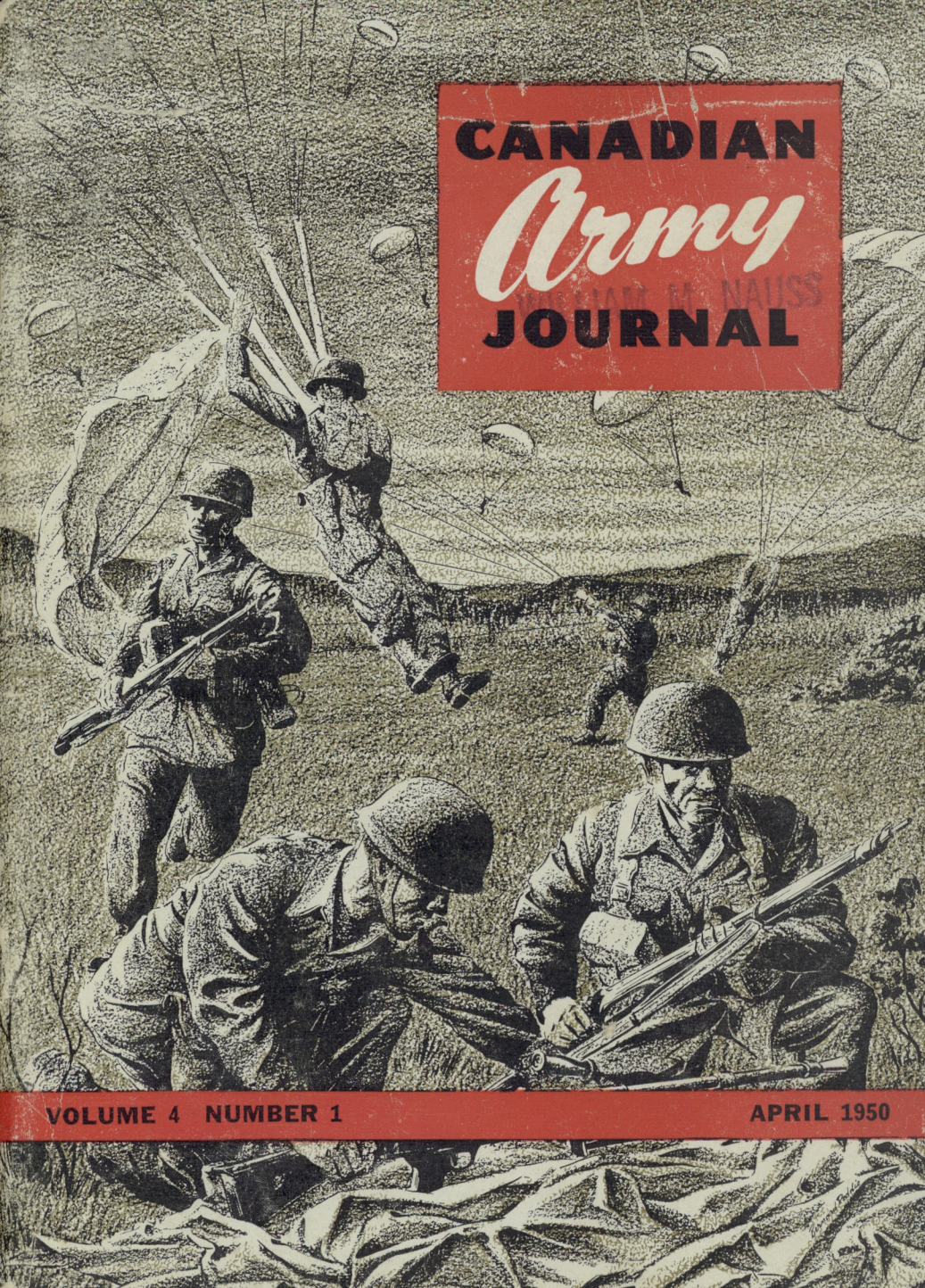

VOLUME 4 NUMBER 1 APRIL 1950

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This Month's Cover
Airborne troops parachuting into action.

CANADIAN Army JOURNAL

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

PRINCIPLES OF WAR

THE Battlefield Pattern

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Introduction

The Principles of War, as enunciated by the Canadian Chiefs of Staff Committee for the use and guidance of the Canadian Armed Services, are as follows:

Selection and Maintenance of the Aim
Maintenance of Morale
Offensive Action
Security
Surprise
Concentration of Force
Economy of Effort
Flexibility
Co-operation
Administration

The December 1947 issue of The Canadian Army Journal describes each of these in broad outline.

A further article "Introduction to the study of the Principles of War" by Major-General W. H. S. Macklin, CBE, appeared in Volume 2, Number 1 (April 1948) of the Journal. His article is well supported by historical references and study of it will prove of great value to all officers. This paper is not intended to be as comprehensive in scope, but is designed to reduce these same principles of war to their application on the battlefield, more in the light of the writer's general experience than by reference to any specific incident.

Every tactical operation involves

all the principles enumerated above, but each may vary in importance, depending on the situation. They are commonsense principles which must govern the action of every leader on the battlefield, no matter what his rank.

Selection and Maintenance of the Aim

In battlefield usage, this means that most important part of every operation, the *Intention.*

Providing they are well trained, supported, and maintained, and properly led, combat soldiers can and will carry out any task they may be given. If, however, they are set a task and given to believe their work ends when it has been accomplished, they will display no enthusiasm for a new task in continuation of their previous effort. Because their calling is highly dangerous, combat soldiers are particularly sensitive in this respect. Limited tasks must, therefore, be avoided or inertia will set in. Nothing is more calculated to create inertia than a parochial *Intention* dealing with the local problem.

As an illustration, let us assume that a division is ordered to capture an important military objective, UTOPIA, 30 miles away, with all possible speed. The GOC's "*Intention*" in his first order will be " 'X' Division will capture UTOPIA". During the course of the advance, he may have to issue a series of orders to cope with different situations created by the enemy to cause delay. Any action which is so ordered is only a means to an end—"*Method*"—which is incidental to his original and constant *Intention.* Thus, in all his orders, his enunciated *Intention* must remain constant—" 'X' Division will capture Utopia".

Some may argue that the GOC's *Intention* may be relegated to the "Information" paragraphs in the orders of his subordinates, and that it must not be confused with the *Intention,* which deals with the immediate problem. If this is so, the GOC's *Intention* is liable to find itself relegated to the background or forgotten in the lower levels of his command, in favour of a local or limited *Intention.* This limits initiative, as no officer or man can develop this to the full unless he works to an intention which is similar in meaning at all levels of command.

Battles are won by the initiative and aggressive action of the leading combat elements. If they know what is wanted of them, they will do it. Too often have we seen the opportunity for resounding success in battle lost, by what has been termed "lack of initiative on the part of subordinate commanders on the spot". In nine cases out of ten this was not due to a lack of aggressive spirit, but an ignorance of the *Intention* motivating the main operation.

To illustrate, when we reach the

level of company command, or its equivalent in the operation for the capture of UTOPIA, the *Intention* in all orders, no matter what the local situation, should be: " 'X' Coy will advance to UTOPIA" or " 'X' Coy will continue the advance to UTOPIA" rather than " 'X' Coy will capture that copse" or "'X' Coy will capture that knoll", etc., etc. Throughout the operation, the capture of local objectives is incidental to the capture of UTOPIA, which must be the goal of all ranks.

Therefore, if we are to apply the first principle of war, "*Selection and Maintenance of the Aim*", in our battle tactics, a similarity of "*Intention*" must be constantly evident, in all battle orders during the course of an operation, at all levels of command.

Maintenance of Morale

Good morale in a soldier is evidenced by a spirit of well-being arising from confidence:

(a) in his own ability as a skilful, well-disciplined soldier. This comes from good training.

(b) in the ability of his superiors to supply him with:

(i) good leadership in battle,

(ii) his creature comforts—food, clothing, mail and medical care, etc.

(iii) good weapons, equipment, and all tools of battle.

(c) In the security and well-being of his relatives and dependents. Soldiers with family worries invariably suffer from low morale.

Soldiers' interest in the cause are generally centered in loyalty and pride in the unit or formation in which they serve—the knowledge that they belong to a good unit. In the broader sense they are motivated by national pride—their country's cause is theirs, right or wrong.

Success in battle creates high morale, be it in the offensive or defensive—the knowledge that they are man for man better than their enemies. It is when things go badly that morale deteriorates and then it is only by means of good discipline and man-management that it can be maintained. Officers and NCO's with high morale can, by example, maintain it in the men they are privileged to lead. Example is everything in battle. It is never a case of "do what I say", but "do what I do".

Maintenance of Morale is the first duty of every leader, no matter what his rank, and must be constantly to the fore in battle.

Offensive Action

Ground forces organized and equipped on modern lines have great defensive power, which, when disposed in depth on the ground, is designed to preserve an intact front, flanks and rear. To destroy an enemy so disposed it is necessary to reach and obliterate the vitals of his defensive system—the rearward

headquarters and installations—and then to destroy his troops piecemeal. This requires deep penetrations and/or envelopments involving sustained attack, i.e. offensive action.

During offensive operations, every commander must press home his attacks ruthlessly, and without respite. In battle, the end justifies the means, and commanders of any grade who become chicken-hearted when the casualty lists are heavy and things are not going too well are bound to fail. No battle can be won without casualties, or enemy resistance, and the will to succeed regardless of cost must imbue all levels of command. Commanders in battle require great single-mindedness of purpose.

Never reinforce failure on the battlefield. When troops have failed to gain an objective, the same troops must be permitted to redeem their failure. At the same time, no attack should be commenced, or resumed, until every means has been co-ordinated to ensure success. Time cannot, however, be wasted. It must always be borne in mind that for an enemy subject to attack, time is precious. Every moment's respite gives him the opportunity to regain balance.

Even on the defensive, offensive tactics pay big dividends. Vigorous and aggressive patrolling by the troops in contact will give them an ascendancy on the defensive battlefield. It must be emphasized, however, that the defensive must be considered only as a temporary phase pending resumption of offensive action.

To sum up, therefore, offensive action is essential to success in battle, and must be vigorously and ruthlessly applied.

Security

The action of opposing commanders on the battlefield is based on intelligence concerning the dispositions, movements and probable intentions of the enemy. If both commanders are fully informed, counter-measures taken by each reduce the liberty of action of the opposing force to nil; the initiative is lost to both, and a stalemate results. It is essential, therefore, that the enemy be denied all knowledge of dispositions, movements and probable intention. The degree to which this is possible is a measure of the quality of battlefield security.

Security measures must, therefore, be designed to:

(a) deny to the enemy identity, dispositions and strength, by maintaining intact the front, flanks and rear; and

(b) obtain and maintain complete and accurate information about the enemy by all possible means.

In application, security measures may be classified as active or passive. Active measures require constant

alertness and observation on the part of the troops and continuous offensive patrolling, both fighting and reconnaissance, by day and by night, firstly to make enemy patrolling abortive, and secondly to obtain full and accurate information. Passive measures require concealment against enemy air and ground observation, track discipline, movements by night, if necessary, and deceptive action, etc. Strict control of passive security must be exercised at all times.

To sum up, therefore, without good security on the battlefield liberty of action is denied and therefore the initiative is lost.

Surprise

To hit the enemy when, where, or how he least expects it, must be the aim of every commander in battle. Tactical surprise is always possible and can be obtained in a variety of ways—by a novel use of familiar weapons, by means of new weapons, by new tactical methods and by unusual timings. It gives an initial advantage over the enemy, but the advantage so gained is usually of momentary value, and if not pressed home is soon lost.

Surprise is one of the most useful stratagems of battle. Without good security it is seldom possible.

Concentration of Force

It has been noted in a previous paragraph that to destroy an enemy, *Offensive Action* is required, and that this must be designed to reach and obliterate the vitals of his defensive system—his rearward headquarters and installations—and then to destroy his troops piecemeal. Also, that this requires deep penetrations and/or envelopments involving sustained attack.

To conduct a sustained attack with the above object in view requires a powerful superiority of strength at the chosen time and place to overcome the enemy defensive dispositions within the zone of advance. This requires a concentration of force on the chosen battlefield sufficient to ensure success.

Oftentimes the term "concentration of force" gives rise to the conception that it is applied to the enemy in a single narrow wedge. This is relatively true, but not strictly accurate. Depending on the number of formations and units employed and the ratio of assault to reserve in each case, there are bound to be a number of powerful thrusts applied simultaneously or echeloned, depending entirely on the plan of the commander concerned. The reserves are the power behind the various thrusts and must be sufficiently strong to maintain the momentum when the opportunity to exploit occurs.

For example, in the case of an infantry division attacking on a frontage of two brigades, the divisional commander might well, and should,

order the number of battalions to be employed in the initial assault. If he ordered four battalions, then, from the divisional standpoint, there would be four initial thrusts. It is necessary to order this, because on it depends the size, positioning and probable future manoeuvre of the reserves. Similarly, in the case of each forward brigade, the brigade commanders should detail the number of rifle companies to be employed in the initial assault.

Since manoeuvre is based on the exploitation of success, the more places struck the greater the opportunity for finding the soft spot. The ruling factor in the number of places to strike lies in the ability to concentrate a superiority of fire to neutralize the defensive fires of the enemy at the chosen point (or points) of attack.

To sum up, therefore, concentration of force in battle is designed to produce overwhelming local superiority at the point (or points) of attack, and for sustained attack during the course of the operation.

Economy of Effort

Economy of Effort, reduced to battlefield dimensions, is best illustrated by the old adage "Never send a boy on a man's errand". The converse is also true. It requires a nicety of judgment based on a knowledge of the capability and limitations of the various elements of battle available. This comes from training and experience.

In preceding paragraphs dealing with *Concentration of Force* and *Security*, it was pointed out that sustained attack required superiority over the enemy at the chosen place and time; and that concentration of force to achieve this superiority required liberty of action. Since it is impossible to maintain a superiority of force everywhere, a concentration can only be created by economy of force elsewhere, leaving *in situ* the bare minimum for security.

When penetrations have been made into an enemy defensive zone, open flanks become extremely sensitive, and the deeper the penetration the greater the sensitivity. Consequently, there is a tendency to over-insure. It must be remembered, however, that every bit of over-insurance will tend to weaken the forward thrust. Therefore, *Economy of Effort* in flank protection must be very closely watched.

In defensive and rearguard operations, the accurate firepower of modern weapons, and their range and flexibility in the application of fire permits great *Economy of Effort*. Therein lies the rule for applying this principle in any form of operation in the battlefield, i.e., full development of the firepower resources available and thereby conservation of the most precious material of battle—trained combat soldiers.

Flexibility

Once an attack is launched the

enemy will react. Usually he will react in a way contrary to expectations. Rarely is it possible, therefore, to execute a battle exactly as planned, no matter how careful the preparation. Enemy reaction must be countered without losing initiative or momentum and full opportunity taken of every advantage wherever it may occur. This is only feasible if the plan is sufficiently flexible to cope with a constantly changing situation.

It is well to remember that one is always tired in battle. This tiredness is a form of mental lethargy rather than physical, and it affects one's subordinates as much as oneself. Therefore, plans must, at all times, be simple, and orders crystal clear.

Any plan which requires a "phased" execution on a "timed" programme tends to be complicated and rarely works. Too many things can go wrong. One of the most difficult operations in battle, although it appears perfectly simple, is to pass troops through other troops who have taken an objective, should the move be exposed to enemy action from fires or counter-attack. A much simpler method is to permit the forward troops to exploit to the limit of their endurance, and to back up their success with reserves who mop up, and consolidate the zone of penetration in depth and width. If it becomes necessary to throw fresh troops into an attack, a new plan should always be made in preference to pre-arranged plans based on factors which were previously speculative. The pause, so required in order to effect proper co-ordination, will be infinitely less than the delay resultant on an attack which fails because it is launched prematurely.

Complicated artillery fire-plans are a prime cause of rigidity. Especially will this be apparent in artillery programmes involving barrages, any part of which cannot be controlled by the forward troops. When a great mass of artillery is employed for support, during a set-piece attack after much preparation, the artillery may tend to become the dominant factor in planning and execution rather than the means to support the manœuvre of infantry and armour for which it was designed. Any fire plan, no matter what dimensions, which is not possible to stop or repeat, in part, or whole, or otherwise control during battle, is lacking in flexibility and will not allow for the ebb and flow of battle.

To sum up, therefore, a plan of battle to be flexible, must be:

(a) simple, and clearly expressed.

(b) capable of sudden adjustment to overcome changing conditions.

Co-operation

The units and sub-units of any formation or unit are skilled teams, each of which has a particular function applied to the battlefield. If the

maximum punch is to be developed it can only be done by the co-ordinated effort of all. Each team must, therefore, be prepared to co-operate with the other to the fullest possible extent. To do so, each must have an intimate knowledge of the functional ability, and limitations, of the other.

Commanders of every grade are responsible for co-ordinating the effort of those under their command. A commander must assess the resources available to him, plan, delegate responsibility, and then supervise to see that his orders are carried out. It is one thing to give an order. It is another to see that it is properly executed. Close supervision by a commander will demand co-operation amongst subordinates whether they are permanently his or attached for an operation.

To engender close co-operation one must be careful to give credit where credit is due. Nothing will produce a desire to co-operate more than praise for a job well done. The soldier whose duty lies in the provision of ammunition, P.O.L., food, the evacuation of casualties or the control of traffic, is just as important a cog in the wheel of success as the infantryman, the tank man, the assault sapper or the gunner.

To win battles requires close co-operation and co-ordination of effort between all arms of the service, whether they be engaged in combat duty, or that of an administrative nature.

Administration

In its application to the battlefield this principle refers to the *Administrative* arrangements. Under this fall a number of most essential battle requirements—control of traffic; provision of ammunition, petrol, oil and lubricants, food, medical supplies; evacuation of sick and wounded; replacement of guns, vehicles and equipment and clothing; re-inforcements, postal, and burial of the dead. In fact, it includes everything required to keep the soldier in fighting trim and capable of sustained effort.

Administration deals with the care and maintenance of the soldier, the human side, and therefore is of prime importance. Good administrative arrangements are essential to success on any battlefield.

Conclusion

The principles of war are common-sense axioms which, when applied to the conduct of war, will prevent serious blunders. My treatment of these in the preceding paragraphs, in my attempt to reduce them to the dimensions of the battlefield, has been neither exhaustive nor original; but if this paper serves as a basis for further thought and improvement by even one young officer, it has served a useful purpose, and has been well worth the effort to write.

