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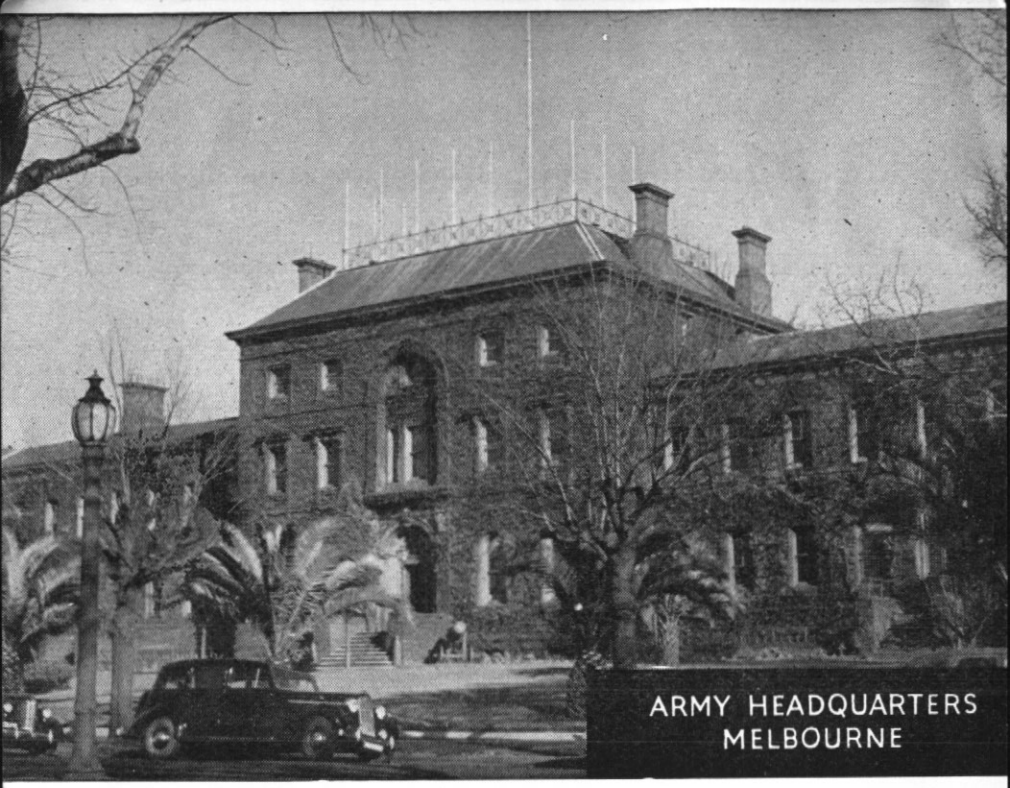
CONTENTS



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AUSTRALIAN ARMY JOURNAL

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The EBAN EMAEL OPERATION

Translated and condensed by the Military Review from an article by H. R. Kurz in "Allgemeine Schweizerische Militarzeitschrift," Switzerland.

Introduction.

The recent war produced several examples of airborne operations on a large scale, notably the German attack on Crete and the British operations at Arnhem. The war also produced a number of smaller, and less well known, airborne operations designed to assist directly the progress of the ground troops. Study of these smaller operations is important because the results achieved show that, given sound planning and resolute execution, they can have far-reaching results.

While it may be claimed that the execution of these tasks is the function of specially trained and equipped airborne troops, the attention being given to this form of attack, particularly in Russia, shows that commanders of all grades should be aware of the techniques employed in order to defend themselves against surprise of this nature.

In the examples we are to consider the reader should put himself in the position of the defending commander and work out, in some detail, the steps which should have been taken before and during the attack.

In the conduct of tactical exercises involving the defence of key points, defence against airborne attack should always be considered. It should be axiomatic that airborne attack on important key points will be liable to occur at any time unless we have marked air superiority.

The examples have been chosen to demonstrate two different techniques in this type of operation, one in which the attacking troops landed right on top of the objective, and the others, in which they landed close to it.

— *Director of Military Training, AHQ.*

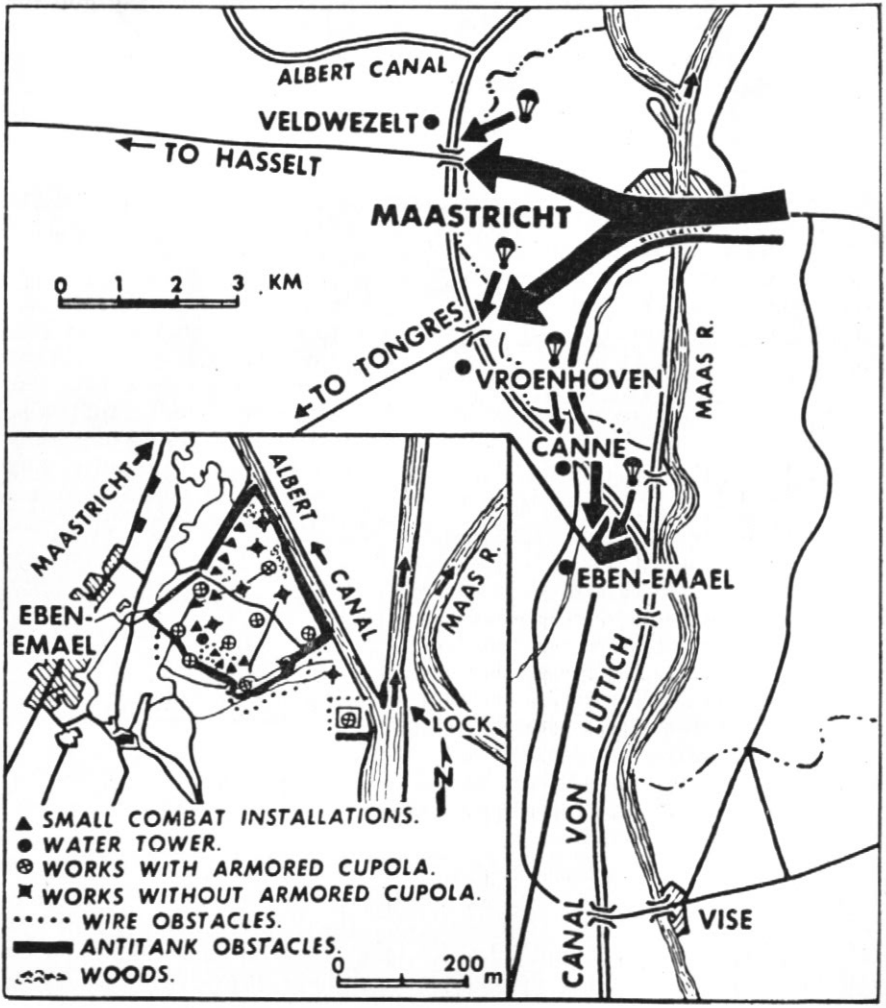
The Eben Emael Fortress.

Because of the nature of the terrain, the Albert Canal formed a strong covering position, and it should have provided considerable

protection for the Belgian main line of defence in the early days of World War II.

In the Albert Line, its southern anchor, Fortress Eben Emael, was the strongest fortified work. Its mission was to block the passages over the Meuse River and the Albert Canal at Vise and Maastricht. In the frontier section of the Dutch enclave of Maastricht, the Meuse forms the boundary between Belgium and Holland. The Dutch had established no installations for the defence of this strip of territory, and consequently there were no outlying frontier positions. The artillery of the fortifications was to take their place.

The Fortress was able to cover the bridges at Vise, Lanaye, Canne, Vroenhoven, and Veldwezelt with



its artillery fire, thus dominating all the routes entering Belgium in its sector. For this reason, Fortress Eben Emael became the key point of the gate way to the most important east-west invasion route into Belgium.

Eben Emael had been built between 1933 and 1935, patterned after the great works of the Maginot Line. In its construction, advantage had been taken of the cut of the Albert Canal through a line of hills some 1,300 meters in breadth. The Fortress had been blasted out of natural rock, and the natural form of the hills was not altered by the construction work. Eben Emael was, therefore, a fortified work of unique form, giving evidence of neither large concrete structures nor exposed masonary. Its underground works covered about 160 acres.

On the east, the fortifications were protected by the Albert Canal. On the north, there was a moat which could be flooded with water from the Geer River, which flowed farther to the north. On the west and south, there were dry anti-tank ditches reinforced by anti-tank walls and infantry obstacles. From the top of the line of hills, the area far beyond the Meuse could be observed. All underground installations—gun rooms, quarters, and ammunition and supply stores—were connected by galleries which were designed to make the fortification self-sufficient. It was firmly believed that Eben Emael would be able to resist for a long time.

In conformity with its mission, the armament of the fortification was mainly artillery. The largest armoured turret contained two 120-mm. guns with a range of 16 kilometers; two other turrets were armed each with two 75-mm. guns with a range of 12 kilometers. Four casemates had three guns each built into them, two pointing northward and two southward. To the north and south of the fortification were bunkers, each equipped with three double machine guns.

In addition, six anti-aircraft machine guns in field positions were located on the upper surface of the fortification. Three dummy gun turrets on the upper surface of the fort were designed to fool an attacker into believing that additional guns existed. With the exception of two light machine guns, there were no infantry weapons on the upper surface of the fortification. An isolated bunker south of the Fortress, but connected with it by an underground passage, was armed with a 60-mm. anti-tank gun. Outer flanking protection for Fortress Eben Emael was provided by six smaller bunkers and two dugouts (north and south), with a total armament of eleven 60-mm. anti-tank guns, 16 double machine guns, and four light machine guns. Additional light machine guns were available in the interior of the fortifications. Altogether, the armament of Fortress Eben Emael included two 120-mm. guns, sixteen 75-mm. guns, twelve 60-mm. guns, 25 double machine guns, six anti-aircraft guns, and 12 light machine guns.

The military strength of the Fortress garrison was as follows:—

	Officers	NCO's	Men	Total
Headquarters	12	40	157	209
1st Battery:				
Cupolas and Casemates	8	28	434	470
2nd Battery:				
Infantry Weapons	4	34	468	506
Totals	24	102	1059	1185

Some of these men, mainly the specialists, were quartered outside the Fortress.

The German Attack.

Early on 10 May, 1940, the German Army attacked westward in several widely separated operations. The point of main effort could not, at first, be determined. Attacks were made simultaneously on France, Holland, Belgium, and Luxenburg.

The initial attack on Belgium was the Eban Emael operation. The object of this operation was to break open the gateway into Belgium in a few hours and to make it possible for the German forces to advance along the direct line from Aachen to Brussels. Two things were necessary before this could be done. Fortress Eben Emael, which dominated the crossings over the Meuse and the Albert Canal, had to be wiped out and the bridges over the two waterways north of the Fortress had to be seized before the Belgian defenders could blow them up.

Only a few hours after the opening of hostilities, Fortress Eben Emael was captured. The Wehrmacht communique of 11 May tells how it was done.

The attack on Fortress Eben Emael was conducted in two phases; an attack from the air, and a drive by ground forces over the two water barriers east of the Fortress.

The air action was a surprise attack in the early hours of 10 May. It was still dark at 0400 hours when several waves of German planes passed over the Albert Canal and then turned back towards the east. Barely discernible in the darkness, 14 gliders were detached from the planes and landed accurately on the surface of the Fortress.

The Belgian sentries followed the descent of the gliders as far as they were able without sounding an alarm. Such an attack was beyond their experience. Immediately on landing, as many as 10 German combat engineers poured from each glider. The men were heavily armed with close combat weapons and equipped with the most modern combat engineer equipment, particularly great quantities of explosives.

