronto, Ryerson, 1940).
M. F. Steele, *American Campaigns* (Washington, U.S. Infantry Association, 2 vols., 1943).
Earl Wavell, *Generals and Generalship* (London, Times Publishing Co., 1941; reprinted in the same author's *The Good Soldier*, London, Macmillan, 1948).
K. P. Williams, *Lincoln Finds A General* (New York, Macmillan, 2 vols. published, 1949).

(*Continued on next page*)

AIRBORNE "EAR"

The airborne magnetometer, an instrument developed during the war for detecting submarines under the sea, has been perfected so that it can be used to make a new magnetic map of the world.

It was devised originally to detect slight changes in magnetism, such as would be caused by a submarine at sea or a considerable iron deposit on land. However, it did not indicate the north-south or up-down direction of the compass needle. With the improvements announced by scientists of the Naval Ordnance Laboratory at White Oaks, Maryland, it determines both of these accurately.

It is known that from year to year there are extensive changes in the earth's magnetic field. The last accurate measurements carried out on a large scale were by the crew of the non-magnetic ship *Carnegie*, operated by the Terrestrial Magnetism Department of the Carnegie Institution of Washington. This ship was lost 20 years ago, and it has been impossible to repeat its observations.

With the new airborne magnetometer, it will be possible to cover in a few hours areas that would have required weeks on board the *Carnegie*.

Among the most notable field in which the magnetometer—described as "starting where radar leaves off"—has proved of value is oil prospecting. It helps find oil deposits. — *The New York Times*.

BOOKS FOR MILITARY READING

(*Continued from preceding page*)

First World War

C. F. Aspinall-Oglander, *Military Operations, Gallipoli (History of the Great War based on Official Documents:* London, Heinemann, 2 vols. plus maps, 1929).

C. R. M. F. Cruttwell, *A History of the Great War, 1914-1918* (Oxford, Clarendon Press, 1934).

Winston S. Churchill, *The World Crisis* (one-volume edition, New York, Scribner, 1931).

A. F. Duguid, *Official History of the Canadian Forces in the Great War 1914-1919* (Ottawa, King's Printer, 1938) (only one vol., with appendix vol., published).

B. H. Liddell Hart, *The War in Outline, 1914-1918* (New York, Randon House, 1936).

Sewell Tyng, *The Campaign of the Marne, 1914* (London, Oxford Press, 1935).

Earl Wavell, *The Palestine Campaigns* (London, Constable, 1928) and *Allenby, Soldier and Statesman* (London, Harrap, 1946).

Second World War

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THE INFANTRY SECTION IN DEFENCE

MAJOR GENERAL S. H. PORTER, DSO, ED, IN THE AUSTRALIAN ARMY JOURNAL

What is Defence?

Defence is very little removed from Attack. Instead of advancing and striking at the enemy, we may choose to prepare a fire trap for him and allow him, temporarily, the opportunity of moving to strike at us. What we really do is to invite him into the trap in order that he may be destroyed in the process. We improve our odds of winning by:—

(a) Choosing a good "killing ground."

(b) Preparing our fire positions.

(c) Assuming an aggressive state of ambush.

Our aim is that he should "come and get it" as a prelude to our going to "hand it out." The "It" is a merciless thrashing.

How Do We Start?

Usually the section will be on the move with its normal protective-aggressive deployment. The Section Leader will be given a role of positioning his section (his LMG, in fact) to cover a certain approach. He will reconnoitre the area which his platoon commander has allotted to him with the object of siting his LMG. He will seek:—

(a) A good field of fire in relation to his task.

(b) A reasonable field of view.

(c) Natural cover from enemy observation.

(d) Natural obstacle value which may be afforded by the terrain.

He may have to compromise with (b), (c) and (d) in favour of his field

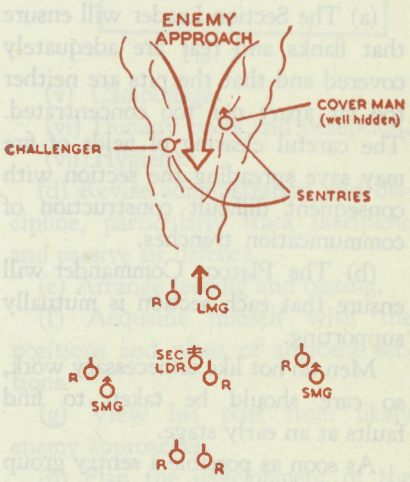

FIG. 1

of fire. By positioning his section in the area allotted to him and preparing a defensive post he will incidentally contribute to the platoon defence plan.

Having chosen the best position for his LMG, he will test the ground for its suitability for digging and heed the natural drainage in the area. Once the LMG has been positioned other members of the section will place themselves, as usual, for its all-round defence, and commence digging the first stage of a section post. The first stage consists of holes in the ground — one for each man.

Before digging has gone far the position of each weapon pit will be checked by the Section Leader and the Platoon Commander.

(a) The Section Leader will ensure that flanks and rear are adequately covered and that the pits are neither too far apart nor too concentrated. The careful clearing of fields of fire may save spreading the section with consequent difficult construction of communication trenches.

(b) The Platoon Commander will ensure that each section is mutually supporting.

Men do not like unnecessary work, so care should be taken to find faults at an early stage.

As soon as possible a sentry group or screen will be posted forward of the post to guard against enemy interference during digging. Sometimes this responsibility is assumed on a company or battalion level, but, if it isn't, the Section Leader will post a sentry group, and relieve the pair of men so posted frequently enough to ensure that all holes are developed evenly.

At this stage the scene will look something like Figure 1.

What is the First Stage of Digging?

The answer to this question is simply to dig in such a manner that a fire position is constructed for each man in the quickest possible time. The fire position must also provide protection against:—

(a) Bombing.
(b) Shelling.
(c) Crushing by tanks.
(d) Small arms fire.
(e) Assault weapons.

We must disregard many of the outdated methods of commencing the task, simply because most of them have ceased to have practical value. Often they created false security and were too long in reaching the stage which provided the requirements stated above. The "slit trench" was ideal when completed, but dangerous when partially completed. The Buffs were crushed to death as they lay in their three-feet deep slits in Libya in 1942. The effort of digging the slits would have been better applied to digging deep holes with mouths

so small that men could crouch in them with safety, should tanks over-run their positions. More important still is the fact that it is difficult to fire in all directions from a slit which is constructed for lying and facing one direction only.

The best approach to the task of digging a deep slit trench is to dig a "post hole" or "fox hole" and later to enlarge it so that it becomes a deep slit. Meanwhile a man may crouch in it and engage the enemy in any direction. It is better to rest above ground, with sentries posted for warning, and to have a "post hole" type of pit to man in the event of any type of attack.

Action of Section Leader

What does the Section Leader do as soon as his men have commenced digging? Several tasks await him, namely:—

(a) Notify Platoon HQ—"No. . . Section in position."

(b) Issue a roster for sentries (usually verbally).

(c) Plan the work for the early stages of development of the post, including—

(i) Improvements to fields of fire and range cards.

(ii) Ration and ammunition particulars.

(iii) Improvement of obstacles and wiring.

(iv) Disposal of spoil.

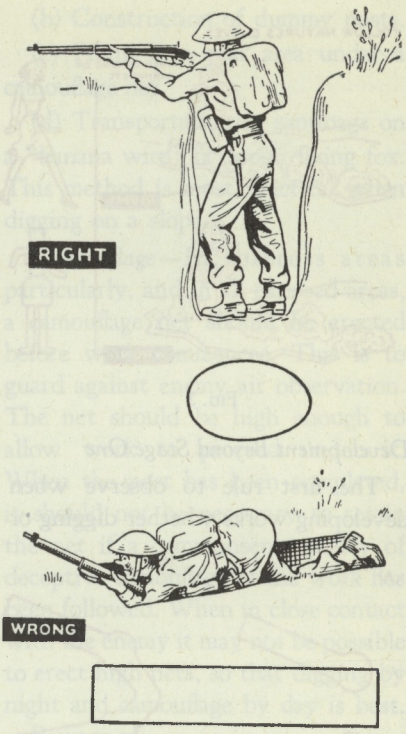

FIG. 2

(v) Camouflage.

(vi) Dummy posts and deception.

(vii) Hygiene.

(d) Revise administration and discipline, particularly track discipline and passive air defence.

(e) Arrange feeding and resting.

(f) Acquaint himself with the positions and plans of adjacent sections.

(g) View his post from likely enemy approaches.

(h) Plan the development of the post.

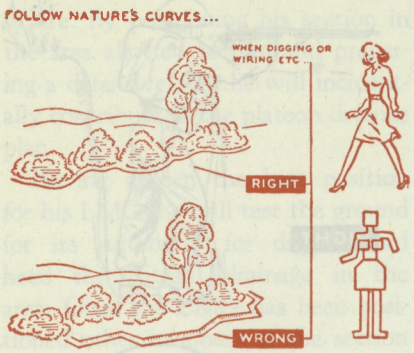

FIG. 3

Development Beyond Stage One

The first rule to observe when developing works whether digging or wiring is that of respect for Nature. Disturb vegetation as little as possible and conform with Nature's curves. Follow the line of contours where possible and dig around patches of natural growth. Do NOT dig on the reverse side of bushes in such a fashion that they must be cut down to provide a field of fire. On the other hand, remember that, with natural growth as a background, silhouetting is avoided.

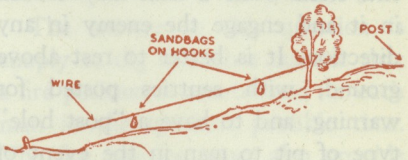

FIG. 5

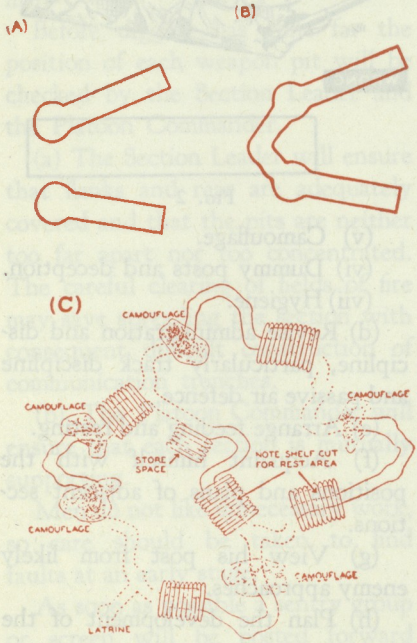

FIG. 4

Once each man has dug his pit to the required depth the best sequence of work is:—

(a) By digging away from the front lengthen each pit, until it becomes a slit.

(b) Join each pair of slits, NOT by digging in a straight line, but rather in an irregular "V," so that blast will not travel along the communication trench.

(c) Dig meandering crawl trenches to join each pair of slits.

(d) Construct rest areas with overhead cover, one sleeping bay where a man can lie comfortably to each pair of slits. These are best constructed at the end of one of each pair of slits, where they may serve as

bomb shelters yet allow free movement in the weapon pits.

(e) Construct stores bays and latrines.

(f) Deepen crawl trenches to convert them up into communication trenches, so that any portion of them may be used as an alternative fire position.

(g) Improve facilities as time permits and use light camouflage merely to break outline as work proceeds.

In diagrammatic form, the progress may appear as shown in Figure 4.

Several factors may alter the deployment of the section and hence the shape of the post. The main ones are the strength of the section and the security actually needed on one or more flanks. An idea of the layout of a post in a section of less than ten may be gained by disregarding one of the loops in the diagram (c) [on page 20]. In other cases, pits dispersed in an approximate triangle are usual. Lack of time usually results in a major effort being applied to communication trenches running astride the main axis, but at all times, the post must be capable of all-round defence.

There are no hard and fast rules for disposing of spoil, provided that it is removed or "smeared" so that there is nothing to draw attention to the post. Several methods used by troops during the last war were:—

(a) Dumping in bushy patches.

(b) Construction of dummy posts.

(c) Piling in a rear area under a camouflage net.

(d) Transportation in sandbags on a "banana wire" or rough flying fox. This method is most practical when digging on a slope.

Camouflage—In fortress areas particularly, and in all exposed areas, a camouflage net should be erected before work commences. This is to guard against enemy air observation. The net should be high enough to allow work to proceed under it. When the post has been completed, it should not be necessary to retain the net if a commonsense policy of deceptive camouflage of the work has been followed. When in close contact with the enemy it may not be possible to erect high nets, so that digging by night and camouflage by day is best.

Beware of:

(a) Using green vegetation which dries out and becomes conspicuous.

(b) Camouflaging so heavily that freedom of movement is sacrificed.

(c) Wearing exposed tracks with uncontrolled traffic, so that the position of the post is marked by converging tracks.

After all, concealment is best, and is easily attained by following the advice in earlier paragraphs.

Overhead Cover — To be of any use overhead cover should cause a projectile to burst outside a post

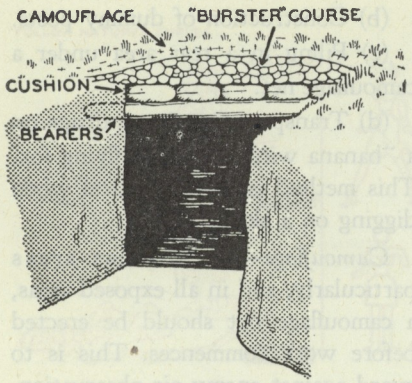

FIG. 6

and not in it. This is attained by covering a post with a "burster course" consisting of hard substance such as rock or stout logs. Under this course there must be a cushion of earth, in sand bags for preference. The whole must be supported by strong bearers.

Wiring—The object of all obstacles is to slow the enemy up in the beaten zone of our weapons while he is still unable to attack us with grenades. He must be made to encounter the obstacle with surprise, otherwise he will seek to demolish it before approaching. Thus, when wiring, use the concealment of vegetation or folds in the ground so that the enemy is unable to approach the obstacle by a covered approach.

Experience has proved that a low anti-personnel type of wire obstacle with adequate depth is effective. It has the advantage of being easy to conceal and is difficult to demolish by crushing or blowing up. Its features are loose wiring at about knee height, and spreading from fifteen to twenty feet or more. It is comparatively easy to construct, especially in bushy country.

Let us now examine the post in the light of the Principles of War:—

(a) *The Selection and Maintenance of the Aim*—From the section point of view, the aim in a defensive task, as in attack, is to bring fire to bear on the enemy with the object of destroying him. This post is definitely a fighting post.

(b) *Maintenance of Morale*—Its efficiency in giving the section an odds on chance of victory is its contribution to morale.

(c) *Offensive Action*—It is planned to provide a hostile reception for the enemy, and to trap him.

(d) *Security*—Its layout and construction combines security and offensive spirit.

(e) *Surprise*—Its ground-level pits and its general features cater for concealment.

(f) *Concentration of Force*—Its communication trench system allows mobility and a concentration of weapons at a threatened flank.

(g) *Economy of Effort*—There is no unnecessary work in it, while the priority of tasks provides for essential work being executed in due priority.

(h) *Flexibility*—The planning and

execution of work are part of a flexible scheme which is easily adaptable to any set of circumstances.

(j) *Co-operation*—The Section is able to fight as a team.

(k) *Administration*—While the observance of this principle largely rests with the Section Leader, this type of post facilitates administrative control.

In addition, there are some commonsense features in the scheme of development of the post which are based on the psychology of the average soldier:—

(a) There is shelter for half of the section members, under which they may sleep with security during the hours which are rostered for resting. This same shelter will protect the whole section during artillery and air bombardments, when the enemy is obviously not at close quarters.

(b) Weapon pits are open, so that complete freedom is allowed for action to all sides.

(c) Communication trenches are also alternative fire positions so that, should a weapon pit be neutralized with enemy fire, the occupant may side-step and hit back.