Medical Problems

OF PARATROOP TRAINING

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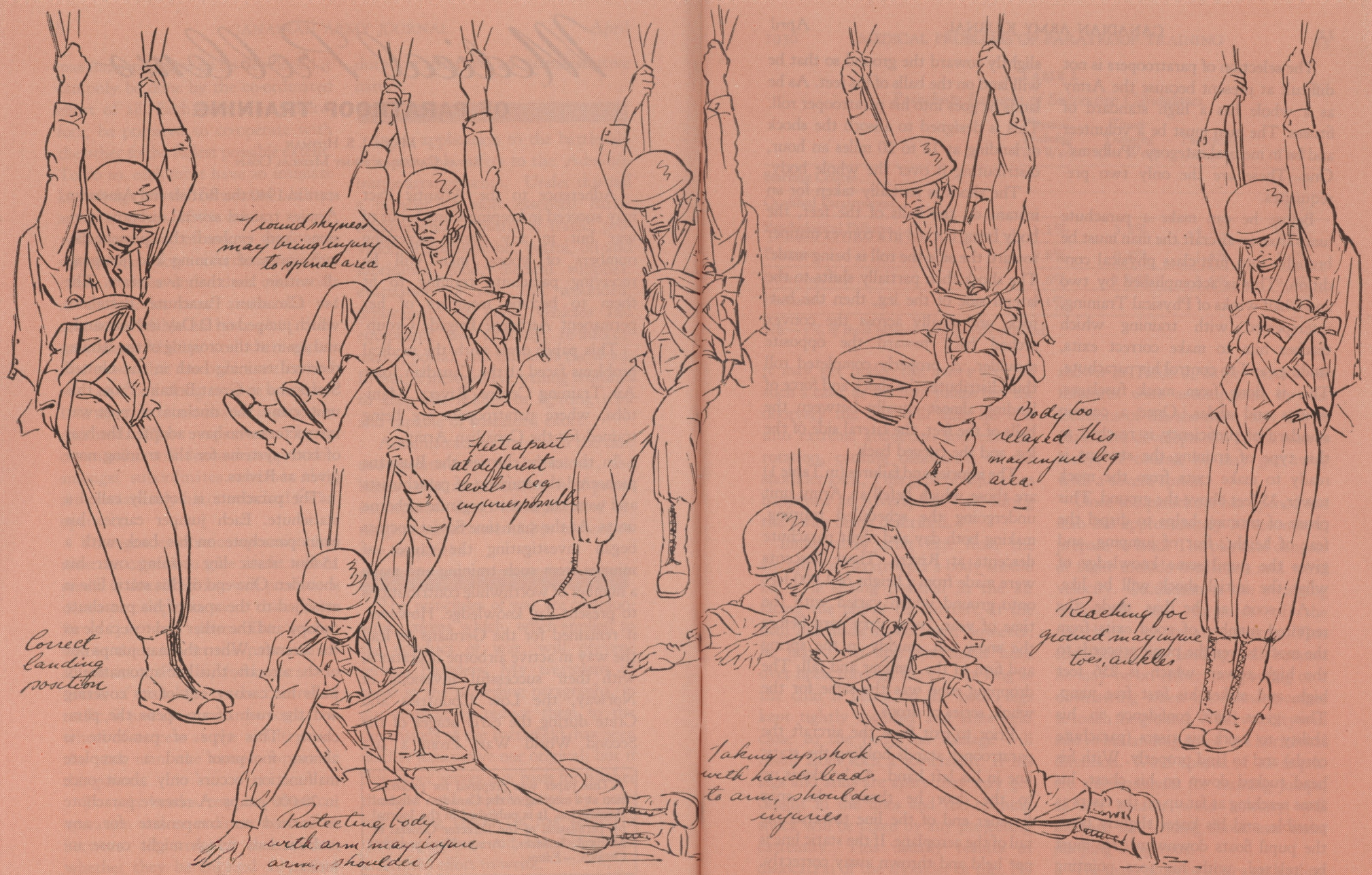
Adherence to the Atlantic Pact may succeed in keeping Canada out of war but in any event increasing numbers of young men will be receiving parachute training to fit them to become members of her permanent Airborne Brigade Group.

This paper deals with the medical problems faced at the Canadian Joint Air Training Centre, Rivers, Manitoba, where paratroopers are being trained for the Canadian Army.

In the early thirties the Russians pioneered the training of parachutists and were the first to organize airborne units. At the same time Soviet doctors began investigating the causes of injuries from such training and made a number of worthwhile contributions to present day knowledge. However, it remained for the Germans to lead the way in active airborne operations, with their successful invasions of Norway, the Low Countries and Crete during the early stages of the Second World War. From a late start in 1940 the British and American Armies trained several airborne divisions and evolved the present-day techniques of training and jumping, all within less than five years. The 1st Canadian Parachute Battalion, which jumped on D-Day in Normandy and again at the crossing of the Rhine, received training both in the United States and in Great Britain. From this unit came the nucleus of post-war instructors who have adopted the best of both systems for the training now given at Rivers.

The parachute is actually called a statichute. Each jumper carries his main parachute on his back with a 15-foot static line coming over his shoulder. One end of this static line is attached to the apex of his parachute canopy and the other end to a cable in the aircraft. When the man jumps out of the aircraft, this line automatically pulls his canopy out of its covering and the rush of air opens the parachute. This type of parachute is almost fool-proof and a complete malfunction occurs only about once in 20,000 jumps. A reserve parachute is carried to compensate for any malfunctions which might cause injuries.

This paper was prepared for presentation at a meeting of the Canadian Medical Association. It is published in the Journal by permission of the Director General of Medical Services, Army Headquarters, Ottawa.—*Editor.*


Correct landing position
Protecting body with arm may injure arm, shoulder
Feet apart at different levels leg injury possible
Round skymen may bring injury to spinal area
Taking up shock with hands leads to arm, shoulder injuries
Reaching for ground may injure toes, ankles
Body too relaxed this may injure leg area.
Bernard Reddick
1950

The selection of paratroopers is not difficult at present because the Army as a whole has a high standard of fitness. The man must be a volunteer and be in medical category "Pulhems" One. These are the only two prerequisites.

Before he can make a parachute jump from an aircraft the man must be brought into first-class physical condition. This is accomplished by two and a half weeks of Physical Training, interspersed with training which teaches him to make correct exits, landings and to control his parachute. This is done from mock fuselages, swings and slides. Once a certain standard of proficiency is reached in this type of training the student is ready to make exits from the mock tower, 35 feet above the ground. This phase of training helps to dispel the fear of height, fear of jumping, and gives the pupil some knowledge of what the initial shock will be like.

As soon as he has made the required number of good exits from the mock tower the pupil proceeds to the high tower, which is 256 feet high, and makes his first free jump. This gives him confidence in his ability to work his risers (parachute cords) and to land properly. With his head tucked down on his chest, his arms reaching as far up on the risers as possible, and his knees slightly bent, the pupil floats downward. He must be relaxed, with his toes pointing slightly toward the ground so that he will land on the balls of his feet. As he lands he goes into his paratrooper roll. This is designed to absorb the shock of landing at 12 to 20 miles an hour, distributing it over the whole body.

The shock is partially taken for an instant on the balls of the feet, the body being curved in a convex manner toward the side the roll is being made. The shock then partially shifts to the lateral side of the leg, then the buttock, and finally across the convex arched back toward the opposite shoulder. A properly completed roll thus distributes the shock and force of landing almost equally between the balls of the feet, the lateral side of the leg, and the curved back.

The injuries and failures (in Table 1) are those which befell an Army unit undergoing the scheduled training, making both day and night parachute descents at Rivers. These descents were made from a height of 1,000 feet onto ground which varied with the time of year, being very hard before the snow fell, muddy in the spring and firm in the summer and fall. The dropping zone was the same for the whole series of drops.

Prior to exit from the aircraft the paratrooper stands holding the static line in his left hand. As he closes up to the door he throws the snap fastener end of the line towards the tail of the aeroplane. If the static line is not held and thrown away correctly,

TABLE 1

Parachute Failures of Successive Candidates

	Physical Training Two Weeks	*Tower Training One Week*	*Parachute Jumping*	*Total*
Starting Course				100%
Qualified Paratroopers				84%
Psychological Failures	1.1%	3.8%	4.3%	9.2%
Fractures	0.8%	0.4%	1.4%	2.6%
Other Injuries	3.6%	1.9%	3.6%	9.2%
Deceased	0.1%			0.1%

NB:—5% of those injured subsequently qualified.

it may get under the man's arm; in such a case, as the man jumps out the doorway the line will fling his arm into extreme abduction and external rotation, causing dislocation of the shoulder joint. This type of injury has happened at Rivers, but not during the series being described.

Immediately after exit from the aircraft the paratrooper's body should be in a sitting position in the air facing the tail of the aircraft. If the man has made a poor exit, however, he may twist and somersault head over heels through the air. As long as the chin is flexed on the body, legs kept tightly together and arms held close to the body, no damage will result from such a somersault. If his legs and arms are apart they may get caught in the lines and the opening shock will be taken by any projecting extremity. This usually results in dislocation of the shoulder or hip. As shown in Table 2, 10 per cent of all fractures were accompanied by dislocations of the shoulder joint due to parachute development. If the man is lucky, of course, he may get away with a severe sprain.

Once the parachute has opened the man has approximately 30 seconds to prepare to land. The physical dangers of flight include oscillation and wind velocity. Oscillation is the swinging backwards and forwards of the parachute due to air currents. This complicates his landing roll because he may be on either an upswing or a downswing when the moment comes to touch the ground. Wind velocity will add to his landing speed in a horizontal direction. Wind speeds of 15 m.p.h. are the maximum for training jumps, as any greater wind velocity will increase the landing shock and make jumping dangerous.

The main cause of injury on landing

is poor body position. Good position on hitting the ground is automatic with a well-trained jumper, and there is little jarring or shock to the body. On the type of dropping zone used at Rivers there would be practically no injuries if each jumper landed and rolled as taught. When the ground is frozen, however, small unevenesses tend to throw a man off balance and may result in most of the shock being taken on part of one foot. If this is complicated by a high wind, or strong oscillation, injury may result.

The condition of the ground was found to be of major importance in serious injuries. Of the fractures on landing, none occurred when there was snow from December to March, and the majority occurred in October to December when the ground was frozen and uncovered.

Some 58 per cent of all fractures involved the ankle and resulted from the following landing factors. Landing with feet apart, the jumper may take the initial shock on one foot and pause before going into his roll. Inversion and abduction of the foot occurs. Then again, landing on uneven ground causes the feet to spread apart, with one lower than the other. Thus the landing shock is taken on one foot, and instead of rolling the jumper merely falls on one side, or the jumper may reach for the ground just prior to landing. This is an inherent tendency, resulting in the landing shock being taken by the toes. The force of landing is transmitted up the foot and the posterior articular lip of the tibia is sheered off. (This is . . . called the Parachute Fracture). Nine per cent of the fractures were of this type.

The commonest type of ankle fracture was a simple fracture of the fibula with no displacement, caused by inversion and abduction of the foot. The balance of the fractures occurred mainly during the Physical Training periods and are shown in order of frequency in Table 2. Although this training simulates parachuting these fractures are not common to the actual jumping.

Sprains of the ankle and foot were caused by the same landing factors that produced the fractures of the ankle. Acromio clavicular joint strain resulted from a poor landing roll. Instead of going into his roll on landing the jumper fell sideways and the point of his shoulder hit the ground with some force. Tearing of the coracoid ligament occurred in only one case. High wind speed, oscillation, or uneven ground are factors leading to this injury.

Abdominal muscle strain usually occurred during training in rope climbing. When this was localized in the right rectus muscle it simulated the abdominal pain of appendicitis and care had to be taken in the diagnosis.

TABLE 2

Fractures Occurring in Successive Trainees

	Physical Training Two Weeks	*Tower Training One Week*	*Parachute Jumping*	*Total*
Fracture of the Ankle	5.2%	10.5%	42.1%	57.9%
Acromial Process Scapula		5.3%	5.3%	10.4%
Talus	5.3%			5.3%
Caboid at Peroneal Attachment	5.3%			5.3%
Tibia and Fibula			5.3%	5.3%
Shaft Metatarsal Foot	5.3%			5.3%
Thoracic Vertebrae	5.3%			5.3%
Colles Fracture Wrist	5.3%			5.3%

NB:—58% are in the fibula and 75% are in the foot and ankle area.

A list of other injuries for which the man was removed temporarily from the course appears in Table 3:

TABLE 3

Other Injuries

Sprained ankle	30.8%
Contusions severe	18.5%
Sprained knee	16.9%
Abdominal muscle strain	9.3%
Strained shoulder	9.3%
Low back strain	7.7%
Concussion	3.0%
Injury internal cartilage knee	1.5%
Sprained thumb	1.5%
Strained muscle foreleg	1.5%
	100%

Low back strain occurs due to the man sitting down on the base of his spine instead of rolling. This resulted from poor body position on landing, with legs flexed 90 degrees or more at the knees. The jumper had an inherent desire to pull up his feet as he came to the ground, thus landing on the base of his spine.

Knee injuries usually occurred during ground training. These resulted from bad practice landings on gym mats early in the training. Once the man was in good physical condition and learned how to do his landing roll, knee injuries were infrequent and very minor in nature.

Tables 4 and 5 serve to demonstrate

that injuries increased with the men's age and weight.

Successful candidates in paratroop training have been broken down by Pozner R.A.M.C. into the four following psychological categories:

1. The smallest group of approximately 5 per cent who regard parachuting as a sport.

2. The second group of about 15 per cent who, after training, acquire a taste for paratrooping and then consider it a sport.

3. The third group of some 70 per cent who have no actual liking for parachuting as a sport; it is a job to be done and their anxiety at each jump is over once they land.

4. The last group of 10 per cent comprise men with considerable personal courage who have never become reconciled to the prospect of parachuting. They never lose their fear of jumping and are always worrying about the next jump.

All of these groups have been represented among the trainees who have gone to Rivers.

Many factors make a soldier volunteer for the parachute course. Group or social pressure may make the man wish to continue with his group of friends. The extra dollar a day risk pay may make all the difference in the world to a soldier's financial needs. The man may be unhappy in his posting and willing to try something new. It is usually such men who become the so-called "Psychological Failures", requesting to be taken off the course during early training, or refusing to jump from the mock tower, the high tower, or aircraft. This group accounts for 9 per cent of those starting a course and almost equals the number injured.

The "Psychological Failures" during the Physical Training period were mainly of the anxiety type. On interview, such men stated that they could not sleep nor eat, had bad dreams and were unhappy about the prospect of jumping. They asked to be taken off the course.

During the next phase there are the men who willingly ascend the mock tower, but when they stand in the

TABLE 4

Relationship of Age to Injury

	Age 17 to 26	*27 to 46*
Other Injuries	6.3%	14.2%
Fractures	2.5%	2.4%
Psychological Failures	8.6%	8.6%
Total	17.4%	25.2%

TABLE 5
Relationship of Weight to Injury

	100 to 150	151 to 200
Other Injuries	5.9%	11.1%
Fractures	3.0%	2.2%
Psychological Failures	8.1%	8.8%
Total	17.0%	22.1%

doorway and see the ground 35 feet below are unable to jump. This type of refusal is mainly due to fear of height, and not necessarily linked with other fears. It has been found at Rivers that some men who displayed great bravery during the war could not make this jump.

By the time men get to the stage of jumping from the high tower they have complete confidence in the instructors and equipment. At this stage men ask to be taken off the course because they have decided that parachuting is not for them. They feel that if they qualify they will subsequently have to jump whenever ordered to do so. The man refuses so that he will not have to worry in the future about jumping.

There are two types of failure in the aircraft itself. First, there are those who freeze in their seats and cannot stand up on the order, or those who get to the door and then refuse to jump. There is a second type of man who has been upset as a result of one of his jumps (a heavy opening load, a landing shock, or a malfunction of the parachute) and who refuses to continue after having made one or more training parachute jumps from an aircraft.

These types of refusal are contagious and every effort to eliminate them is made. Failures and refusals in the aircraft are dangerous, creating uneasiness and a desire not to jump among the other men.

Ever since such men started their parachute course they have been subjected to stories about parachutes failing to open, malfunctions, tall tales by veteran jumpers, all of which cannot be erased from their minds. As soon as they climb into the plane they can visualize all these stories coming true, with themselves in the leading role. They see the aircraft leave the ground, start climbing, and then watch the countryside through the open door. These sensations pyramid upon their own human inherent fear of height and, by the time the order to prepare for jumping is given, their brains are a mass of conflicting emotions and vivid imaginations. On the order "stand up" they have no

strength to obey and are unable to move a muscle. These men give a history of feeling weak, of dizziness, and sometimes nausea. Sometimes they manage to stand up and then collapse. Others get as far as the open door and freeze, with both hands rigidly grasping the doorway to prevent their exit.

Men with vivid imaginations and those who are highly strung and sensitive are not suitable for parachute training. Successful candidates are those who can relax and not let nervous tensions build up. The problem of "Psychological Failures" may possibly be lessened by adequate screening by selection boards in the future. In the series described in this paper there were no rejections in preliminary medical examination for instability or anxiety, and each candidate was allowed to carry on until he asked for removal from the course.

Physical injury in training is relatively common and is a major case of wastage. Fortunately, a large proportion of injuries are of a minor nature and, after recovery, the individual can return for completion of his training. As noted above, age and weight are of some significance in parachute training. Again, snow covered ground reduces the number of fractures. With continued improvement in training equipment and technique and more adequate personnel selection to screen out potential "psychological failures" the proportion of successful candidates completing each course will gradually rise.

The number of injuries and "psychological failures" seem to vary in direct proportion to the physical and mental condition of the man. The candidate must be in good physical condition and have complete confidence in his equipment, training, instructors, and especially in himself. Mental alertness, or a lack of it, is an important factor and injuries are preventable if the man is mentally on his toes and can respond quickly to any unforeseen situation.

This investigation was suggested by Col. J. N. Crawford, Ottawa, and Lt. Col. G. L. M. Smith, Winnipeg. I wish to thank Lt. Col. Smith especially, for his help and inspiration in preparing this article for presentation at the Canadian Medical Association meeting at Saskatoon this year.