The Germans, troops of the 1st Paratroop Regiment, sprang to their tasks without hesitation. In a few moments, the anti-aircraft crews stationed on the upper surface of the Fortress had been overpowered and cut down. At the same time, the bunkers, which served as outer defences, were knocked out by concentrated charges set off in their firing embrasures. The attackers then seized the gun cupolas, observation towers, and fire-direction installations located on the upper surfaces of the Fortress and began their destruction.

First, the large armoured turret with its two 120-mm. guns and then the remaining turrets of the guns aimed toward Maastricht, were destroyed by high explosives. The explosives were new, hollow charges, now successfully used for the first time against the armoured turrets of Eben Emael. Gun tubes were blown up or otherwise rendered incapable of action. In the same manner, gun rooms and ventilation installations were broken into, ammunition lifts were blocked, and the entrance into the interior of the Fortress opened in various places.

These demolitions, planned to the last detail by the attacker, required only a few moments. When the Belgian defenders recovered from the shock of the attacks and sounded the alarm, it was already too late. The decisive first 10 minutes of every air-landed operation had passed. The attackers had seized possession of the upper surface of the Fortress and were firmly entrenched there. They had blinded the fortification by destroying its observation installations and had rendered it incapable of action by knocking out its guns.

A few minutes after the gliders had landed, a long and heavy bombing attack was conducted on the area around the fortification. Stuka dive-bombers, dropping 500-kilogramme bombs, were employed. The purpose of this attack was to prevent an eventual counter-attack. The Stuka attack increased the general confusion; thereby succeeding in its mission. Immediately after the bombing attack, the besiegers were reinforced by a strong detachment of paratroops who also landed on the upper surface of the Fortress. As a result of this reinforcement, the strength of the attackers was increased to about 300 men by daybreak. Uncertainty and confusion were increased still further by the use of dummy paratroops, which were dropped over a wide area around the Fortress.

The Belgians attempted as best they could, and with the limited means at their disposal, to defend themselves from this entirely unexpected form of attack. One of the first defence measures of the Fortress consisted in requesting the neighbouring Pontisse and Barchon Fortresses to lay down their artillery fire on the upper surface of the fortification. An artillery counter-attack was also to be made by a field artillery battalion of the 1 Belgian Army Corps, to which the Fortress Eben Emael was subordinated. It was soon necessary to abandon both of these relief operations, however, since the Germans immediately attacked the other Fortresses with Stukas. They put the Pontisse and Barchon fortifications out of action immediately and cut the field artillery to pieces while it was still on the march.

Infantry counter-attacks were attempted by a detachment of the 1st Grenadier Regiment, which was stationed north of Eben Emael. These operations failed, however, due to liaison deficiencies and to the continued Stuka bombing attacks. The 7th Infantry Division, located on the Albert Canal, was short of reserves, and since misunderstandings occurred in the transmission of orders, the counter-attacks were soon stopped. The points of the German tank columns had by now pushed across the bridges at Vroenhoven and Veldwezelt, and the advance of the reinforcing Mikosch detachments, approaching from Maastricht, made the presence of these counter-attacking troops appear to be of more importance elsewhere. Several attempts on the part of the garrison to break their way out were similarly unsuccessful. Since the defending garrison was neither trained in infantry fighting nor had the necessary equipment, these attempts soon had to be discontinued. Efforts were limited to attempting to keep the Germans from penetrating into the interior of the Fortress.

The German attackers remained on the Fortress all the day of 10

May and the following night, but in the forenoon of 11 May, the Combat Engineer Battalion, attacking by land, succeeded in establishing contact with the German airborne troops.

The Ground Attack.

The ground attack of the Mikosch Battalion was the second part of the plan for the capture of Fortress Eben Emael. This battalion, which consisted of four companies of combat engineers and two companies of infantry, was equipped with heavy infantry weapons and anti-aircraft guns, It crossed the German-Dutch frontier on the morning of 10 May, east of Maastricht, and was supposed to establish contact during the day of 11 May with the air-landed troops on the Fortress.

The Battalion reached Maastricht almost without fighting, but the two bridges there were not usable as the Dutch had been able to blow them up. Only one pier of the main bridge had gone down, however, and the bridges were soon usable again. Because of this, the Mikosch Battalion was forced to cross the Meuse on pneumatic rafts. It suffered heavy losses due to the fact that one of the guns in a casemate in the northern part of the Fortress was able to lay its fire down on the river. This resistance was broken up by the use of anti-tank guns firing direct fire against the embrasures of the casemate.

The Mikosch Battalion fought its way ahead against scattered resistance on the west side of the Meuse as far as the bridge over the Albert Canal at Canne, which the Belgians had succeeded in blowing up. Since the canal lay under fire from a few of the works of the Eben Emael Fortress and from troops of the 2nd Grenadier Regiment, the advanced elements of the Mikosch combat group did not succeed in crossing over to the west bank of the canal until late evening and during the night. This crossing was effected 800 meters south of Canne, under the protection of the anti-tank and anti-aircraft weapons of the combat group.

At Canne, the battalion joined the paratroops who had been dropped early in the morning with the mission of seizing the bridge, but who had not been able to accomplish their mission. Here, the attackers faced a new obstacle; the moat north of the fortification had been flooded with water from the Geer. A detachment of 50 volunteers undertook to cross this water obstacle during the night with the help of pneumatic rafts and to attack the Fortress from the north. This detachment succeeded in working its way to the firing embrasures of the outer defences that were still capable of action and in blowing up embrasure after embrasure with concentrated charges. The Mikosch Detachment followed through the dead area thus created. Early on 11 May, a junction with the air-landed forces on the upper surface of the Fortress was made, and the work of destruction was completed by their combined efforts.

The Surrender.

The situation in the Eben Emael fortification become more and more desperate during the morning of 11 May. Hardly one of its external weapons was capable of action any longer, and those that remained were under the direct fire of the German anti-tank and anti-aircraft

guns. The attackers pushed through the breaches which they had created into the interior of the fortification and fought their way forward with explosive charges, machine pistols, and flame throwers. To make matters worse, the electric current in the fortification failed, and the fortress lay in darkness. Sixty men of the garrison were dead, 40 severely wounded, and the survivors were badly shaken by the continuous and heavy detonations of the explosive charges. They were disheartened by their inability to offer any resistance to the German advance. At 1230, after a 32-hour fight, the fortress commandant discontinued the useless resistance and hoisted the white flag.

The psychological effect upon the whole world of the unexpectedly quick fall of the Eben Emael Fortress was very great and almost as important as the purely military success.

The fall of Eben Emael was primarily a surprise victory. Since the Fortress could hardly have been taken within the necessary time limit with ordinary means, the German High Command thought of something unusual. The plan was indicated by the two weak points in the organization of the Fortress; its incapacity to defend at night, and its vulnerability to an encirclement from the air. Both of these weaknesses were known to the Germans.

Gliders as carriers of military personnel and as a means of transporting heavy engineer material did not make their entry into the history of war until 10 May, 1940. Surprise was increased by the *coup de main* nature of the attack, and by the lack of preparedness on the part of the Belgians. The employment of heavy hollow charges by the Germans was also a technical innovation whose explosive effects on the armoured turrets of the Fortress reached a hitherto unheard-of intensity. Last, but not least, the attacker was aided by the prevailing belief of the Western Powers in the impregnability of concrete. This belief frequently led the Western Allies to minimize the use of mobile outer defences for their fortifications and to await the enemy attack behind protecting walls and armoured cupolas. This attitude favoured the combat technique of the Germans, who counted on the employment of astonishingly small forces.

The German success at Eben Emael was not due entirely to surprise. To an equal degree, it was the result of highly spirited action by all participating personnel, of painstaking planning and preparation, and close co-operation of all units employed. It is known today that the Germans possessed the exact plans of the fortification. In the autumn of 1939, they had built a model of the Fortress on the training area of Grafenwohr.

Later, at Hildesheim, an accurate model of Eben Emael was constructed in preparation for the attack. How thoroughly the Germans were acquainted with all the details of the fortification is shown by the fact that in their attack they passed up all the dummy armoured cupolas. The Eben Emael operation shows that the attack of fortifications must begin in time of peace. The Germans had a decisive lead in this respect.

Naturally, many wild rumours soon arose concerning the taking of

Eben Emael. The employment of a gas which paralyzed the garrison, a subterranean passage under the Albert Canal which was supposed to have been used by the attackers, and even treason on the part of the garrison, were all mentioned. German propaganda welcomed these rumours. The rumours were still further reinforced by allusions to the new methods of attack contained in the Wehrmacht communique of 11 May. These have been refuted conclusively, however, by the investigations which the Belgians conducted at the end of the War.

Summary.

The fight for Eben Emael shows the effects of surprise in war on all echelons. Strategically, the Eben Emael operation diverted the Allies as long as possible from the intended direction of main effort and drew them into the Belgian area, where they would be surrounded. Tactically, a new method of combat was employed in connection with an unexpected direction and time of attack. Technically, the use of several theretofore unknown combat means placed the defender in a situation in which he was unable to win with the means he had at his disposal. These tactical and technical innovations, introduced on the battle fields of Belgium and Holland, represent the beginning of a new era in which combat includes use of the air. Even today, the possibilities arising from this can scarcely be estimated. We are standing at the threshold of developments that will bring about revolutionary changes. Let us learn this one lesson from the events at Eben Emael —that only ceaseless, spiritual, and material preparedness, to meet the most unusual conditions can offer any prospect of success.

[Further examples of this type of airborne attack will be considered in the next number of the AAJ. — Editor.]

It is comparatively easy to know what you want to do in any kind of war. Leadership consists in knowing whether you can do it—the risks you aught to take.

—Field Marshal Sir William Slim.

THE MIDDLE EAST

AND

ISRAEL

Directorate of Military Intelligence.

Introduction.

During the past two years the stability of the Middle East has been somewhat disturbed by the emergence of the small state of Israel into the orbit of Middle Eastern politics. In its key position Israel can either prove a blessing or a scourge to the area and therefore its internal conditions, foreign policy and relations with neighbouring Arab States are of infinite importance to the Western Powers.

Economic Problem.

Israel's economic condition can only be termed as being chaotic. Her troubles arise mainly from the fact that expansion of production has been unable to keep up with the growth of population. This is quite understandable when it is realised that the population of Israel has increased from 655,000 in 1948 to approximately 1¼ million at the end of 1950. Industrial and agricultural expansion has naturally been unable to keep pace with this influx of people.

This increase in immigration has meant that larger amounts of foreign exchange had, and still have to be spent to feed, clothe and house these new arrivals. Without extensive help from abroad Israel cannot possibly hope to bridge the gap in her economy, which at present is slowly strangling the new nation.

To overcome this economic problem a recent meeting of Jewish financiers drawn from all parts of the world was held in Jerusalem. The outcome of this meeting was the organising of a plan whereby new capital amounting to 1.5 billion dollars would be raised for the

purpose of carrying out the Government's programme. One billion dollars of this amount is to be provided by the United States Jewry.

The remaining 500,000,000 dollars is to be raised within Israel itself. When this plan is fully operative it will greatly assist Israel to close the present gap in her economy. However, it is quite evident that for many years to come she will be economically unstable, and unless the Government is prepared to reduce the immigration quotas this economic instability is likely to continue indefinitely.

Foreign Affairs.

Israel has endeavoured to steer a middle or neutral course when international problems have arisen which have caused differences of opinion between the Western Powers and Russia. In the United Nations Israel has ensured that her voice has been heard when matters pertaining to aggression have been discussed. In relation to the Korean War Israel has supported UN action, but has stated that the same action should have been taken in the matter of the Palentine War, where she contends that the Arabs were the aggressors, and that the United Nations should have intervened in that conflict.

The fact that Britain has applied her Treaty obligations with Jordan to that part of Palestine which was formerly known as Arab held Palestine and now a part of Jordan, has caused some ill-feeling.