(d) The fact that the original deep slits run parallel to possible lines of approach of the enemy allows complete freedom of action for throwing grenades during close combat, without exposing the thrower. If men are required to expose themselves by leaning out of a trench in order to obtain freedom of arm action, it is

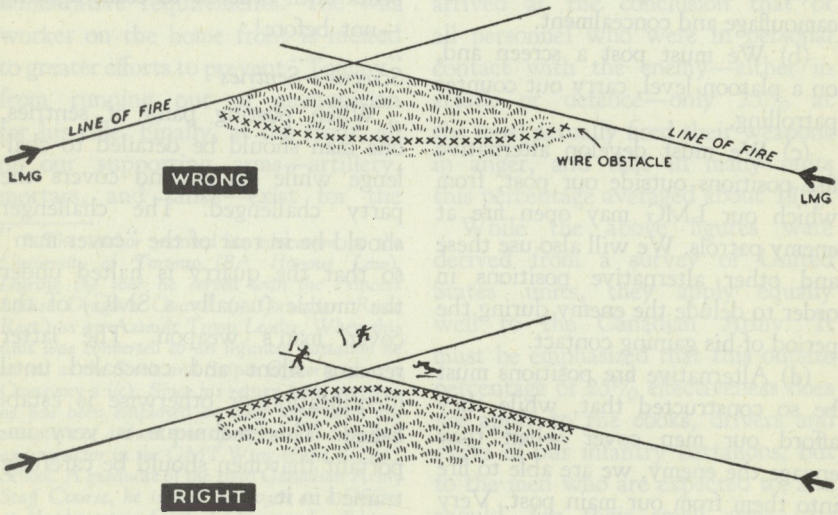

FIG. 7

unlikely that any grenades will be thrown with effect when the enemy is at close quarters.

A Few Points on the Conduct of the Defensive Battle

Before the enemy may launch a set-piece attack he must discover the whereabouts of our LMG and other positions, so that he may neutralize them with fire in support of his assault troops. This he will attempt to do by patrolling or by launching encounter attacks. Thus our first concern must be to keep his patrols at a distance and provide him with false impressions as to our actual positions.

We may do this by a combination of the following:—

(a) We must perfect our use of camouflage and concealment.

(b) We must post a screen and, on a platoon level, carry out counter patrolling.

(c) We must develop alternative fire positions outside our post, from which our LMG may open fire at enemy patrols. We will also use these and other alternative positions in order to delude the enemy during the period of his gaining contact.

(d) Alternative fire positions must be so constructed that, while they afford our men cover when they engage the enemy, we are able to fire into them from our main post. Very often, natural cover only will suffice for an alternative position. We must not make duplicate posts which the enemy may use against us.

(e) We must construct a few dummy posts, but care is needed here, too. Dummy posts must not be so close to our real positions that we may be endangered by enemy fire aimed at the former. They must not be so obvious that they attract attention during the early phases of contact, and thus inform the enemy of our digging activities in the area.

(f) We must post our SMG's to cover short approaches from flanks where a volume of fire at short range is likely to be needed.

(g) When the main attack is launched we will fight from our main posts until ordered to cease fighting —not before!

Screens—Sentries

When posting pairs of sentries, one man should be detailed to challenge while the second covers the party challenged. The challenger should be in rear of the "cover man" so that the quarry is halted under the muzzle (usually a SMG) of the cover man's weapon. The latter remains silent and concealed until identification or otherwise is established. This technique is very important that men should be carefully trained in it.

TRAINING THE FUNCTIONAL RIFLEMAN

Capt. W. R. Chamberlain, MC, Royal Canadian Dragoons*

It is a common and somewhat trite expression that the entire effort of a nation at war is behind the "man behind the gun." This man is the infantry rifleman, the man who digs the slit trenches, advances under fire to the enemy positions, and who, finally, kills the enemy with his weapon—be it rifle, sub-machine gun or light machine gun. All of our services are behind this man, and take pride in ensuring that he need never "look over his shoulder" for supplies or other administrative requirements. The war worker on the home front is incited to greater efforts to prevent "Tommy" from running out of ammunition for his rifle. Finally, at the front, all of our supporting arms—artillery, mortars, and tanks—exist for the sole purpose of helping the infantryman into positions that will enable him to kill the enemy at close range.

With this knowledge of the massive support that the infantry rifleman receives in carrying out his function of killing the enemy, it comes as a considerable shock to find out that the rifleman has not been truly-functional in this role. Colonel S.L.A. Marshall, a historian for the United States Army in the Second World War, conducted a thorough survey of infantry units in action and arrived at the conclusion that of all personnel who were in personal contact with the enemy—either in attack or defence—only 25% at the most actually fired their weapons in anger, and that in many units this percentage averaged about 15%.

While the above figures were derived from a survey of United States' units, they apply equally well to the Canadian Army. It must be emphasized that this outsize percentage of 25% effectiveness does *not* apply to the cooks, drivers and clerks of our infantry battalions, but to the men who are expected to, and should, fire their small arms—the

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men in the rifle platoons.

One is tempted to ask that if 75% of our riflemen were not firing their weapons at the enemy, what exactly were they doing? As far as Colonel Marshall's researches reveal, their prime function seems to have been that of keeping the "firers" from getting lonesome. So all the efforts of our services and supporting arms have not been expended in a very fruitful manner. Nor is it any great incentive to the munitions worker to find out that 75% of small arms ammunition lies unused, and that 75% of front-line small arms are not fired at the enemy.

The time has come for a good deal of house-cleaning in our training methods if the product of those methods is only 15–25% effective. If the object of our small arms training is to produce an effective killer of the enemy we have *not* attained that object. Something is drastically amiss if our so-called riflemen will not fire without orders at enemy within sight and within range of small arms fire. The writer has seen this happen only too often, and has received confirmation of this practice from practically all infantry officers whom he has queried.

For reasons which this paper will attempt to enumerate, our trained riflemen (or 75–85% of them) arrive on the battlefield without the urge to kill the enemy; they have little confidence in their weapons and little desire to use them; they have absolutely no idea of what lies ahead of them nor of how they are going to perform their job of killing the enemy. Their basic attitude is defensive and dominated by the idea of self-preservation.

Can we, then, arrive at any reasons for this most undesirable mental attitude? Basically, it is felt that the reluctance of the individual soldier to fire his weapon at the enemy could be traced to our way of life. Western civilization has set as its highest ideal the prolongation, amelioration and preservation of human life. From his mother's knee the citizen is taught "safety first" and respect for the welfare of his fellow-man. Our culture is a constructive one, in which destruction is frowned upon as anti-social. As a consequence, a mental block—most desirable from peace-time standards —has been established in the normal law-abiding citizen's mind against the taking of human life.

So the civilian enters his military training with this reluctance to kill firmly implanted in his mind. Nor does he at any period during his training receive any purposeful indoctrination that will motivate him in such a way that he is prepared to shoot his enemy on sight without having first received a direct order to do so.

The recruit goes into the first of the many phases of his rifle training with greatly varying degrees of experience with shooting. He may have been a fine hunting shot, or he may have had no experience with a rifle whatsoever. In either event he is put through all the deadly mechanics of our weapon training. He is taught to memorize the parts of the weapon, how to strip it, how to clean it, and finally, how to transport it from one position on his body to another in rifle drill. The largest part of weapon training is devoted to these exercises, and by the end of them the former hunter has had his keenness considerably dulled, for he knows that he was able to make successful kills on the game trails without this rigmarole. The novice at shooting, after being initially interested by the novelty of the subject, soon falls into a state of co-operative but lethargic acceptance of the scheme of things—a state of mind that some authorities are pleased to call "disciplined." Certain it is that with such training, his mind is not capable of acting with initiative when is comes to the subject of shooting.

When that red-letter day comes on which the recruit is actually to fire his rifle, and his somewhat subdued enthusiasm is roused, what do we do to fan that feeble flame? We line him up, march him out, line him up again, lay him down in line, and order him to fire at a black and white target. All is neat and military and disciplined but the net result of such an experience is to awaken no interest in firing in the mind of the recruits. A typical attitude to range practice was expressed by the recruit who stated that he liked the subject because on such occasions he could relax and have a smoke when his relay wasn't firing!

As presumably the object of our training is to fit the man for combat, let us compare the conditions under which the recruit fires on the rifle range with the conditions under which he *is expected to fire* (but doesn't!) on the battlefield. On the range he fires from a level position in a formal manner, in accordance with the book. He fires *only* on a given order—Heaven help him if he does otherwise. He fires at a large white square in the exact centre of which is a round black bulls-eye. He fires from a known range—given always in hundreds of yards—corresponding to the graduations on his rifle sight.

Now in action, he rarely, if ever finds a level sward from which to fire. The effective rifleman has to adjust his position to piles of rubble, trees, brush or the odd dead body. He fires when *he* sees the enemy, and he fires at a target that is often

fleeting, sometimes behind cover, and frequently firing back. His range is *not* given—he must figure that one out for himself: he cannot rely on a NCO or an officer to do this for him.

We may now inspect the finished product of our present rifle training. Badly motivated for his job as a rifleman by his civilian environment, with no military indoctrination to counter this, his possibilities for the job stifled by a dislike for the mechanics of rifle firing, and his whole weapon training totally unrelated to the battle picture, what wonder our rifleman is only 15–25% effective! It is quite possible that this 15% effective class comes from men who had pre-military experience in actual hunting, and who reverted to old ingrained practices learned on the hunting field and fired upon the enemy with the same zest and easy skill with which they had once fired at a running deer or a grouse on the wing.

In searching for a cure for the above conditions, certain basic ills in our training methods become apparent. We have concentrated on the physical and mechanical aspects of rifle training to the exclusion of the mental and moral aspects.

To outline any training that will be effective, we must have as our object the production of a *soldier who will want to fire at the enemy.* To this end we must ensure that the recruit forms a genuine liking and interest in small arms shooting. Competitions with suitable awards are suggested, with inter-platoon shoots to encourage team spirit. As much as possible, shooting should be in the form of simple exercises, using three-dimensional targets of life-like proportions, *always* leaving the initiative to fire with the rifleman. The recruit must be encouraged to fire on sight and instinctively, and to further this a modified form of skeet shooting with shotguns would be useful. Firing at cover behind which are set lifelike targets will develop the recruit's confidence in searching fire, and at an advanced stage, moving targets should be used.

When the recruit's confidence in himself and his weapon has been thoroughly implanted, he must be put more and more in the battle picture. He must become familiar with the use of all types of ground, both from the point of view of firing positions and his judgment of distances. He must learn to fire while under fire, and under the noise and disturbances of battle so that when he takes the field he will react to enemy action in an aggressive manner, and not merely "shoot back" but "shoot first."

The relation of the rifleman to the enemy must be given constant attention throughout his training.

Some form of indoctrination must be an ever-present part of his conversion from civilian to military thought, in order that he may become motivated as a soldier. It is not a question of engendering hatred for the enemy in the recruit's mind, but of impressing upon him that his sole function is to kill the enemy, and that if he does not perform that function when the opportunity presents itself, he is useless.

The possible criticism that such training will result in lack of control and "trigger-happiness" is not tenable. The problem is not to *stop* fire, but to start it, and it is far better to have some excess of enthusiasm than the present lassitude displayed by some of our so-called riflemen. Nor is there any question of ammunition wastage. The ammunition will be *used*, and it is the cheapest and most effective means we have of killing the enemy. Artillery concentrations and air bombardments will "neutralize" and "keep their heads down," but no enemy is so effectively "neutralized" as the one with a rifle bullet in his head.

It must be emphasized that this article is not attempting to advocate "quantity" at the expense of "quality" in our small arms firing. We must produce *both*. The expert shot should be encouraged to improve his skill. The recent reports on fighting in Korea state that the sniper's rifle has hardly been used "due to the fact that very few men were qualified snipers." Very few Canadian soldiers are capable of firing the .303 Mark 4 or Mark 5 up to its capabilities, either.

At one time the soldier's only trade was that of arms, and he was rewarded for proficiency in this trade. He won his "spurs" only after a clear demonstration of his skill in the use of his weapons. The rifleman of today, however, remains among the few individuals in the Canadian Army who receive no remuneration for attaining a high degree of skill in their trade. In other words, we give trades pay to our cooks, clerks, and storemen because of their special knowledge and skill, but leave unrewarded the master of the most important trade of all—the marksman!

This is NOT an advocacy of combat pay, as known in the United States Army. A soldier's job is to fight, and he is not entitled to extra pay for doing that job. However, proficiency in that job should be rewarded and skill in marksmanship is capable of being assessed. Certain it is that trades pay would encourage riflemen to improve their skill. The requirement of annual requalification would maintain a high degree of skill and unlimited allotment of "trade vacancies" would ensure that all riflemen could qualify.

In conclusion, in order to produce

RIGHT MAY BE WRONG

Island hopping to the Korean battlefield has brought back memories to veteran Canadian Army drivers of the Second World War.

Eleven years ago Canadian troops were cautiously feeling their way along the strange left side of British roadways and generally wondering why. Crossing the channel to Europe, Canadian drivers found themselves driving once more on the right side of the road.

On the Japanese islands, vehicles drive on the left side. Crossing another channel to Korea, driving is again on the right side.

"And", said Capt. Gordon Booth, MC, Ottawa, officer in charge of the Canadian Army transport section on the Korean cliff-climbing ration run, "there is the usual confusion in vehicles."

Canadians mainly use American-made vehicles with left-hand drives for "right hand" roads. British vehicles mount their steering columns on the right—good for Japan but wrong for Korea.

"To top it all," said Capt. Booth, "we're using U.S. Army trucks and jeeps while New Zealanders and Australians rolled ashore here in Korea with Canadian-made vehicles."

"The reason for that," Capt. Booth added, "is that the Canadian vehicles they have were saved from the last war."—*Directorate of Public Relations (Army), Army Headquarters, Ottawa.*

TRAINING THE FUNCTIONAL RIFLEMAN

(Continued from preceding page)

the effective, "functional" rifleman, we must accomplish three things. First we must mould his mind so that he has the desire to fire—call it the "hunting" attitude if you will. Then we must improve his skill and confidence and enthusiasm for weapon firing. Finally we must put him thoroughly in the battle picture by training him under battle conditions, so that he will go into action ready to function as a rifleman. With this proper motivation the rifleman will carry the battle to the enemy; he will replace the former "slit trench attitude" with a positive desire to use his weapon on all possible occasions; he will dominate the close-range battlefield. The Canadian soldier has proved his ability to "take it;" let us fit him to "dish it out."

AIR SUPERIORITY

By
MAJOR D. J. HUNDEN, ESSEX SCOTTISH REGT.*

With the increasing attention given to air power by senior military authorities, it behooves each officer to examine carefully his army/air thinking. This applies particularly to such a confusing term as air superiority.

Definition

Air superiority has been defined as "That degree of superiority which prevents the enemy from interfering effectively with our own ground and air operations."[1] [The author's references are listed at the end of the article]. In relation to the land battle, the object frequently called local superiority is to produce an air situation to give freedom of movement on the ground to our own forces and to deny that freedom to the enemy. Overall air superiority is related to the source of the enemy's air power and typical targets will be factories and oil. Local air superiority is related to the tactical air strength of the enemy and typical targets will be aircraft and airfields. For the soldiers purpose, air superiority could be a condition when and where the air represents an asset in contrast to a detriment.

Importance

Field Marshal Montgomery claimed "The achievement of a favourable air situation is the primary task of the air forces and the greatest contribution they can make to the land battle."[2] No responsible authority has yet questioned this statement, although the uninitiated may still request close air support too soon. The degree of support which air forces can provide for armies depends on the degree of air superiority which has been obtained. It is worth remembering that air superiority is a pre-battle requirement

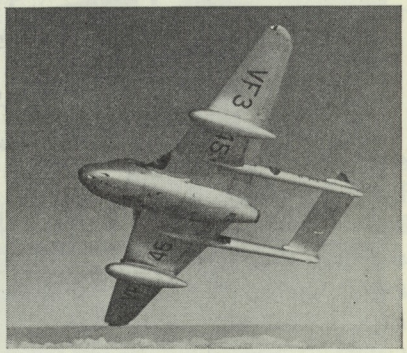

Photo supplied by De Havilland Aircraft
A Vampire jet.

**The author has held numerous Army/Air appointments in the Canadian Army, including those at the Canadian Joint Air Training Centre and the Directorate of Military Training, Army Headquarters, Ottawa. He is a graduate of the RCAF Staff College, and at the present time is attending the Command and Staff College at Quetta, Pakistan.—Editor.*

and that many of the planes providing air superiority will later provide the desired close support.