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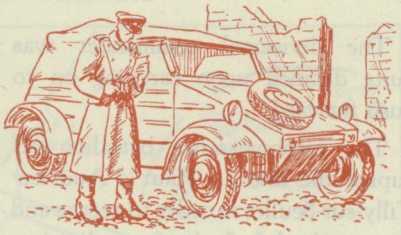
This is the first instalment of a narrative of the German forces' movements in the Caen-Falaise operation written by Capt. Bernhard-Georg Meitzell, a German Staff Officer at Divisional Headquarters of the 12th SS (Panzer) Division. Meitzell was wounded and taken prisoner east of Falaise by the Allied Forces in August 1944. The second instalment will be published in the next issue of the Journal.—*Editor.*



Caen-Falaise

6 June 1944

Without knowing anything about the beginning of the Battle of Normandy I left Berlin by car at 0600 hours with "TOP SECRET" documents, intended for Panzer Group West, 1 SS Panzer Corps, and 12 SS Panzer Division.

The first news of the landing of allied troops in Normandy reached me when making a short stop at the headquarters of 1 SS Panzer Division east of Turnhout in Belgium. When I was told that first parts of 12 SS Panzer Division had already come in contact with British troops, I tried to reach 12 SS Panzer Division the same day but was delayed by at least half a dozen punctures and didn't arrive at Divisional Headquarters, west of Bretteville-sur-Laize, till 0700 hours on 7 June.

7 June

Having stayed up all night the whole divisional staff looked overtired, their two command-cars had been destroyed the day before by attacking fighter-bombers. During the attack, our fourth staff officer's driver had been killed. My own driver, whom I had left at Divisional Headquarters when I went to Berlin, was seriously wounded and died three days later.

Though I myself had had no sleep during the night I had at once to organize removing Divisional Headquarters to the western suburb of Caen. In spite of myriads of fighter-bombers we managed to reach Caen without being attacked by aircraft.

We had hardly arrived at our new place when Divisional Headquarters was flooded by news reporting on the fighting activities of our advance guard north of Caen: Panzer Grenadiers had succeeded in capturing Buron and Authie and taking the first prisoners belonging to 3 British Division. Elements of the reconnaissance company, 25 Panzer Grenadier Regiment, had entered Rots and reported on fighting with elements of 3 Canadian Division.

The divisional commander was quite decided upon carrying on to push forward.

The reconnaissance battalion occupied the line Le Haut d'Audrieu-Tilly-sur-Seulles in order to secure and protect the left flank of our division.

The third battalion, 26 Panzer Grenadier Regiment, arrived late in the afternoon but managed all the same the capture of Brouay and in doing so contributed considerably to the consolidation of our left flank.

But the two other battalions of 26 Panzer Grenadier Regiment were again and again held up by attacking fighter-bombers and traffic jams and failed to arrive in time to close the gap between 25 Panzer Grenadier Regiment and the third battalion, 26 Panzer Grenadier Regiment, and to procure the preliminary condition for a continuation of our advance.

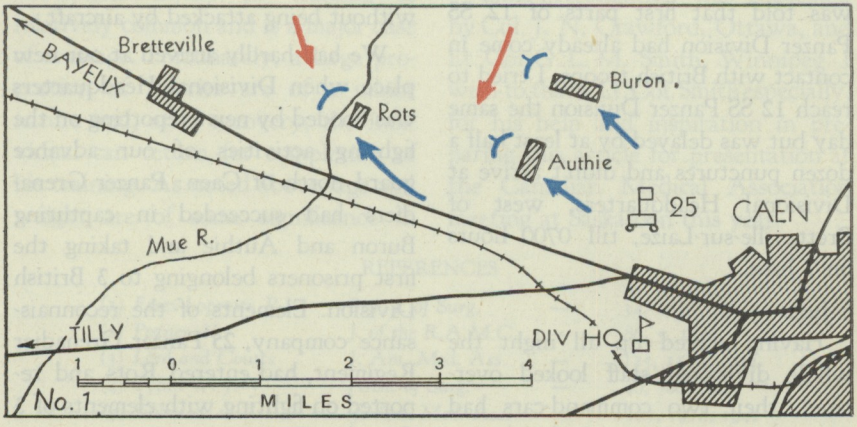
By midnight, the divisional commander decided to cease pushing forward. I remember our divisional intelligence officer muttering when leaving our chief of staff's room: "Well, that was our only chance of pushing them back into the sea. What's left to do is to make the best of a bad job."

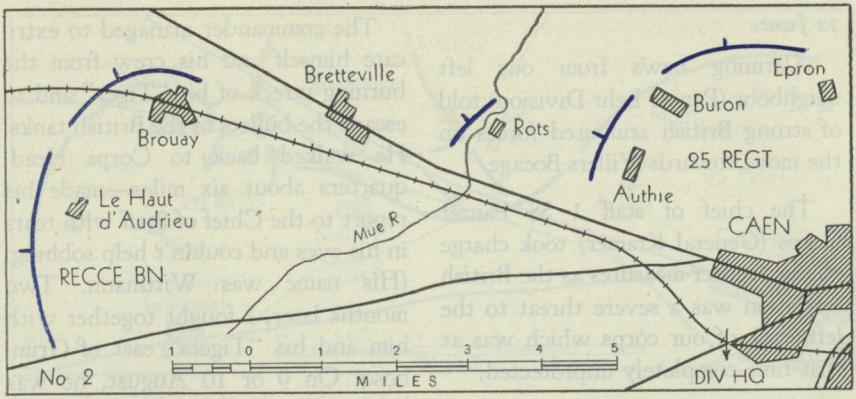
8 June

The Second Battalion, 26 Regiment, at last arrived, attacked Putot but, having taken it, was unable to hold it.

The First Battalion, 26 Regiment, closed the gap between our two Panzer Grenadier regiments, but arrived too late to prevent the loss of Rots and Bretteville.

During the fighting round the villages of Rots and Bretteville the reconnaissance company and the elements of our Panzer Regiment suffered heavy losses. Both the company commanders were killed.





9 June

British tanks and infantry snatched away from our reconnaissance battalion the village Le Haut d'Audrieu.

As the battalion was at the same time engaged in supporting first parts of the Panzer Lehr Division to keep off British tanks and infantry from entering Tilly, it was quite a job.

During the first three days of the Battle of Normandy the general commanding the Seventh Army, Colonel-General Dollmann, and the general commanding Panzer Group West, General Geyr von Schweppenburg, visited our Divisional Headquarters.

At that time, Colonel-General Dollmann had almost no idea either of the strength and order of battle of the British and American forces or the intentions of the German High Command.

General Geyr von Schweppenburg, who had lost all his staff in the course of an air bombardment, was in favour of an early withdrawal of all armoured formations from the country west and southwest of Caen which was in his opinion unsuitable for major tank operations. "The ideal ground for a major counter-attack and night operations of mobile forces is the open country south-east of Caen. There we'll be able to use our tanks and to exploit their mobility and the superior range of their guns to the utmost extent.

"We'll lose Caen anyhow. Why then not evacuate the country west of the Orme voluntarily and leave the British behind guessing . . .?"

These unconventional views caused his eventual removal and General Eberbach took his place.

12 June

Alarming news from our left neighbour (Panzer Lehr Division) told of strong British armoured forces on the move towards Villers-Bocage.

The chief of staff 1 SS Panzer Corps (General Kramer) took charge of the counter-measures as the British operation was a severe threat to the left flank of our corps which was at that time completely unprotected.

On 12 or 13 June, five "Tiger" tanks were rushed to Villers-Bocage. According to the report of their commander, they by-passed south of Villers-Bocage but couldn't make out any British tanks either in the village or in the immediate vicinity. So the tank commander left four of his "Tigers" in the western suburb of the village and tried with one tank to find out the whereabouts of the British armoured column.

All of a sudden his tank was at close quarters with advancing Bren-carriers and tanks. Almost at the same moment the leading vehicle exploded, hit by an 88 shell of his tank gun. He took up position beside the burning vehicle. The column was made havoc of by his formidable 88 gun. Some vehicles were rushed when the 50-ton tank moved on. But the concentrated fire of British tanks crippled the tank and knocked it out in the long run.

The commander managed to extricate himself and his crew from the burning wreck of his "Tiger" and to escape the bullets of the British tanks. He walked back to Corps Headquarters about six miles—made his report to the Chief of Staff with tears in his eyes and couldn't help sobbing. (His name was Wittmann. Two months later, I fought together with him and his "Tigers" east of Grimbosq. On 9 or 10 August, he was killed in a fight northeast of Fotigny. His tank was hit and exploded at once).

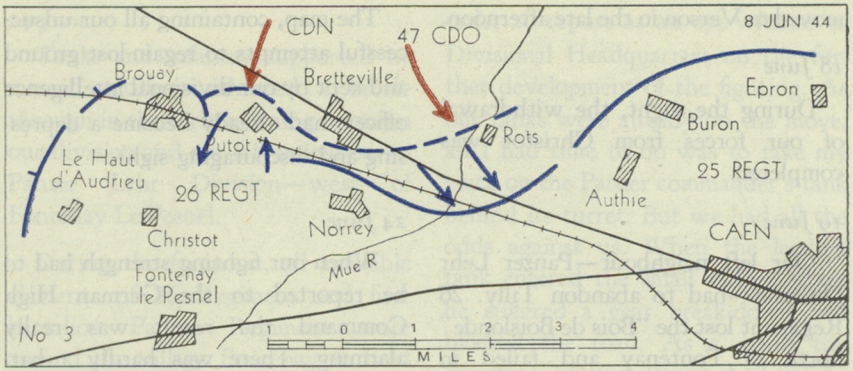
First parts of 2 Panzer Division reached Villers-Bocage later in the day and enabled us to withdraw our tanks from that sector.

14 June

Advanced posts of the first and second battalions, 26 Regiment, were forced out of Norrey by 3 Canadian Division.

A counter-attack of our Pioneer Battalion to recapture Norrey was dispersed by massed British artillery and anti-tank gunfire and had to be broken off.

The salient on the left wing of our front-line (Norrey-Brouay-Christot) was repeatedly attacked by tanks and infantry. Moreover, we had to support our left neighbour with our only company in reserve to keep off attacking elements of 50th Division. As the



British attacks against our positions in the Norrey-Brouay-Christot area were obviously reconnaissance in force, a major attack against 26 Regiment salient was to be expected. Our Chief of Staff asked the corps again and again for the permission to prepare new positions north of the road St. Mauvieu — Fontenay-le-Pesnel but was not even allowed to lay out some strongholds to be manned in case of a break-through.

17 June

Our Chief of Staff had just left Div HQ when a heavy artillery barrage fell suddenly upon our Headquarters. I was writing the war diary when the first shower of shells overran the Headquarters and was still writing when we were shelled for the second time. Then someone cried into the window of my room: "The divisional commander is dead!" I jumped out of the window and a third barrage forced me to take protection beside a young soldier. "Where is the divisional commander?" I cried. When the young soldier lifted his left arm to point at the ditch where the corpse of the divisional commander was lying a shell-splinter cut off the man's arm. At a bound I reached the next ditch. Broken props and stone fragments and the crushed bodies of the divisional commander and his fourth staff officer were all that was left.

In the late afternoon, the commanding officer of 25 Regiment took over the command of the division.

His first task was to look out for new suitable positions north of the road St. Mauvieu-Fontenay, a task which had become indispensable in the meantime. Permission to do so— though refused by the corps two days ago—had at last been given.

Divisional Headquarters was re-

moved to Verson in the late afternoon.

18 June

During the night, the withdrawal of our forces from Christot was completed.

19 June

Our left neighbour—Panzer Lehr Division—had to abandon Tilly. 26 Regiment lost the "Bois de Boislonde" north of Fontenay and failed in regaining the lost ground.

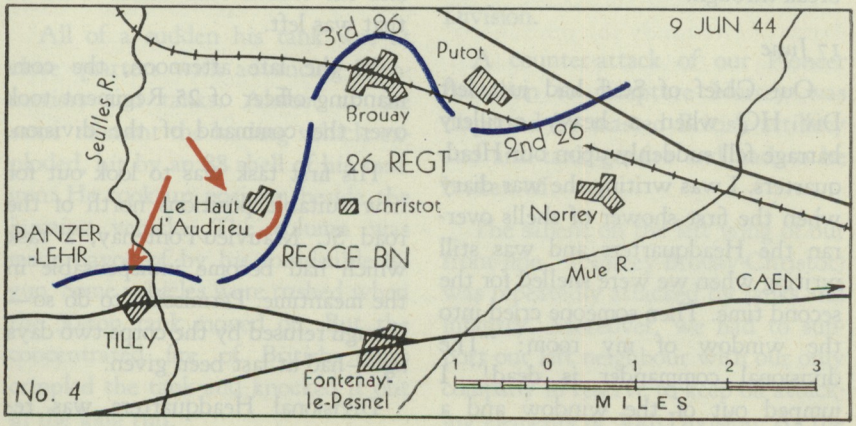
23 June

When our right neighbour—21 Panzer Division—reported British forces attacking and eventually capturing St. Honorine we supported his counter-attacks with our artillery and elements of our Panzer Regiment. But hardly was anybody astonished when 21 Panzer Division's attempts failed to recapture St. Honorine.

The map, containing all our unsuccessful attempts to regain lost ground and kept by our divisional intelligence officer, had already become a depressing and discouraging sight.

24 June

When our fighting strength had to be reported to the German High Command the result was really alarming. There was hardly a battalion which had still the fighting strength of an ordinary company. All but two companies of our division were fighting in the front line. Even the Pioneer and Anti-aircraft Battalions were engaged in front-line fighting. Two reconnaissance companies whose fighting strength had been diminished to 20 or 30 during the fighting round the village Le Haut d'Audrieu were the whole divisional reserve.

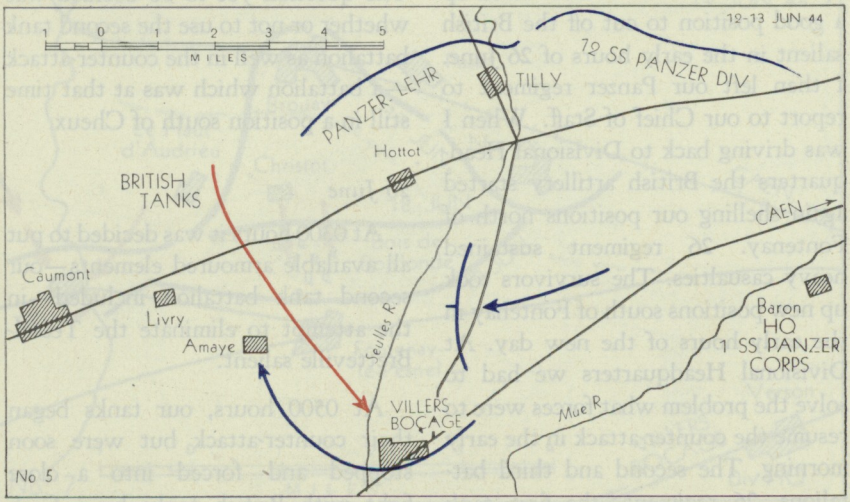


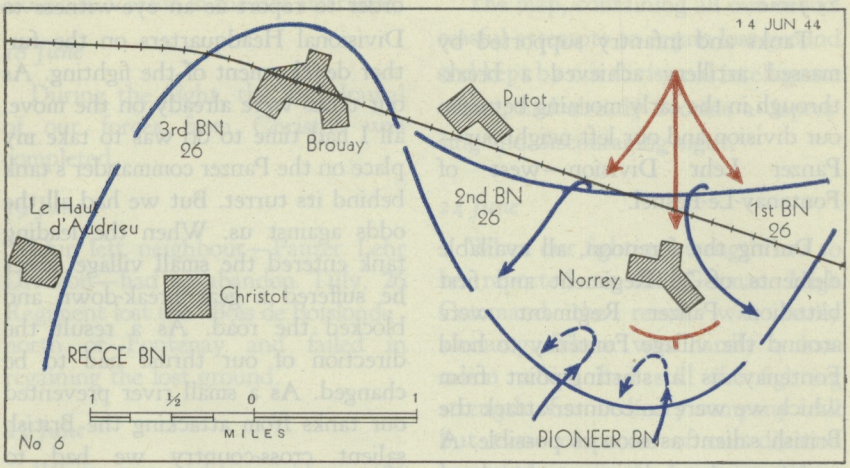
25 June

Tanks and infantry supported by massed artillery achieved a break-through in the early morning between our division and our left neighbour—Panzer Lehr Division—west of Fontenay-Le-Pesnel.

During the forenoon, all available elements of 26 Regiment and first battalion Panzer Regiment were around the village Fontenay to hold Fontenay as a starting-point from which we were to counter-attack the British salient as soon as possible. A tank force of our division and tanks of our left neighbour were ordered to close the gap between Fontenay and Juvigny in the afternoon.

I arrived at Fontenay about the time when the counter-attack began in order to report as an eye-witness to Divisional Headquarters on the further development of the fighting. As our tanks were already on the move, all I had time to do was to take my place on the Panzer commander's tank behind its turret. But we had all the odds against us. When the leading tank entered the small village street he suffered a gear break-down and blocked the road. As a result the direction of our thrust had to be changed. As a small river prevented our tanks from attacking the British salient cross-country we had to redirect our tanks to Tessel-Bretteville where a bridge enabled them to cross the river. The result was our failure to prevent the British tanks and infantry from gaining the high ground and wood west of Tessel-





Bretteville. By nightfall, we had made some progress in gaining the west bank of the river. When our leading tanks reached the road Fontenay-Juvigny by midnight, we were of opinion that we had at least taken up a good position to cut off the British salient in the early hours of 26 June. I then left our Panzer regiment to report to our Chief of Staff. When I was driving back to Divisional Headquarters the British artillery started again shelling our positions north of Fontenay. 26 regiment sustained heavy casualties. The survivors took up new positions south of Fontenay in the early hours of the new day. At Divisional Headquarters we had to solve the problem what forces were to resume the counter-attack in the early morning. The second and third battalions, 26 regiment, the first tank battalion, and two companies of the reconnaissance battalion were already engaged in the sector southeast of Fontenay. Another "Tiger" company was put at our disposal by the corps. The question yet to be decided was whether or not to use the second tank battalion as well in the counter-attack —a battalion which was at that time still in a position south of Cheux.