Relations with Arab States.

When dealing with the matter of Israel's relations with the Arab States it is well to remember that a little over a year ago the Arabs and Israelis were at war with each other. From that conflict has arisen a deep and lasting distrust of the other's motives. It will be recalled that Israel, with a population of less than one million was able decisively to defeat the Arabs, whose collective population is somewhere in the vicinity of 40 millions.

This fact alone has given Israel reason for unbounded confidence in her ability successfully to wage war against any possible attack the Arabs may launch against her. The fact that the Arabs were divided among themselves during the Palentine campaign, were lacking in equipment and unco-ordinated, is in itself unimportant. The important thing is that Israel was the victor.

In her dealings with her Arab neighbours, Israel has consistently gone out of her way to originate a series of pin pricking incidents which resulted in outbursts of anger and finally the resort to arms by the Arabs. On all such occasions Israel glibly brands the Arabs as the aggressors. The Arabs also have been responsible for incidents which have led to hostilities. The result is that the Middle East is an armed camp living in an atmosphere of uncertainty which is likely to continue indefinitely.

Israel contends further that the Arabs are only reorganising and rearming preparatory to launching a "second round" attack in this battle for power in Palestine.

There may be a distinct possibility that Israel's insistence on the possibility of the Arabs carrying out further attacks on her is an attempt to gain world sympathy and thus ensure that such sympathy will result in a continued flow of financial assistance.

Any approaches by either party in the matter of resumption of trade are suspect. The Arabs regard any initiative by Israel in this matter as purely political and an attempt to destroy so-called Arab unity.

This division of the Middle East can be considered as unnatural and could be dangerous if it were not for the Three Power guarantee of the lines laid down at the Armistice. Unless the present deadlock can be broken it may have to be accepted for many years to come.

Communism in Israel.

The Jewish Communist Party in Israel is not strong numerically nor in terms of real power. Israel is not a fertile field for Communism, which not only does not accord with, but is actually opposed to Zionism, an intensely nationalistic movement.

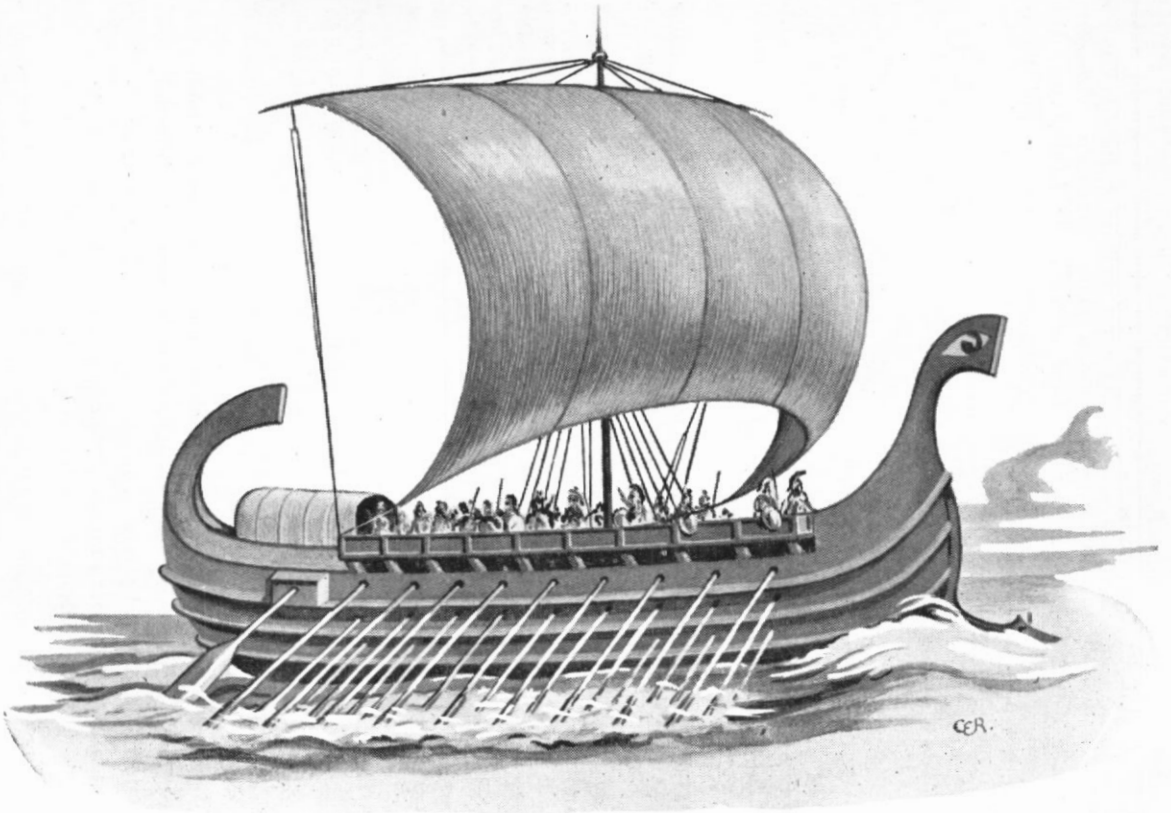
Most Jewish Communists in Israel were such before they came there. Jews appear to realise that Soviet control or domination would shatter their dream of a national independent state. Therefore in spite of some contrary indications, the majority of Israelis are spiritually and materially committed to the West.

Conclusion.

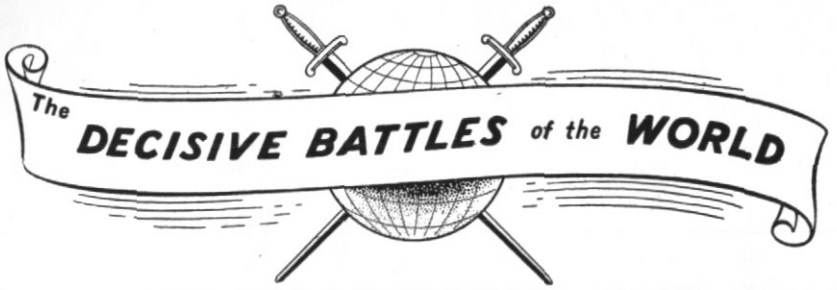
In view of the fact that Israel is on the whole largely dependent upon Western capital for the carrying out of her plans regarding the expansion of her industry, agriculture and immigration programme it is logical to assume that she will continue to move more and more toward the West. In particular Israel is unlikely to jeopardise her present good relations with the United States, whence the bulk of her monetary assistance is forthcoming.

The fulminations of Soviet statesmen and the Soviet press against imperialism, aggression, interference in internal affairs and alleged attempts to gain world domination so accurately reflect Soviet practices, policies and aims that one sometimes wonders why they insist on constantly calling attention to the fact.

—Walter Bedell Smith in "Moscow Mission."



An Athenian Trireme



SYRACUSE, BC 415-413

THE victory at Athens did not put an end to the Persian attempt to extend their empire westward into Europe, but it broke the spell of the Persian name. It gave to the Greeks confidence in their ability to stand against the Asian colossus and it induced the more important states to accept, temporarily, a measure of unity against the common foe.

From 490 to 487 B.C. western Asia was filled with Persian preparations for the renewal of the attack. These preparations were delayed by the necessity for crushing a revolt in Egypt and it was not until the spring of 480 B.C. that the Emperor Xerxes, successor to Darius, led his army into Europe across a bridge of boats thrown over the Hellespont.

Meanwhile the two strongest Greek states, Athens and Sparta, had pushed ahead with their preparations. Under the guidance of Themistocles the Athenians devoted their energies to building a fleet to oppose the hitherto unchallenged naval supremacy of the Persians.

In the early stages Xerxes met with considerable success, particularly on land. Some of the Greek states, overawed by the immensity of the odds or actuated by motives of jealousy, submitted to the invader. Athens was occupied and burned, but neither Themistocles nor his Spartan allies felt that the issue was hopeless while they had an army in the field and a fleet upon the sea. Their constancy was rewarded when, at the Battle of Salamis, the Greek fleet wrested command of the sea from the Persians. Two years later the Persian army was decisively beaten at the Battle of Plataea. Persia accepted this defeat as finally putting an end to her ambitions in Europe.

Greek Colonization.

Striking proof of the energy and enterprise of the early Greeks is afforded by the numerous colonies established by the various city-states around the shores of the

Mediterranean and the Black Sea. Civil strife often led to the emigration of a party among the citizens, but another frequent cause for the foundation of a colony was the desire felt by some of the more enterprising citizens for freer scope when they found themselves thwarted by lack of opportunities at home.

The colonies were usually established with the approval of the cities from which they issued, and under the management of leaders appointed by them. But a Greek colony was always politically independent of the motherland. The only connection between them was one of filial affection and common religious ties. Similarly, as they grew in power and wealth many of the original Greek colonies established colonies of their own.

Numerous colonies were planted in Asia Minor between 800 and 750 B.C., many of which developed into important cities. Westward expansion began even earlier, and it is thought that the first Greek settlement was established in Italy in the 11th century B.C. Subsequently several settlements were planted at other points on the Italian coast and in the island of Sicily. Among the latter the most important were Syracuse, founded by the Corinthians in 735 B.C., and Agrigentum, an offshoot of the Sicilian city of Gela, which was itself a colony from Rhodes, planted in 690.

The richness of the soil of Italy and Sicily, the absence of powerful neighbours, and the enterprise of the settlers, enabled the western colonies to flourish undisturbed by the threat of strong external pressure. They took little part in the Persian wars and, while the Greeks in the homeland were struggling to stem the tide of invasion, the Italian and Sicilian cities developed their commerce and their wealth.

Expansion of Athens.

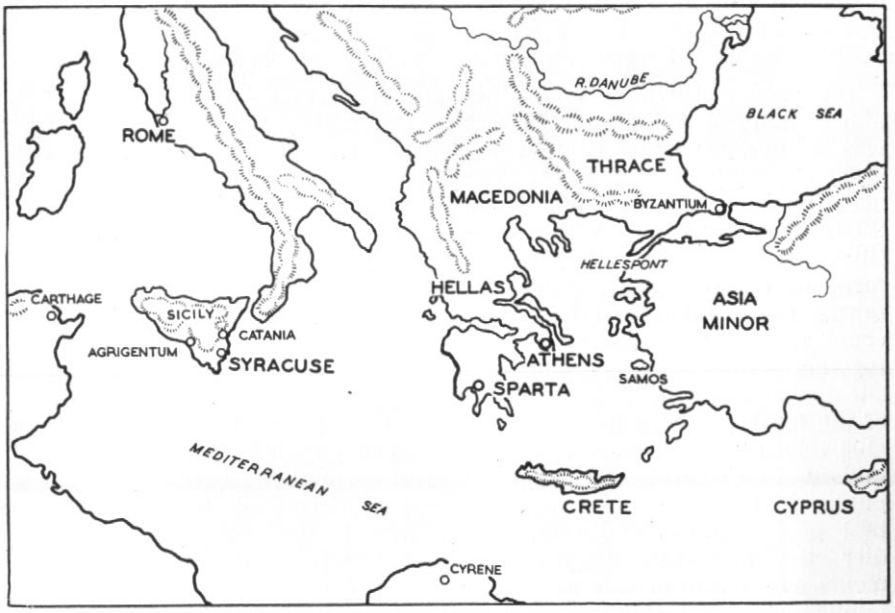
After the defeat of the Persians at Plataea, Athens pursued a policy of naval expansion. In the first instance this was brought about by the necessity for protecting her steadily developing commerce from the piracy constantly practised by the Greek states in the islands of the Aegean Sea. A long run of successes placed her at the head of a powerful confederacy and turned her thoughts to the idea of extending her political hegemony over the entire Greek world. These activities and ambitions were bitterly resented by several mainland states, notably those lying to the south of the Isthmus of Corinth. Under the leadership of Sparta these states challenged the Athenian bid for supremacy, and there ensued the long struggle known at the Peloponnesian Wars.