The battle for air superiority is fought to a co-ordinated plan. It is a popular fallacy that glamorous interceptor fighters carry out the task alone. Air superiority is best ensured by offensive operations. Strategic bombers assume the lion's share of the burden by attacking the source of the enemy's air power. Reconnaissance aircraft supply the intelligence for an adequate plan. Intruder bombers harass training and communications. Fighter aircraft tend to be defensive and only gradually extend their domination beyond the home base.

The gaining and maintaining of air superiority is entirely an air problem, but such is the importance of this task that other services may be called upon to play a part. Armies occupy airfield areas to provide bases for friendly, short range aircraft or to deny such areas to the enemy. In addition, the army supplies anti-aircraft protection. The navy may deny certain airfield areas to the enemy and land shore parties to disrupt the enemy air warning system. Finally the underground forces can supplement intelligence reports and confound enemy communications.

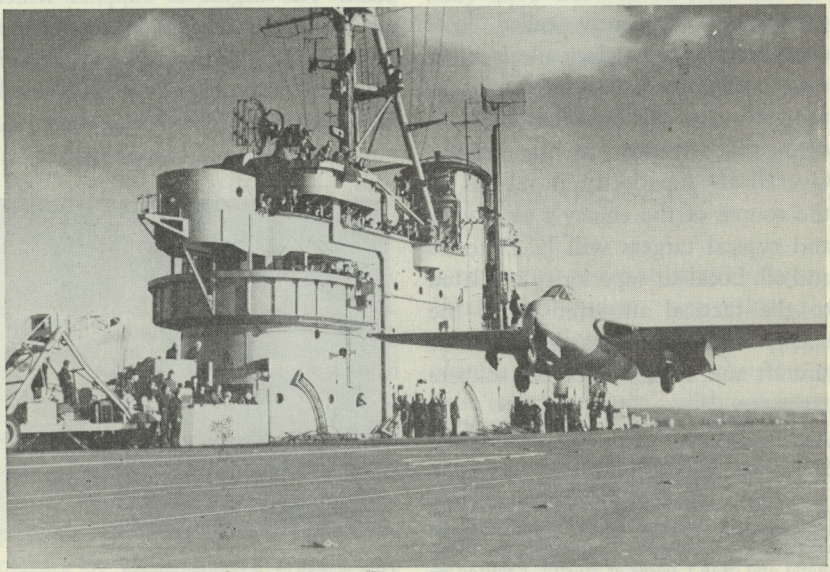

Photo supplied by De Haviland Aircraft

A Vampire jet landing on an aircraft carrier.

Prerequisite

Field Marshal Montgomery also stated that air superiority "is a prerequisite to military success."[3] The official pamphlet is more cautious. It says "Air superiority is in some degree a prerequisite for any military operation."[4] Obviously the Field Marshal's statement merits careful study.

An increasing weight of opinion is doubtful if ever again we may enjoy the overwhelming degree of air superiority that we enjoyed in 1944–45. In fact one writer warned recently that "there is no guard anywhere that an air war would not reach a point of stalemate, with air superiority long in doubt."[5] Certainly, air superiority is becoming increasingly expensive to achieve. Interception of determined raiders is becoming extremely difficult. One influential civilian aircraft magazine, reporting on Exercise SWARMER in the United States, drew such a conclusion when it recorded that although outnumbered 1 to 7 "aggressor" air forces were able to destroy 22½ of the transport aircraft.[6] It is entirely possible that 7 to 1 superiority may be beyond the economic resources of almost any likely combination of nations in a future world war.

Without Air Superiority

While it may be obvious that future ground operations with flagrant defiance of enemy air power are impossible, it is not obvious that ground operations without air superiority must cease. One of the outstanding features of Rommell's victories is that they were achieved with an inferiority of force and without any command of the air. And again, "With the collapse of Italian resistance in Sicily, the two 'scratch' German divisions, though devoid of any air support, succeeded in delaying from seven to twelve allied divisions for over a month."[7] Moreover, the German army from August 1944 to April 1945 with an inferiority in equipment and manpower on the ground as well as in the air staged a withdrawal which merits detailed study. Even in 1950, after losing all control of the air within a few hours after the arrival of the United States Air Force, the North Koreans maintained the offensive for over two months.

Lessons

What then of the future?

First, we should resist the insidious tendency to judge the shape of operations early in a future world war by typical operational conditions late in the last war. With air forces busy preventing the enemy from using the air as a channel to convey weapons to destroy our bases and forces, there will be precious little

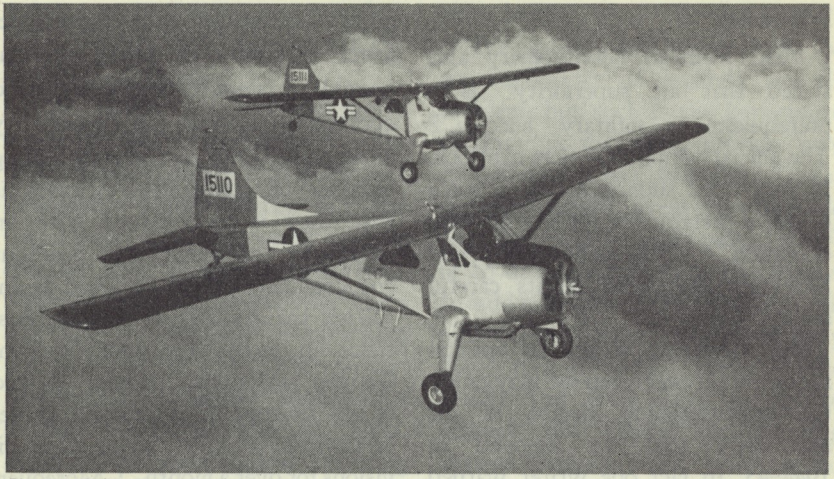

Photo supplied by De Haviland Aircraft

The YL-20 "Beaver" now in use by the United States Air Force. This aircraft is used for liaison purposes and casualty evacuation, having space for four litters.

air effort left for direct support of field forces.

Secondly, even without air superiority the army should seek by every means within its power to maintain the offensive spirit. This can be pursued by developing all those arts which tend to neutralize the effects of enemy air power. Battlefield targets are not particularly fruitful. In all our training, studies, and exercises we should pay meticulous attention to methods of evading the worst consequences of air attack. To resist hysteria we should consider that there is never a desperate situation—only desperate men. The heart of the army, the infantryman, will always be utterly dependent on fire power and, regardless of how necessary and how vital efficient air support might be, it is not considered likely that air power will ever entirely replace the infantry's normal heavy support weapons.

Thirdly, to prevent despair at the lack of air support, every effort should be made to indoctrinate all troops with the principles behind the correct employment of air power. We must teach that the services work as a team pursuing the national aim even when that integration is not readily apparent.

Finally, our study of land/air warfare in peacetime should be realistic. Every use should be made of highly qualified schools like the Canadian Joint Air Training Centre. At the same time we should remember

that the air support organization now considered the ideal was the result of five years of air experience and two years of air superiority. The circumstances which are likely to pertain early in a future world war should be always considered by future commanders and staff officers.

Conclusion

The disadvantages of an adverse air situation are formidable. However, we must not deduce that the army need not expect to fight until the air battle has reached a satisfactory stage. All services should be prepared to fight against any odds.

The side inferior in the air, by stressing other factors such as leadership, can win at least temporary victories on the ground and can make aggression expensive. Good troops, properly deployed, cannot be destroyed by air power alone. The Second World War showed, and Korea is confirming it, that battles can be won without the direct aid of air power.

Air superiority, however overwhelming, will never compensate for bad generalship. It seems appropriate that officers should prepare for operations when there is no favourable air superiority.

REFERENCES

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[2] F/M B. L. Montgomery, *Some Notes on the Use of Air Power*, p. 28.
[3] F/M B. L. Montgomery, *Some Notes on the Use of Air Power*, p. 28.
[4] *Land/Air Warfare Pamphlet No. 1*, War Office, p. 10.
[5] M. Andrews, *Disaster Through Air Power*, p. 49.
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[7] B. H. Liddel Hart, *The Strategy of the Indirect Approach*, p. 283.

RADIATION TAGS

Two types of radiation "dog tags" have been developed by the [U.S.] Navy researchers which are supposed to fill requirements for the protection of personnel. Both types are simple, rugged, and inexpensive. In addition, these "dosimeters", which measure the amount of radiation exposure the wearer has experienced, keep their sensitivity in storage and under extreme heat. One type uses salt crystals known as alkali halides, normally transparent but turning blue when exposed to gamma rays. Intensity of colour determines the amount of radiation. The other contains a silver-activated phosphate glass. Gamma rays convert the glass into a phosphor which takes on an orange colour under ultraviolet light. As in the first, the intensity of colour determines the seriousness of the radiation casualty. —*Marine Corps Gazette* (U.S.).

WINTER TRIALS

By
LT. COL. D. A. G. WALDOCK, ROYAL CANADIAN ARTILLERY*

Since the war, much time and effort have been devoted to winter equipment trials. It is probably not generally realized that there were active winter trials programmes in Canada more than one hundred years ago. These trials were conducted by British forces stationed in Canada and were ordered either by the Master General of the Ordnance at the War Office in London or by the Commander of the Forces in Canada.

In particular, several winter armament trials were conducted during the winter 1845–46 by Artillery troops stationed in Quebec, Montreal and Kingston. This article contains a brief description of some of the more topical of these and other trials conducted during the first half of the last century.

Cold Weather Rocket Trials

During January-March, 1846, there was an "experimental rocket practice to ascertain whether extreme cold has an injurious effect upon rockets and if so whether the action is upon the case or composition of the rocket, also whether the effect is temporary or permanent".

The trial was under the direction of Colonel F. Campbell, Commanding the Royal Artillery in Canada, and firings took place at Quebec, Montreal and Kingston. The rockets employed were 12-pounder (shell) and 6-pounder (shot), some 70 rounds being fired in all. His Excellency, the Commander of the Forces in Canada, was sufficiently interested in the trials to request personally that a few of the rockets, to be fired in the coldest weather, be placed in a heated room nearby until immediately before being fired. It will be appreciated that rockets at that time were in a experimental stage and it is of interest to point out that we have by no means satisfactorily overcome the problem of storage and operation of rockets at low temperatures even today.

The results of the trial indicated that the rockets were "so much affected by severe cold as to render them dangerous to those employed in using them, but the officers by whom the practice was carried on did not consider the injury to be permanent". It appeared that some difficulty was experienced then, as it still is today, in obtaining the required low temper-

**The author, who was formerly with the Directorate of Armament Development, Army Headquarters, Ottawa, is now a student at the Military College of Science in England.—Editor.*

atures at the appropriate times and the firings were conducted in temperatures between −2° and +38°F.

Trials of Snow and Ice Defence Works

At the same time, trials were conducted at Montreal "for the purpose of ascertaining the effect of shot and shells upon Defences constructed of Ice and Snow". The trials team consisted of one officer and 54 other ranks. Bearing in mind the relatively small number of regular troops stationed in Canada at that time, this represents a considerable effort and indicates the importance with which the trial was regarded.

A butt was constructed from ice and snow by a Royal Engineer detachment on a small island in the St. Lawrence river about 400 yards south of St. Helens and upon which the guns were placed at a range of 440 yards. The butt was 66 feet by 47 feet at the base and was carried upward with a slope of 2 inches to the foot to a height of 18 feet. The bottom 8½ feet were composed of ice, "forced upon the island by the strong current of the river", and formed into a compact mass by breaking it down with sledge hammers and throwing water on it. The remainder of the butt was formed of snow rammed down and having "water thrown upon it three times a day". A total of 126 rounds, including both shot and shell, was fired at the butt from guns of natures varying from 6-pounder up to 32-pounder, the firings extending over some five weeks.

At the end of the trial, it was concluded that "30 or 40 effective shells would form a considerable breach in a parapet of these materials", although a total weight of just over half a ton of solid shot was not able to effect a worthwhile breach. It was further concluded that a snow and ice parapet of this type might prove of considerable value in Canada, particularly in the defence of open towns and villages against musketry and field artillery.

Trials of Mortar Shells Against Ice

During the same winter, an "experimental mortar practice" was carried out on the ice of the river St. Charles to determine the effect of live shells against ice. Eight-inch, 10-inch and 13-inch mortars were used. The thickness of the ice varied from two to three feet. The 8-inch shells made little or no impression while the 10-inch shells made holes about 18 inches deep. The 13-inch shells just about penetrated the three feet of ice.

A similar trial was carried out with a 10-inch iron mortar at Fort Henry. The stated object of this trial "was with a view to ascertaining the capability over a principal road leading across the ice and which in the winter is always made the communication between the United States and Kingston, and to try the effect of the shells

in breaking the ice". Holes varying from 18 inches to 6 feet in diameter were made in ice about 9 inches thick. The trial was conducted under the direction of Lt. Col. C. Dalton, Commanding Royal Artillery, Canada West. What happened to communication between the United States and Kingston during the remainder of that winter is not recorded.

Transport of Artillery Over Ice

It is of interest to note that military observers from Canada also attended U.S. Army winter trials more than hundred years ago as they do today. In January 1835, Lt. Col. F. MacBean, Royal Artillery, attended a trial concerning the transport of a 24-pounder gun (weight about 2½ long tons) across the frozen Hudson river.

The gun with its associated timbers, lashings and sleds, etc., weighed 7,203 lbs. and was drawn by horses at about 8 m.p.h. It successfully travelled over ice varying in thickness from 16.5 inches down to 5.56 inches, the pressure on the ice being about 7.75 lbs. per square inch.

An anxious time was experienced in traversing an area "50 paces wide" near the mouth of a creek where the ice averaged only 5.56 inches in thickness and was covered with a sheet of "snow-water" 2 inches deep. By this time the horses were tiring and only making about 4 m.p.h. and the ice "bent much".

The conclusions drawn from the trial were that:

1. A load may be transported with perfect safety over sound ice 8 inches in thickness by distributing the weight so that the pressure never exceeds 7.75 lbs. per square inch.

2. A load cannot be safely transported over sound ice 5.56 inches thick where the pressure on the ice exceeds 7.82 lbs. per square inch.

It was pointed out that by placing a layer of straw on the ice, throwing water on it and allowing it to freeze, adding another layer of straw and again water, "the thinnest ice may be made to support great burthens".

Movement of Artillery in Winter

During the first half of the nineteenth century, considerable effort had been put into the design and trials of "sleigh carriages in the service of Artillery". Up to 1845, sleighs of three different patterns had been used for transporting field artillery in Canada.

The first, dating from about 1783, consisted of two brackets for the gun to rest on and which were placed on the simplest form of sledge. An improved sleigh called "Sinclair's pattern", after Major John S. Sinclair, Royal Artillery, was introduced about 1830. With this sleigh, the summer carriage, having the axletree and wheels removed, was placed with the axletree bed resting on runners

"THERE IS NO METHOD, HOWEVER CRAZY . . ."

By
CAPT. A. G. STEIGER, HISTORICAL SECTION,
ARMY HEADQUARTERS, OTTAWA

During the years preceding the Allied invasion of North-West Europe, Field Marshal von Rundstedt, the German C.-in-C. West, circulated his impressions gained on inspection trips in a series of memoranda entitled "Basic Observations".

With the passing of time most of these remarks have become immaterial, but some are of interest to the historian and others might still serve to instruct present-day officers.

In May 1942 Rundstedt made the following remarks:

Hardness:—In the East, fighting, danger and weather produce an enormous hardening of all ranks. In the West, due to long periods of quiet, good quarters and climate, troops may become soft. Therefore, apart from being hard with himself, every leader must always strive to harden his men.

Examples: When a commander does not leave the garrison of a strongpoint in the strongpoint, but quarters them in houses half a mile distant, because there are no quartering facilities in the strongpoint, that

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WINTER TRIALS

(Continued from preceding page)

about 16 inches high, the trail resting on the ground to the rear. A model of this sleigh was sent from Canada to the United Kingdom where the Master General of the Ordnance assembled a Select Committee to report on it. The result was the rejection of that sleigh and the introduction of the "Woolwich pattern".