26 June

At 0300 hours it was decided to put all available armoured elements—our second tank battalion included—in the attempt to eliminate the Tessel-Bretteville salient.

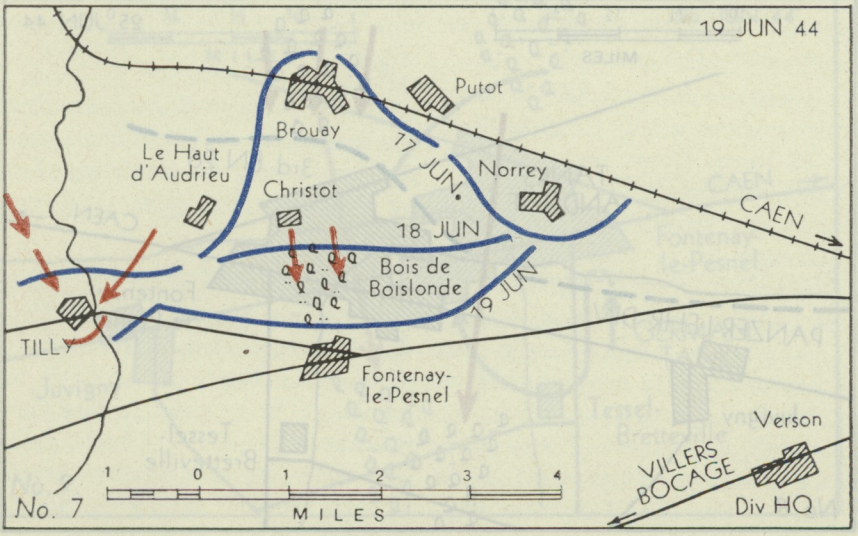
At 0500 hours, our tanks began their counter-attack but were soon stopped and forced into a close fight with British tanks by a fresh

British attack. Attacks and counter-attacks followed in quick succession. In the long run, our tanks were unable to hold Tessel-Bretteville in the face of subsequent attacks from the north and the west. But any attempt of British tanks to enter Rauray was frustrated by our tanks' determined reaction.

About 0730 hours, an emergency 'phone call reached Divisional Headquarters from the commanding officer Pioneer battalion: "My battalion's outposts have been overrun by British tanks. All my anti-tank guns have been destroyed by a tremendous artillery barrage in the early morning. Where are the tanks . . .?"

The telephonic connection between Divisional Headquarters and the Pioneer Battalion was interrupted. Our Chief of Staff was inclined to belittle the call. But more alarming news arrived soon. Our self-propelled artillery was reported to be fighting duels with British tanks north-west of Colleville. Our second artillery battalion—in a position north of Grainville—had been by-passed and was in danger of being surrounded by British tanks and infantry. The commanding officer of this battalion was killed during the fighting.

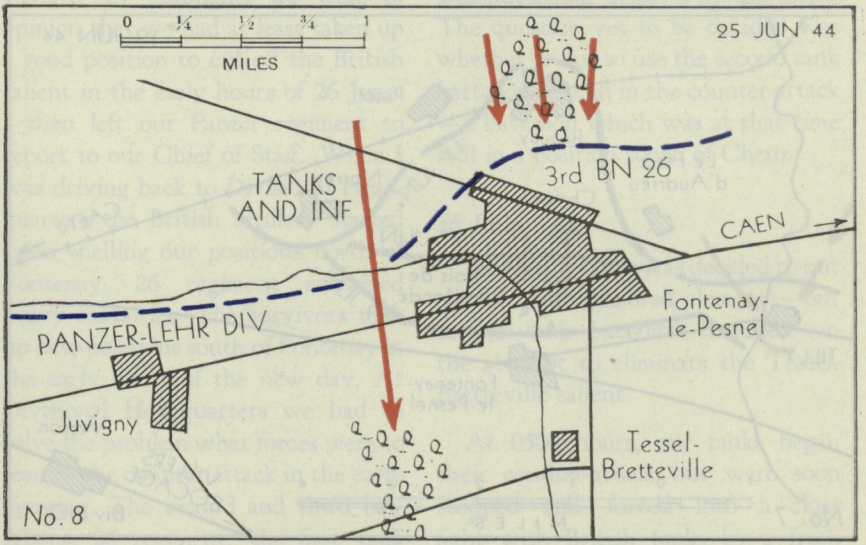
To stem the flood of British tanks and infantry our divisional commander formed two battle groups, one on either side of the British salient. He himself took charge of the battle group Mouen and the commanding officer of the Panzer Regiment took



over the command of the battle group Grainville. It was a piece of good luck that the telephonic connection between these two battle groups was never interrupted during the day.

But we didn't succeed in bringing the British attack to a standstill, in spite of all our desperate efforts. We sustained heavy casualties and had a series of very bitter experiences. Our infantry was of no use at all against British tanks co-operating with infantry when unsupported by our tanks or anti-tank-guns. Two of our shattered Panzer-Grenadier companies were completely wiped out by the same method of attack. British tanks by-passed and surrounded their position. The defending Panzer-Grenadiers were forced by machine-gun fire to seek shelter in their foxholes. British infantry then closed up under cover of the tank-guns to drop hand grenades, burying the defenders in their foxholes.

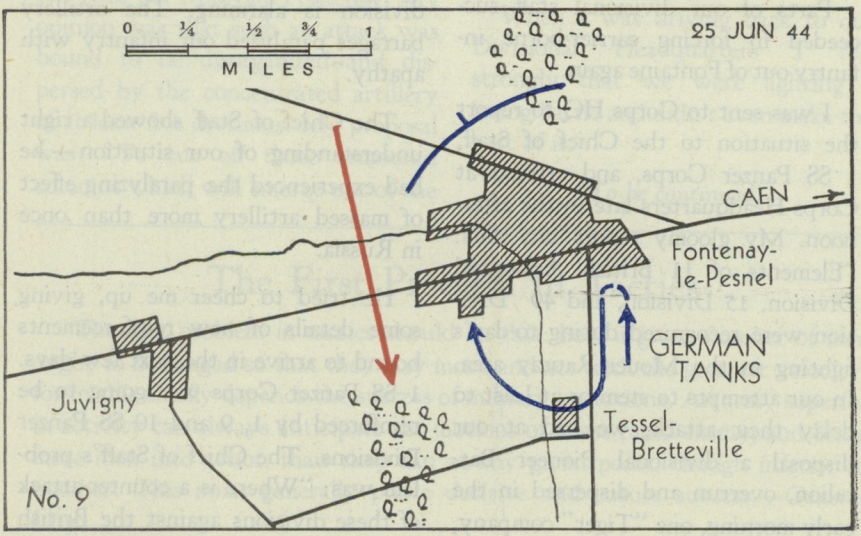
I was lying beside my divisional commander when, only half a mile in front of us, his reconnaissance company was eliminated by British tanks and infantry and we could do nothing at all to help them. We could not even shorten their torture as our artillery munition was almost used up. Our divisional commander had known each one of these 17- and 18-year-old soldiers who were dying half a mile in front of us. When I looked at the general beside me I saw tears in his eyes.

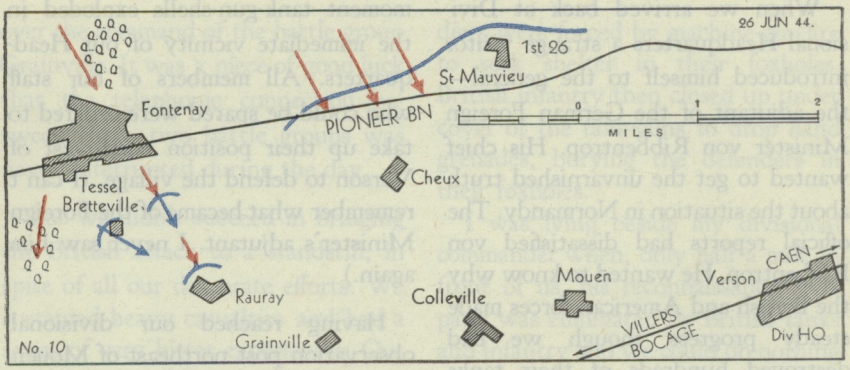


When we arrived back at Divisional Headquarters a strange visitor introduced himself to the general—the adjutant of the German Foreign Minister von Ribbentrop. His chief wanted to get the unvarnished truth about the situation in Normandy. The official reports had dissatisfied von Ribbentrop. He wanted to know why the British and American forces made steady progress though we had destroyed hundreds of their tanks according to the official reports. The Foreign Minister's adjutant was still talking about his chief's requests when a tank officer broke the news: "British tanks and infantry have entered Mouen!" (Mouen was half a mile northwest of our Divisional Headquarters). Almost at the same moment tank-gun-shells exploded in the immediate vicinity of our Headquarters. All members of our staff who could be spared were ordered to take up their position northwest of Verson to defend the village. (I can't remember what became of the Foreign Minister's adjutant. I never saw him again.)

Having reached our divisional observation post northeast of Mouen I watched the close fight between British tanks and tank-reinforcements of 21 Panzer Division which had at last arrived and reported the development of the fighting to Divisional Headquarters.

As our tanks and grenadiers failed to recapture Mouen, Colleville and





Grainville, it was decided to strengthen our position on both sides of the bottleneck Mouen-Grainville and to let the wooded country in the quadrangle Mouen-Baron-Gavrus-Grainville take charge of itself.

Divisional Headquarters moved from Verson to Louvigny.

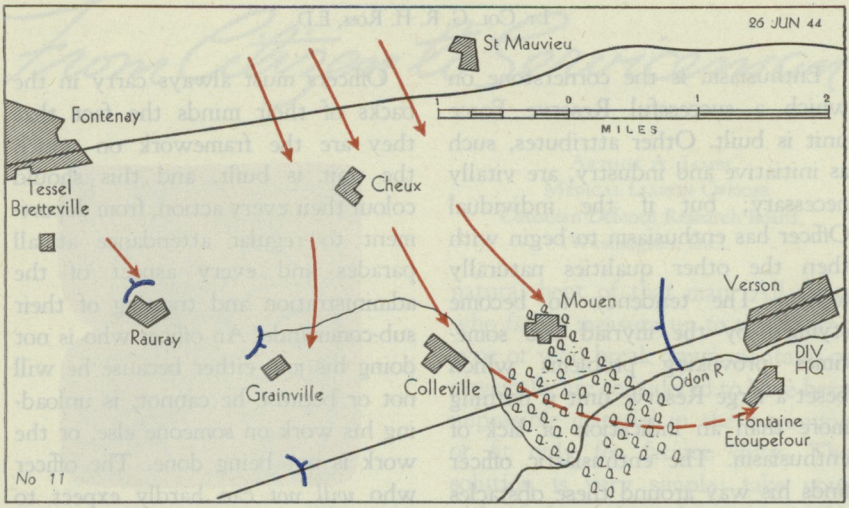
Parts of our divisional staff succeeded in forcing carrier-borne infantry out of Fontaine again.

I was sent to Corps HQ to report the situation to the Chief of Staff, 1 SS Panzer Corps, and arrived at Corps Headquarters late in the afternoon. My gloomy report ran thus: "Elements of 11 British Armoured Division, 15 Division, and 49 Division were recognized during to-day's fighting in the Mouen-Rauray area. In our attempts to stem or at least to delay their attack, we had at our disposal a divisional Pioneer Battalion, overrun and dispersed in the early morning, one "Tiger" company, reduced to two tanks during the fighting, tanks of 21 Panzer Division, not very eager to attack and suffer damage, and our decimated 26 Panzer-Grenadier (2nd and 3rd Battalion) and Panzer Regiments.

"The effect of the massed British artillery on the young soldiers of our division is alarming. The artillery barrages paralyzed our infantry with apathy."

The Chief of Staff showed a right understanding of our situation — he had experienced the paralyzing effect of massed artillery more than once in Russia.

He tried to cheer me up, giving some details of new reinforcements bound to arrive in the next few days. 1 SS Panzer Corps was going to be reinforced by 1, 9 and 10 SS Panzer Divisions. The Chief of Staff's problem was: "Where is a counter-attack of these divisions against the British



wedge most likely to succeed?" He thought of an attack from Carpiquet —an airfield in a western direction— to regain our former positions north of the road St. Mauvieu-Fontenay. My opinion was that such an attack was bound to be disorganized and dispersed by the concentrated artillery of at least five divisions. My proposal was: "To cut off those armoured columns which will emerge out of the 'hole' Verson-Baron-Gavrus and to attack the flanks of the main salient at the same time to disperse the fire of the British artillery."

When I was driving back to our Divisional Headquarters I felt strongly that we were fighting a losing battle and didn't even make the best of it.

(To be continued)

The First Problem in Tactics

The first problem in tactics should be this: how a given number of men ought to be ranged so that they may move and act with the greatest velocity; for in this chiefly depends the success of military operations. An army superior in activity can always anticipate the motions of a less rapid enemy, and bring more men into action than they can at any given point, though inferior in number. This must generally prove decisive and ensure success.—*General Lloyd.*

ENTHUSIASM

Lt. Col. G. R. H. Ross, E.D.

Enthusiasm is the cornerstone on which a successful Reserve Force unit is built. Other attributes, such as initiative and industry, are vitally necessary; but if the individual Officer has enthusiasm to begin with then the other qualities naturally follow. The tendency to become stymied by the myriad and sometimes provoking problems which beset a large Reserve unit is nothing more than an indication of lack of enthusiasm. The enthusiastic officer finds his way around these obstacles and is really not very concerned about them, much less discouraged. Also it is a well known fact that enthusiasm is the most contagious of qualities and the enthusiastic officer invariably has a heads-up, efficient, happy and aggressive troop or squadron which is up to strength or well on its way there. On the other side of the ledger we have the officer who lacks enthusiasm and this is reflected in his sub-unit strength, which is not what it should be, in poor attendance except on pay-day, and a general lack of *esprit-de-corps* which is just another word for enthusiasm.

This is taken from an address which Lt. Col. Ross, Commanding Officer, made to officers of the 8th Princess Louise's (N.B.) Hussars (5th Armoured Regt.), Fredericton, N.B.—*Editor.*

Officers must always carry in the backs of their minds the fact that they are the framework on which the unit is built, and this should colour their every action, from deportment to regular attendance at all parades and every aspect of the administration and training of their sub-commands. An officer who is not doing his job, either because he will not or because he cannot, is unloading his work on someone else, or the work is not being done. The officer who *will not* can hardly expect to stay with the unit. We have every sympathy for the officer who *cannot*, due to his civilian employment or other good and sufficient reason, but it must be pointed out that the end result is the same and someone else is carrying his portion of the load. In all honesty, these officers should apply for transfer to the SRO and plan on coming back to the unit when their civilian employment, location or other determining factor permits them to carry out all the duties of their rank and appointment. It is well realized that a Reserve Officer's first responsibility is to his civilian job, which is his living, and if the nature of his work makes regular attendance, etc., impossible, then there is no thought of criticism what-

(*Continued on Page 67*)

From Citizen to Serviceman

Arthur A. James,
Medical Liaison Officer
Canadian Defence Research Board,
Washington, D.C.

Nowhere is it more important to understand the particular national circumstances prevailing at the time than when enlisting service personnel. No matter how effectual a plan may be, when considered in terms of peace-time practice and designed to fit a particular situation, that plan likely will be entirely unsuitable when applied under the vitally different circumstances in war. Even the methods employed in one war are unlikely to be efficient in another. No two countries could hope to use the identical system with equal hope of success.

Many military men insist that given the men, they will make the soldiers. What these officers really conceive as their mission is to train a man forcibly into a specified type irrespective of the capabilities or natural bent of that man. All those who fail to measure up to the desired type or who break down mentally or physically are considered to have been impossible material in the beginning or fit only for fatigue duty. The solution is very simple: take your pick of the end product, return the others for disposal, complain loudly of the human material supplied, and let someone else worry.

Now there is some justification for the above method under a voluntary system or during a limited war where the manpower needs are not great. It could be expedient to accept a wasteful trial and error method if better means of selection would not be advantageous under the conditions.

However, during a state of total war where demands on human effort are certain to be ahead of available supply for the national effort as a whole, it might be necessary to increase the efficiency, not only in proper selection for service or civilian occupation, but to see to it that "make or break" methods in training and employment are not allowed to waste manpower, time and money.

On the face of it, it would seem relatively easy to devise a systematic smooth plan of selection, induction, job placement and training were it not for two things: the inscrutable nature of human personality and the enormous difficulty in accurately predicting individual capabilities under wartime conditions. There is much need of further research and evaluation here. In spite of great advances in psychiatry and psychology we still, by using a comparison, cannot tell by looking at a frog how far it will jump (or where). Everyone accepts the thesis that it is sensible to place round pegs in round holes but many regard this an easy matter which can be solved on the basis of a few simple tests, rather than what it is, namely, a difficult integration of job fitness with job requirement. Until, God forbid, we reach a stage of thought control and the subjugation of man's emotions, there will be inevitable difficulty in making a man or woman do what he or she does not want to do, or in restraining their liberty by force. The very restraints necessarily imposed in the Services are likely to make the individuals react differently than they would in their natural peaceful environment.

However, this does not mean that psychiatric and psychological studies are not effective. Quite the reverse is true. It does mean though, that well-trained psychiatrists and psychologists working in teams must have time and facilities to carry out their studies on the individual. It is not only a problem of screening out the totally unfit persons but more important still of carefully estimating the personality, skills, aptitudes and motivation of the recruits and recommending appropriate placement. There are great masses of people with defects of all sorts. In fact, few are without some deviation from the ideal. However, provided they are reasonably allocated, the majority can be suitably employed in the service somewhere. The normal is, after all, the average of the civil population and the Services cannot hope in total war to possess in numbers and quality that which does not exist. Neither should the Services forget that they are in essence but that segment of the people of the Nation, who backed by the will and support of all the people, actually carry out the collective policy of war by force of arms. They are then of the people and have responsibility, not only for successful operations but also for proper employment and care of those entrusted to them. These same citizens in their ranks must, when peace ensues, return to take their full place with the others in the national effort of reconstruction and the life of democracy.

Even with individual defects, man is a very adaptable animal. For love of God and country, for great ideals, for

primitive survival, for love of his fellow-man and for many lesser motivations, he can for longer or shorter periods transcend his mundane existence and rise to the greatest heights of heroism or sacrifice. To the extent that he is activated by these devotions and willing, even anxious to play a part in his country's need, so is he motivated to freely accept the conditions of services and give of his best.