Basically it was a clash of ideas as well as commercial interests. Athens was the champion of democracy, Sparta of aristocracy. Athens represented enterprise, experiment, novelty, in the intellectual field as well as in the physical. Sparta represented conservatism in all its aspects. In land forces Sparta and her allies were the stronger, but at sea Athens was supreme and her resources of wealth far exceeded those of her adversaries.

Interspersed with uneasy truces the struggle dragged on with fluctuating fortunes for 16 years. On the whole the balance of success inclined to Athens and, at the time of which we write, she was at the height of her power and glory.

Nevertheless, she had not succeeded in overcoming the Spartan superiority on land. Despite her numerous victories at sea the Spartans could, and several times did, lay waste her lands to the very walls of the city. More allies were needed, allies with land forces which would enable her to carry the war to the walls of Sparta. With Sparta destroyed Athens would stand undisputed mistress of the Greek world. And for success would not only provide Athens with the levies to enable her to crush Sparta, but it would also provide her with unlimited room for further political, cultural and commercial expansion. The west was now the quarter towards which the eyes of every aspiring Athenian were directed.

As a first step in the project it would be necessary to conquer



behind that ambition lay the dream of extending her power beyond the eastern Mediterranean basin.

Whilst Pericles guided the affairs of Athens he kept a restraining hand on the more ambitious expansionists. When this restraint was removed with his death, the advocates of expansion to the west—to Sicily and Italy — found many supporters in the Athenian councils. The prospect was indeed attractive Syracuse, the strongest of the Sicilian Greek cities. With the capture of Syracuse it was reasonable to expect that all Sicily could be secured without much further military effort. And with the aid of the levies which this accession of strength would bring into her armies there seemed little doubt that most of Italy would be drawn irresistibly into the Athenian orbit. Thus to her supremacy at sea would be added supremacy on land, and to her al-

ready extensive empire would be added the prospect of unlimited expansion throughout the Italian peninsula and to the lands still further to the west.

The Expedition.

When a nation is bent upon conquest an excuse for military action is rarely difficult to find. Amidst the interminable intrigues which bedevilled Greek politics Athens had no trouble in finding a plausible reason for despatching an expedition against Syracuse.

The armanent which the Athenians equipped for the enterprise was in every way worthy of the great city which sent it forth. The fleet consisted of one hundred and thirty-four war galleys, with a multitude of store ships. A powerful force of the best heavy-armed infantry that Athens and her allies could furnish was sent on board, together with a smaller number of slingers and bowmen. The quality of the force was even more remarkable than the numbers. The zeal of individuals vied with that of the republic in giving each galley the best possible crew, and every soldier the best possible accoutrements. And with private as well as public wealth lavished on all that could give splendour as well as efficiency to the expedition, the noble fleet began its voyage for the Sicilian shores in the summer of 415 B.C.

Syracusan Preparations.

At the time of the Peloponnesian War the Syracusans were a bold and turbulent democracy, wielding considerable power over the weaker Greek cities in Sicily. In numbers and spirit they were fully equal to the Athenians, but far inferior to them in military and naval discipline and skill.

When the probability of an Athenian invasion was first mooted, the efforts made by some of the wiser citizens to improve the state of the national defences met with considerable opposition on the grounds that the danger was being much exaggerated by people intriguing to derive power and benefit from the scare. A leading popular orator declared:—

"Athens knows her own interest too well to think of attacking us. Even if they were to come, so distant from their resources, and opposed to such a power as ours, their destruction would be easy and inevitable. Their ships will have enough to do to get to our island at all, and to carry such stores of all sorts as will be needed. They cannot therefore carry besides, an army large enough to cope with a people such as ours. They will have no fortified place from which to begin their operations, but must rest them on no better base than a set of wretched tents, and such means as the necessities of the moment will allow them. But in truth I do not believe that they would even be able to disembark. Let us then set at nought these reports as altogether of home manufacture, and be sure that if the enemy does come the state will know how to defend itself in a manner worthy of the national honour."

Despite the lessons of over 2,000 years of history, and in face of the stark realities of the times in which we live, there are men amongst us today who are saying precisely the same things.

Defences of Syracuse.

At the time of the Athenian invasion the city of Syracuse consisted of three distinct parts. Ortygia, the original city, lay on the promontory which forms the northern arm of the Great Harbour. The narrow isthmus which connected the promontory to the mainland was defended by a strong wall. Beyond the isthmus lay the outer city, also enclosed by strong walls. Further to the north lay the unfortified suburbs of Teminites and Tyche. When the accuracy of the information predicting the Athenian attack could no longer be challenged, the Syracusans put in hand the construction of a wall to protect the outer suburbs. The exact location and strength of this wall are somewhat uncertain, but it probably followed the course shown on the map and it seems to have been strong enough to have deterred the Athenians from an early attack in this quarter. As will be seen, more energetic Athenian leadership might have made short work of these hastily erected fortifications. The Syracusans had more luck than they deserved.

North-west of the outer city the ground sloped up to the plateau of Epipolae. This feature dominated the defences, but the Syracusans had not had time to include it within their defences before the Athenians arrived.

First Phase.

Command of the Athenian expedition had been entrusted to three officers—Alcibiades, Nicias and Lamachus. The first two were "political" generals, whilst the third, although a competent soldier, was not strong enough to carry his opinions against the others.

The expedition landed at Catana and established itself ashore without difficulty. Lamachus was for an immediate attack, while the Syracusan preparations were still incomplete. However, the other two decided on subsidiary operations designed to collect Sicilian levies before making the main assault. Three months were frittered away in these fruitless operations. While they were going on Alcibiades was recalled to Athens to answer charges preferred against him by his political opponents. Nicias now assumed supreme command and resolved to bring the Syracusans to battle, a course which clearly should have been followed at the very outset.

Bringing the Athenian fleet into the Great Harbour, Nicias landed near the mouth of the Anapus. In the battle which followed the Syracusans were soundly beaten, but, instead of vigorously exploiting success, Nicias retired into winter quarters at Nazos. The Syracusans seized the opportunity to strengthen their fortifications, and to send envoys to Sparta asking for assistance.

Second Phase.

Having received re-inforcements in the spring Nicias resolved to lay close siege to Syracuse. Landing at Leon on the Bay of Thapsus, he took possession of Epipolae and erected the fort of Labdalum on its summit. Downhill towards the city he built another fort at Syke. From the latter point he began his line of circumvallation, one wall extending southward towards the Great Harbour, and the other wall running northwards towards the outer sea. The Athenians succeeded in completing the circumvallation toward the south, in spite of Syracusan attempts to thwart them by building cross walls running out from the main defences and shown at a-a and b-b on the map. The Athenian fleet now returned to the Great Harbour, where it was permanently stationed.

The northern wall was never completed and through the gap thus left open the city continued to receive some supplies. Nevertheless, the Syracusans began to feel that their situation was hopeless and opened negotiations for surrender. Nicias acted with his accustomed sloth, pressing neither the negotiations nor the operations vigorously.

Meanwhile Sparta had resolved to intervene, and appointed an able soldier named Gylippus to the Sicilian command. She gave him neither men nor money, but she gave him her authority, which was all that he needed to persuade Corinth and other Peloponnesian states to undertake the organization of a fleet to be placed under his command. Gylippus set out for Sicily with the first four ships ready to sail.

Landing on the north coast of Sicily, Gylippus announced himself as the advanced element of a large expedition. The magic of the Spartan name brought volunteers to his standard, and in a few days he marched towards Syracuse with about 3,000 men. With enexcusable carelessness, Nicias made no attempt to impede his movement into the city through the northern gap.

Gylippus turned what had for a long time been a purely passive defence into a very active one. His first exploit was to capture the Athenian fort at Labdalum, which made him master of Epipolae. He next constructed a counter-wall to intersect the Athenian lines on the northern side and shown at c-c-c on the map. This turn of affairs induced those Sicilian cities which had hitherto remained neutral to embrace the Syracusan cause. Gylippus was also reinforced by 30 triremes from Corinth and other Peloponnesian allies. Thus an energetic, active defence soon brought about a radical change in the situation.

Nicias now decided that the attempt to blockade Syracuse with his present force was hopeless. Accordingly he retired to Plemmyrium, the southern-most point of the entrance to the Great Harbour, where he erected three forts and formed a naval station. The Athenians had now become a besieged rather than a besieging force. Their triremes were becoming leaky and their men victims of pestilence. Nicias wrote to the Athenian Government, begging that he be either recalled or strongly reinforced.

Third Phase.

It was not the custom of Athens to be easily diverted from any enterprise. Accordingly she des-

patched a fresh fleet of 75 triremes with 5,000 heavy infantry and a larger force of lightly armed troops. This force was under the joint command of Eurymedon and Demosthenes (the soldier not the orator).

Meanwhile Gylippus gave the Athenians little opportunity for repose. In a surprise combined operation he captured and destroyed the Athenian forts and storehouses at Plemmyrium, but was deprived of the full fruits of victory by the defeat of his fleet. Undeterred, he reorganized his ships and returned to the attack. This time he was more successful and, if he did not entirely destroy the Athenian fleet, he severaly damaged their reputation for naval supremacy. This successful action in the Great Harbour gave a tremendous boost to Syracusan morale, and compelled the Athenians to beach their ships under the protection of their fortified lines.

The arrival of the new fleet, however, again gave the Athenians possession of the Great Harbour. Demosthenes saw at once that the capture of Epipolae was an essential preliminary to an assault upon the city or the active prosecution of the siege. Accordingly, after a diversionary frontal attack, he led his troops by night inland to the foot of the western slopes of the plateau. Sound planning, thorough reconnaissance and swift movement achieved complete surprise and brought the force in good order to the heights of Epipolae. Demosthenes promptly assaulted the outwork c-c-c, captured it, and pressed on towards the city walls driving successive bodies of Syracusan troops before him.

Amidst the general confusion of rout and retreat one body of defending troops kept their heads. This was a small force of Boeotian infantry posted just outside the city walls. Coolly and steadily the Boeotians formed up and, undismayed by the current of flight around them, advanced against the oncoming Athenians. This was the crisis of the battle. The Athenian van, disorganized by its own previous successes, was hurled back by the co-ordinated and disciplined Boeotian charge. The following divisions of the army were thrown into confusion and, in the darkness, were unable to recover their balance on the unfamiliar ground. The Syracusans took heart, reformed and returned to the fray. After much confused fighting, the defenders, who had the advantage of familiarity with the ground, drove the Athenians back over the cliffs with heavy loss.

Fourth Phase.

Encouraged by their successful defence of Epipolae, the Syracusans launched an offensive by land and sea. On land the attack of Gylippus was repulsed, but at sea the Athenian fleet was soundly beaten. Gylippus immediately closed the mouth of the Great Harbour with a line of vessels moored across it.

Nicias saw that all hope of success was now gone. Even to make good his retreat he would have to break the line of blockships, and to do that he would first have to defeat the Syracusan fleet. However, with 110 undamaged triremes at his disposal he stood a reasonable chance of success. Both fleets prepared for action.

Never perhaps was a battle witnessed by so many spectators vitally concerned in the result. The basin of the Great Harbour, about five miles in circumference, in which nearly 200 ships, each with a crew of more than 200 men, were about to engage, was lined with spectators.

The battle opened with an unsuccessful Athenian attack on the blockships. The engagement then became general, and the combatants were encouraged by the shouts and cheers of their friends on shore. Slowly the Syracusans wore down their adversaries until the last 60 damaged triremes, all that remained of the proud fleet of Athens, were driven ashore.