The Woolwich pattern sleigh consisted of a platform about 7 feet by 4 feet placed on runners 16 inches high upon which also rested two strong transoms to which the brackets supporting the gun were secured. A box on each side of the gun carried 15 rounds of ammunition and served as a seat for the Nos. 1 and 2. Two further patterns were under consideration in 1845 with a view to conveying the complete summer carriage with the gun.

is not consideration, but weakness. A bivouac does not approach by a long way the weather conditions endured by the troops in the East. An emergency shelter can be prepared quickly and with scanty material.

When a commander says of one of his subordinates, "He is a decent chap, but not much good", and when asked why he does not get rid of him, replies, "He is such a good fellow", this shows lack of firmness, which will be paid for dearly during operations.

Appointments:—Whether an officer can carry out his duties efficiently now, when things are quiet, is not important; what is important is whether he will be able to command his unit day after day in battle, and to meet the most trying mental and physical demands.

It is better that an officer with less service, who can meet these requirements, should command a unit—even if not in line for appointment—than one with longer service who cannot meet them.

It is better for such a change to be made now, rather than in action, when the officer in question has gone to pieces mentally and physically, and thus given a devastating example to his men.

A senior commander bears a heavy responsibility if, from a mistaken desire not to be hard on those under him—that is, from weakness—he leaves a subordinate in an appointment which in action he cannot fill satisfactorily.

Speculations on Enemy Course of Action:

Every commander must be continually considering what the enemy could undertake against his sector or strongpoint.

But this should not lead to a limited outlook. Such speculations as, "The British have never done this; they always acted in such and such a way", are wrong. They can and will do things differently, perhaps even the next time.

Such considerations as "with the existing wind and weather conditions" are good, but they should not lead to relaxation of watchfulness during an apparently safe period.

The man who has fought in the East knows well:

There is no method, however crazy, that the Russians did not make use of; and there is no calculation, however well thought-out, that the Russian did not upset.

The responsible commander must reckon thus:

"*Everything is possible, even the most improbable.*"

Education makes a people easy to lead, but difficult to drive; easy to govern, but impossible to enslave.—*Lord Brougham.*

Bell Aircraft Corporation Photo

Troops embarking in a medium helicopter.

THE HELICOPTER'S ROLE IN TACTICAL AIR POWER

By

MAJ. GEN. ROBERT M. LEE, COMMANDING GENERAL, TACTICAL AIR COMMAND [USAF], LANGLEY FIELD, NORFOLK, VA.*

In accepting the invitation to speak at this dinner of the Sixth Annual Forum of the American Helicopter Society, I was encouraged by the fact that each of you in the helicopter industry of today has a dual interest in your work. First, you have the interest of the creator, in research, engineering and building helicopters; and second, you have the interest of a taxpayer wanting the greatest national security for that portion of your federal tax dollar that goes into the creation of helicopters.

These two interests are common with the objectives and interests of the United States Air Force inasmuch as it is our desire to facilitate the research, development and building of items for a balanced Air Force (which includes helicopters) and also to give the people of this Nation the

*This is the text of an address delivered at the Sixth Annual Forum of the American Helicopter Society. It is published in the Journal by permission of Maj. Gen. Lee.—Editor.

greatest security for that portion of their tax dollar that goes into military appropriations.

In the beginning I should like to narrate briefly the history of the development of Tactical Air Power, its mission and objectives, and then to indicate how I think the helicopter can aid in accomplishment of the various tasks in the application of Tactical Air Power in peace and war.

Before World War II there was no accepted doctrine for use of Tactical Air Power. The basis of any training conducted by our air and ground units was usually either some dogmatic concept of employment of weapons and conceived by an inflexible military system when the airplane was in its infancy, or the results of the efforts of some individual to put his own ideas into practice. The early concept of employment was that the airplane assisted the effort of the soldier on the ground by getting up in the air and seeing over a few more trees and hills than the man on the ground, and reporting verbally, or by means of photographs, what he saw. This concept also visualized that an airplane equipped with guns and bombs could only augment artillery fire employed in the support of infantry and assist the anti-aircraft artillery in keeping hostile aircraft from attacking our military forces and installations on the ground.

A few airmen of vision were thinking along more progressive lines, and although no doctrine for employment of tactical air power was in published form on the eve of World War II, aircraft and weapons were emerging with military characteristics suitable for their role in tactical air operations.

This was the difficult position with respect to tactical air power in which the Air Force found itself at the outbreak of the war. It took the war to bring out its deficiencies. From the lessons learned through our mistakes and the mistakes of the German and Japanese Air Forces, and development of materials since World War II, our current concept of the weapons and methods of employment of tactical air power evolved. The basic principles for the employment of air power in support of ground forces are as follows:

1. There must be co-equality of air and surface forces.

2. Control of air forces must be centralized.

3. There must be an integration of efforts of the air and ground forces.

4. The achievement of general control of the air or at least local air superiority in the areas of intended operations is a prerequisite to a major surface campaign.

5. Interdiction of the battle areas is a most remunerative method of employment of tactical air units.

6. Tactical air power must be

Bell Aircraft Corporation Photo

A Bell H13D helicopter. Note the skid landing gear.

capable of close, direct support of surface forces in the immediate zone of combat.

Based on these premises, the mission of United States tactical air forces must be stated: Either independently or jointly with the Army and/or Navy to conduct sustained offensive and defensive air operations aimed at the destruction or neutralization of any enemy military force, including its reserve, reinforcements, supplies, and installations.

The execution of these specific tasks by tactical power is divided into three categories of air assistance to the surface forces:

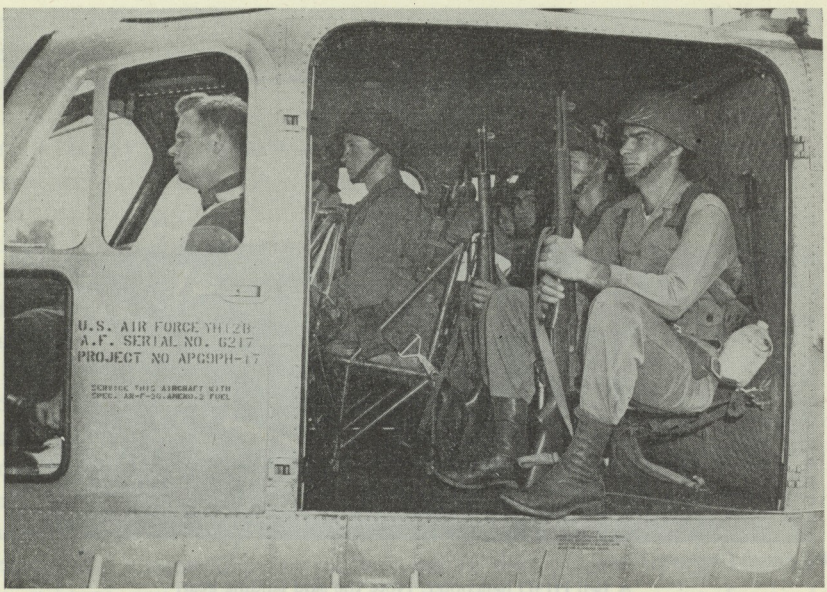
1. Offensive type operations, which include air combat, strikes against both deep and close ground objectives; and visual, photographic, and electronic reconnaissance.

2. Air transport type operations.

3. Miscellaneous operations, which include liaison and courier service, message and photo delivery and command orientation flights.

Now we come to the main point. How can the helicopter aid tactical air power in accomplishing its missions? What jobs can it do in the execution of these three types of missions and what do we want it to do for us in the future?

The helicopter has already been adopted by all branches of the armed



Bell Aircraft Corporation Photo

An assault troop transport helicopter showing a typical load of eight combat troops.

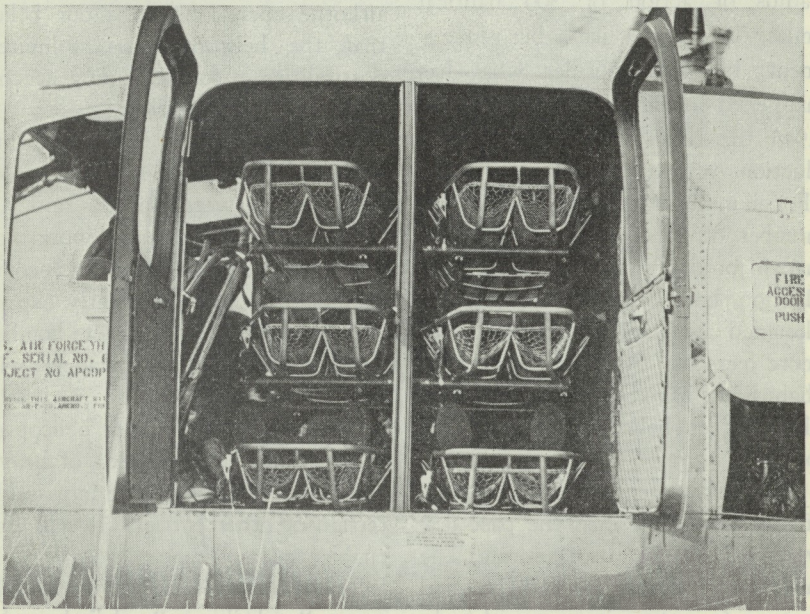
services as necessary basic equipment. Our light helicopters now contribute to a limited degree to the accomplishment of the offensive and air transport type operations and can perform many of the miscellaneous operations. Our goal in increasing the effectiveness of this machine is (1) the development of a heavy lift helicopter which will facilitate the movement of land and air combat forces by performing tactical and logistical support missions and (2) the achievement of speed and range capabilities comparable to conventional aircraft. Primarily, the helicopter is not a weapon, it is a vehicle, a means of transport and as such has much application to all phases of tactical air work, but one of the uses with the highest potential is its eventual utilization in airborne operations.

To carry out our responsibilities in the conduct of airborne operations better, we envision the use of large assault type helicopters. At the present, airborne operations are carried out in three phases: First, the assault phase during which parachutists are dropped preparatory to the landing of gliders and/or assault transports. Second, the build-up phase which includes the maintenance of the flow of supplies and the construction or

rehabilitation of an airstrip. Third, the exploitation phase during which medium and heavy cargo aircraft carrying the heavier equipment and additional troops needed for extended operations are landed in the established airhead.

The parachuting of troops and equipment onto an assault area is an expensive method of aerial delivery. Specialized troops, equipment, and aircraft are required, and only the Army's highly-trained airborne divisions are capable of doing the job. A suitable assault helicopter could make all standard infantry divisions capable of being air-lifted into a forward airhead where there are no prepared runways. The requirements for extensive parachute training facilities, highly qualified volunteers, and specially fitted aircraft could be deleted. The resulting savings could be transferred, if required, into more helicopters.

To do this job we need, ultimately, one type helicopter capable of carrying a payload of approximately 8,000 pounds with a radius of action of 300 nautical miles. We have a further requirement, ultimately, for a larger helicopter carrying a payload of approximately 16,000 pounds for a



Bell Aircraft Corporation Photo

Casualty evacuation facilities in a medium helicopter.

Canadian Army Photo

A Bell H13D helicopter showing the method of carrying troops outside the compartment. Litters can also be placed in this position for casualty evacuation.

radius of action of 300 nautical miles. This seems like a big requirement, but lets consider what has happened in the last few years. In 1945 the largest helicopter in production was a four-place aircraft, though in the closing months of 1949 a number of helicopter manufacturers had in production, or ready for production, helicopters which were designed and built to carry ten or more persons. A great number of flight hours have been accumulated on these larger helicopters during the past.

It is my contention that the startling advances made in the past few years will continue to accelerate. The helicopter industry has had the good fortune to mature in an era of technology in which the necessary skills, scientific data, materials and processes are available already. There are still a great many problems to be solved and improvements to be made on helicopters. Further progress for a military craft will be affected by budgetary limitations of the Armed Forces, which in the past has curtailed the funds which could be expended for research and engineering on helicopters. The solution to these problems could be found if development was accelerated by an intensive effort on the part of both industry and the Armed Forces to provide the incentive and wherewithal to accomplish it.

Other than in its application to airborne operations, it is our belief that the helicopter has unlimited possibilities in further aiding accomplishment of our mission.

We believe that it is the vital link to complete the chain of close cooperation between surface and air transportation. The rescue work that has become so familiar as to become commonplace may be greatly expanded so that rescue of complete bomber crews over extended distances will be accomplished.

The "flying crane" type helicopter will permit the movement of heavy equipment over otherwise impassable terrain or other barriers. It will also enable the movement into desirable locations or "spotting" of detachable cargo "packs" or "pods" brought into an area by "pack" carrying cargo

aircraft. Equipment items of high density can be transported from rear echelon supply areas into forward dispersal areas.

Our forces will be able to retrieve damaged equipment, transport critical supplies or personnel from rear areas and evacuate groups of wounded collected in clearing stations at the rear of combat zones.

Other jobs will be limited aerial reconnaissance and photography, camouflage inspection of camps and bivouac areas, radar calibration, mapping, control of marching or motorized columns, messenger, liaison, and courier service, emergency wire laying, mosquito and pest control, maintaining surveillance of enemy forward areas for locating and adjusting fire on appropriate targets and obtaining intelligence information concerning enemy forces.

One of the biggest jobs a helicopter may be called upon to perform in the event of a future conflict will result from its special usability and versatility in bombed areas. It should

The Sikorsky S-51 helicopter using the winch to take a man aboard.

The Sikorsky S-51 in flight.

prove invaluable in decontamination work, rescue, fire fighting, and transfer of medical supplies, food, equipment, and personnel. In certain types of atomic attacks the residual effects of the explosion may present a grave difficulty in evacuation of the injured. This problem may be solved by the use of helicopters because of their ability to get in and out without lengthy exposure to radioactivity.

Just recently I returned from Alaska and the Yukon Territory in Northwestern Canada where I witnessed the combined Canadian-American cold weather operation, "Exercise SWEETBRIAR." While there, lieutenant General Nathan Twining, Commanding General of the Alaskan Command, and I discussed the application of the helicopter to operations over that extremely rugged terrain, and to the many logistical and transportation problems now paramount in the arctic. It is his definite opinion that the helicopter is one answer to these problems, for such craft could be utilized to supply outlying bases such as radar sites. We both are of the opinion that the helicopter can perform many other tasks, such as moving personnel and equipment over

the vast expanses of the arctic where there is no method of surface transportation except the dog sled and small boats during a very short period of each year. Acquiring a fleet of helicopters to do such a job appears to be far more economical than building roads or railroads to do the same tasks. It is apparent that the helicopter, though limited, can do some of these things for us now. It is up to you in the helicopter industry to further develop them to:

1. Carry greater loads a greater distance.
2. To increase their speed.
3. To reduce their vulnerability to ground fire.
4. To utilize new methods of propulsion and power.
5. To reduce the rotor and engine noises for under cover operations.
6. To make them easier to fly, so that any "frozen wing" pilot can operate them.
7. To develop their instrument flight capabilities to the point where all-weather operations are feasible.

We in Tactical Air Command have been thinking about the possibility of a convertiplane in various phases of our work. It seems to have application to a great many of our tasks because of its indicated unique capabilities. It appears that because of its complete independence of prepared airstrips while retaining a relatively high flying performance, it might prove effective in airborne landing operations, cargo and personnel transport, and offensive tactical air support missions on a broad scale. Application of the convertiplane principle, first to small aircraft then to transport, and, perhaps, eventually, to tactical fighter aircraft, will materially increase our capabilities.

There are no currently available military air vehicles or any under development which tend to combine the best features of fixed and rotary wing aircraft. However, many convertiplane proposals have been made, and if it appears technically feasible, we may soon expect some action in the combination of these features. It is our belief that additional impetus should be given this project, and action should be taken to activate a development program that will enable us to realize with the least amount of delay the great potentialities of this principle.

In conclusion, I should like to say that although we have only limited numbers of helicopters in the Armed Services today, they have earned a very vital place in our military planning for the future. You have come a long way in the past few years and I hope that my remarks will furnish you additional incentive to continue the tremendous strides and advancements made in the helicopter industry.

ARTHUR WILLIAM CURRIE

A Book Review by Major General W. H. S. Macklin, CBE,
Adjutant-General, Army Headquarters,
Ottawa

The one volume of the official History of the Canadian Army in the First Great War stops in mid-1915. Nothing is being done, nor does it seem probable that anything ever will be done, to complete it. Of the grim slaughter of the Somme, of Vimy, of dreadful Passchendaele, as well as of the triumphant surge of "The Last Hundred Days", official Canada has seen fit to say nothing.