Many, whose motives are purely selfish, or at least show little evidence of higher ideals, will accept service willingly enough merely because of their liking for certain phases of it. Some accept it as a means of escape from an unsatisfactory environment. Others may accept it if there is no other way out.

But, with the finest of motivation, the incentive to serve well can be killed through bad handling and disillusioning experience. At all stages in the soldier's career this desire to serve must be fostered. It is stupid to promote enthusiasm through sentimental exhortation and promises and then kill it in the early days of service. First impressions of service life are apt to be lasting. There should be a gradual introduction to hard training rather than the sudden application of discipline so often practised. Nowhere is intelligent leadership more significant than in the early stages. Once a man can see the reasons for controls and has the feeling that he is being fairly dealt with, he usually adapts himself quickly to the needs of the group. Thereafter, if he can realize that the inherent strength of the group is greater than his own he is well on the way to becoming a good soldier. If on the contrary he conceives that he is an outcast or misfit, unfairly disciplined or treated to the point of resentfulness, or made to obey through fear alone, his future usefulness to the service will not be hard to predict. Unless he is "mentally rescued" by a change for the better in man management or individual psychiatric attention he soon will become motivated to escape rather than serve. In time, unless conditions are corrected, or even in spite of correction, he will in all likelihood (a) attempt to "work his ticket" out of the service through some form of dissimulation, (b) become a chronic offender, or (c) show neurotic behaviour or psychosomatic disorder.

At any stage of training or operations, mental or psychic breakdown can occur, of course, but it is believed that the most critical period is undoubtedly during the early stages of adjustment to service. Emotional conflicts set up at this stage, and not resolved, probably account for much of the disturbance appearing at a later date when extra stress is met. There are those who still believe that

early selection should eliminate all those with any neurotic patterns of behaviour (if it were really practicable so to do) and thenceforth they assume that neurosis will not occur. Certainly the experiences of the last war do not seem to bear out their contentions. Unselected men appeared to show no higher breakdown rate than those who were selected. Unfortunately there is no means of now knowing how well those who were turned down at examination would have done had they been accepted.

If, then, we can assume that the early period of transition from civil life to service environment is as important to the production of good soldiers as is believed, let us consider some general principles in the machinery of selection, and period of induction which would favourably or unfavourably influence success.

Let us begin with the individual rather than the State or the requirements of the Services. In a free democracy, as opposed to a tyranny, the government or State exists through the collective will of all citizens expressed by their secret ballot supporting their freely nominated representatives. Inherent in the system is the necessity for voting at agreed intervals so that representatives may be tested as to their views or record, against those of a contrary opinion. The pros and cons of policy are freely debated before the people. It is theirs to choose. To avoid a chaotic multiplicity of group views, those of rather similar mind tend to group themselves into as few parties as possible. Since strength must be met by strength in opposition, there is naturally a tendency to form into two main groups only. In the nature of things there must be not less than two groups if democracy is to survive. One-party rule inevitably leads to tyranny and the abolition of the ballot.

The free democratic citizen then is conditioned to freedom of expression. Indirectly but surely, he influences his country's foreign affairs and through his individual ballot influences war or peace. If before war he is opposed to it at any price, it will likely take a good measure of persuasion to overcome his distate if war unfortunately happens. In the final analysis, he as a free citizen has the right to his opinion one way or another. He is conditioned to fighting out the pros and cons of his viewpoint at the polls and with more or less good grace accepting the majority verdict. Unless he can feel that war in this case was inevitable or necessary and not the result of mismanagement by the people's representatives, his aversion to war is understandable.

In the cross-section of the populace there are all shades of viewpoint and all varieties of individual circumstances and social and financial pressures, varying with the times. If a

man is of military age and total manpower mobilization is necessary, he is faced with suddenly relinquishing his freedom and being told to either work at a specific occupation or be inducted into the Services. The entire pattern of his life may be changed overnight. The farmer, the jobholder, the merchant or student, whether independent or employed, must give up what he is doing and go forth into a strange environment. He is usually beset by many difficulties incidental to winding up his affairs, or making special provisions for his family. No matter how willingly he sets out, it is a period of great emotional excitement and uncertainty. He has heard many tales of glory and of death. He wonders what the fates have in store for him and invariably hopes for the best. He is in a very receptive mood for the guiding hand and the sympathetic mentor. Under the protective colouration of the bravado of youth lie his mixed emotions, motivations and hopes waiting to be guided harmoniously into the ways of a new life, the paths of which seem so uncertain.

Is it any wonder that the sensitive young man suddenly finding himself reduced to a number, subjected to bullying remarks and commands and thrown among strange and incompatible bedfellows suffers intensely and begins to brood on escape? The transition often is a greater shock to his psyche than his seeming indifference would indicate. In the democratic way of life it is not taught that all men shall regard all others as congenial or that all orders or whims shall have the sanctity of the law. The Services might also recall that their organization is not a business. It is patterned on an early aristocratic tradition of autocratic rule which the passage of time and social change has modified but neither erased nor always improved. Within their jurisdiction they can still show either the benevolent or tyrannical aspects of their character. This essential difference in the way of life in the Services to that in free democratic civil life is basic to an understanding of the marked social and emotional adjustment the recruit must make. Long ago there was less difference between the two ways. There is less difference today in many countries. A question at issue might be, "Are we to have more democracy in the Services or less democracy in civil life?" The latter alternative has been the invariable solution of dictators of whatever stripe, for only in this way can they control both the people and the Armed Forces. In time even God must be ruled nonexistent since they cannot trust the hearts and souls of men who would believe in and follow a Supreme Being in ways quite at variance with their own.

Next we must consider where the medical examination and selection of

personnel takes place and how men are allocated for particular duties.

If we presume conditions of total war and some form of compulsory allocation according to apparent requirements, then it is obvious that long and detailed studies of manpower and womanpower resources must be carried out well in advance and kept amended to date. The relative requirements in industry, farming, essential services, etc. and the Forces then can be arrived at roughly and a balance struck.

But there is one great unknown factor. How many and who are mentally and physically fit for service, and if fit with or without limitation, how can these persons best be utilized on the basis of their ability and motivation applied to specific service tasks?

The call-up cannot be faster than the capacity of the Services to assimilate personnel. Then in what order is it intended to draft them? Obviously if all the eighteen-year-olds were absorbed first the Services could not expect to find any tradesmen, technicians, or professional people. To be really orderly in method an exact distribution of required types would have to be known.

Are they to be medically examined in their hometown or at an induction centre or at both? If examined at the induction centre, how much time shall be allotted prior to attestation? This last is of vital importance for several reasons:

(a) Too hasty examination leads to errors.

(b) There must be time for the proper study of the man's motivation and personality before reasonable selection can be made.

(c) If there be too great an interval before attestation, the rejectee may find that his civil job has vanished, thus creating unnecessary hardship. Possibly, preliminary screening is one way to reduce this difficulty.

(d) If there is no provision in special cases for the man to return to his home for a period following acceptance, how will it be possible to avoid hardship on the small businessman, for instance, who sells out on the expectation of acceptance only to find that he is unfit and has nothing to return to? The Service has a responsibility here.

Voluntary enlistment rather than compulsion avoids many of the above difficulties. A man could then ask for a medical examination and if fit, return home to put his house in order before actually enlisting. His motivation towards serving is in all probability good. There is less likelihood of early mental conflict if he has the feeling of free choice.

Yet, if after enlistment, he finds that he is allocated against his will to a branch of the service which he dislikes or considers unsuited to him,

he is apt to feel that his free will is unnecessarily restrained and in consequence reacts much like those who are conscripted.

Would it not be wise under a compulsory system to offer as a compromise, as much free choice at various stages as is possible? Could not examination for all three Services take place at one centre and the man after a reasonable interval during common basic indoctrination and training be given freedom of choice of service? Later, could he not be given a reasonable latitude of choice as to particular branch? (Subject, of course, to special fitness or aptitude which may be required.) Surely this humanization of policy rather than blind worship of establishment tables would be feasible. There is no doubt but that it would reap great dividends in human efficiency.

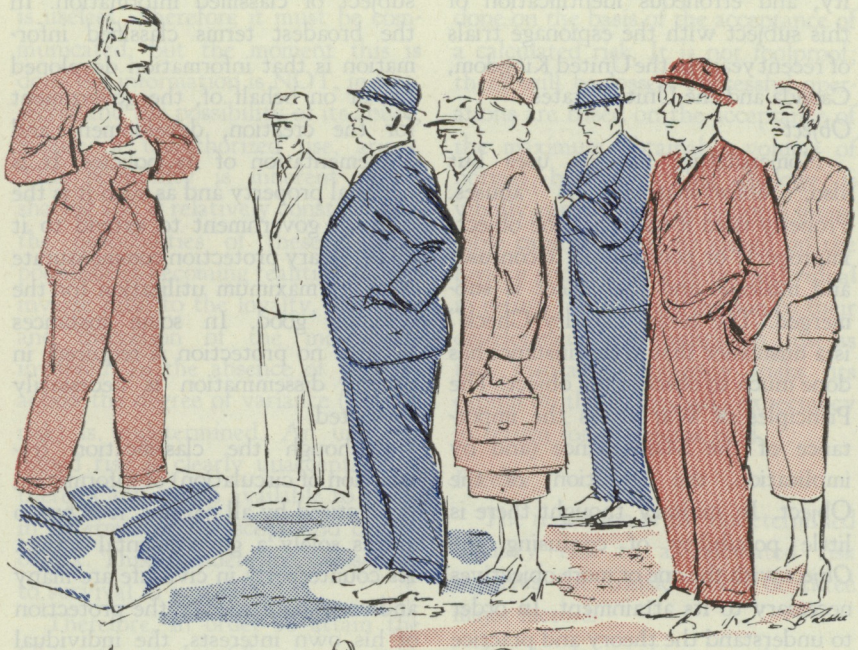
The siting of induction and early training centres is of importance. It is most desirable that during the early period of transition from civil to service life the man be kept as near home as possible. The others with whom he rubs shoulders come also from his area and have much in common. He has both male and female friends and relatives nearby. It is much easier for him first to learn the strength of group association and the need for discipline and self-control among those whom he more or less understands than among complete strangers. There is plenty of time for wider and wider associations. Haste should be made slowly. Administrative and training plans not paying regard to the importance of this will surely head for futile manpower wastage.

Above all, the initial examination, indoctrination, and common basic training centres set up must be most carefully staffed. This is a key position which demands officers and N.C.O's who possess a knowledge of human relations and are favourably known and respected throughout the area for good character, integrity, justice and inborn leadership. There should be no place here for martinets who know no other leadership than that of command through fear. There are unfortunately too many of these to be met up with later in the soldier's, sailor's or airman's career, when it can be hoped he has acquired a safer mental adjustment, or that the exuberance of such characters has been curbed through an enlightened policy. At the initial training centre is where the individual should begin to feel his common identity as a citizen and a soldier and that as a citizen he is not being set apart from others, but is to serve so as to most suitably express his free political will in opposition to the enemy. Having achieved that concept, his objectives become clearer. He can then settle down to pursue his mission in the war with resolution,

knowing that the sooner it is successfully concluded, the sooner he can again employ his knowledge and experience together with new and old skills in the peaceful reconstruction which must follow.

The Armed Forces, however, only can proceed so far in their efforts to successfully utilize manpower. Unless the national morale has been so molded by national leadership both before and during war that the masses of the people have pride and faith in their Armed Forces and the common cause, and wholeheartedly support them, the Forces cannot hope to achieve final success. In other words, the degree of faith and belief in the righteousness of the cause which is inherent in the national motivation and morale, will directly determine the real effectiveness of the Armed Forces.

One very practical consideration does, however, influence all the foregoing, that is: how can this or any mobilization and training procedure be appropriately timed? Advances in weapon development, the serious threats of organized sabotage using atomic, biological or chemical means, coupled with undeclared global war, introduce factors which almost defy estimation. There is no sure method of either accurately forecasting the requirement for immediate defence at an unknown time or the duration of a future war. This is a handicap shared by any non-aggressor country. Whether it is solved by greater peacetime forces, lesser forces backed by trained and instantly available reservists, or a combination of a small active force supported by imperfectly trained reserve formations is a matter of national and service policy based primarily on an integration of the national economy with the degree of probable hazard. Certain it is, though, that if or when an orderly and efficient mobilization training and employment of the whole national human resources is necessary, it must be carried out deliberately in relative freedom from the strain of panic requirements. The degree to which preliminary stages can be carried beyond research and planning in peacetime is very limited. That the people then may be able, if necessary, to reach their full potential in their own defence in war, it should be apparent that such development can proceed only behind an adequate and immediately available fighting screen of all branches of the Armed Forces. Security bought for any less would but open the way for confusion and calamity for all in a full scale war of the future.



Loyalty Checks

A Commentary by Capt. W. E. Braun, Canadian Intelligence Corps

Few subjects of current interest appear to be as little understood as the so-called "Loyalty Checks". The cumulative effect of continued widespread misunderstanding could adversely affect the security of an entire country. The purpose of this paper is to bring the subject within the terms of general knowledge and understanding.

There appear to be three major factors contributing to the existing

misunderstanding. These are: faulty nomenclature, lack of proper publicity, and erroneous identification of this subject with the espionage trials of recent years in the United Kingdom, Canada and the United States.

Object

Nomenclature has its uses but also, unfortunately, its abuses. Properly used it identifies the object; improperly or poorly used it confuses and misleads and the object is submerged. The term "Loyalty Check" is a misnomer that in this instance has done much to obscure the object. The Principles of War stress the importance of the Maintenance (and by implication, the definition) of the Object. In military thought there is little possibility of confusing the *Object* with the one or more objectives necessary to its attainment. In order to understand the theory and practice of the so-called "Loyalty Check", more accurately described as a Security Clearance, it is essential to define and then closely and continuously maintain the object. *The object of the Security Clearance is the protection of classified information while permitting its maximum effective use.* There is no other object. This Object must be clearly understood, borne in mind throughout, and be the prime factor in the consideration of all aspects of this subject.

Classified Information

Because of the very real necessity of fully understanding the Object it is necessary to digress briefly to the subject of classified information. In the broadest terms classified information is that information developed by, or on behalf of, the government for the creation, development and implementation of its policies. It is national property and as such it is the duty of government to extend to it all necessary protection commensurate with its maximum utilization for the common good. In some instances little or no protection is required; in others, dissemination is necessarily restricted.

Although the classification (restriction of circulation) of information is practised by all nations, it is by no means solely a governmental action. Its counterparts in civil life are many and commonplace. For the protection of his own interests, the individual restricts the general use of whatever he may have developed by application for Letters Patent or Copyright. Few security measures are more complete and effective than those used by the large automotive manufacturers during the development period of a radically improved model.

Objective

The protection of classified information can be very simple. If it is confined to the originator, one person, it is safe and is, in fact, secret. This method has the obvious and fatal limitation of precluding joint develop-

ment and joint application. In short, classified information so protected cannot be used effectively and hence is useless. Therefore it must be communicated, but the moment this is done the information is NOT, in fact, secret and the possibility of its abuse, misuse or unauthorized use, arises. This possibility is inherent in all sharing and is relatively constant. But the probabilities of these adverse possibilities becoming realities vary in inverse ratio to the loyalty, integrity and discretion of the individuals involved. In the absence of positive action the degree of variance (i.e. the risk) is undetermined. An undetermined risk is clearly unacceptable if there is any means available to assist in determining the scope and degree of risk. This consideration is essential to survival in any field.

Therefore, in order to attain the *Object*, the primary Objective must be the reduction of an undetermined risk to a calculated risk. Security Clearances are a means to that end.

To say that this Objective cannot be achieved is to say that life insurance cannot be profitably underwritten because so many people die every day. Both operations are based on a similar actuarial basis. The underwriter knows that all risks are not standard. On some risks he will accept only a reduced or minimum liability or increase the premium; others he must reject. By careful selection he will keep rejections at a minimum and, at the same time, will underwrite the maximum possible volume. This is done on the basis of the acceptance of a calculated risk. It is not foolproof; there will be losses. Successful operations are based on the acceptance of the maximum obtainable volume of normal business. This analogy is wholly applicable. The nation's intangible capital assets are risked on the loyalty and integrity of the individual in return for his contribution to their development and application, just as the insurance company risks its capital on the individual's expectancy in return for premiums paid.

Factors

The reduction of the undetermined security risk to a calculated risk involves the consideration of three major factors.

Loyalty: It is unfortunate that most people immediately prefix this word with "dis-". There are no disloyal individuals, but there are a thousand loyalties of which all of us have many. Loyalty to self, family, party or class—all worthy in themselves—are but reflections of the loyalty due the whole society of which these are but a part. It is axiomatic that the whole is greater than the part, yet this axiom is ignored by many, including communists whose loyalty requirements for party membership read as follows: "Those whose loyalty to the working

class and devotion to the interests of the majority of the . . . people is unquestionable shall be eligible for membership". Too often have minorities suffered under the application of this and similar definitions and in one field or another we are all members of minorities.

The commonweal of our society is epitomized in the code of law and governmental institutions of Christian democratic nations. The history of Western democracy shows this to be no static loyalty to the status quo, and the development of this commonweal must continue to be kept free from the threat, or use, of force either to accelerate or impede its growth. Therefore classified information held by or on behalf of a Christian democracy can be entrusted only to those loyal to their country and to its constitution.

Prior to the commission of an overt act of disloyalty, disloyalty cannot be proven. Loyalty cannot be absolutely proven at all. Man's nature is not subject to absolute proof. But this does not invalidate the value of security enquiries any more than an underwriter's inability to assure a given individual that he will reach the expectancy for his age group invalidates the mortality tables. In both instances there are ascertainable contributing factors. The individual whose forebears for generations have lived to a ripe old age has, other things being equal, a better than average chance of doing likewise. The individual whose forebears helped to develop our institutions and laws is likely to continue to serve them loyally. To continue the insurance analogy: the individual diagnosed as having a suicidal mania will be rejected by a life insurance underwriter even though he has never committed suicide; the individual who advocates the use of force to "improve" our society, even though he has committed no overt act, is an unacceptable security risk. Those who would forcibly destroy or undermine the freedoms and privileges enjoyed in a Western democracy must be regarded as subversive. Yet these are a lesser security danger than the confused, the easily led, the unknowing, the new alien unacquainted with our tongue, laws and customs. The former are few, the latter, many. Hence a security enquiry makes no attempt to establish disloyalty but strives only to establish a factual basis for an assumption of loyalty in those to be entrusted with classified information. Where a reasonable basis for such an assumption does not exist, the risk remains undetermined and cannot normally be accepted. Refusal to accept the risk is NOT an accusation of disloyalty but simply an admission that sufficient facts were not available to permit the reduction of an undetermined risk to a cal-

culated risk.