All was now over. Nicias could do no more than attempt to save his army of 40,000 men by marching overland in the hope of finding a suitable place in which to take refuge. In this extremity of misfortune Nicias displayed a spirit and energy which, had they been brought into play in the early stages, might well have carried him to victory. In the circumstances in which he was now placed they were of no avail. At the end of the sixth day of retreat only 10,000 men remained. Faced with overwhelming odds and surrounded on all sides, Nicias had no option but to surrender unconditionally.

Comments on the Operations.

The outstanding feature of the Syracuse campaign is the contrast in leadership which it produced. The political aim, far-reaching as it was, was well within the resources of Athens. So far as we can be certain of anything in war, it may be said that, given competent leadership, the powerful expedition sent forth by the imperial republic was quite capable of fulfilling its mission.

From first to last Athenian leadership was characterized by indecision, irresolution and faulty tactical appreciation. There can be little doubt that had Nicias launched a determined assault immediately after his arrival, he could have carried the city. At that time the morale of the Syracusans was at a low ebb, their organization faulty, their training defective and their landward defences incomplete. And their own leadership left much to be desired. In the face of a resolute attack they could, at best, have died bravely.

Having thrown away this golden opportunity, Nicias pursued his next line of action—circumvallation on land and blockade by sea — with equal tardiness. Failure to close the northern gap left the way open for supplies to reach the city. Even so, had he not dallied over-much with the Syracusan envoys he might have had the city in his hands before Gylippus arrived. And when it became evident that success was no longer possible, his inability to make up his mind to withdraw led to the destruction of his force.

All that Sparta contributed directly to the conflict in Sicily was one man. But that man was a military leader of outstanding ability. Within a few hours of his arrival in Syracuse he had set about raising morale by offensive patrolling, reorganization of the defences, and a vigorous training policy. At the earliest possible moment he undertook a limited offensive which gave him possession of the dominating feature of Epipolae. Not only did his resolute, energy encourage the

Syracusans, but it attracted reinforcements from Sicilian cities, which hitherto had been afraid to oppose the might of Athens.

If ever a general showed tenacity of purpose and maintenance of the aim, it was Gylippus. He did not relax for a moment, nor did he let anyone else relax either, until the destruction of his adversary was final and complete.

Demosthenes' attack on Epipolae is a good example of the difficulties associated with driving home a deep penetration night attack on unfamiliar ground. In the darkness his troops lost cohesion and he was unable to co-ordinate the action of his units. It might have been better, perhaps, had he timed his movements to use darkness to gain initial surprise and win the heights, and then have daylight for exploitation.

Conversely, the action of the Boeotian detachment provides a good example of the far-reaching results which often flow from the resolute action of even a small, but disciplined, well-trained body of troops. It is also a fine example of cool, steady leadership and rapid appreciation on the part of the Boeotian commander. To that unknown junior officer must go much of the credit for saving Syracuse.

What Might Have Been.

Had Syracuse fallen it is at least highly probable that all Sicily and southern Italy would have been rapidly incorporated in the Athenian Empire. Against this accession of strength Sparta would almost certainly have succumbed. Athens would have been undisputed mistress of the Greek world.

What would have followed can be no more than an assessment of probabilities. Since the eyes of Athens were directed towards the west it is unlikely that she would have rested content with her first conquests in that area. In the full flush of victory she would probably have pressed on, overthrown the youthful Roman republic, and brought all Italy under subjection. Henceforth Greek efforts would have been directed towards an extension of their power in Europe instead of towards the Hellenization of Asia-Minor, later accomplished under Alexander the Great and his successors.

Whether or not Athens could have held this empire together is doubtful. In view of the political instability of the Greeks it is more than likely that the design would have been ruined by internecine jealousy and strife. In that case there would probably have been no Roman Empire, the institution which provided the organization for the spread of Christianity and the foundation for the development of Western Civilization.

With her defeat at Syracuse, all danger from Athens to the independent peoples of the west came to an end. She, indeed, continued to struggle against her combined enemies and revolted allies with unparalleled gallantry and many more years of warfare passed away before she surrendered to their arms. But no success in subsequent conflicts could ever restore her to the pre-eminence in enterprise, resources and maritime skill, which she had acquired before her fatal reverses in Sicily. Nor among the rival Greek republics was there any capable of reorganizing her em-

pire, or resuming her schemes of conquest. The domination of western Europe was left for Rome and Carthage to dispute two centuries later, in conflicts still more terrible, and with even higher displays of military daring and genius, than Athens had witnessed either in her rise, her meridian, or her fall.

This is the second of the series, "Decisive Battles of the World." Next month we shall consider the Battle of Arbela in B.C. 331.—*Editor.*

ORGANISATION OF THE COMMUNICATIONS ZONE.

In order to standardize with current British practice, the following terminology to describe the communications zone in a theatre of operations has been approved by the Australian Chiefs of Staff Committee for adoption by the Australian Services.

Communication Zone.—The whole geographical area between Army rear boundary and the boundary of the theatre. This will include the ports of entry and the advanced base, or main base if one exists in the theatre.

The overall headquarters controlling the administration of the zone will be known as Headquarters Communications Zone.

Areas.—The sub-divisions of the Communications Zone will be known as Areas. These may be either Communications Areas (formerly L of C Sub-Areas) or Base Areas (formerly Base Sub-Areas).

Base Areas are those which include a main port or ports of entry into the theatre, and the advanced base, or main base if one exists in the theatre.

The controlling headquarters will be known as Headquarters Communications or Base Area.

Garrison.—This term will be used for any sub-division that is necessary below Area.

THE

SEMI-AUTOMATIC RIFLE

Advantages and Disadvantages

Warrant Officer J. H. Welch,
Royal Military College.

IT is understood that the question of replacing the existing .303 bolt-action rifle with a semi-automatic rifle has been under examination for some time, but very little information on the progress of these enquiries has been made generally known to the Army. Therefore, a brief examination of the advantages and disadvantages of the semi-automatic rifle may be of interest, particularly to soldiers who will, if it is introduced, have to rely upon it as their main fighting weapon.

From personal discussion of the subject there appears to be some doubt about exactly what a semi-automatic rifle is. A semi-automatic is a rifle capable of firing a single shot every time the trigger is pressed. This is possible so long as there are rounds in the magazine. Like the Bren, it is a gas-operated weapon which employs the gas produced in firing to operate loading and unloading mechanism. It is fired from the closed bolt position, and uses normal service ammunition.

Advantages.

Now, using the current service rifle as a base to work from, what can we say are the good and the bad points of these semi-automatics? The advantages will be discussed first.

Rate of Fire.

The rate of fire is excellent and greatly exceeds that obtainable with a bolt action rifle. However, we must not be misled by considering the rate of fire of a weapon to be the number of shots that may be fired in a minute. It is more realistic to call it the number of effective shots that may be fired in that time. With semi-automatic fire the advantage lies in the ease with which the firer can get the same number of hits with the same number of shots in less time. US Army tests have proved that an average shot, firing both semi-automatic and bolt action rifles for a similar time, will usually obtain twice as many effective hits with the semi-automatic as with the other rifle.


GARAND


GEWEHR


TOKAREV

No Kick.

The kick is slight as the recoil is used to assist in operating the mechanism. This helps to eliminate gun shyness in the firer.

No Bolt Manipulation.

This has the advantage, especially in a period of prolonged firing, of keeping the "master hand" and arm from tiring.

Loading.

Loading is as simple as with the bolt action rifle. No problems are encountered by the firer, and no apparatus is required to fill the magazine.

Readiness for Use.

While loaded, the semi-automatic is always ready for a shot. This is a good morale builder and tends to create confidence in the user.

Range and Wind Corrections.

These can quickly be made by observation of rapidly fired shots with corrections to the point of aim as required.

Weight.

Semi-automatics need be no heavier than any other rifle, and some, in fact, are slightly lighter. For example the American Garand weighs 9½ lbs., the German Gewehr 43, 9½ lbs., and the Russian Tokarev 8½ lbs.

Ammunition.

Standard machinegun ammunition is used. When this is rimless excellent magazine feeding can be obtained.

Portability.

These rifles are light, easy to carry, conceal, and keep firing. Thus, they may be less vulnerable than an LMG, and might often be

used on simple tasks where that weapon is required, but is not readily available.

Effectiveness at Long, Short and Medium Ranges.

Over 600 yards rapid groups of shots like machine gun bursts are recommended. At short ranges the semi-automatic is as deadly as the machine carbine. In a crisis, 50 to 60 aimed shots could be fired in a minute. At medium ranges the rifle can be effectively used to fire slow single shots or sharp bursts as required.

Reserve of Fire Power.

Normally a semi-automatic is used to fire slow single shots as is the case with the bolt action rifle. However, a tremendous increase in the volume of fire is always immediately available. This could be used on fleeting targets like low-flying aircraft or rapidly-moving men, massed infantry attacks, or targets that quickly disperse when fired on.

Disadvantages.

Against the foregoing advantages the following disadvantages must be considered.

Accuracy.

Because the barrel is usually not bedded as in a bolt-action rifle, extreme accuracy is not obtainable. Also, it is possible that the bullet may be damaged in loading and chambering. The firer, knowing that another shot is always available, may not aim with the same care as with the bolt-action rifle. However, competition accuracy is not required, only the standard which must be obtainable from any service rifle.

Stoppages.

As with any weapon with moving parts, stoppages will occur. It would be very difficult to design a weapon as reliable in this respect as our present .303 bolt-action rifle.

Maintenance.

More care is required, and cleaning is more difficult because of the number of moving parts.

Spare Parts.

Because of the wear on the moving parts, replacements would have to be readily available. Mechanical breakdowns because of wear would be more frequent than with a bolt-action rifle.

Ammunition Supply.

Ammunition expenditure would probably increase considerably. With the bolt-action rifle perhaps 10 to 20 rounds could normally be fired in a minute, depending largely on the skill of the firer. With the semi-automatic the rate might rise to 20 to 30 shots a minute. These figures are only approximate, but they do show an increase in ammunition expenditure with all its problems of supply. As against this, however, the following interesting facts have been published in the USA. These reports came from World War II units, which, although equipped with semi-automatic rifles, used considerably less than their allotment of ammunition. The units reported that frequently in an engagement many men never fired at all. The main reasons they gave were:—

(a) The men could not see anything to fire at.

(b) They would not fire because they were afraid of disclosing their position.

(c) The squad (section) commander had not given a fire order.

It would be wrong to assume that every semi-automatic rifleman sees himself as a junior machine gunner. Normally his rate of fire would, as with the bolt-action rifle, be dictated by the tactical situation.

Summing up the ammunition question, could it be that the amount used might be greater on odd occasions, but about the same per day or week? Again, without good fire control by section commanders, expenditure might soar at all times. Finally, it appears that, as a general proposition, ammunition expenditure would be directly related to the quality of the fire discipline of the men and the fire control of the section commanders.

Training.

The additional mechanical parts might make the semi-automatic more difficult for the recruit to understand, but surely no more difficult than the LMG, which he also has to know.

Conclusion.

Doubtless there are other factors, such as production problems, to be taken into account in studying the question of the provision of semi-automatic rifles for the Australian Army. The foregoing paragraphs attempt no more than to summarize the discussion from the point of view of the men who would use the weapon in battle.

LEANING ON THE BARRAGE.

We attacked up the hill and reached the crest as our barrage ceased. A few of our own shells had fallen among the leading platoon, but had caused no casualties. So far we had had only the odd grenade and a few rifle shots fired at us. For this reason I appreciated that the enemy had withdrawn so I pushed two platoons about 200 yards down the forward slope. They ran into the Germans, who were returning to their positions, killed a few, and took some prisoners. I have no doubt that these Germans had withdrawn from the crest to escape the shelling, and were on their way back to their posts now that our artillery support had lifted. My supposition was confirmed the next morning when we found several Spandaus in position, cocked, and ready to fire. It was well that we had so closely followed our barrage.