When the victorious Commander of the Canadian Corps reached Halifax on 17 August 1919, "The CARONIA stole in during the night as if to conceal her entry". The senior official to greet Lieut.-Gen. Sir Arthur Currie, and Lady Currie, was the District Officer Commanding. And later, at Ottawa, "The reception on Parliament Hill was frigid".

In fact, the manner in which Canada, whose very nationality was forged in the First Great War, proceeded to forget her military leaders and relegate to obscurity the mighty deeds of the men they led, was both astonishing and discreditable.

It is satisfying, therefore, that there has come from the press a biography of Arthur William Currie* that contains at least some of the story of those high and far-off times.

It is a pity that the book, by Col. Hugh M. Urquhart, CVO, DSO, MC, is not an easier book to read, because it should be read. It could have been improved by revision, but the author died before his book was published.

Arthur Currie, of mixed Irish and Puritan descent, was born in 1875, near London, Ont. Lacking means to qualify in law or medicine, he trained as a school teacher. It is strange to find that he was frail as a child, because, as an adult he was a huge man, well over six feet, and very heavy.

At the age of 19 he suddenly left home and went to Victoria. In 1897 he joined the Militia as a gunner. He turned from teacher to insurance salesman in 1900. For the next 14 years his life was a curious contrast of intense application and sense of responsibility in respect of the Militia,

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* *Hugh M. Urquhart*, Arthur Currie, The Biography of a Great Canadian (*Toronto and Vancouver, J. M. Dent & Sons (Canada), Limited, 1950*). $5.00.

and increasingly speculative ventures in business.

As for the Militia, he was commissioned in 1900, rose to command the B.C. Brigade of Canadian Garrison Artillery in 1909, and retired temporarily in 1913. But he was persuaded to take command of a Highland Battalion in January 1914, and that was his appointment when war came.

In business he plunged into real estate in 1908, and by 1914 was disastrously in debt. Some of his creditors hounded him for years, and as late as 1917, when he was commanding the Canadian Corps in battle, were still prepared to break him, regardless of the consequences to the Army in the field, or to Canada. From this humiliating situation he had to be rescued by friends.

There is not much doubt but that as a military figure, Arthur Currie, not even a professional soldier, but a product of 17 years training in the Militia, was in the top bracket of his time. Unfortunately, not even the professionals had solved the military problems of that period, and all too little imagination was apparent in some of their attempts at solution. Writing of Jenghiz Khan, Group Captain C. C. Walker, RCAF, said:

"We may liken the Great Mongol to the Paleolithic artist of the Old Stone Age, who by a few deft strokes with a broken flint on a splint of bone could produce a picture of stag or bison which still excites our admiration as a work of art. The Great Khan took the materials which lay ready to his hand, but the skill with which he used them proclaims the artist. Using the same simile, the art of war as practised in 1914–18, with all science at its disposal, which, after mere collisions of masses, dignified by the name of 'encounter battles', degenerated into stagnant massacres in mud solemnly termed 'battles of attrition', may be likened to the work of some modern artists in colours. These latter, who have at their disposal more colours than the man of Altamira ever saw, invent such terms as 'Cubism' or 'post-impressionism' to describe work that no prehistoric artist would have tolerated."

Sir Arthur Currie

The principle of "Offensive Action" is a sound one but there is small justification for an offensive that produces sixty thousand casualties on the first day, as did the battle of the Somme. If Haig had to act offensively in 1917, as he did, to take the weight off the reeling and mutinous French Army, one still wonders why it was

necessary to fight in Flanders in an indescribable bog, where the mules drowned if they fell off the plank roads.

In this somewhat mediocre atmosphere of tactical ineptitude, Currie was definitely above the average. His conduct of the battles of the autumn of 1918 was up to the best standards of the times. In particular the performance of the Canadian Corps at Amiens on August 8, 9, and 10 was a model. It is curious and tragic that this battle, described by Ludendorff as "The black day in the history of the German Army in the War", is today remembered by scarcely one Canadian in a thousand.

The base and contemptible charges that Currie wasted his men's lives to promote his own glory were as false as they were wicked. On the contrary, as Col. Urquhart shows, over and over again, he was solicitous of his troops and refused to commit them until satisfied that the preparations were the best that were possible.

General Currie was never popular with his troops. His biographer admits that his manner at times was cold and his approach awkward but is inclined to place most of the blame on the machinations of his enemies, within and without the Corps. This reviewer is inclined to disagree, at least in respect of the period of the war itself. The fact is Currie was not a soldier's soldier. He never did inspire his troops. This reviewer served under him as a private soldier during the entire campaign of 1918. I recall seeing him only once, when he addressed the 4th Brigade in the Spring. The burden of his remarks was to the effect that because of certain happenings and readjustments the 4th Brigade would have to go back into the line. I remember this as an unimpressive performance even after the lapse of 33 years. He did not put his point across to the troops, and when cheers were called for the response was feeble to put it mildly. This defect was used against him with deadly effect by his enemies, especially after the war, when the campaign of vilification finally ended with Currie's victory in the libel suit of 1928 against the "Port Hope Guide."

Perhaps one of the most interesting things that emerges from this book is the extent to which party politics bedevilled the Canadian Army of the Great War. Doubtless this was due in no small measure to the eccentric, domineering and erratic personality of the Minister of Militia, Sir Sam Hughes. It is not unimportant to recall that in civil life, before the war, Sir Arthur Currie was a Liberal, and quite an active one at that. As a Militia commanding officer he defied a partisan order of Sir Sam, and in the end there was developed against Currie by Hughes an animosity as

unreasoning as it was unreasonable. Hughes had plenty of party stalwarts in uniform ready to follow his line, and against these political "cabals" and cliques Currie had to contend almost as continuously as he fought the enemy.

On that part of the book that deals with Currie's post war career as Principal of McGill there is no need to dwell. There were many more trials and difficulties but, as Field Marshal Smuts says in the Foreword —"His real contribution was made in the Great War".

After all is said, Sir Arthur Currie, citizen-soldier, starting from scratch worked his way, in spite of all intrigue, to the Command of the Canadian Corps which, under his direction became, in 1918, the most powerful single formation on the Western Front. Its deeds are his memorial, and perhaps we can say of him as was said of the murdered King of Scotland:

. . . Duncan is in his grave;
After life's fitful fever he sleeps well;
Treason has done his worst; nor steel, nor poison,
Malice domestic, foreign levy, nothing,
Can touch him further.

GLASS RIBBON

Through the use of glass ribbon in the place of mica sheets in miniature condensers, the Army Signal Corps [U.S.] expects to achieve a saving of 50 to 70 per cent in manpower during mass production.

The glass ribbon capacitors were developed by the Corning Glass Works of Corning, New York, under a Signal Corps research and development contract. Glass ribbon is used as the dielectric, the insulation between the charged plates of the condensor, and aluminum foil as the electrodes. They are sealed in a glass case that is impervious to atmospheric moisture and other troublesome climatic effects.

A huge manpower saving in mass production is foreseen because the glass ribbon will be of uniform thickness, whereas sheets of mica now have to be hand-sorted for uniform thickness and quality. From low frequency to self-resonant frequency, the new miniature capacitors equal or exceed the performance of equivalent mica condensers. The glass condensers are one-fifth to one-sixth the size of equivalent mica capacitors. In addition, production and stocking problems will be simplified by a reduction of grade styles from 15 to 2.—*Military Review (U.S.).*

SURPRISE

An Essay by Lt. Col. G. M. C. Sprung, MC.*
The Accompanying Maps were Produced by the Author

Part 1

In searching out the meaning and importance of surprise in war, we are joining an illustrious group of scholars who have found the going very heavy over the treacherous ground of the "principles of war". Sun Ztu sought to make his way with five principles, as Major-General Fuller and Cyril Falls do today. Foch named four, the United States Army declares for ten, our own Field Service Regulations outline seven (?) and Moltke refused to enumerate any. In the nature of things there can be no definite list of the principles of war. As well might one expect a universally acceptable manual on painting or the composition of music. War is a living thing and dead concepts will ever be unable to exhaust its fullness.

Surprise is subject to the same variety of treatment as the other principles. Traditionally the weight of opinion has been for taking the word in a narrow sense. It has meant the unexpected *coup*, the ambush, the trick, the sudden descent upon an unguarded camp. Frederick the Great enjoins the cunning of the fox to lure the enemy into a false position where he can be suddenly fallen upon. This is surprise in its narrowest tactical sense. Jomini passes over surprise with a hasty scratch of the pen. He too wishes to limit the word to wholly unexpected descents upon the enemy and robs the concept of any practical meaning by adding that this is all but impossible. Foch makes surprise dependant upon the enemy's neglecting to post adequate security detachments. In this sense surprise becomes merely the tactically unexpected. In the whole of Moltke's writings, as far as I am aware, the word surprise occurs but a very few times and always in the narrow sense. Clausewitz employs a more adequate concept. He does admit that surprise must, in some sense, underlie every successful operation of war. In his view, however, it is merely a condition of achieving superiority of force at the decisive point, an opinion with which I will later take the liberty of disagreeing.

In the present study a sharp break is made with this tradition. It appears fruitful to give the term surprise a radically more embracing meaning.

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* *The author served during the Second World War as an Intelligence officer in North Africa, Sicily, Italy, France and Germany. He graduated from the United States Armed Forces College in 1948 and was then appointed Director of Quartermaster Operations and Planning at Army Headquarters, Ottawa.*— Editor.

Attempting to carve up the single whole of war into separate principles is much like trying to determine how many sides there are to a ball. Depending upon one's angle of vision one includes or excludes much or little in any one "side". Surprise is one of the many sides of the ball. I have taken the broad view and include supply problems, technical capabilities and general efficiency, among many other points, in my angle of vision. This is done because these factors interact in reality and in a practical study of war should be brought under one concept and shown in their interdependence.

I

Before discussing the importance of surprise in war, a working definition of the term must be evolved. I propose to proceed by following my nose from a dictionary definition of surprise through a few obvious examples taken from past wars and then to analyze those examples into their elements in order to arrive at a comprehensive notion of surprise suited to our practical purpose.

Among other things, the dictionary tells me that surprise is "the act of taking (one) unawares". This appears to be appropriate to our present problem and sufficiently understandable to guide us through military history in search of a critical, refined and specifically military definition of surprise.

Frederick the Great's victory at Leuthen in 1757 during the Seven Years War is well known.[1] The Austrians, after the battle for Breslau in November, had advanced a few miles to the northwest and encamped with about 70,000 troops in a position centered on the village of Leuthen. Their right was firm in boggy ground at Nippern, their main line lay along a chain of hills, and their left rested on the stream Schweidnitz. The approaches from the west were kept under observation by an outpost at Borne about two miles to the front. There was no good reason to expect an attack from the recently defeated Prussians.

Frederick, with 35,000 troops, broke camp at Neumarkt, 8 or 10 miles from the Austrian position, at dawn on 5 December, advanced eastwards and routed the outpost at Borne, thus robbing his enemy of any further observation of his movements. By showing some cavalry on the heights at Borne he made the Austrians fear an attack against their right wing and they obligingly moved their reserve of cavalry to Nippern. Frederick, however, concealed by the morning mists and the hills, executed a right wheel, and in two columns headed for the south and the unsuspecting Austrian left wing. Arriving at Schriegewitz about one

[1] *See map on page 61.*

o'clock, the columns drew out into echelon of battalions, turned left, formed into two lines and began the assault.

The rest was inevitable. The Austrians did everything possible, but they were rolled up from the flank before they could redeploy their troops to the new front. This was the critical point. Given the time and space factors—it was about five miles from the right wing to the left and Frederick attacked without losing a minute—the Austrian dispositions could not be altered to meet the real situation before it was too late. That is the real meaning of being caught unawares in war: being out of balance. In this case the result was disaster for the Austrians. Of an army of 70,000 which had begun the campaign, scarcely one fourth returned to Bohemia after Leuthen.

In discussing this battle, Napoleon[1] points out that the Austrians originally expected Frederick to take up a defensive position and not to attack; that is, his boldness was part of the surprise. Napoleon says further that the manoeuvre could only be risked because Frederick had switched his lines of communication around to the south into Silesia, so that the new direction of attack did not uncover them. This administrative factor will appear again and again as an essential element of surprise. Lastly, Napoleon emphasizes the superiority of Frederick's troops, and it is clear that the swiftness of the blow against Schriegewitz was only possible because of the parade ground skill of the Prussians in forming line from column without loss of momentum.

Leuthen was an example of tactical surprise. A modern example can be found in the Allied landings in Normandy in June 1944. The details of this operation are still fresh in our minds. It is enough merely to list those points which have an important bearing on the present investigation. The problem was to strike at some weak point in the 60 Division German front with a force which would be, and could be kept, locally superior. To do this the supply of equipment and men had to be guaranteed. Prefabricated harbours made it possible to meet these conditions. This was the decisive point for there is as little surprise in assaulting a well-defended port as there is in landing on a weakly defended beach if the force landed cannot carry out its task. Deception as to time and place of the landing was elaborate. Every activity which was open to German observation was distorted to imply a threat against the Pas de Calais. Air attacks were concentrated in that area, troops and shipping were assembled as far to the

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[1] *Darstellung Der KRIEGE CAESARS, TURRENES. FRIEDERICHS DES GROSSEN P 372-379. Translated from Vols 31 and 32 of Napoleon's Correspondence.*

east in England as possible and a dummy invasion army was created and revealed by false wireless traffic. The event proved that surprise was achieved. The Fifteenth Army remained in the Pas de Calais area. Not until 25 July did an infantry division arrive in Normandy. Only a fraction of the available German forces was deployed at the critical point. The Germans in France were caught off balance and their dispositions rendered ineffective.

The machine of war was more intricate in 1944 than it was in 1757, but the problem of OVERLORD was, in essence, the problem of Leuthen: to strike the enemy in such a way that his strength could not be brought to bear at the decisive point before swift events overthrew him; or, in short, to effect surprise.

There is a larger setting for the drama of surprise than either Leuthen or Normandy, although it is a rarer thing in war: that strategic combination of Jomini's which makes victory sure before the battle is fought. While it would appear that nothing is sure before the battle is fought, it is interesting to recall the famous march of Marlborough from Brabant to Bavaria in 1704, and to note its application to our present theme.

In April 1704, the disposition of forces in the War of the Austrian Succession[1] favoured the French design[2]. In northern France and Flanders 50,000 troops in Dutch pay were opposed by about the same number of French under Villeroy. In Germany, the Elector of Bavaria, stiffened by some French troops to a strength of 40,000, was posted about Ulm, and was balanced by the Margrave of Baden with a force of approximately 30,000. In Alsace the French had a movable counter in the small army of Tallard—about 17,000 men. Marlborough's strategic reserve consisted of 19,000 British troops at Breda. The French and Bavarian plan was to move on Vienna with their southern forces and drive Austria out of the war.

In Marlborough's view the decisive theatre was Bavaria. His problem was to concentrate a superior force there by joining up with the Margrave of Baden. The great strategic combination was put in train on 5 May by the first move of the 19,000 British from Breda. Their long route led to the Rhine at Bonn, across at Coblenz, where their numbers were swollen by Prussian regiments, along the far bank to Mainz, across the Neckar near Heidelberg and on southeast to the final junction with Baden's force at Launshein, 10 miles from Ulm. The leading elements arrived

[1] *That is, in the Northern European theatres only.*

[2] *See map on page 65.*

on 22 June. Marlborough's force had been strengthened by further drafts and by 1 July he commanded about 50,000. The Margrave of Baden's army had increased to about the same size.

Meanwhile the Bavarian army had been reinforced up to 50,000, and Villeroy had marched 21,000 from Flanders to Alsace where the total French force now stood at approximately 50,000. Thus had Marlborough achieved his superiority of force in the decisive theatre. He and Baden lay, with 100,000 men, between, and as it appeared, effectively separating, the two smaller enemy forces. He had the opportunity of crushing the one before the other could arrive. He had unbalanced his enemy, and now time and space were such that the French could do nothing to restore the balance in time. That, in the event, Marlborough and Baden did not exploit the opportunity and actually fought at Blenheim with an inferiority of numbers is not part of the present problem.