Integrity: This factor, too, is intangible and cannot be absolutely determined. But a solid basis for a reasonable assumption of integrity can be established and its absence (in the past) can also be clearly shown. The embezzler who has once betrayed a trust, and the convicted criminal who has knowingly and deliberately violated the law, setting his own will above that of the community, may be reformed and are certainly entitled to every assistance in rehabilitation. But NOT in a position of public trust. Classified information, once compromised, is gone. Unlike money, it is not replaceable and the possible consequences are far greater than any monetary loss. The record of the recidivist precludes any assumption that he will give any greater respect to the regulations governing the handling of classified matter than he has shown toward any other regulation. Normally the risk appears too great to be acceptable.

Discretion: This is the third factor and is by far the most difficult to assess. It is equally important for, whether classified information is compromised by intent or through carelessness, the result is the same. Despite the obvious difficulties it is usually possible to find a pattern of conduct of sufficient clarity to permit some degree of calculation of this aspect. A case in point could be the individual who is so unsure of his present position and standing that he grossly exaggerates his past accomplishments the better to support it. Such an individual is all too apt to reveal classified information to prove to himself and others that he too is "in the know". While this type of risk cannot be closely calculated a norm can be established and variations from the norm noted.

Objections

As a result of the widespread misunderstanding of this subject, a number of misconceptions have apparently gained considerable currency. Some of these, the most prevalent, will be discussed.

Civil Rights: In some quarters it has been contended that security enquiries are, per se, an infringement of civil rights: that a man's beliefs, actions, capabilities and potentialities are solely his own concern. If this were the full story it could be true but this is NOT the full story. It is a principle of Western democracy that every man has an inherent right to gainful and useful employment, but there is no thesis giving every man an inherent right to employment in a position of trust—either private or public. He who holds a position of public trust is, rightly, the object of public concern. By his voluntary application for, or acceptance of, a position of trust, the individual either directly or by implication alleges his

trustworthiness. In business, references and other data are requested and given for the sole purpose of permitting confirmation of the allegation of trustworthiness. This routine business practice is further strengthened by bonding the individual in order to assure continued trustworthiness or, in its absence, recompense. There is no bond written, no recompense possible, to cover the compromising of classified information. If confirmation of the individual's allegation of suitability for a position of public trust constitutes an infringement of civil rights, then the civil rights of every barrister, solicitor, banker, broker, corporation executive and countless others are continuously infringed.

Trial in Absentia: The impression that, as the result of security enquiries, an individual will be jailed or "smeared" as a subversive is probably the most arrant bit of nonsense in circulation. All security measures, including Security Clearances, are wholly and solely preventive. They are not at any time punitive. No individual is found guilty of anything—that is a matter for the courts—and court action only follows the commission of an overt and illegal act. When such an act has been committed, security measures, to that extent, have failed and the matter passes out of the field of security. Espionage trials are NOT security matters. The classified information in such cases has long been compromised and the punitive action, if any, taken against the individual by the courts has no direct bearing on the security problem other than a hoped for deterrent effect. There is no more a "trial" aspect to selection for employment in a position of public trust than would be found in the action of the personnel manager of a large corporation considering the qualities and qualifications of a dozen applicants for a single position. One will be selected, the rest rejected.

"*Guilt by Association*": This is another of the trick phases that sound reasonable until analyzed. Again there is the implication of an effort to find somebody guilty of something to be followed by punitive action. If this type of thought actually motivated security enquiries, the Object could not be realized. Any effort to curtail necessary circulation of classified data would defeat the attainment of the Object. This can only be attained by the positive approach, endeavouring to find the maximum number suitable. Of course a man's associates are important. Anyone who habitually associates with a group of criminals does not thereby become a criminal, but he is more likely to be used by criminals for a criminal purpose (knowingly or unknowingly) than is the individual who has no such associates. This is equally applicable

to association with subversive elements. In either case the risk is greater than the norm.

Back Fence Gossip: The possibility that the standing or opportunities of an individual may be impaired as the result of irresponsible or malicious allegations may seem a very serious risk. In the course of any type of research, it is inevitable that much immaterial, irrelevant and misleading data are encountered. In no field is this fact regarded as precluding sound results. Those entrusted with such research are trained in the evaluation of both information and sources.

In point of fact, deliberate prejudice is readily identifiable as such, and even unconscious prejudice can be detected. The calculation of the probable degree of security risk is not dissimilar to balance sheet analysis. Each item or aspect has a well-defined relationship to others and to the whole. The injection of a grossly false figure into a normal balance sheet would catch the eye of any Chartered Accountant at first glance. Not because the figures do not balance but because the falsified item is not, and cannot be made to be, in normal proportion to other items or to the whole. In the same way, the inaccurate statement, the unfounded allegation, stands out in glaring contradiction to the other parts and to the whole. In short "back fence gossip" simply doesn't add up.

Conclusion

Security Clearances permit the dissemination of classified data necessary to the proper development of these national assets while at the same time providing safeguards against their dissipation. This action is selective and preventive in nature with no punitive aspect and no question of guilt. It is consonant with accepted practices which have never been regarded as an infrigement of the rights of the individual. If this most reasonable modicum of protection still seems excessive, consider it in relation to the following quotation:

"The conquest of power by the proletariat is the violent overthrow of bourgeois power, the destruction of the capitalist state apparatus (bourgeois armies, police, bureaucratic hierarchy, the judiciary, parliaments, etc.), and substituting in its place new organs of proletarian power, to serve primarily as instruments for suppression of the 'exploiters'."[1]

If Security Clearances must still be regarded as directed against someone, then let it be against those who overtly or covertly wish to place us, by such means, under such "organs of proletarian power".

[1] *"Program of the Communist International", 2nd Edition (page 37). Published by Workers Library Publishers, Inc., NYC.*

THE Eben Emael OPERATION

H. R. Kurz

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 defense 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 gateway 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 masonry. 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

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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.

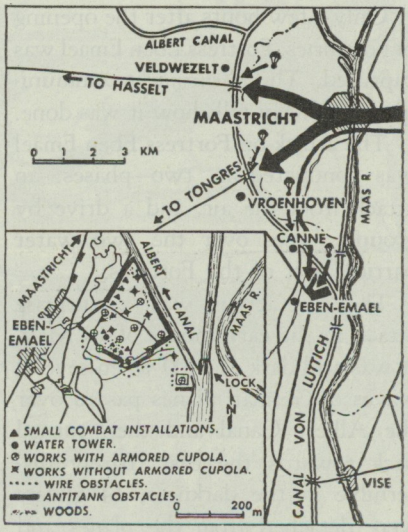
In conformity with its mission, the armament of the fortification was mainly artillery. The largest armoured turret contained two 120-mm guns with a range of 16 kilometers; two other turrets were armed each with two 75-mm guns with a range of 12 kilometers. Four casemates had three guns each built into 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 11 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, 16 75-mm guns, 12 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	*NCOs*	*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

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 Luxemburg.

The initial attack on Belgium was the Eben 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 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 upper surface of the Fortress.

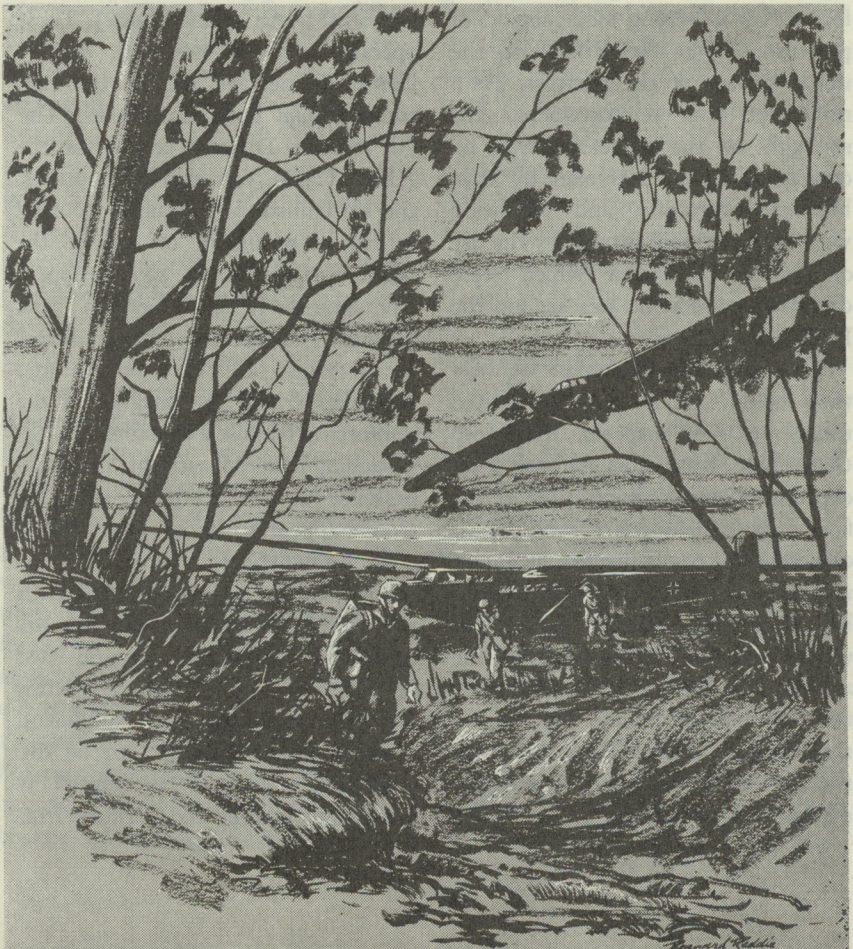
The Belgian sentries followed the descent of the gliders as far as they were able without sounding an alarm. Such an attack was beyond their experience. Immediately on landing, as many as 10 German combat engineers poured from each glider. The men were heavily armed with close combat weapons and equipped 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-kilogram 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 neighboring 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 I 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 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 con-

centrated 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 situation in the Eben Emael fortification became 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 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 explosives 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 vunerability 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 materiel 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 armored 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 cooperation of all the 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 troop training terrain 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 armored 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 rumors 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 rumors. The rumors were still further reinforced by allusions to the new method 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.

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 battlefields of Belgium and Holland, represented 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.

JAPAN'S Technical Secrets

CAPTAIN WINTHROP SLOCUM, U.S. NAVY RESERVE (RET.), IN THE MILITARY REVIEW

It may surprise some readers to learn that the United States Navy sent a group of missionaries to Japan immediately after that nation admitted its fall from divine favour in the summer of 1946. These persons, however, were not of the Chaplain Corps dispatched to propagate religion in Nippon. They were a group of officers and civilian engineers and experts, members of the U.S. Naval Technical Mission to Japan. Our Navy wanted to determine the position of the Japanese in the field of naval technology. The fighting war had been won—what scientific lessons could we learn from our erstwhile enemy?

How did the design and construction of the Japanese warships compare with ours? What range and power had their guns? How heavy was their armor and what was its metallurgy? Were they ahead of us in electronics development? The Navy wanted the answers to these and a thousand other technical questions.

To obtain the desired information, it was essential that investigators enter Japan with the Occupation Forces, before manufacturing plants, equipment, materials, and records could be destroyed and experienced personnel dispersed.

The U.S. Naval Technical Mission to Japan, better known as NavTech-Jap, was established on 14 August 1945 by an order of the Commander in Chief and Chief of Naval Operations. The purpose of the mission was to survey all Japanese scientific and technological developments of interest to the Navy and Marine Corps in the Japanese Islands of Hokkaido, Honshu, Shikoku, and Kyushu; in China; and in Korea south of latitude 38°N. This involved the seizure of intelligence material, its examination and study, the interrogation of personnel, and, finally, the preparation of reports which would appraise the technological status of the Japanese Navy and Japanese industry.

The surrender of the Japanese in mid-August served as a jet-assisted take-off for the Naval Technical Mission which sailed from Pearl Harbor on 1 September. It was part of the convoy that entered Sasebo Naval Harbor on 23 September 1945, in the initial occupation of Kyushu. Within three weeks, technical intelligence teams stemming from Sasebo had entered Tokyo, Yokohama, Yokosuka, Kure, Hiroshima, Osaka, Nagasaki Shimonoseki, and many other

cities with, or shortly after, the initial landing of the Army or Marine units in those places.

Before the cessation of hostilities the Office of Naval Intelligence had ready a publication, "Intelligence Targets—Japan." This was a series of pamphlets stating the Navy Department's requirements for intelligence exploitation in Japan, and represented the co-ordinated demands of the Chief of Naval Operations, the several material Bureaus, the Office of Research and Inventions, the Naval Research Laboratory, and other technical activities. The targets contained therein emphasized naval interest entirely. Nevertheless, they had also been co-ordinated with the War Department Intelligence Collection Committee in those cases where War Department interests paralleled those of the Navy.

There were other intelligence units operating in the Empire, too, such as the Compton-Moreland Scientific Survey ("Usbus"), the Air Technical Intelligence Group ("Atig"), and the Military Intelligence Section of SCAP. The function of NavTechJap had to be correlated with the activities of these other groups in order that all intelligence units could profit from the disclosures obtained by each.

What sort of things were the Navy Bureaus interested in? What was the nature of some of these individual targets? First, of course, were such items of general intelligence as Japanese naval war plans, war diaries, and battle reports; budget estimates and annual construction figures; codes and ciphers; hydrographic and meteorological information; personnel figures and training programs.

The Bureau of Ships was naturally interested in the characteristics of Japanese naval vessels in service and under construction; submarines; mine detectors; electrical equipment; and ordinary things like ship's-bottom paints.

The Bureau of Ordnance wanted information about torpedoes and their aerial counterpart, guided missiles; mines and depth charges; rockets, bombs, ammunition, armor, and the big naval guns.

The Bureau of Aeronautics, of course, inquired about new designs of aircraft, new types of engines; progress in jet propulsion and in propeller research; de-icing equipment; parachutes; photographic equipment.

The Bureau of Medicine and Surgery was especially interested in data relative to life in the jungle and on sea islands, particularly that apropos diet, malaria control, and insect repellents; infection of Naval personnel with tuberculosis (in view of Japan's high TB rate); neuropsychiatry and rehabilitation. A special target of considerable interest at the time involved the medical effects of atomic bombing.

Electronics targets were set up separately, in view of the importance of this equipment in modern naval warfare. Information was desired about all kinds of radar and radar countermeasures; direction finders and navigational aids; electron tubes, antennas, and many other subjects, all very technical.

Only a few of the engineering and medical members of NavTechJap could speak Japanese. To undertake investigations in a foreign country without knowledge of the language would be like trying to scale a high wall without a ladder or rope. But the Navy had foreseen this problem, and language officers were made available as interpreters. Many of them had been teachers of language in high schools and colleges before their commissioning in the naval reserve. They had been given six months to a year of very intensive training in Japanese. This is an extremely difficult language, and their instruction, of course, had to cover not only social conversation but technical terms used in nautical practice, in electrical engineering, chemistry, metallurgy, and so on. Fortunately, engineering drawings and blue prints speak a universal language, and when these were available, as was often the case, the discussions proceeded under a full head of steam.

In many instances, it was necessary for the Navy technician to do considerably more than simply to investigate the material on hand. For example, a new model, 20-cylinder diesel engine was about 50 per cent completed when Japan surrendered and all construction and development of war equipment stopped. The engine showed promising possibilities. The originating Japanese engineers and scientists were located and brought back to complete its construction, at the expense of the Japanese government. Upon completion, tests were run under NavTechJap supervision, to determine its performance.

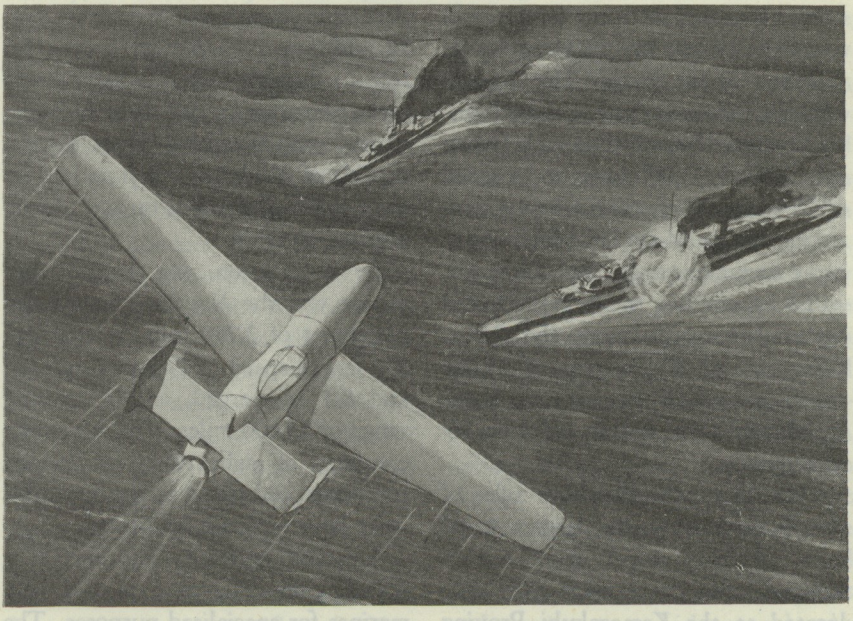
NavTechJap investigators, unarmed and often alone, visited scores of places in Japan, both urban and rural, and never once were molested or threatened. Usually, the American was ignored, little curiosity being displayed by Japanese adults. When the Japanese were asked for information, friendliness and willing cooperation were the general rule.

Of considerable interest was the observation that the Japanese Army and Navy both deliberately spurned the Japanese scientist, whose knowledge, laboratories, and research equipment might have contributed so much toward a more successful prosecution of the war by the Japanese. The scientist recognized this and felt deeply injured over the lack of confidence in his ability and his loyalty. Little organized research war carried

on during the war outside of the Army and Navy. A corollary to this is the fact that by such policy Japan failed, in general, to realize those tremendous and permanent scientific advances that a modern nation gains from huge wartime expenditures for research.