—Extract from a War Diary of an Infantry Battalion in Italy.

SOVIET MILITARY ORGANIZATION

Condensed from an article in "Army Information Digest," USA, January, 1951.

THE Soviet Union has geared its entire military and civil structure for rapid mobilization — whether it be open or secret, general or partial mobilization. Not only do the plans embrace the call-up of all reservists, but even farm horses and tractors are tagged for M-day. As a nation the USSR follows the old Cossack tradition of being prepared—men, women and teen-agers all—to saddle horses and ride forth from the villages in military formation.

In keeping with this total preparedness, all male citizens who reach their nineteenth birthday are subject to conscription. Unless they possess special qualifications all male conscripts enter the military service as privates. Only men over 50 years of age and those judged to be physically unfit are exempt from military service. However, physical standards vary widely according to the urgency of the situation. Those under arrest, exiled, or deprived of suffrage rights are normally excluded by law; but during World War II the Soviets drew hundreds of thousands of combat and service troops out of their prison labour camps. There is a generous and enlightened policy of deferment for scientists, teachers, technicians and such artists as movie actors, since these specialists are in chronic short supply in the Soviet Union.

Qualified women are conscripted in war-time. Even in World War I Russia had a women's combat infantry battalion. In World War II Soviet women were assigned as traffic control, medical, veterinary and

service personnel. In addition many were accepted for combat units on a voluntary basis. Approximately 2,000,000 women between the ages of 18 and 25 wore the Soviet Army uniform. In war-threatened areas everyone, including adolescents, women and old men may be mobilized. During the early months of World War II, hastily organized divisions of factory workers were thrown into the breach and sacrificed in the defence of Leningrad and Moscow, while reserve units were being trained for the counter-offensive.

The military indoctrination of the Soviet recruit begins long before he is called up for active service. No other country in the world has such an intensive and all-inclusive programme of military training. The average Soviet citizen lives his entire life in an atmosphere of military semi-alert. Small children in school learn their history from a martial-Marxist point of view. The words "front," "offensive," "struggle," and "objective," are used to describe many non-military activities. The Russian Pioneer—counterpart of the Boy Scout—is taught such skills as rifle markmanship and anti-tank tactics.

Preconscription training also is provided in voluntary societies for assistance to the armed forces (the DOSARM, DOSFLOT or DOSAV) under sponsorship of the Army, Navy or Air Force. In these organizations millions of young civilians learn such military skills as parachute jumping, chemical warfare, ski-ing, first aid and pilot training. If his formal education extends beyond the seventh grade the Soviet citizen will have spent several hundred hours in pre-military training prior to active service.

The conscript fulfills his military obligations in peace-time by serving on active duty or by entering the reserve. Active duty involves induction into the standing army, whereas direct assignment to a reserve unit obliges the new reservist to perform periodic training with troops.

Periods of active duty ranging from two to five years are prescribed by law, but men are often retained well beyond the date they become legally eligible for release. After World War II, men were released in blocks of age groups with the eldest being demobilized first. Certain specialists, however, were held in uniform and tens of thousands who had been deferred during the war were called up in 1946 and 1947 to serve their term in the army. Reserve officers are being held on active duty indefinitely with the release of officers being carried out on an individual basis.

Civilian technicians and experts of various types pass into and out of the army with little more formality than donning or doffing the uniform.

The Russian recruit spends an average of two to three years on active duty and then is released to the reserves. As a reservist he receives annual refresher training and is subject to recall at any time until he reaches 50 years of age; beyond that age he may be directed to serve in the home defence units in an emergency. This soldier training provides an immediately available manpower pool capable of providing an army of many millions of trained men at any time.

The Soviet reserve system divides all fit men into two categories, those who have had active duty training and those who have not. In addition to this grouping in terms of thoroughness of training, reservists are classified according to age. The first class includes men up through 35 years of age, who are required to take frequent refresher training. The second class includes the next ten years' classes, while the third is made up of men from 46 through 50. Thus the trained reserves of the first class — those up through age 35 — constitute the bulk of the immediately effective potential available for mobilization into combat units.

Technically any reservist or conscript who has completed his term of service may volunteer for extended active duty, but in practice usually only non-commissioned officers are accepted. Women specialists, such as translators, doctors, switchboard operators and the like, may volunteer, and young men may be accepted as volunteers before they are called up for active duty.

The law states that only citizens of the Soviet Union may volunteer for the Soviet Army—but there have been exceptions. In World War II Polish, Czech, Yugoslav and French volunteer units served in the Soviet Army. These units served in a capacity similar to the American and British sponsored Free French, Free Polish and other allied military forces. Foreigners' eligibility for military service with the Soviet Army is determined by political factors—not by any hard and fast rule.

Conscripts are initially assigned on the basis of their educational qualifications, civilian skills, political reliability and physical characteristics according to the requirements of the service. The Soviet Air Force and Navy receive a higher type of conscript than the Army, while within the Army the technical arms and services have the pick of the crop. The graduate of a ten-year school (high school) is likely to be selected for non-commissioned officer training. Drivers, of whom the Army always has a shortage, are assigned to motorized or transport units. The politically unreliable conscripts from the Baltic regions — many of whom have little affection for the Russians or for Communism — are assigned to service units or to the infantry in spite of skills that might normally qualify them for specialized assignment.

The Army exploits the natural skills and background of certain ethnic or regional groups. Cossacks make excellent cavalry-men. Caucasians are usually assigned to mountain units. Siberians are likely to serve with ski troops.

As his training progresses the soldier acquiries a military occupational specialty. His later assignments are governed by merit, existing vacancies and, in the case of non-commissioned officer candidates, successful completion of the nine-month training course.

More officers graduate from the numerous officer candidate schools than the Army can absorb. As a result competition is keen and an officer's career remains on a probationary basis until he reaches field grade. As an officer rises in rank, political reliability progressively becomes a more important factor in selection for promotion. Seniority —especially in the field grades and among generals—is of comparatively

little significance. The great majority of Soviet Army officers are Communist Party members or affiliates.

Status as a "reservist" or "regular" means nothing in determining an officer's career. There is no single academy graduating "regular" officers and there is no distinction among components.

Officers' careers follow a planned rotation among school, troop duty and staff assignments. The various arms and services administer the affairs of their officers at the medium and higher levels. In the lower echelons this is accomplished by commanders exercising limited authority in this sphere.

Through the highest military academy which is operated directly by the General Staff, the Soviet High Command is able to guide the selection and training of out-standing officers, who are hand-picked for duty with the General Staff.

In the Army, as elsewhere in the Soviet Union, the class distinctions that the 1917 revolutionaries sought to abolish have now come back with a vengeance. A Soviet marshal receives more than 110 times the pay of a private. Furthermore, the Soviet conscript receives no furloughs except in an emergency. Even though it is tax exempt, the pay of the Soviet soldier amounts only to pin money. However, he is provided with clothing, food and shelter and certain modest allowances may be paid to his family.

While pay differences are great, the real class distinction lies in the extra privileges granted officers. For instance, Army officers have special commissary privileges — a vitally important factor in the Soviet Union. In 1944, for example, one Moscow department store was divided into three floors or sections, the first of which was open to the public. The second floor, displaying additional items and food, catered to officers only, while the top floor sold its stock of luxuries only to Heroes of the Soviet Union and ballet dancers.

Base pay is augmented by bonuses to paratroopers, to combat flight personnel in the Air Force and—during war—to combat ground troops. These categories receive approximately 50 per cent. extra pay. Officers are paid various bonuses over base pay depending on their assignment, with additional pay accompanying extra responsibility and extra technical skill.

Technically, Soviet soldiers are discharged or furloughed to the reserves by age class, from the oldest downward, but in many instances military personnel are discharged at the convenience of the government. Disabled servicemen are eligible for pensions, the degree of disability determining the amount of compensation. A completely disabled conscript soldier receives a pension equivalent to his last civilian wage. If he is killed in action his family will receive a lesser amount.

A soldier may retire on a pension of 50 per cent. of his base pay after 25 years' service, with an additional three per cent. for each year he serves beyond 25 years. Extra service credit is given those who fought in the 1917 Revolution and Civil War, or who served in the submarine or other hazardous branches.

Generals are retired at 90 per cent. of base pay; field officers at

80 to 90 per cent., depending on length of service. Company grade officers who leave the service are normally not retired, but are transferred to the reserve.

Throughout his military service, the Russian soldier is subjected to a rigorous training regimen whose doctrine has been keynoted by the Soviet leaders. The Soviet press has attributed the following maxim to Lenin: "The very essence of the military profession requires that an army, even though it be a victorious army, as soon as hostilities are over, submit to hard, but profitable training for fear of being outdistanced."

Stalin, who since the close of World War II has given his personal attention to Soviet Army training, recently stated, "The entire training of the army is to be based on the skilful use of experience of the war. This experience should also be thoroughly utilized for the theoretical education of officers."

Lessons of World War II are being applied in all Soviet Army training. The Army conscripts a large number of Soviet citizens annually and fully integrates them into the ground forces. The average Russian soldier may not have the technical background of the Western soldier, but extensive training is probably reducing this handicap. Soviet infantry training teaches recruits sound basic doctrine and provides opportunities for peak physical conditioning.

Army training—carried on six full days a week — is intensive, continuous and realistic. Live ammunition is issued during field exercises and actual combat conditions are so closely simulated that training accidents are accepted as a matter of course.

Military training, like every type of education within the Soviet Union, is accompanied by a constant programme of political orientation. Communist Party members within each military unit are organized as a group which decides minor matters of conduct. Meetings are held for discussion of the Marxist-Leninist doctrine. According to Party doctrine, the special function of the Communists within the ranks is to stir enthusiasm among other soldiers and, in time of war, to set an example of courage and devotion to duty. Recruits and regular soldiers receive daily lectures on such topics as Soviet history, Communist theory, the embellished story of Stalin's life and the Soviet interpretation of domestic and international issues.

The Soviet Army's annual training cycle is based on a progressive schedule. Conscripts usually enter service in October and receive rudimentary training at the reception centre. By December they are assigned to units. Since new recruits comprise only 25 to 30 per cent of the regular units they are fully integrated and receive the benefit of association with experienced troops. The first training period, from January to March, is devoted to physical conditioning, development of combat capabilities, small unit tactics, weapon training, range practice, construction and improvement of training facilities, and class instruction. Emphasis is placed on the preparation of the individual and of the platoon for spring training.

The next phase, April through July, begins with company and battalion exercises and concludes with regimental exercises. In this period the Army concentrates on the consolidation of the ranks into unified combat teams. The August through September phase is organized around the divisional manoeuvres.

The high point of Soviet Army training occurs during the October and November army manoeuvres. All arms, including tanks, infantry, artillery, rocket and close-support aircraft, plus the specialist arms, are combined in full-scale and realistic tactical problems under conditions simulating actual warfare.

Elaborate critiques are held at the conclusion of these manoeuvres. Approved solutions to the various problems are given by the senior commanders and by General Staff observers from Moscow. Detailed correction is conducted by junior officers and non-commissioned officers in the ranks.

The entire training programme is designed to produce efficient, hard-hitting, rugged soldiers, integrated into well-organized cohesive combat units. By the end of his first year the recruit is familiar with his weapons and knows how to employ them to good advantage. He is conditioned to live ammunition and is inured to near-combat field exercises. His physical condition is excellent and requires very little of the elaborate care common in Western armies. On manoeuvres he rolls up in his blanket(which is actually his coat) under a bush at night or joins his poncho with that of a comrade to make a small tent. In the morning, if conditions permit, he has a hot breakfast and is given a large chunk of black bread. Otherwise his only hot meal of the day is a bowl of borsch in the evening. His peasant background permits an easy transition to field conditions and his stolid nature quickly adjusts to military routine.