Though the factors which contributed to this strategic success were many, I believe it is fair to view them all under the unifying aspect of surprise. The critical move on Marlborough's part was the crossing of the Neckar on 7 June. Until that time the French were fairly well in balance, with Tallard in Alsace and Villeroy moving south to join him. Until 7 June the French expected Marlborough to swing into France, at first down the Moselle and later across the Rhine at Phillipsburg. In either case they were not ill-poised to meet him, and needed to fear no disaster. When he advanced across the Neckar and swung east towards Bavaria, they were unhinged, their dispositions were rendered ineffective —in a word, they were surprised.

It is instructive to note how Marlborough accomplished this. He kept his plan secret. Even his Quartermaster-General did not know the ultimate objective. Further, he used a cover plan: he told the Dutch he was going to the Moselle, he had his Prussian contingent sent openly to Coblenz, and let contracts for boots, saddlery and ammunition there. Later, when he had passed the mouth of the Moselle, he had bridges built over the Rhine at Phillipsburg to simulate preparations for a crossing into Alsace. These measures of deception were successful.

The march was no less an administrative achievement. Stocks of boots and saddlery waiting at just the right points kept the force on its feet and in the saddle. The financial arrangements which Davenant, the English agent in Frankfurt, had made, permitted the troops to buy good and plentiful food and forage at each camp. In the big scene Marlborough had made plans to switch his exposed

line of supply from the Rhine, over to Franconia where it ran north through Nuremberg and lay at right angles to his front.

Finally, this famous achievement of surprise was possible only because the troops were in good condition and the force, as a whole, efficient. Ways of surprising an enemy are not difficult to conjure up. It is in carrying them out that the sting lies. Surprise is doing it.

II

These three operations taken from past wars can serve as a basis for analyzing the surprise factor into its component parts. I should say before beginning this analysis that I have left out of account that very important factor in war—the accidental or unforeseen event. Present purposes appear better served if the enquiry is limited to undertakings which are part of a plan. I intend to proceed by examining first the prerequisites of surprise, and then the various ways in which surprise can be achieved, in order to evolve a working definition.

The first prerequisite of surprise is good intelligence. At Leuthen, Frederick observed with his own eyes the dispositions of the Austrians. The excellence of Marlborough's intelligence and its high cost in pounds and pence are well known. He knew the French dispositions at every stage during his march to Ulm. Montgomery's initial plan at Alamein was based on accurate knowledge that Rommel's Panzer divisions were divided between the north and the south flanks of his position. Moltke knew before the start of the war in 1870 in what dispersed manner the French corps would advance to the frontier. The point is too obvious to need labouring. If one's own movements are to aim at the weak spots in the enemy's overall situation, then clearly one must know where that weak spot lies.

The second prerequisite is secrecy, which likewise is almost axiomatic. Secrecy has many refinements. There is security of information, concealment of activity and active deception. At Austerlitz, Napoleon simply concealed the forces of his centre behind the hills at Pratze and launched them forward onto the Russian rear at the proper moment. In many situations concealment is impossible and the only resort is to active deception. Before the third Battle for Gaza, Allenby was forced to deceive the Turks into believing the attack on Beersheba was only a feint, because all preparations for it could not be concealed. The same was true of the demonstrations against the Pas de Calais in 1944 and of Montgomery's efforts to mislead Rommel into expecting an attack against his southern flank at Alamein.

However it is done, it is as true as it is obvious that if the enemy is to be

caught in a state of unreadiness, he must be denied the information which would enable him to get ready.

The third prerequisite is a sound plan. Surprise is not merely a startling trick which astonishes for a brief moment and then reveals itself as harmless. There is no point in manoeuvring, with elaborate preparations, to put a force onto the rear of an enemy, if when it gets there it is too weak to cause any damage. Nor is there any value in having a small force scale difficult cliffs or land on remote beaches, if it cannot achieve its object. Such undertakings are not surprise because the enemy's dispositions are adequate to cope with them. Montgomery had a sound plan at Mareth because the flanking New Zealand force was large enough to do the job and the ground, in fact, was not insuperable in the attack. If in his march to Ulm, Marlborough had taken a mere handful of soldiers, the French may well have been "surprised" (at his foolhardiness) but the strategic balance of forces would not have been upset and, in our sense, no true military surprise would have been realized.

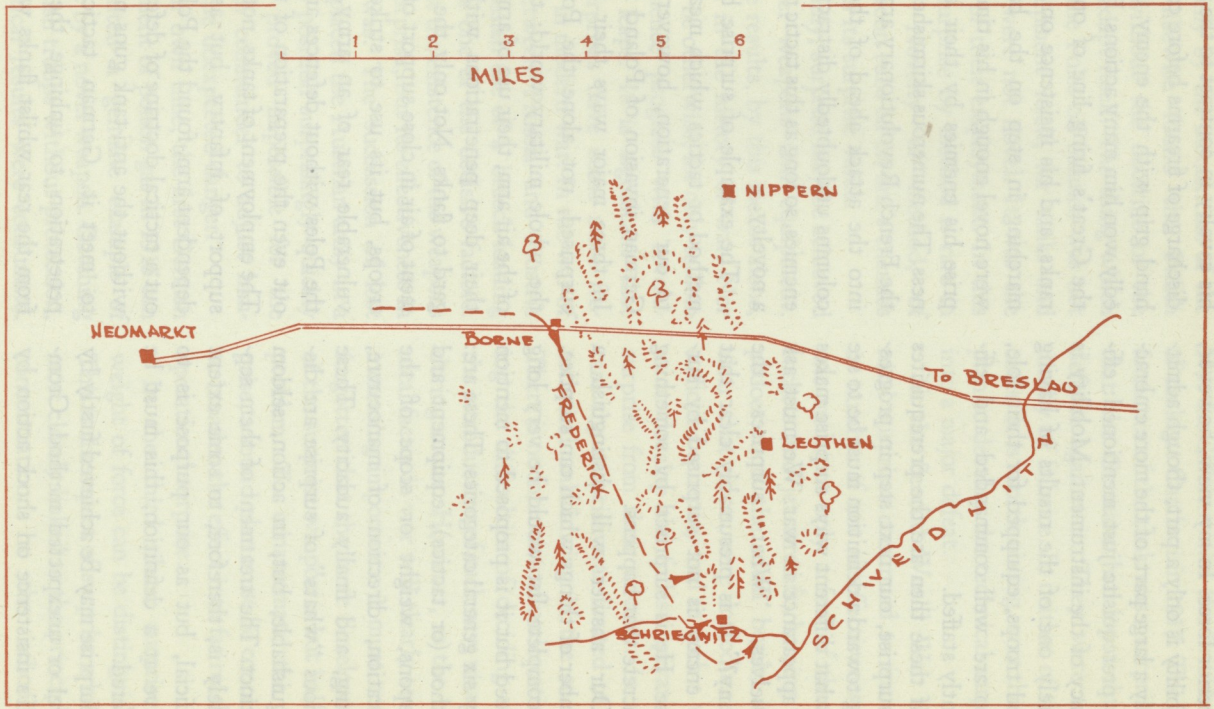
The fourth prerequisite is adequate supply arrangements. This is of course part of a sound plan, but deserves mention by itself. We noted Marlborough's careful forward planning of supplies for his long march, and we stressed the importance of the Mulberries in making the attack on Normandy a sound operation of war. Napoleon's care to establish forward provisioning bases during his campaigns abroad, and his administrative foresight in pre-planning switches in his line of supply were prerequisites of his swift marches onto his enemy's flanks.

The fifth prerequisite is the proper temper in the instrument—forces trained and commanded in a manner adequate to execute the surprise. The great strength of Moltke was his confidence in the efficiency of his instrument. The discipline of his infantry, the ability of his staff to move formations, and the initiative of his subordinate commanders permitted him to execute manoeuvres which would have been disastrous for a mediocre army. This simple truth becomes doubly clear if one considers operations where special training is necessary—in the jungle, the desert, or the arctic. Troops at home in these elements and sensibly equipped can carry out operations which will repeatedly surprise an untrained and convention-ridden enemy.

There is one further factor in war which is frequently mentioned as a prerequisite of surprises, namely mobility, or speed, and certainly it cannot go unmentioned here. I think mobility is accorded a special place because the commonest form of surprise is the swift concentration of

LEUTHEN

MAP 1



superior force. In my view, however, mobility is only a part, though admittedly a large part, of the more embracing prerequisite just mentioned: efficiency of the instrument. Mobility is merely one of the results of having good troops, equipped for their role, who are well commanded and efficiently staffed.

If these then are the prerequisites of surprise, our next step in progressing toward a definition must be to see in what different ways surprise makes its appearance in war. We must ask ourselves, "What surprises the enemy?" It is presumably clear that the enemy is not surprised by surprise. He is surprised by something concrete that happens.

Our answer will distinguish a number of things which can surprise. A complete list would be very long indeed but it is proposed to mention only six general categories. These are: method (or tactics), equipment and weapons, weight or scope of the operation, direction of manoeuvre, timing, and finally audacity. These various "whats" of surprise are distinguishable, but, in action, seldom distinct. The treatment of them separately is, therefore, to some extent artificial, but as our purpose is to arrive at a definition, this must be suffered.

Surprise may be achieved firstly by novel or unexpected method. Cromwell's insistence on shock action by his cavalry in contrast to the accepted discharge of firearms before coming to hand grip with the enemy undoubtedly won him many actions. Frederick the Great's firing line of only three ranks, and his insistence on his men marching in step on the battlefield were novel enough in his time to surprise his enemies by their effectiveness. The numerous skirmishers which the French Revolutionary armies sent into the attack ahead of their main columns undoubtedly distracted their enemies, so long as this tactic remained a novelty.

The example of surprise by novel method or tactics which means most to our generation, however, is the German invasion of Poland in 1939. In three major ways their methods surprised, not alone the Poles, but the whole military world: their use of the air arm, their use of armour and their deep penetrations without regard to flanks. Not only the employment of air in close support of ground troops, but its use to strike at the vulnerable rear of an army, caught the Poles without defences and without even the preparation of training. The employment of tanks, not in close support of infantry, but as an independent arm, found the Poles without a tactical doctrine of defence, and without the anti-tank guns necessary to meet it. German tactics—deep penetration to unhinge the enemy from the rear whilst flanks were pro-

tected only by the momentum of the attack—likewise found the Polish Army without the doctrine or the skill to adapt itself. The thing which caught the Poles off balance was not the equipment itself, for tanks and aircraft were not novel. It was the manner of their employment. In this degree surprise by method is rare in history. Novelty of method, of course, soon rubs off on one's enemies and loses its surprise value.

Secondly, surprise may be achieved by novel weapons and equipment. Decisive results, by this means alone, are rare in the history of war. Nor could it be otherwise, for only seldom does science progress with revolutionary leaps. It is significant that such surprises have come more frequently in modern war. In the war of 1866 between Prussia and Austria the Prussian use of a breech-loading rifle was one of the decisive factors. Not that the existence of the weapons was a surprise, but its effectiveness in action was. The succession of lost battles placed the Austrian army in a perilous position surprisingly quickly and it proved impossible for the Austrian commander to adjust himself to the unexpected danger.

In our own time, the first German employment of poison gas in 1915 can be counted a genuine example of surprise by a novel weapon. Catching the British troops without protection, the tactical results were consumate. Not far different was the British use of tanks at Cambrai in 1917. The performance of the tank was a surprise in that the Germans had no technical defence against it. They were technically off balance. In neither of these cases, it is worth noting, was there a plan to develop the technical surprise into a major defeat.

In the Second World War technical surprises continued to increase in number if not in effectiveness. If one mentions only a few of them—rockets and jet aircraft, homing torpedoes, and the atom bomb, it is clear that none were introduced in sufficient quantity and in such a way as to develop the fullest operational surprise from their novelty. In each case the surprise was limited to the technical unbalancing of the enemy. There is no intention of underestimating the difficulties of deciding upon the introduction of such new weapons during a war. However, as the technical factor in war will clearly assume increasing importance it must not be forgotten that the mere development of the surprise weapon is but half the problem. To consummate the surprise, a sound plan must be conceived to broaden the effect into far reaching operational surprise.

In the third place, surprise by weight of force can be distinguished. This is the aspect of surprise which is most closely linked to the principle of concentration. In the school of

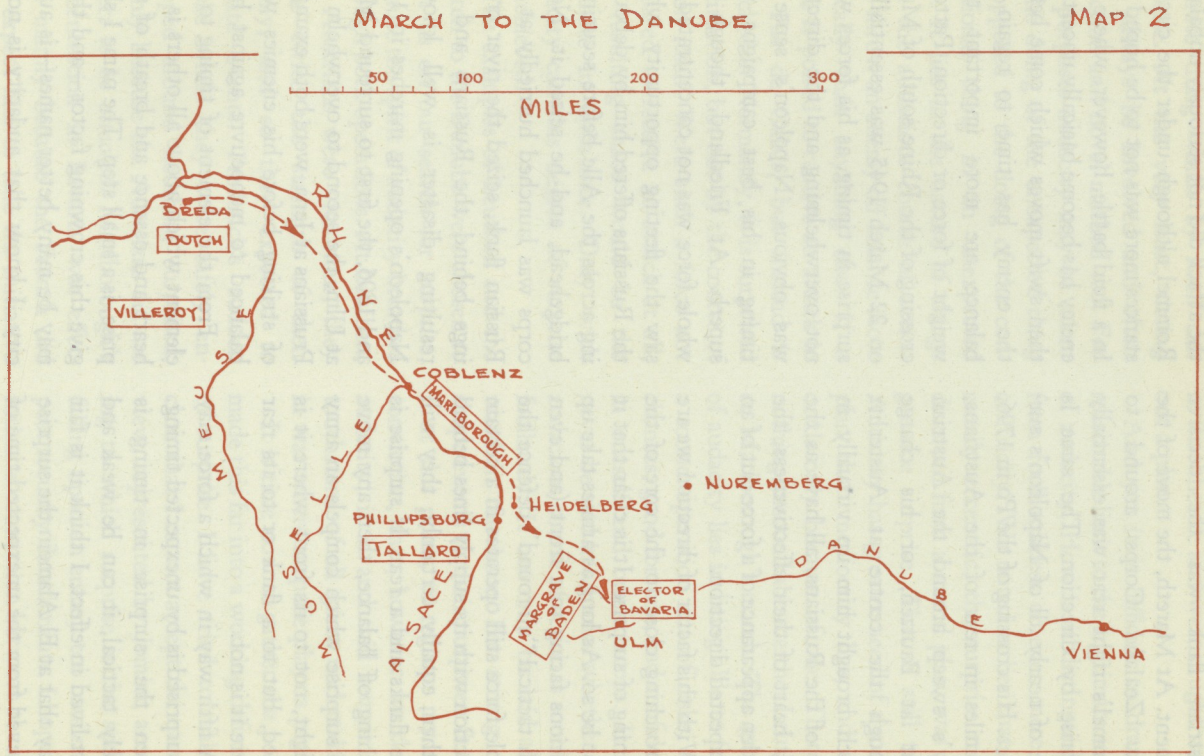
thought which singles out the achieving of a superiority of force as the first principle of war, surprise consists of concealing this superiority as far as possible, until it is revealed in battle[1]. Surprise, in this view, is merely a prerequisite of achieving superiority of force at the decisive point. This is one of the kinds of surprise. The sole emphasis on the quantitative side of battle is, however, very dangerous if it undervalues the intangible factors of timing and audacity. It is the very function of these factors to negate numerical superiority, and for this reason I cannot join with those who make surprise a subordinate ally of superiority of force.

Be this as it may, surprise by weight of force is clearly basic to our theme. In some cases this factor stands alone, or nearly so. German submarine operations in the last two wars illustrate this. The submarine itself was no surprise. The thing which threw us out of balance was the *extent* of the sinkings. No one had dreamed that the havoc could extend to about one million tons of shipping in a month. A parallel case is the allied strategic bombing of Germany in 1943 and 1944. I believe it is fair to say that the only important element of surprise is these operations was the physical weight of the attack. This found the German defences inadequate and their aircraft industry unequal to the task of matching the allied effort.