The common concept that the Japanese lack originality and are merely an imitative people is in need of qualification. They entered the fields of science and mechanical industry only a comparatively few years ago. The sensible thing was to engage in wholesale copying until they caught up with other countries. Had they proceeded independently in scientific research and discovery, they would always have been 50 years behind. The Japanese may be especially adept at copying, but evidence of their originality and ingenuity is not lacking.

The Japanese received very little effective help from the Germans or the Italians. It is true that many Japanese submarines were equipped with the *Schnorkel*, but it is understood that the Japanese saw a German submarine in Hong Kong and copied the *Schnorkel* features. A Japanese submarine crew was sent to Germany for training, but all hands were lost on the trip back. Some assistance was



The *Baka* Bomb, a Japanese suicide weapon.

received from Germany pertaining to electronics, but Japan was still well behind us in the design of this equipment. Such information as the Japanese obtained was largely of a general, rather than a specific nature. The single important exception seems to have been the assistance given by Germany in the sonar field. Some of the Japanese equipment was almost an exact copy of captured British equipment.

At the time of the Pearl Harbor attack, Japan had a strong and well-equipped navy, with ships that were of good design and rugged construction. Three of them, the battleships *Yamato* and *Musashi*, and the aircraft carrier *Shinano*, were the largest, and in many respects the most powerful, warships in the world. The *Yamato* and the *Musashi* had standard displacement of 63,000 tons each (when fully loaded, 73,000 tons) and a speed of 28 knots. Their main battery, consisting of nine 46-cm (18.1-inch) guns, had a maximum range of 45,000 yards.

To match this, the largest United States battleships were the *North Carolina* and *Washington*, of 35,000 tons standard displacement, 28 knots speed, and main battery of nine 16-inch guns.

The 18.1-inch, 45-calibre rifles of the *Yamato* were the largest naval guns in the world. NavTechJap shipped home two similar guns they located at the Kamegakubi Proving Ground, each 75 feet long and weighing 180 tons. They were sent by LST not by Parcel Post.

During the latter part of the war, surface ship production was largely abandoned by the Japanese in favor of submarine production. During 1944, they brought out the I-400 class-three—huge submarines whose primary mission undoubtedly was the bombing of the Panama Canal and cities on the west coast of the United States. They had a displacement of 5,550 tons each, a length of 400 feet, a maximum speed of 19.7 knots surfaced and 7 submerged, and a cruising range of 34,000 miles at 16 knots. Eight torpedo tubes and one 5.5-inch deck gun comprised the armament. In addition, in a hangar tube (11.6 feet in diameter) on the main deck, each submarine carried three bombing planes, each weighing about 4 tons, capable of 290 knots speed and carrying a bomb of 0.8 tons or one 18-inch airplane torpedo.

By comparison, our largest submarine was the *Nautilus*, with a displacement of 2,730 tons, a length of 371 feet, a speed of 17 knots surfaced and 8.5 submerged, and a cruising range of 15,000 miles. The armament consisted of eight tubes for 21-inch torpedoes, and two 5-inch guns which were later replaced by 3-inch.

Japanese ingenuity resulted in a great many different types of submarines for specialized purposes. The

multitude of classes, each consisting of relatively few submarines, proved to be a major weakness in their submarine policy, resulting, as it did, in lack of standardization and consequent limitation of production. The entire hull and outside decks of most Jap subs were coated with a thick black substance which offered at lest partial protection against detection by radar and echo-ranging. Their latest submarines used small belt-driven motors for low-speed, quiet, submerged operation, a splendid idea obtained from the Germans, incidentally. And they incorporated an American idea in the design of at least one of their models, namely, a fireman's pole for quick descent of deck personnel in case of a crash dive. Gravity being unaffected by military edict or Japanese ingenuity, it was still necessary for the submariner to climb a ladder on the up-and-out-bound journey, if any!

The Japanese developed very successfully torpedoes of three different types, using pure oxygen, air, and electricity for propulsion. There was nothing unusual about the 18-inch air-driven torpedo, but the 21-inch electric type, with a range of 7,500 yards at 30 knots, was an effective weapon because it left no wake and was easy to manufacture. Hence, it was used extensively.

Most readers will recall the Japanese Army's effort to use paper balloons as weapons of war. Some 8,000 to 9,000 balloons were launched in 1944, each carrying a load consisting generally of a 15 kilogram high explosive bomb and 4 or 5 kilograms of incendiary bombs.

It was estimated that 10 per cent of the balloons released would be carried by air currents to the American mainland and would start forest fires or cause other damage. The project was conceived principally to boost home morale and also to serve as a psychological warfare threat against the United States. It was discontinued because of negligible results, the advent of unfavourable weather, and a shortage of hydrogen gas. An investigation was undertaken by the Mission to learn if this project bore any relationship to plans for bacteriological warfare. Extensive research was known to have been carried on by the Japanese Army Bacteriological Warfare Section, but no connection could be established linking it with the trans-Pacific paper balloon project.

In time of war, persons of every nationality show unlimited courage and self-sacrifice, but never before was the willingness of the individual soldier to destroy himself so incorporated into the wartime policy of a nation. When Japan was forced to change from offensive to defensive warfare, she realized it would cost the lives of many brave men. Coolly and efficiently, however, she devised plans and equipment which would take

numerous enemy lives in exchange for each native son.

The best known of these implements of self-destruction was the *Kamikaze* plane, or dive bomber. It was considered not so much a projectile carrier as the projectile itself, with a human being as part of its steering and control mechanism. The men who volunteered for this one-way ride were a select group of Japan's best pilots, and there were always more volunteers than planes.

The *Baka* Bomb and its human control was a variation of the same idea of death in and from the air. This was a small jet plane or glider, with a pilot locked in, along with a heavy load of high explosive. It was carried under the fuselage of a larger plane which launched it a few miles from its target.

On the surface of the water, it took the form of *Shinyo*, a small special attack boat which utilized the explosive charge in its bow by ramming the side of the intended victim. These motor boats were collected in special attack basins along the coast or were carried on mother ships. Such suicide craft were manned by middle-school boys of 15 and 16 years of age. It is reported that an ample supply of volunteer pilots was obtained because of special privileges, early responsibility, fast promotion, and the promise of a posthumous monetary award to the volunteer's parents.

Underwater opportunities for destruction stimulated the Japanese imagination. The *Kaiten* ("Great Undertaking") was a one-man submarine, or more accurately, a type 93 torpedo with a human pilot and additional fuel capacity inserted between the torpedo warhead and the torpedo engine. Six *Kaiten* were carried on the decks of I-type submarines and connected by tubes through which the pilot could enter the torpedo and start on his journey without the submarine having to surface. These midget or suicide subs were manned by young volunteers of 18 to 20 years, attracted by much the same inducements offered the *Shinyo* pilots. The Japanese claimed great success in the encounters between *Kaiten* and enemy shipping.

For the Pearl Harbor attack, five submarines of the I-16 class were specially fitted to carry one two-man submarine each. All five of these *Ko Hyoteki's* were successfully launched, and all were lost. (The "I" class submarines all returned). Lieutenant Iwase, senior commander of the two-man subs, reported by radio that he had successfully attacked a battleship of the *Arizona* class, which was a very modest statement. Considering the unbelievable damage wrought in that attack, he might have claimed the sinking of Ford Island itself, without greatly exaggerating the situation.

The Japanese also had amphibious

tanks 35 feet long that rode "piggy back" on submarines. In preparation for an attack, the submarine would surface, and, after the tank had drained, it would be boarded by a crew of 1 officer and 6 men and a landing party of 35 men. The tank would then be driven off the sub, or the latter would submerge, leaving the water-borne tank ready to proceed under her own power. When the Nipponese strategy turned defensive in 1944, these sea-going tanks were modified to include torpedo cradles. Upon reaching an objective, both torpedoes would be released at short range. No attempt to return ashore for re-loading would have been made, as the expendable tank would have simply been scuttled on the spot, and the brave but hapless crew would join their honorable ancestors. These mechanical oddities were never known to have been used operationally, although about 100 were built.

Still another, though less well-known suicide group, was the *Fukuryu*, or "Crouching Dragons." Had the war reached the stage of repelling an amphibious landing on the shores of Honshu, the *Fukuryu* were prepared and equipped to walk underwater and ram an explosive bomb against the hull of an enemy landing craft. These "underwater Kamikazes" wore diving suits equipped with two oxygen tanks, submarine-type air cleaning devices, and tubes for liquid food. They could operate effectively in water 50 feet deep; they could walk underwater more than a mile an hour, and could stay underwater for 10 hours. At the war's end, 4,000 *Fukuryu* were at the Yokosuka Naval Base, of whom 1,200 were fully trained.

Loss of much of her shipping capacity and the resulting fuel and food shortage caused Japan to give consideration to suggestions by her oceanographers that ocean currents be utilized for transportation of necessities. Since 90 per cent of the drift bottles set adrift in the Japanese Sea off the east coast of Korea reached the northern part of Honshu, it seemed feasible to use the *Kuroshio* (Japan Current) for the transportation to Japan proper of soya beans from Manchuria, and other goods from Formosa, Nansei Shoto, and other places. A small wooden ship of 200 tons was successfully floated from Fusan to Honshu. Then plans were made for floating metal drums which would drift below the surface; some in every lot would be equipped with radios and at intervals they would rise and be contacted by land stations in order that their movements could be traced. Loss of the Philippines, meantime, prevented carrying out the plan.

Japan was far behind us in the field of electronics, but her experiments with a "Death Ray" may have the

unique outcome of saving countless lives threatened by tuberculosis. These experiments showed a pronounced effect on the lungs of the animals tested, and further research was contemplated toward a possible cure for tuberculosis. It was noticed that higher frequencies affected the brain. The investigators realized that heat was an evident factor, but they were sure that frequency was important also. The frequency characteristic could be associated with the resonance dimensions of the head and body respectively. It is quite possible that Japanese or American investigators may develop treatment for tuberculosis and for certain brain disorders that will have great therapeutic value. A mass chest X-ray program for the diagnosis of tuberculosis was interrupted by the war, but Japan was using an "immunization" technique that should be further investigated.

Japanese medical officers observed that most cases of night blindness occurred with pilots having liver trouble and whose secretion of the bile was not normal. Acting on this hint, they developed a preparation named *Migozai*, whose ingredients stimulate the secretion of the bile and the absorption of Vitamin A, so necessary for the retina of the eye. The vision of the dark-adapted eye, when taking this preparation, improved from 11 to 2½ times. This means that, looking at the same object, the eye can see it from twice the distance.

More notable, and certainly more far reaching, is the discovery of two drugs by Japanese who were searching for some therapeutic agent resembling chlorophyll, with its power of converting sunlight into energy. These were derived from neocyaine and named *Koha* and *Shiko* (meaning Rainbow Wave and Violet Light). The drugs improve general body resistance and stimulate regeneration of tissue. The Japanese have demonstrated remarkable results with these when used in leprosy cases. Burns and frostbite responded with gratifying acceleration, while benzine burns and boiling water burns, especially, showed quick improvement.

Japan has long been noted as the most active earthquake land area in the world. No other country remotely approaches her average of 4,000 per year. Japanese scientists have made contributions of great importance in the field of seismology. Building laws governing wood and concrete construction have been strongly influenced by their researches and recommendations. NavTechJap investigators discovered that several large steel-frame hangars at the Yokosuka air field were of very unusual construction. This novel design was called the "Diamond Truss," from

the diamond-shaped pattern formed by the intersecting arches. The skewed arches form the longitudinal bracing of the structure in addition to taking the regular loading. Admirably constructed to withstand earthquake shock, this design also resulted in a tremendous saving of steel—a major wartime objective. It should receive the consideration of American architects and contractors for any structure where large roofing areas are involved, such as hangars, garages, factory and mill buildings, armouries, and gymnasia.

The Japanese, in spite of considerable stock-piling, soon encountered serious shortages in basic materials. The principal metallic shortage was nickel. Molybdenum was used in conserving nickel, until it, too, became scarce. Tungsten, although relatively plentiful at the beginning of the war, in time became a critical material. Some very interesting research was undertaken in the field of high temperature alloys for gas turbines and rockets, because of the scarcity of nickel and cobalt. Inferior iron-chromium alloys had to be substituted in the field of resistance wires in place of the conventional nichrome types. Their copper was of high quality but of such short supply that high-grade conductors were used only for the most pressing applications, such as aircraft.

Petroleum was the "Achilles heel" in the Japanese armour, and her lack of this precious fuel was the fundamental cause of her downfall. When the Japanese super-battleship *Yamato* made her suicidal sortie southwest of Kyushu in the waning months of the war, she was powered by edible refined soya bean oil. U.S. Navy planes sank the soya bean-burning warship 7 April 1945, when she was intercepted enroute to attack American shipping at Okinawa.

Lack of oil resources kept scores of Nipponese ships lying immobile in Kure and other ports. Many of her battleships and cruisers were sitting-duck targets, easily sunk by bombs and torpedoes dropped by our airmen.

The Mission's search for data and equipment on Japanese petroleum research seemed hopeless, until the remains of a laboratory were discovered at Ofuna. Most of the documents and data were said to have been destroyed, but enough remained to indicate that a sizeable establishment was once in operation there. Again, the Japanese engineers, draftsmen, scientists, and research men formerly employed in the laboratory were assembled to duplicate plans, drawings, and experimental data which had been developed. Strangely enough, the Japanese scientists took considerable pride in accomplishing this work to demonstrate the extent of their advancement. The net result was a complete disclosure of Japan's petro-

leum research.

Japan's efforts to find substitute fuels were frantic, and to a limited extent effective, but entirely inadequate. Until the beginning of the war, the Japanese Navy's chief source of diesel and bunker fuel was imports from California. This stock pile was exhausted in 1942, and cracked residues from Sumatra and Borneo crudes were then utilized as bunker fuels. In 1944, due to Japanese tanker losses to U.S. submarines, research and practical testing were undertaken on both diesel and boiler fuels to develop substitutes. By the spring of 1945, aircraft carriers were utilized as tankers to bring motor gasoline from Singapore to be used as charging stock in the manufacture of even more desperately needed aviation fuel.

Satisfactory diesel fuels were produced from coconut oil, hydro cracked; pressed copra oil; esterified copra oil; and soya bean oil. Pine root oil was used, too, but it had a tendency to leave gummy deposits in the engine. A determined effort was made to develop an industry for converting coal into oil, but the results were comparatively insignificant. As a matter of fact, the outputs of oil from shale at Fushan, until 1944, exceeded the combined output from all coal conversion processes.

During the last year of the war, the Japanese had considerable success with a program for producing alcohol and using alcoholic aviation fuels. For instance, they were able to produce 1 pound of ethyl alcohol from the fermentation of 11 pounds of sweet potatoes. This, in turn, necessitated vital decisions about which varieties of potatoes were best for food and which best for fuel, and how the two should be apportioned to keep the nation alive to fight.

By the spring of 1944, the supply of cane sugar and molasses from Formosa, Java, and the Philippines was decreasing, and more emphasis was placed on Manchurian grain as a raw material source of ethyl alcohol. Finally, butanol plants were converted to the production of ethyl alcohol. Thus were the Oriental and Occidental opposed in mortal—and technological—combat: the Japanese converting his rubber into gasoline and the American converting his gasoline into rubber.

Such were some of the highlights reported by the mission.

ADDITIONAL DUTY—CIRCA 1880

In the library of the Field Artillery School, Fort Sill, U.S.A., are documents which describe what the problems of a Commanding Officer may have been in the 1880s. These dog-eared and faded papers are in the handwriting of a certain lieutenant who was simultaneously post commander and troop commander with additional duty as post ordnance officer, post quartermaster and post inspector.

Certain items of ordnance equipment were worn out through normal wear and tear. As troop commander, the officer wrote the post commander requesting that they be inspected and condemned. As post commander, he sent this communication to the post ordnance officer for remark. As ordnance officer, he wrote to the post inspector that he saw no objection to this procedure. As post inspector, he sent the communication back to the troop commander for remark as to what precautions had been taken for the care of ordnance property. As troop commander, he sent a long endorsement to the post inspector detailing the precautions that had been taken. As post inspector, he approved this memorandum and sent it to the post commander, who sent to the troop commander an order that the worn-out equipment be destroyed. The troop commander thereupon supervised the destruction of the articles and signed a certificate to that effect.

ENTHUSIASM

(Continued from Page 32)

ever, but the fact still remains that someone else is doing his work or the work is not being done. This officer is entitled to every sympathy and if transferred to the SRO, can expect the most favourable consideration of his application for reinstatement at any time that his civilian duties, etc., permit him to carry out the functions of his appointment.

The unit can function and function properly and efficiently if every officer does his own job well. No officer will then be called upon to devote more than a reasonable portion of his spare time to unit activities. That is the millennium and with enough enthusiasm even the millennium is possible.

A METEOR FLASHED ACROSS THE SKIES

A historical "flash back" consisting of opening paragraphs gleaned from German High Command Orders

by

Capt. A. G. Steiger, Historical Section, Army Headquarters, Ottawa

31 AUG. 1939—

Fuehrer Directive No. 1

All political means having been exhausted to correct in a peaceful manner the unbearable situation on Germany's eastern border; I have decided upon a *solution by Force.* . . .

30 SEPT. 1939—

Fuehrer Directive No. 5

As a result of the Boundary and Friendship Treaty of 28 Sep 39 with Russia, it is intended to regulate the political organization of the former Polish Territories within the German sphere of interest according to the following guiding principles; . . .

9 OCT. 1939—

Fuehrer Directive No. 6

If it should become apparent in the near future that Britain and, under her influence, France also are unwilling to end the war, I am determined to go over to the offensive without much delay. Preparations are to be made for an offensive at the northern flank of the Western Front, through the area of Luxemburg, Belgium and the Netherlands. . . .

1 MAR. 1940—

Fuehrer Directive for Operation "Weseruebung"

The development of the situation in Scandinavia requires that all preparations be made to occupy Denmark and Norway with parts of the Armed Forces. . . .

16 JULY 1940—

Fuehrer Directive No. 16

Since Britain, despite her hopeless military situation, still shows no indications of a desire to come to terms with us, I have decided to prepare an invasion, and, if necessary, to carry it out. . . .

12 OCT. 1940—

Armed Forces High Command

The Fuehrer has decided that preparations for the landing in Britain are to be kept up from now

until spring, merely as a means of exerting political and military *pressure.* . . .