In his first year he has received training in basic military subjects and individual tactical infantry training. He has received detailed instruction in attack, defence and reconnaissance. He also has demonstrated his ability in field problems dealing with such basic operations as use of cover, routes of advance, camouflage, fieldcraft, weapon handling and gun drill. Many soldiers have received instruction in sniper skills, use of artillery and special weapons.

Technical training is inferior to that achieved by Western armies, although normal running repairs, maintenance and care of weapons and equipment is relatively good. Technological knowledge in the USSR is lower than that in countries west of the "Iron Curtain." This factor has prevented the spread of technical competence in the Soviet Army. State educational establishments and the armed forces training programme are being pressed to overcome this weakness.

Throughout his course of training the Soviet soldier is strongly stamped with a harsh type of discipline. The salute is now required at all times. Furloughs, passes, and recreational facilities are limited and go only to those whose record is nearly perfect. Those committing even slight infractions of discipline are severely punished. Outside the USSR associtaion with foreigners is

forbidden. Off-duty time throughout the Soviet Army is strictly and unfailingly supervised.

The training of non-commissioned officers is receiving greater attention today than was the case in the pre-World War II Soviet Army. Gradually there has been an approach to the professional point of view familiar to Western armies — namely, that top ranking non-commissioned officers are the "backbone of the army." Present disciplinary regulations allow the non-commissioned officers to administer minor punishments up to three days of restriction. In tactical operations they are being given responsibilities commensurate with those in Western armies, such as command of infantry platoons or the operation of artillery auxiliary observation posts. In the post-war army a Soviet non-commissioned officer must have a minimum of a seventh-grade education. The most promising may compete to attend a three-year officer candidate school course.

The top priority element of non-commissioned officer instruction in the Communist view, is political education. Those who were not good Marxists before being made non-commissioned officers must become so.

The technical and command training of Soviet non-commisioned officers is normally the responsibility of the line regiments and divisions, which operate training units for this purpose. Courses of approximately nine months' duration are given in a variety of subjects applicable to the respective branches of service. The infantry course, for example, includes political training, small unit tactical instruction, the handling and firing of small arms and field engineering. Potential non-commissioned officers are well-grounded in communications, defence against gas, air-craft recognition and artillery support. They also receive some instruction in unit supply and administration, and army regulations.

The typical Soviet non-commissioned officer is a hard, Communist-indoctrinated individual who obeys orders promptly. He has good staying power and his morale is usually good.

The Soviet officer corps represents a selection from the large World War II army. Most have World War II experience now being supplemented by extensive theoretical training. The officer class as a whole has growing prestige in the state and is rapidly becoming professionalized. A definite distinction is made between officers and other ranks. Military courtesy is emphasized and rigidly observed.

The extensive combat experience of most officers permits greater time to be devoted to theoretical training. Instead of the one-year courses common in Western armies, the Soviet officer usually has two or three-year courses in the various schools and academies. Meanwhile constant participation in annual field training and manoeuvres provides opportunity for the application of theoretical training.

Throughout his military career the Soviet officer is exposed to continuous political propaganda calculated to make him an enthusiastic supporter of Communism. Even so he is constantly watched by his commanders, brother officers and the secret police for any departures from the approved Party line. Considerations of political reliability

continue to weigh heavily in the promotion of officers. The problems of political unreliability among officers and the reluctance on the part of the Soviet regime to decentralize responsibilities have in the past tended to stifle initiative. Present doctrine and training as well as added perquisites of rank are tending to increase the professional attributes of the officer group. In effect the training induces a double standard of compromising Communism with military principle. It stresses flexibility in military matters, rigidity in political matters.

Early training in Suvorov schools may now be reducing the problem by so carefully indoctrinating potential officers with loyalty to the regime that they will emerge as fully trained Marxists. These schools accept students at the age of nine. They receive nine years of general education and a heavy indoctrination of Leninism-Marxism, as well as military discipline and training. Graduates attend officer candidate schools for three years and upon successful completion of the course are commissioned in the Soviet Army. The first graduates of this system are now entering the junior officer ranks. They may be expected to be politically unimpeachable and adequately trained company officers.

The complex of officer education that begins with military preparatory schools progresses through various stages of professional training to the apex of Soviet military instruction—the Voroshilov Higher Military Academy—which is comparable to the United States National War College. At present there are a large number of officer candidate schools conducted by the various arms and services. By analogy, these schools are comparable to a blending of the United States Military Academy and a United States Army officer candidate school. (In Australia, the Royal Military College, Duntroon, and Officer Candidate School.) Each arm and service operates its own academy, which offers courses roughly equivalent to the advanced courses of the United States Army's branch schools at Fort Benning, Fort Sill or Fort Knox. (In Australia, the Armoured School, the Artillery School, School of Infantry, etc.)

Specialized training in ordnance, signal, medical, and other services is supervised by the training section of the senior headquarters of the arm or service concerned and is co-ordinated by an agency within the headquarters of the Ground Forces.

The USSR provide suitable theatres for the training of troops under special conditions of climate and terrain, and considerable emphasis is placed on such training. The Caucasus, the Tadzhikistan Mountains, the Central Asian Desert, the swamps and forest of the Pripet Marshes and the tundra country of the northern latitudes provide diversified manoeuvre areas. More particularly, the Soviets take full advantage of the training facilities in Europe to adapt their troops to modern continental warfare as well. Training at all levels has been conducted in Germany and Austria throughout the Soviet occupation zones.

In the Soviet Army training programme, a paramount consideration of Soviet policy becomes apparent —to make military training a potent

force in developing to maximum readiness every segment and stratum of the total population of the USSR and to utilize military force or the threat thereof in implementing the will of the Soviet regime throughout the world. Certainly, the Soviet Army today is a well-trained, adequately led and politically controlled military machine.

AIR ATTACKS ON GUN POSITIONS

An extract from the report of an Operational Research Section operating in North-West Europe in 1945.

DURING the campaign in North-West Europe, a large number of captured gun-sites were examined with the object of finding out what damage had been done to them and how much of that damage had been caused by air attack. This report is based on personal surveys of captured gun-sites and subsequent discussions with members of Air and Armament Staffs together with conclusions taken from reports previously published.

Although air attack on enemy gun positions has been of considerable assistance to our ground forces, it should not be expected that a whole battery will be knocked out by air attack alone. Counter-battery fire will usually also be required. Even attacks by fighter-bomber air-craft will be only partly effective.

Guns in open emplacements can be successfully attacked by bombs and rocket projectiles. On hard ground the debris thrown up by near misses often silences individual guns.

Hardly any material damage has been done to guns in heavy, reinforced concrete emplacements. Destruction of these positions entail direct hits from heavy, armour-piercing bombs; but rocket projectiles, and cannon and machinegun fire may succeed in silencing guns temporarily, even those in concrete emplacements.

The stunning effect produced by air attack can be successfully exploited if the ground forces follow up within a few minutes. This stunning effect, which is manifest in a temporary loss of power to resist infantry attacks, only lasts for a few minutes.

There is no evidence to show that air attacks have a lasting effect on the morale of gun crews, but it is not unlikely that they have such an effect. The influence on morale is seen in a reduction in the will to resist infantry attacks.

OPERATIONAL RESEARCH

Captain F. R. Bond, RAAOC.

NUMBER of war-time soldiers will remember the Australian Operational Research Section (O.R.S. (Aust.): MGO Branch) and will know of the work carried out in New Guinea. Others will have seen references[1] "Operational Research," or to use the American version, "Operations Research," and may have wondered what it meant.

Logicians have warned us of the dangers inherent in definitions, and, heeding this warning, we shall offer a functional definition, regarding this step only as a starting point and not as an end.

Since the days of "Blackett's Circus,"[2] the methods of operational research have been applied, in the United Kingdom, not only in the Navy, Army and Air Forces, but also in the Board of Trade, the Boot and Shoe Industry, British Railways, Civil Aviation, the Cotton Industry, the Iron and Steel Industry, and the National Coal Board; hence our definition must be of a broad and general nature.

Definition.

One possible functional definition[3] is:—

"Operational Research seeks to provide factual data to assist the decisions of the Executive, and by experiment, both statistical and scientific, seeks to predict the probable outcome of given courses of action."

Implicit in this definition is the assumption that the "Intention" of the Executive is clear. There is seldom any doubt regarding the major intention of any functional organisation, but the formulation of subsidiary intentions may in itself provide an operational research task.

Difficulties in Definition.

Some difficulties have arisen in defining operational research. In the first place it is not new. For example, the work of Lanchester[4] may be quoted. Again, considerable work of an operational research nature must have been carried out before the format for Military Appreciations achieved its present form.

1. e.g., "Scientists Against Time," J. P. Baxter, Little, Brown & Co., Boston.
2. The nickname given to the workers led by Professor Blackett working with Gen. Sir Frederick Pile in Anti-Aircraft Command, U.K. (1940).
3. Articles on the definition of operational research have appeared in "The Operational Researcher" — Journal of the Operational Research Club, London.
4. "Aircraft in Warfare," F. W. Lanchester, Constable, London, 1916.

That which is **now**, perhaps, is the formation of suitably selected teams to study and report on problems, to the exclusion of other work. One result of this is that effort of greater intensity can be applied to a problem and often time can be saved between the discovery that a problem exists and the production of a workable solution.

In the second place the methods of operational research are those of an applied science. This does not exclude the necessity of provision for fundamental research in an operational research organisation. Operational research workers may seek to apply and combine the results of fundamental research in the several natural and social sciences, only to find, as occasionally has happened, that fundamental research has not yet progressed very far in that particular field of enquiry. In these circumstances the operational research worker must seek to provide at least a first approximation to the final solution, and indicate, with such pointers as he may discover, some lines of possibly fruitful enquiry to the specialist fundamental researcher.

Thirdly, many people carry out operational research without so naming their activities. For example Heyerdahl[5] and his associates conducted what may become a classical operational research experiment, combining as it did the researches of biologists, anthopologists and archaeologists with the practical task of lumbering, navigating, sailing and wireless operating; but no mention of operational research appears in his book.

5. "The Kon-Tiki Expedition," T. Hayerdahl. Translated by F. H. Lyon, Allen & Unwin, London, 1950.

Functioning.

The general field of operational research work in the Army includes the following:—

(a) The (comparative) measurement of the operational effectiveness of the man (crew) and weapon in combination.
(b) The measurement of the operational effectiveness of the man (crew) and equipment in combination.
(c) The assessment of fire control systems.
(d) The investigation of methods of working in depots.
(e) The study of logistics and supply.
(f) Investigation of rates of movement of field formations.
(g) The assessment of personnel selection procedures.
(h) The assessment of methods of training.
(i) Battle study.
(j) The utilisation of manpower.

The operational research organisations of a number of armies are at work throughout the world. In the United Kingdom work is based on Army Operational Research Group (AORG) with semi-autonomous sections in Germany, Korea and Malaya. The Canadian Army is served by the Canadian Army Operational Research Establishment (CAORE). In the United States work is carried out by the Operations Research Office (ORO). South Africa maintains an embryonic section with members working in the United Kingdom, while Australia has a number of serving officers with operational research experience.

Although organisations differ, the general method of work is the same. The methodology is that of the natural and social sciences. Firstly comes the framing of an hypothesis (in many problems a number of initially seemingly plausible hypotheses will present themselves). The hypothesis is then subjected to a strict test in an attempt to demonstrate, usually by experiment, that it is false. If the experiment fails to show that the hypothesis is false, then greater confidence can be placed in it. Formally, the hypothesis is stated, the initial conditions are stated, and the conclusion is drawn.