Earlier wars do not show many cases where weight of force was decisive by itself, if separated from the commander's audacity, sense of timing, and surprise use of direction. Perhaps Moltke's campaigns provide the best illustration we can find of this fact. In 1866, for example, he overwhelmed the Austrians by critically weakening himself in the west, by the skilful use of the Prussian rail system for deployment, and by a carefully timed concentration of his three armies from different directions, the whole resulting in a decisive superiority on the Austrian northern flank at Koenigraetz. It is clearly artificial to separate out weight of force as a factor in itself. I have mentioned it as one of the things which can surprise in war, chiefly in order to point out how rarely it is effective alone. Indeed, in measure as the superiority of force increases, the importance of surprise decreases. Where forces are roughly balanced, or even more where the weaker force wishes to take the initiative, there surprise is decisive.

In the fourth place, the main element in what surprises may be the direction of the attack. In the battle at Koenigraetz mentioned above, the direction of the second Prussian Army's descent upon the unprepared

[1] *This is the Clausewitzian view, which is still alive, as witness Cyril Falls,* Ordeal by Battle, *p. 28.*


MARCH TO THE DANUBE
MAP 2
50
100
200
300
MILES
DEEDA
DUTCH
VILLEROY
MEUSE
RHINE
COBLENZ
MARLBOROUGH
MOSELLE
PHILLIPSBURG
TALLARD
ALSACE
HEIDELBERG
NUREMBERG
MARGRAVE OF BADEN
ELECTOR OF BAVARIA
ULM
DANUBE
VIENNA

Austrian flank was the decisive element. At Mareth, the move of the New Zealand Corps around to Rommel's right rear was essentially surprise by direction. The same is true of nearly all of Napoleon's surprises. His crossing of the Po in 1796, 50 miles in rear of the Austrians, Ney's sweep around the Austrian right at Bautzen, or his charge through the centre at Austerlitz which brought him up virtually in rear of the Russians, all have as the very heart of their effectiveness, the sudden appearance of a force out of an unexpected direction.

With this factor of direction we are approaching close to the core of the meaning of surprise. It is clear that it must be so. As long as armies take up positions facing to a front (and even with tactical "all-round" defence the whole force still operates in a certain direction with its supply lines behind it) then, equally certainly, they will have flanks and a rear. If surprise is catching off balance, then any move will surprise which compels an army to fight, not to its front where it is poised, but to a flank or to its rear where it is not.

A fifth way in which a force may be surprised is by unexpected timing. When the surprise in timing is merely tactical, it can be weak and short-lived in effect. I think it is fair to say that at El Alamein the surprise achieved from the unexpected time of the attack did not seriously unbalance Rommel although under the circumstances more was not to be hoped for. In a fluid battle, however, where the enemy has become basically uncertain, then swift moves which come before the enemy has time to regain his balance are more important than weight of force or direction. Patton's crossing of the Rhine south of Mainz on 22 March 1945 was essentially a surprise in timing, as his forces were not overwhelming and the direction was obvious. Napoleon's sense of timing in his best campaigns was superb. At Friedland, though his whole force was not concentrated, he saw the fleeting opportunity which the Russians offered him by debouching across the Alle before securing a bridgehead, and he seized it. Ney's corps was launched hurriedly at the Russian flank, seized the river crossings behind the Russians and the resulting disaster is well known. Napoleon's opening marches in 1805 and 1806, the first to surround Mack at Ulm, the second to overwhelm the Prussians at Jena, were both examples of striking before his enemies were balanced to manoeuvre against him.

From the element of timing to the element which above all others is the heart and essence and breath of surprise, is a small step. The name I shall give this crowning factor—and there may be many better names—is audacity. I know that audacity is not a

separate thing which by itself can surprise. At the very least, timing will always be involved and often direction and novel method too. For our purposes audacity may be taken as the doing of the unexpected *thing* as opposed to the doing of the conventional thing in an unexpected *way*. It lies in the nature of things that the audacious course of action will throw an enemy off balance more radically than anything else. If a force is poised to receive an attack in the Pas de Calais, but instead is attacked in Normandy, it is surprised in direction, but not by the course of action itself. Were such a force not prepared to receive an attack at all, the resulting chaos would be the ultimate in unbalance. Only with audacity can this degree of surprise be achieved.

The examples of Leuthen and the March to the Danube were chosen to start us on our search for surprise, because the spirit of audacity breathes through both operations. At Leuthen, the Austrians were victorious, they were twice the strength of their enemy, and so they expected to dictate events. Frederick's sudden stroke while they were safely encamped around Leuthen, surprised, mainly because the Austrians *did not expect to be attacked*. Marlborough's concentration in Bavaria was effective mainly because the French did not expect him to take the initiative in that theatre and were caught without a plan.

And yet it is difficult to draw a reasonable limit to the legitimate scope of audacity. How is it distinguished from foolhardiness or even mere eccentricity? We noted earlier that the merely eccentric, the surprise move divorced from a sound plan, was not genuine surprise. That is still true. Audacity has greater need of a sound plan than mediocrity has, and succeeds only because of one. There is nothing unsound about either Leuthen or Marlborough's march. The genius of audacity lies in being able to forge a sound operation out of risks, slim chances, good fortune, and confidence in oneself and one's troops. It can never be said in advance whether the audacious course of action is sound or foolhardy. It can only be said afterward in the issue. For strong men shape events to their purposes. Suffice it at this point, to register my sure conviction, that, however we define audacity, it is and will remain the touchstone of all great undertakings in war where surprise plays a part.

It is time now to gather the points made this far into a working definition of surprise. I have tried to make it clear that I cannot accept the narrow view, represented by Jomini, according to which surprise is the sudden falling upon an enemy too careless to post security detachments. I hope the intimate connection between the clas-

sical principles of war and the achievement of surprise has emerged beyond all doubt from the examples given. In this sense, *surprise is, by a sound plan prepared in secrecy from good intelligence, rendering an enemy's dispositions ineffective by the weapons and methods used, or by the direction, timing and audacity of the operation.*

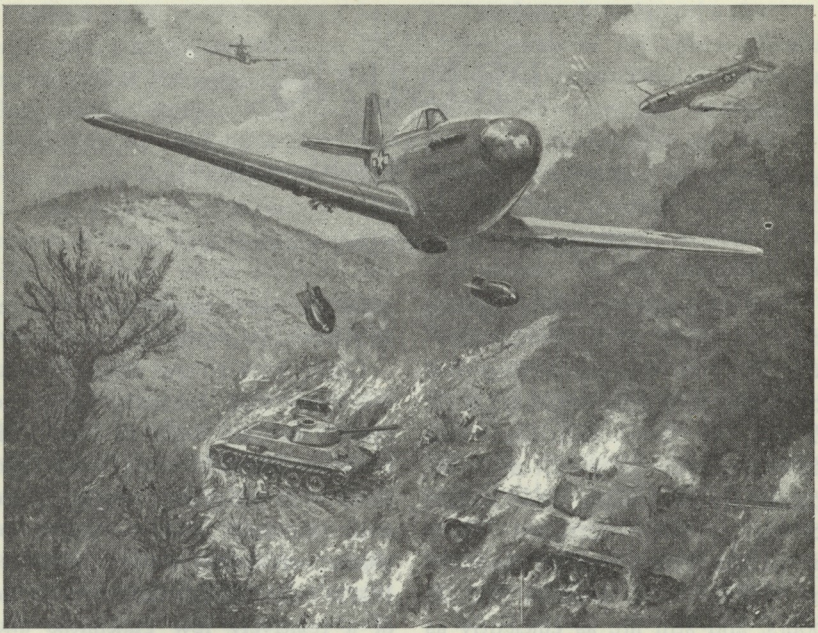
This definition may be too embracing for some, but I can express the inner coherence of the main factors in war in no other way. It will not be denied that it must always be the commander's endeavour to strike an enemy where he can least effectively defend himself. In the normal case an enemy can be so struck only by the interplay of all those factors which we have associated with surprise. Therefore, I say, if there is one word better than another for describing this most basic of ideals, that word is surprise.

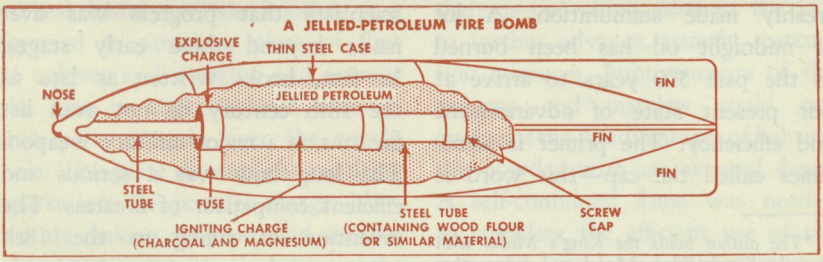
On the other hand, surprise must not be stretched to include the result of the campaign or the battle. After surprise is effected, the campaign or the battle must still be fought and won. Surprise can be perfect and yet go unused. Marlborough, after rendering the French dispositions temporarily ineffective by his march to Ulm, made no use of the surprise and actually fought at Blenheim against a slight superiority. Anzio is still fresh in our memories: German dispositions in Italy were temporarily ineffective against the landing, but nothing came of it. Surprise can in all fairness be taken to mean only the setting of the stage for victory, but not the whole drama.

There is one great omission from the foregoing analysis of surprises which will not have escaped notice: I have said nothing about surprise in the defence. On the level of minor tactics there are perhaps a few details which would not be identical with offensive surprise. The use of ground is different, as is the concealment or camouflage of weapons and positions. The principles, however, are the same throughout. Austerlitz, after all, was a defensive battle for Napoleon. The surprise he achieved came in the counterstroke at the Russian centre, and in every respect it was identical with the offensive surprise gained by Frederick at Leuthen. Surprise in a defensive campaign is likewise identical with surprise in an offensive campaign. Napoleon's campaign in Italy in 1796 illustrates offensive surprise. His methods in the defensive campaign of 1814 were in every essential a complete repetition. For our purposes it does not appear essential to distinguish between defensive and offensive surprise.

(To be continued)

BOMBING TANKS WITH "NAPALM"





The top picture shows U.S. *Mustangs* (F–51s) using "napalm" bombs against North Korean Russian T-34 cruiser tanks, and the schematic drawing (bottom) shows the construction of the incendiary bomb. To produce "napalm" a chemical thickener is added to gasoline, which turns it into something not unlike raspberry jelly. This jelly is carried in a bomb, varying in size from 100 lb. to 500 lb., with a thin steel case. The bomb contains a fuse, igniting charge, and explosive detonator, and when it bursts on contact with the target it throws the flaming jelly in all directions. The burning jelly adheres where it alights, and generates a tremendous heat. It is particularly effective against truck convoys, buildings, trees and grass; but it also causes the abandonment or destruction of the most heavily armoured tank, as it clings to the outside and generates an unbearable heat inside. If it seeps into the interior, it is likely to cause complete destruction of the tank by exploding the fuel tank.—*The Illustrated London News.*

HISTORY OF PRIMERS AND PRIMING

By
MAJOR J. W. HOULDEN, WINNIPEG LIGHT INFANTRY*

PART 1

"The primer is the spark plug of a cartridge."

The admonition of early fighting men to "Keep your powder dry" was the only safeguard they had to be sure their guns would fire at all. Today we have cartridges that have and are oil-proof, moisture-proof, sealed bullets and lacquer coated priming mixtures. These modern cartridges can be immersed in water, under pressure for 24 hours, and still fire as efficiently as freshly made ammunition. A lot of midnight oil has been burned in the past 500 years to arrive at our present state of advancement and efficiency. The primer is sometimes called the cap—this word is generally used throughout Europe; in America it is called a primer.

Going back to our history books we find that firearms began to appear in the wars of the 14th century. The old arms were used chiefly to frighten people, since their accuracy was a matter of chance, or should we say accident? It was only through the perseverance of a relatively few gunsmiths and scientists that progress was ever made beyond these early stages. In fact, books written as late as the 18th century do not even list firearms as a major military weapon. The long bow was a serious and efficient competitor of firearms. The invention of rifling in the 18th century and percussion mixtures in the early 19th century are perhaps the two principal keys to the flood of improvements that followed.

The first weapons to use gunpowder, and a projectile, were very crude both in shape and construction. The ignition of the powder in which

**The author holds the King's Medal with bar, the King's Silver Medal and many other Empire shooting awards. He has been captain of the Lord Dewar International Small-Bore team on two occasions, and has qualified for the Canadian Bisley Team 10 times since 1926. He joined the Active Force in September 1939, but was withdrawn from the service to assist in government contracts for ammunition. During the war he was engaged in ammunition research and was chief ballistician of Canadian Industries Limited, with which company he is still employed.*—Editor.

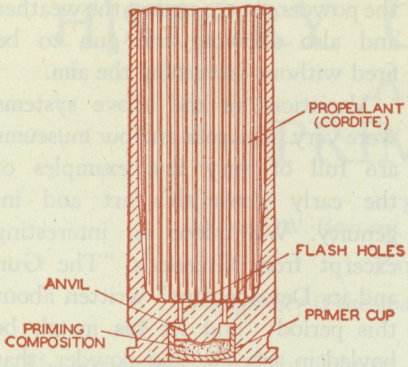
we are interested was by the crudest method known—namely, to hold a lighted piece of tinder, or a hot coal, over a hole (touch-hole) in the breech end of the weapon and ignite the powder charge. This method could only be used on a clear day with not too much wind. Limitations of this type soon started a few ingenious souls trying to improve their weapons, since it was also almost impossible to hold a shoulder weapon of this type and light the powder at the same time.

The result of this thinking was a match-look in which a match or flare was placed on a lever and was pulled down on to the touch-hole or powder charge when the gun was to be fired. Any improvement always started a train of thought and since flint was common in our earliest history it was another step forward to attach a piece of flint to a lever and a spring and arrange the flint to strike against a rough iron plate directly over the touch-hole. This plate directed the resulting sparks into the powder charge. Now we are making progress, and another observant gunsmith thought up the idea of putting the striking plate on a hinge which would cover the powder charge when the flint was cocked, but would fold back and expose the touch-hole when struck by the flint. This latter invention had the dual purpose of protecting the powder charge against the weather and also allowing the gun to be fired without disturbing the aim.

Variations of the above systems were very numerous and our museums are full of very fine examples of the early gunsmith's art and ingenuity. We quote an interesting excerpt from Greener's "The Gun and its Development" written about this period: "and let his match be boyled in ashes-lie and powder, that it may bothe burn well and carry a long coale, and that will not falle off with touch of his finger. This preparation will at first touch, give fire, and procure a violent, speedy and thundering discharge. Some use brimstone, finely powdered, in their touch powder, but that furs and stops up your breech and tutchole".

In all these systems, however, there is one thing missing: the key to further advance, namely, percussion mixtures. Improvements of the firearms and matches could not overcome the disadvantages of lighting the powder with an exposed flame. A self-contained flame was needed to complete the efficient use of the potential power and energy in gunpowder.

Around 1785–1790 Bertholet discovered that potassium chlorate mixed with a combustible substance ignited when struck. A few years later around 1800 Howard discovered fulminate of mercury, a substance



Centre-fire cartridge.

which would burst into flame when struck a sharp blow. These two discoveries now gave to the gun-maker explosive substances which could be placed near the powder charge and all that had to be done to get a hot flame was to hit them. Now they really had something to get their teeth into and improve their firearms.

The first British patent was taken out by a Scottish clergyman by the name of Alexander Forsythe in 1807. This covered a rifle with "percussion-ignition" system. The gates were now wide open for the scientist and gunsmiths to enter the world of modern centre-fire ammunition.

As an example of the need of improvement, we quote from the book by Hans Busk on "The Rifle and How to Use It" published in 1859:

"To give an idea of the miserable deficiencies in both particulars, I may mention upon the authority of Colonel Schlimmbach, of the Prussian artillery, an officer of great experience, whose statistical calculations extend over a long series of engagements during the wars of the first Napoleon, the indisputable fact, that on the average, a man's own weight in lead and ten times his weight in iron were consumed for each individual placed 'hors de combat!' "

The need for improvement here is quite obvious. Statistics from the Battle of Vittoria in June, 1813, show that 3,675,000 rounds of ball were used to kill or wound 8,000 men in one day. In other words, one musket-shot in 459 took effect. This is a huge consumption of ammunition when you remember that all the men of both armies were fully visible at all times. Records of 1851 show that a British patrol in Africa expended 80,000 ball cartridges to kill 25 savages at The Cape, or 3,200 rounds per casualty.