However, there is one major difference between many military applications of operational research and applications elsewhere. The laboratory of an army is war, and it is seldom possible to simulate, with any high reliability, those war conditions appertaining to the human factor. This throws into greater emphasis the need for battle study. The more classified quantitative data that can be collated on the battle field, the greater can be the reliability of subsequent trials and analyses. The work of oversea sections in Burma, Italy, the Middle East, New Guinea, and North-West Europe, and of those sections concerned with the defence of the UK Base can now be seen in almost respectable historical perspective. Current work in Korea and Malaya may be expected to confirm or bring up-to-date some of the findings in the war-time reports.

Since operations are carried out by men, and men exhibit considerable variation in attributes, statistical methods similar to those employed in the biological and social sciences are sometimes useful. Thus while individual (man, round, fragment) characteristics may be difficult to predict with any reliability, group characteristics can be estimated with greater ease and certainty.

Also considerable use is made of experiments designed to permit of factorial analysis, particularly where the factors involved are not easily held constant and it would be difficult to discover the relationship between pairs of variables.

In general, then, a variety of methods are available to the operational researcher. He uses these tools to find out "what makes things tick," or possibly why things are not ticking in the way the Executive expects. The operational researcher seeks methods of measurement which are independent of opinion, or if opinions form the subject of his researches he uses those social survey techniques likely to produce unbiased results.

Conditions for Successful Functioning.

It is difficult to prescribe those conditions under which operational research workers can be used so that an organisation can achieve the greatest benefit.

In the military sphere much is contained in the maxim: "A good soldier is afraid of nothing, not even a new idea." Generally the Executive must expect its ideas to receive a certain scepticism in the hands of operational researchers until the test of detailed and accurately recorded experiment has been applied. On the other hand the operational researcher must not be surprised if some of his most beloved brain chil-

dren are rejected as unsuitable after study of the Executive in the light of experience.

It is, however, the free interchange of ideas which probably leads to success. "No new idea is born unless at least two people are present at its birth." In fact a number of operational research reports are only records of investigations, the recommendations in them having been put into effect, as a result of close co-operation between soldier and operational research worker during the course of the investigation, before the report itself was written.

It may be interesting to note that biologists, chemists, economists, engineers, geographers, geologists, mathematicians, physicists, physiologists, psychiatrists, psychologists and statisticians combined with soldiers of every army and service (Army and science sides often combined in one person) have formed teams each of about four men, to tackle with frequent success a wide variety of army problems. Wise direction and close co-operation of army members, which latter has been the rule rather than the exception, cannot be ignored; but the wider view and the opportunity to relate and measure the interactions of widely different army activities which are open to the operational researchers may be counted as major factors.

The Future.

There are available about 2,000 published reports and memoranda by operational research workers dealing with army problems. Security inhibits the recounting of their contents, but they range between such diverse subjects as "Long Range Rockets," "Methods of Instruction at Staff College," and "Packaging of Hairpins." It is not unlikely that operational research workers will tackle more problems in the future, and that to some of these a solution will be found.

However, the problems are many, some latent and unrealised, and the workers are relatively few. The reports already issued give useful leads, but operational researchers like to encourage others to conduct investigations in their own particular sphere, hoping in this way to develop the "four dimentional minds" which may be so necessary in any future conflict.

Operational research reports are available through the usual channels, though sometimes necessarily on a restricted circulation.

It may be that some of the reader's problems have already been tackled; should the reader wish to know if reports covering his own military problems have already been issued he is commeded to try a little operational research and find out.

PROBLEMS
in an
AIRHEAD OPERATION

Major-General Otto P. Weyland, US Army.

ON the night of 5 March, 1944, gliders of the First Air Commando Force cut loose from their mother transports deep in Japanese-held Burma. The troops and equipment they carried established the "first" United States airhead, and, together with subsequent Air Commando operations, provided the "only" combat history of United States airhead operations.

Before anyone takes violent issue with the "first" and the "only," let me define the "airhead" upon which these statements are based. An airhead is an objective or a series of objectives well within enemy territory which can be taken only by airborne assault and which must be supplied and reinforced entirely by air until the successful completion of the operation.

It is not the purpose of this article to recite the military actions which have contributed to the modern concept of airhead operations. It is important, however, that it be understood that the concept finds little basis in experience in airhead operations. Rather, it stems from an analysis of similar operations (standard airborne, the Hump, the Berlin Airlift), an evaluation of the capabilities of present-day aircraft, and an acknowledgment of the existence of effective air-transportable weapons and equipment of the Army.

Visualize, if you will, the airborne phase of Normandy combined with the Berlin Airlift, plus active air opposition, and you have a fair picture of an airhead operation. It requires no stretch of the imagination to see that such an effort presents problems—many of them.

First of all, such an operation has a staggering transport aircraft requirement. Major-General James M. Gavin has stated that in his opinion a corps is the smallest unit that offers promising tactical prospects in the establishment of an independent airhead.[1] Colonel Joseph N. Bell has stated that the airlift of a corps would involve 31,400 tons and that its daily supply requirements would amount to 3,000 tons.[2] Add to this the required engineers, receipt and distribution personnel, aerodrome

—*From Army Information Digest, USA.*

1 *Infantry Journal, December,* 1946.

operations and maintenance personnel and fighter defence units and we begin to see the immense airlift problem that faces us.

Besides the problem of securing sufficient transport aircraft departure airfields must be selected which have the facilities necessary to provide for the complicated marshalling of aircraft and Army and Air Force units destined for the airhead. This is no small problem. Hundreds of aeroplanes and thousands of officers, soldiers and airmen must, from start to finish, be at the right place at the right time. This, of course, requires more than facilities. A major problem in organization is involved.

It is the theatre commander—or perhaps even the Joint Chiefs of Staff—who, having no other method of securing a "must" objective in the overall strategic scheme of the war, decides that an airhead operation will be carried out. A Joint Task Force will most likely be organized and given the airhead mission and the units with which to carry it out. It is this Task Force which does the detailed planning which puts the right men, the right equipment and the right aeroplanes all at the proper place at the proper time.

Let us assume that our Joint Task Force has been allocated the required number of transport aircraft, adequate departure airfields and assurance that sufficient combat and supporting units will be provided. We now have something to work with, but our work has just begun.

Before there can be any hope of success we must establish air superiority. Our fighters and bombers must clear the sky of the enemy, and not until this is accomplished to a sufficient degree can we risk the employment of our slow, unarmed transports with their valuable cargoes of men and equipment.

While the battle for control of the air is progressing, our reconnaissance units will be working overtime to select the exact drop zones and landing zones. They must keep the Task Force supplied with up-to-date photo coverage and reports on enemy air and surface activity over the entire area. The photographs must be studied in detail to select phase lines, to determine the capacity of the existing airfields and to select sites for the construction of airstrips if that should prove necessary. Landing-field capacity must be adequate to handle the maximum effort of our available transport aircraft and the operations of our fighter planes.

Assuming that the capacity of the airhead landing fields is satisfactory, we must then select the personnel and equipment to keep our transports flying the maximum number of sorties day and night in all weather. This means that we must plan to install instrument landing equipment and have it operating early in the action. It means that the right number of receipt and distribution personnel must be selected, trained and equipped so that aircraft turn-around time is kept to a minimum. If we have too many men for this job it will cause an extra airlift burden—for they, too, are consumers.

2 *Air University Quarterly Review, Winter,* 1948.

As our reconnaissance and intelligence reports are studied over a period of time, a picture of the enemy's capabilities begins to come into focus. We can make our "final" selection of combat units and determine the priority with which they will be introduced into the airhead. Having selected the combat units, the next problem is to determine the number and kind of supporting units they require. How many and what kind of engineers, for example, are needed? Can we afford to base fighter planes in the airhead, or, conversely, can we afford not to base them there? What will be the fighter defence requirement and what is the offensive reguirement? Many educated guesses have to be made—guesses based on an estimate of the enemy's capabilities.

The method of utilizing protective fighters is itself a major consideration. A wrong guess as to where to base them and in what strength may make or break our airhead operation. Besides the fighter units, an effective control system must be installed. In a recent exercise in which an airhead was established, close tactical air support was enhanced in the initial stages of the operation by Forward Air Controllers. These men parachuted into the area with the airborne units and established contact with and control of the air alert fighters in the area in a matter of minutes. As the airhead expands, the Tactical Control System, too, must grow so as to employ effectively our air effort from both an offensive and defensive standpoint.

So far, no mention has been made of the weather man, but we can be certain that he has been slaving over his charts and his crystal ball. He is the man who will exercise considerable influence in the selection of D-Day. What kind of weather do we want? Good weather —good enough to allow the assembly of our horde of troop carrier aircraft and their escort fighters. We may be able to use a "Berlin Airlift Stream" later on, but initially for the airborne phase of the operation we want as large a gathering in as small a space as possible. We therefore want weather good enough to allow the employment of mass and we want it to stay good until instrument landing systems can be installed in the airhead.

From the time the decision is made to conduct the airhead operation until the day it is established, there is one important problem for which the most careful plans must be made—namely, the maintenance of security. No whisper of what or where must reach the wrong ears. Like standard airborne operations, the airhead by its very nature depends on complete surprise for success. An informed enemy could lay a trap, the consequences of which are not nice to think about. It is almost certain that if the enemy knew our plans, the airhead would fail before it was fairly started. Deception has been employed effectively in past military operations, however, and might well prove valuable in planning for airhead operations.

The picture opposite shows American paratroops landing at Nadzab, New Guinea, to prepare the ground for the transports flying in the 7th Australian Division in September, 1943.

In summary, these are some of the basic requirements in an operation. First, air superiority must be established, or all thought of airhead operation must be abandoned. Second, there must be effective intelligence in order that an accurate picture of the enemy's capabilities may be presented. Any plans made without an understanding of these capabilities might well be suicidal. It is the key to the selection of units, weapons, equipment and the airhead itself. Third is the obvious requirement that sufficient airlift and combat and supporting units are available to conduct the operation. Fourth, security must be airtight. Like airborne operations, the establishment of an airhead requires for its success the advantage of surprise. Fifth, weather must be carefully analysed. The weather forecast plays an important part in the selection of D-Day, good weather being required for the employment of mass in the initial stages of the operation. These are a few of the major problems.

Some military thinkers consider that the logistic support required to establish and maintain an independent airhead exceeds our capability. The logistic support required is indeed enormous and limits the selection of areas suitable for an airhead. It is conceivable, however, that sites might be selected with a complex of airfields already built or utilizing, for example, natural features of the terrain such as the bed of a huge dry lake, which would require little if any heavy engineering equipment or construction materials.

The modern concept of airhead operations, as mentioned earlier, is based in part on an evaluation of the capabilities of present-day aircraft. Meanwhile, the weight-lifting capacity of transport aircraft is increasing steadily. Cruising speed, too, is increasing, and this in effect increases lift capacity since it allows more sorties in a given period. The reversible propeller can stop a heavily-loaded transport in a short distance. The same transport empty, or nearly so, can take off from the airhead in a shorter distance so that smaller airfields may be used.

The modern concept of airhead operations also is based in part on the acknowledgment that the Army is succeeding in its efforts in making modern weapons and equipment air transportable—with less weight and bulk. The recoilless rifle having the weight of a .50 calibre gun and the wallop of a 75mm. howitzer, is an example of the success of this programme.

As the Army programme to make its weapons and equipment air transportable and the Air Force programme to increase the lift capacity of its aircraft progress, the airhead operation becomes a potent capability—a capability that a belligerent nation cannot take lightly.