French records show that 25,000,000 rounds were expended in their Crimean offensive to inflict less than 25,000 casualties. We quote these records to give you an idea of the inaccuracy of the weapons. A considerable amount of this inaccuracy was due to the method of igniting the powder. The time consumed in this cycle

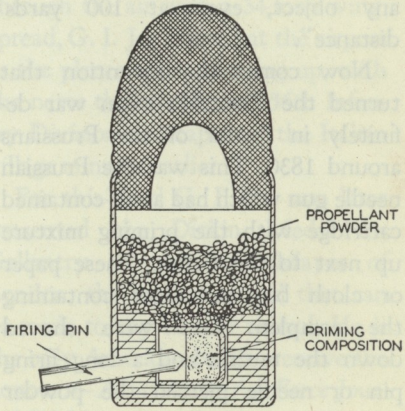
was so long the average human being could not hold the weapon steady long enough for the bullet to get out of the muzzle.

Let us look at our newly-discovered percussion mixtures. What do we want in a primer? First and foremost it must be "sure fire," secondly, it must be sensitive so that it will fire in poor guns as well as good ones. Other qualities are uniformity; not affected by climatic conditions or old age; easy and safe to handle; cheap, and having no harmful effect on the weapon or cartridge case.

The early primers used fulminate of mercury mixtures in France and a mixture of potassium chlorate, sulphur and charcoal in England. Both of these primers were corrosive and erosive and did considerable damage to the weapon. Fulminate of mercury was a particularly bad actor as it has an affinity for brass or copper and caused the metal to crack and split after a short period of time. Potassium chlorate when fired leaves a chloride in the barrel which has the same action as table salt, and rusting and corrosion set in within 24 hours.

In spite of these defects, however, the percussion mixtures were superior and were used by putting them in small paper packages the same as the "caps" the youngsters use today. These were placed close to the powder charge touch-hole or in it. The guns were still muzzle loaders but speed of firing and accuracy were now striding forward in leaps and bounds. Muzzle loading guns were converted to use percussion primers and then special guns were soon designed.

The caps were made of paper, foil, copper and in countless types and shapes. The most widely adapted system was known as percussion or muzzle-loading caps. These were used by inserting a hollow nipple into the gun chamber containing the main powder charge. A small copper cup about $\frac{1}{8}$" to $\frac{3}{16}$" in diameter, with percussion mixture in the bottom, was placed over the nipple and when struck by the hammer it produced a hot flame. This flame flashed down the hole in the nipple and ignited the powder. Thus we have a gun which could



A pin-fire cartridge.

be loaded at will and was ready to fire at a moment's notice; the cap kept the powder touch-hole closed and the speed of firing increased to as high as two rounds a minute by expert marksmen.

Here is another quotation from Hans Busk's book which gives an exact appraisal of guns of the "percussion-cap muzzle loading type":

"With proper aim and deliberation, four to five rounds may by fired in two minutes. Far from urging soldiers to fire rapidly, they ought to be urgently cautioned against it to insure effectiveness of fire. People who write very authoritatively on these matters are too apt to forget that in action, after the first few rounds, the field speedily becomes obscured with smoke and that it is scarcely possible for a marksman however expert, whether stationed, in line or in square, to single out any object, even at 100 yards' distance".

Now comes the invention that turned the Franco-Prussian war definitely in favour of the Prussians around 1830. This was the Prussian needle gun which had a self-contained cartridge with the priming mixture up next to the bullet. These paper or cloth bag cartridges containing the complete load were shoved down the muzzle and a long firing pin or needle pierced the powder charge and struck the priming mixture up next to the bullet. In 1835 they were improved still further and the cartridge inserted from the breech. This method enabled a man to practically double his speed of firing.

About the same time, the French, Americans and English introduced self-contained cartridges but with the priming mixture in paper and metal capsules or caps up against the powder. These were ignited by being struck directly on the cap by the hammer.

From 1830 to 1880 the Government patent officers of all countries were flooded with inventions, private gunsmiths were perfecting their own ideas and in all it seemed to be a race to see who could improve the most. The next cartridges were metal, contained the bullet and powder charge but had a paper or metal priming cup placed against a small hole in the head to allow the flame to get to the powder charge.

A real improvement occurred in 1836. This was a pin-fire cartridge invented in that year by LeFrancheux of Paris. In this cartridge the bullet, powder and priming mixture were all self-contained and a pin was inserted in the side. This pin protruded through a hole in the side of the weapon and when struck by the hammer caused the cartridge to fire. We show herewith [page 73] a cross-section cut of a typical pin-fire cartridge. This cartridge is the

first totally self-contained cartridge in which none of the components are exposed. It also allowed the guns to be completely closed and fired under almost any climatic condition. Pin-fire cartridges were extended to shotgun shells, pistols, revolvers and all types of rifles.

This brings us up to the period around 1870 and the introduction of the "Berdan" type primer by a United States Army colonel, in which the pin or anvil becomes part of the cartridge case and the priming mixture is contained in a thin copper cup. This cup collapses when struck by a firing pin and crushes the priming mixture against the anvil, subsequently igniting the powder. The Berdan type primer became more popular in Europe than in the United States and is in general use even today. It is sometimes called the European type primer. The illustration on page 72 shows a cross-section cut through a typical Berdan type primer. The shape and form have changed very little in the past 75 years.

(*Author's Note*:—We are indebted to the "RCMP Quarterly" for the use of their cuts and to E. I. DuPont de Nemours & Company for data from their book on "Smokeless Shotgun Powders;" also the Ammunition Division of Canadian Industries Limited for additional reference data).

(*To be continued*)

FAMOUS FLIGHT COMMERORATED

An anniversary party was held last autumn at the Pigeon Breeding and Training Centre, Fort Monmouth, N. J. Centre of attraction was "G. I. Joe," king of the War Heroes Loft, who saved the lives of 1,000 British soldiers in Italy during World War II.

On 18 Oct. 1943, the dark-checked splashed pigeon, then only six months old, raced 20 miles in 20 minutes to cancel a scheduled Allied bombing of Colvi Vecchia, a town about 10 miles north of Mount Cassino. Zooming through the air with a 34-inch wing spread, G. I. Joe arrived at the airport as the planes were warming up, with the news that the British 56th Infantry Division had captured the Italian village minutes earlier.

For this deed G. I. Joe was later presented the Dickin Medal for Gallantry by the Lord Mayor of London, the highest award that can be made to any bird or animal. He is the only American bird to receive the honour.—*Army-Navy-Air Force Journal* (*U.S.*).

ON CRITICISM

CONDENSED FROM THE ROYAL BANK OF CANADA MONTHLY LETTER

Every person, and particularly every business person, should know two things about criticism—how to give it and how to take it.

Neither is an easy art. We are likely to be very pert at criticizing others, and reluctant to accept their advice.

There are many kinds and degrees of criticism. The business man out of whose good judgment there comes a suggestion for a change in method of production, is displaying a constructive kind of criticism. The man in high position who finds relief from his personal worry by making continual complaints, and the executive who constantly finds fault with the office boy, are using a very low form of criticism.

Criticism can be used and met constructively or destructively. It can be the means by which men receiving it climb, or it can be used to bolster the critic's vanity.

Criticism in its highest sense means trying to learn the best that is known and thought in the world, and measuring things by that standard.

But let us look at the other kinds. Captious criticism takes note of trivial faults; its author is usually unduly exacting or perversely hard to please. Carping criticism implies a perverse picking of flaws. Cavilling criticism stresses the habit of raising petty objections. Censorious criticism means a tendency to be severely condemnatory of that which one does not like.

Ordinary faultfinding seems to indicate less background and experience than the word criticism implies. It is wholly concerned with tearing down and scolding.

There are several grades of criticism involved when we talk about art, literature and music. An essay which tells one's opinion about a work of art may be a critique, a review, a blurb or a puff.

In art, true criticism implies expert knowledge in the field, a clear standard of judgment, and a desire to evaluate the work under consideration. A review permits less exhaustive or profound treatment, giving in general a summary of book contents and the impressions it produces on the reviewer. A blurb is a short fulsome essay, usually a publisher's description of a work, printed on the jacket of a book to advertise it. "Puff" became common in the eighteenth century to describe an unduly flattering account of a book, play, or work of art.

Silence is sometimes the severest criticism, not only in the world of literature and art but in the world of business.

How to Criticize

Perhaps the first lesson in learning to meet criticism is to learn how to criticize intelligently.

In its best sense, criticism implies an effort to see a thing clearly and truly, distinguishing the good from the bad in it, and seeing the whole of it fairly in its proper setting.

There are some hints about criticizing which can be observed by both business men and critics of literary works. Socrates observed a good principle: Before starting to criticize a person's actions, I stop and ask how I measure up beside him in the things which I criticize. Dale Carnegie suggests that we start with praise and honest appreciation, and, on occasion, call attention to people's shortcomings indirectly.

Criticism should have good manners and honesty, coupled with a sense of personal dignity, but it needs proportion, too. The objective should be appraised. All one's big guns should not be brought to bear in case of a minor peeve. It is not worth the same effort to capture a flock of sheep as to lay low a great army.

When the purpose of criticism is to reform what one believes to be a wrong, particular care is needed. Reform refers to two distinct individuals: self and somebody else. It usually means making over our neighbour's conduct to conform to our own ideas of conduct. In fact, many people seem to think that their duty to society consists in considering and deciding what other people ought to do. For A to sit down and think: "What shall I do?" is commonplace; but to decide what B ought to do is interesting, romantic, self-flattering and public spirited all at once.

Even the most tolerant man has difficulty in refraining from being a bit irritated at the social superiority assumed by the habitual social critic. If you do not agree with the critic you are lacking in sensitiveness, and belong to the morally "great unwashed". If you tell him that to your way of thinking the grandest thing in the world a man can do is to educate himself, mind his own business, and take care of his family, you are said by the critic to be lacking in public spirit.

Another aggravating kind of criticism is the back-handed kind. The favourite word of these critics is "but." Their method goes something like this: "The author presents a thoughtful, high-calibre article, full of meat and inspiration, but . . . " A good example is that of Sir Fretful Plagiary in Sheridan's play *The Critic*. Sir Fretful says: "I say

nothing—I take away from no man's merit—am hurt at no man's good fortune—I say nothing. But this I will say . . . "

Philosophy of Criticism

There can be pleasure in criticism, both taking and receiving it. A talk between two men of similar taste, just and sympathetic, critical yet appreciative, is a high intellectual pleasure. Even if one is hurt in such an encounter, one learns.

No one really escapes criticism, and the more eminent one is the more criticism may be expected. That is a price one pays for holding a distinguished position. It is, as Addison said in his essay on *Censure*, folly to think of escaping it and weakness to be affected by it. There is no defence but obscurity.

If you wish to avoid criticism, shun employers who are given to checking up the qualities of their workers; undertake only such duties as you can readily perform; always double check to make sure you are doing what other people want you to do. The man who consistently dodges criticism may be counted on as a business pigmy, but he may be happier so.

Who is a critic? Few of us will step out in answer to the invitation. The truth is that we are all critics. The woman who dislikes the cut of her neighbour's dress or the way she brings up her children is a critic. The man who calls an employee on to the carpet for neglect of business or who tunes out one radio programme in favour of another, is a critic. This woman and this man are discriminating according to their personal preferences, their individual standards.

This, of course, implies judging. There are some who say it is ridiculous for anyone to criticize the work or actions of another unless he has distinguished himself by his own performances, and others who say no one has any right to set himself up as a standard by which to judge others.

These two objections would seem to rule out all criticism whatsoever, but they really point only to a need for great discretion. Epictetus, the Roman philosopher of the first century, gave this sage advice: "Doth a man bathe himself quickly? Then say not *wrongly*, but *quickly*. Doth he drink much wine? Then say not *wrongly*, but *much*. For whence do you know if it were ill done till you have understood his opinion? Thus it shall not befall you to assent to any other things than those whereof you are truly and directly sensible."

The Written Word

Writing is made difficult by the fact that it is closest of all the fine arts to our ordinary experience. It bears the burden of the difficulty of communication of ideas in regard to the humdrum as well as the most

exalted matters. Many a writer has bitten his pencil in two with his teeth, struggling with the shades of meanings of words, in despair of ever saying exactly what is in his mind. And a critic is sure to appear with the precise word needed.

Another hazard in writing, of the business kind as well as of the professional kind, is the lack of information in the reader's mind about the conditions surrounding the writer. A business man, for example, writes a letter, then he moves on to new experiences and to other letters on different topics. When a critic writes to tell what is wrong in the first letter, the business man has a feeling of irrelevance. Did I write that? How odd. Today the problem is altered; the circumstances aren't the same. How could so-and-so know the troubles I had that day?

Thoughtless critics see what is before them, and do not take the time or use their intelligence to assay what was written in the spirit of the person who wrote it. So, when you receive a letter of criticism it is well to remember that it was written in ignorance of the circumstances you know of—or it may simply have been written to give the writer a feeling of importance, or lift him out of a sense of inadequacy.

The business man, or anyone else who writes things for people to read, should be under no delusion. He may have matured into self-reliance, self-criticism and self-understanding, but when he writes for others he invites their criticism, he exposes himself to it, and there is no escaping it.

What is Fair Criticism?

Fair criticism implies a desire on the part of the critic to judge with clarity and say with honesty what he believes to be true. His judgment will be based upon his own experiences, his disappointments, his burned fingers, and his beliefs. At the same time, he will make an effort to get the other fellow's point of view and take the gentle and indulgent side of most questions.

Fair criticism does not judge without factual information. It considers the event on which it is to pass judgment in the light of these factors: what was said or done? what did the person mean to say or do? what was his reason for saying or doing it? what is the effect of what he said or did? why do I object to it?

Fair criticism means taking every precaution to be correct. It is not so serious when a mistake courses only the doer to suffer, as when Lord Byron the critic thought *Childe Harold*, the product of Lord Byron the author, was useless, and gave it away. But when a mistake involves a victim, that is serious.

Fair criticism does not include

common gossip. Gossip may be merely friendly talking, or useless chatter, but it too often degenerates into mischievous comment on neighbours or business associates.

Good Criticism

Having told, then, about what is not fair criticism, it behooves us to consider the constructive quality of good criticism.

Our judgements should be positive, not shaken and carried away by casual commendation or censure of others. Knowledge, up-to-date and accurate, must be the critic's great concern for himself. His question about every case should be, not whether it is good or bad, but whether it is supported by facts.

The ideal critic would know the topic, he would be dispassionate in weighing the evidence, he would have ability to see clearly what follows from the facts, he would be willing to reconsider the facts, if that seemed advisable, and he would have courage to follow his thoughts through to the bitter end. He would not, in all this process, brush aside the help of advisors. He would retain a keen and lively consciousness of truth.

In making his criticism known, the ideal critic would have regard for the feelings of the other fellow. Courtesy is easily the best single quality to raise one—even a critic—above the crowd. Mrs. Thrale, biographer to Dr. Johnson, sounds the keynote when she says of her distinguished friend's disposal of someone whose work he did not like: "He undeceived him very gently indeed."

Charming ways are quick winners. When an end is sought, why browbeat and shout and storm if one can persuade? The critic who is judicial in his approach to the matter, bland in his manner of debate, and soft-spoken in his judgment, can be a far more forceful critic than the one who blusters.

The good critic will not force the person he criticizes too far. It is always good strategy to let the other fellow save his face.

About Meeting Criticism

If we are on the receiving end of criticism, we must school ourselves to rise above all that is petty and to accept and use what is worth while. There are times to fight back, but these must not be decided by inclination but by answering the question, after searching consideration of the criticism: Is it right?

The fatal blight that strikes some persons under criticism is to develop a feeling of persecution. Criticisms are not to be measured by the degree in which they hurt, nor by the motives of the critics, but by their rightness.

One calming thought for most of us when subjected to criticism might be: he little knew my other vices, or he would not have mentioned only these.

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