18 DEC. 1940—

Fuehrer Directive No. 21

The German Armed Forces must be ready *to crush Soviet Russia in a rapid campaign,* even before the termination of the war with Britain. . . .

14 JULY 1941—

The Fuehrer and Supreme Commander

After the defeat of Russia, when our forces will be in control of Europe, the size of the Army can be decreased considerably. . . .

8 DEC. 1941—

Fuehrer Directive No. 39

The severe winter which came surprisingly early in the East, and the resulting difficulties in bringing up supplies, compel us to stop all large-scale offensive operations and to go over to the defensive. . . .

19 DEC. 1941—

Fuehrer to Commander in Chief, Army

I have decided to assume in person the High Command of the Army, effective today. The Chief of the General Staff, Army is to be my immediate subordinate. . . .

23 MAR. 1942—

Fuehrer Directive No. 40

In the near future the European coast will be exposed very seriously to the danger of enemy landings. . . .

13 AUG. 1942 —

The Fuehrer wants to prevent the opening of a second front at all costs. There is only *one* front; the other one can only be a defensive one. *Therefore the Fuehrer has decided to build an impregnable fortress along the Channel and Atlantic Coasts.*

3 NOV. 1943—

Fuehrer Directive No. 51

The fierce and costly fighting against Bolshevism has occupied our military resources and energies to the utmost during the past two years and a half. This was in keeping with the seriousness of the danger and the situation as a whole. However, the situation has changed in the meantime. The danger in the East remains, but a greater one is looming up in the West: an Anglo-American landing. . . .

28 JAN. 1944—

Fuehrer Order

In the next few days the "Battle for Rome" will begin. It will be decisive for the defence of Central Italy and for the fate of Tenth Army. It is, however, of even

The author of this historical "flash back" is an officer of the Supplementary Reserve who served during the war in the Canadian Intelligence Corps. He is now Head Translator in the Historical Section, and is in charge of the research in German documents which is being undertaken in conjunction with the official history.—*Editor.*

greater importance, for the landing at Nettuno is the beginning of the invasion of Europe planned for 1944. . . .

2 APR. 1944—

Army General Staff, Army Operations Order

The Russian offensive on the southern sector of the Eastern front has passed its peak. The Russians have exhausted and divided their forces. The time has now come to stop the Russian advance once and for all. . . .

13 JULY 1944—

Fuehrer Order

In the event that enemy forces should penetrate into Germany the following orders are to go into effect: . . .

1 SEPT. 1944—

Fuehrer Order

I issue the following orders for completing the Westwall defences: . . .

3 SEPT. 1944—

Fuehrer to Commander in Chief, West

Since our forces are much in need of reinforcements, which it is impossible to bring up quickly in sufficient numbers, no line can be designated at the present time which must and can be held with certainty. . . .

16 SEPT. 1944—

The Fuehrer has ordered:

In the West the fighting has advanced onto German soil along broad sectors. German cities and villages are being included in the combat zone. This fact must make us fight with fanatical determination. Each and every pillbox, every city and village block must become a fortress against which the enemy will smash himself to bits, or in which the German garrison will die in hand-to-hand fighting. . . .

29 APR. 1945—

Chief, Naval Staff

Rumors concerning formation of a Bavarian liberation committee, a capitulation offer by Reichsfuehrer Himmler, or an armistice at the Western front are creations of enemy propaganda. The Fuehrer is taking part in the fateful battle for Berlin. It is more than ever necessary to accept only the orders of the responsible superiors, obey them without hesitation, and carry out the directives of the highest command to the last. . . .

8 MAY 1945—

To everyone:

On 8 May preliminary capitulation at Rheims. On 8 May Keitel, Stumpf, Friedeburg sign the unconditional German capitulation at Berlin. Thereafter fighting will cease at all fronts at 0000 hrs. 9 May. . . .

The Commander in Chief, Navy.

Breakaway Cockpit

Reprinted from the Marine Corps Gazette (U.S.)

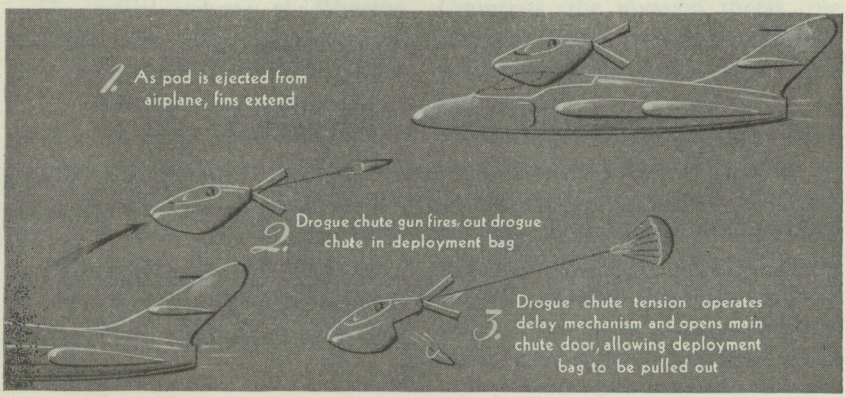
A breakaway cockpit unit, designed to serve as a parachute-borne emergency escape vehicle for pilots of high-altitude, supersonic planes has been developed by the Navy Bureau of Aeronautics after almost two years of intensive research.

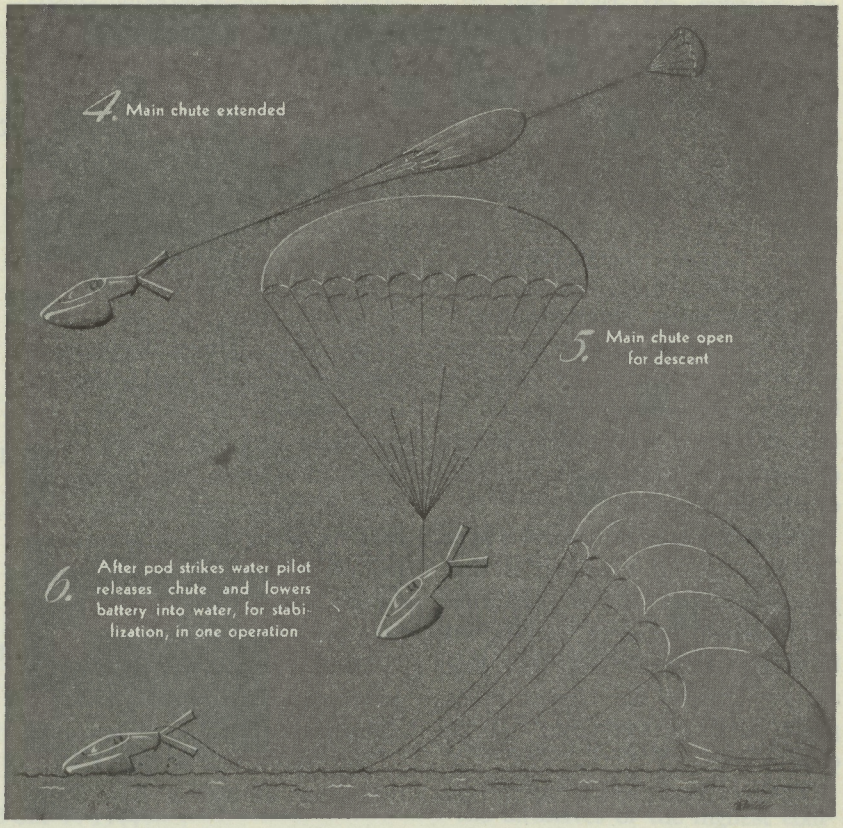
The pod-shaped unit, known as an "ejection cockpit capsule", is completely enclosed, and is pressurized and insulated. Riding in it, a pilot will be safely dropped from very high altitudes where the rarified atmosphere and extreme cold quickly destroy life.

The cockpit capsule is blown from the plane when the pilot pulls a release lever. Three stabilizing tail fins prevent the capsule from tumbling through the air, and a large parachute drops it gently to the earth. In addition, the cockpit unit floats in water and will serve as a boat for pilots forced down at sea. In case of crash landings at sea, the capsule is unhooked and floats away from the sinking aircraft.

The capsule also will carry survival gear, emergency rations, and radio equipment to direct rescue operations.

The capsule will be flight tested at the Naval Ordnance Test Station,





Inyokern, California, late this year. Preliminary tests and evaluations have indicated that the vehicle is completely feasible and practical.

MILITARY HISTORY

Military history is the record of divers experiences covering all conditions of country, of climate, and of armament. It is the storehouse of the accumulated knowledge of soldiers of all ages. It is the revelation of the practice and the principles of the great captains. It is the one and only means, in default of long service in the field, of forming a military instinct, and of gaining a clear insight into the innumerable problems associated with the organization and command of an armed force.—*Colonel G. F. R. Henderson.*

WAR MEMOIRS

A Commentary on the first two Volumes of "The Second World War"

By Colonel C. P. Stacey, O.B.E., Director of the Historical Section, Army Headquarters, Ottawa

In the year 1898 a young British cavalry officer published a personal account of a little campaign, calling it *The Story of the Malakand Field Force, 1897*. It was a great success, and its author has written, "I knew that if this would pass muster there was lots more where it came from!" There certainly was. Ever since that time he has been campaigning in one capacity or another, and writing books about the campaigns afterwards. In 1950 he is still at it, producing with unabated energy and undimmed style successive instalments of his personal history of the Second World War, in which he served for five eventful years as Prime Minister of Great Britain.

The initial volume of Winston Churchill's second great series of war memoirs (the earlier series, *The World Crisis*, tells the story of the war of 1914) appeared in 1948, followed by the second in 1949.[1] The third has just been published, and I hope to say something about it in an early issue of the *Journal*. In the meantime, it may be worth while to attempt a brief and belated commentary on the earlier volumes, *The Gathering Storm* and *Their Finest Hour*, primarily from the point of view of a soldier, and particularly of a Canadian soldier.

The Gathering Storm tells the story of the wasted years before the war, and of the war's first months: the "phony war" and the "ramshackle" campaign in Norway. It ends with the resignation of Neville Chamberlain and the formation of Churchill's coalition government. *Their Finest Hour* deals with the balance of the tremendous year 1940: the disastrous campaign in France and the Low Countries, the invasion threat, the Battle of Britain and the first victory in the Desert. The tale is told not merely from the author's unrivalled personal knowledge, but from documents, hundreds of which are quoted at greater or less length: it is clear that Mr. Churchill did not leave No. 10 Downing Street entirely empty-handed. These documents account for much of the work's interest, both for the general reader and for students of

[1] The Second World War. *By Winston S. Churchill.* [*Vol. I*] The Gathering Storm (1948). [*Vol. II*] Their Finest Hour (1949). (*Published in Canada by Thomas Allen Limited.*) $6.00 *each.*

history and war. The latter will find them a mine of information concerning the practical manner in which the "higher direction" of the war was carried on.

There is no doubt of Churchill's preferences in the matter of machinery for running a war. He has no patience with committees—even Chiefs of Staff Committees. In one aspect, these volumes are the chronicle of how he concentrated more and more power in his own hands until on 10 May 1940 he became Prime Minister and Minister of Defence: "it was . . . understood and accepted that I should assume the general direction of the war, subject to the support of the War Cabinet and of the House of Commons." He always pays due deference in print to the War Cabinet; perhaps it did not always receive quite so much deference in day-to-day practice. Churchill writes frankly that though he had held most of the great offices of state, "the post which had now fallen to me was the one I liked the best . . . Power . . . in a national crisis, when a man believes he knows what orders should be given, is a blessing." He clearly believed, and with reason, that he had kept a rendezvous with destiny. He had unbounded confidence in his own capabilities. He obviously considered that the best organization for conducting a world war consisted simply of Winston Churchill supported by an adequate and obedient staff. (And there *have* been worse formulas.)

The extraordinary quality of the man appears most strikingly in the multitude of hortatory minutes and memoranda, addressed to Ministers, Chiefs of Staff, every kind of high authority, which are printed in these pages. There was no apparent limit to the energy or ingenuity of his mind, nor to his capacity for pursuing details when he thought them worthy of attention. The heads of the services undoubtedly had for him a feeling akin to veneration—although on occasions when he was riding one of his own special hobby horses they must sometimes have wished him in Timbuctoo. Nobody was exempt from his inquisitions: he writes to the Minister of Agriculture that he is "far from satisfied at the proposal to reduce pigs to one-third of their present number," and to the Postmaster-General asking for a report on "complaints about the Post Office service during air raids." But his main concern was always with Service matters. One of my favourite minutes, written while he was First Lord of the Admiralty, relates to appointments to naval cadetships:

> I have seen the three candidates. Considering that these three boys were fifth, eighth, and seventeenth in the educational competitive examination out of . . . 400 who competed, I see no reason why they should have been described as unfit for the Naval Service. It is quite true that A has a slightly cockney accent, and that the other two are the sons of a chief petty officer and an en-

> gineer in the merchant service. But the whole intention of competitive examination is to open the career to ability, irrespective of class or fortune . . . Cadetships are to be given in the three cases I have mentioned.

Even leaving entirely aside the inspirational influence of his leadership upon the forces and the public (and this was probably his greatest contribution), the effect of Churchill's personal activities upon the British war effort must have been very powerful, though also quite immeasurable. General Pile of A.A. Command has recorded, "Whenever he left the country we felt the impetus flag, and the moment he came back things began to hum again." Reading these memoranda, one understands why.

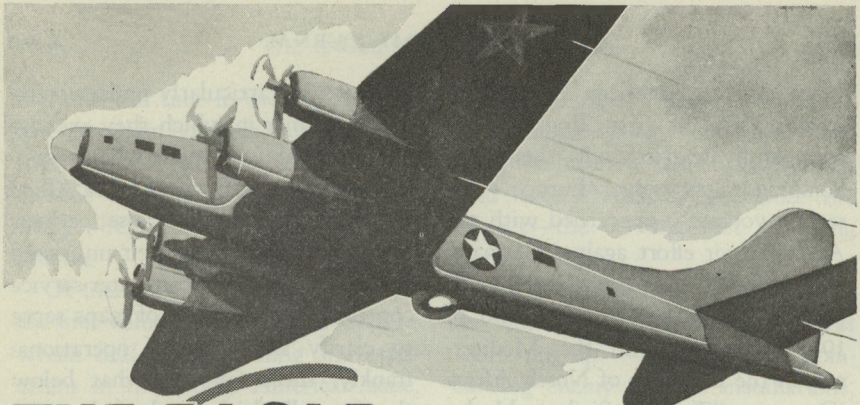
Churchill's chief interest, of course, was strategy in all its aspects. One could discuss this at great length, but a few points must suffice. As a general rule, he strongly favoured the bold course; his regret during the Norwegian campaign at the abandonment of the frontal attack on Trondhjem—a desperate enterprise in which a Canadian force was to have a large share—is characteristic. So is the decision, taken in August 1940, to reinforce Egypt with an armoured brigade from Britain, then threatened with imminent invasion. Not the least interesting part of *Their Finest Hour* is its incidental revelation of Churchill's ideas concerning appropriate strategic policy for Britain in the days when the Commonwealth was alone. In October 1940 we find him demanding that the number of armoured divisions be doubled—"We cannot hope to compete with the enemy in numbers of men, and must therefore rely upon an exceptional proportion of armoured fighting vehicles." But it was not the Army to which he pinned his hopes of final victory at this time. In July he had written, " . . . when I look round to see how we can win the war, I see that there is only one sure path. We have no Continental army which can defeat the German military power . . . But there is one thing that will . . . bring him down, and that is an absolutely devastating attack by very heavy bombers from this country upon the Nazi homeland." This is the core of Churchillian strategy at that period. Perhaps it is as well that it was never fully tried. When Russia and the United States entered the war, winning it on the ground again became practical politics.

Every volume this distinguished author produces adds something to the Canadian story of the war. For example, we learn from *Their Finest Hour* just why the British Government suddenly stopped pressing for the despatch of the whole of the 2nd Canadian Division to Iceland. On 6 July 1940 Churchill visits the 1st Canadian Division. Next day he writes the Secretary of State for War: "You shared my astonishment

yesterday at the statement made to us by General McNaughton that the whole of the 2nd Canadian Division was destined for Iceland . . . No one was told anything about this. We require two Canadian divisions to work as a corps as soon as possible." War Office policy then changed abruptly. In *The Gathering Storm* we get more than has been previously published on the reasons for the abandonment of the Trondhjem scheme—on which the British Chiefs of Staff reversed themselves overnight. On the other hand, our author is sometimes disappointingly silent. He was at the centre of the discussion of "Angel Move"—the "Dover Dash" scheme for sending Canadian troops to Dunkirk which caused so many flaps and flurries on 23–27 May 1940; but he does not even mention it.

There are polite references to aid from Canada and other Commonwealth countries. Various messages from Churchill to Mr. King are quoted, including some urging him to attempt to influence United States policy. But if the Dominions were partners in the British Prime Minister's eyes, they were very junior partners indeed. The appendix to *Their Finest Hour* contains two different memoranda from Churchill to the Secretary of State for the Dominions complaining that too much information is being sent to Dominion governments about the progress of the war. This rather chilling bit of realism is in contrast to the formal phrases of appreciation. However, the author never fails to lump Dominion forces in with those of the United Kingdom when comparing British and American contributions to the winning of the war.

Mr. Churchill has risen from subaltern to Prime Minister, but he has been an author all the way—one of the most distinguished authors of his long day. It is our great good fortune that the chief surviving actor in the "dreadful and impassioned drama" of the Second World War is also a historian capable of telling the tale in a manner worthy of the events. The war has already produced a considerable number of very good books; but in its combination of a great mass of solid information with a remarkably vivid and vigorous presentation, Churchill's work stands—among the personal records, at least—without a serious rival. At the moment when these lines are written, the fortunes of politics have brought him close to a return to power. One hopes that, in whichever direction the uncertain balance swings, he will be able to continue the production of this impressive history. The interruption of it would be a disappointment to—it does not seem too much to say—literally millions of readers, and something like a disaster to students of the war.



THE EAGLE *Spreads its Wings*

A Book Review

By Lt. Col. G. W. L. Nicholson,
Deputy Director, Historical Section, Army Headquarters, Ottawa

During the seven months that Air Service units of the American Expeditionary Force were in combat during the First World War they released a total "rain of bombs" of 138 tons behind the German lines; in the last month of 1943 the bomb-load dropped by the United States Army Air Forces on enemy-held territory in Europe was 9765 tons. Behind these figures lies the story of a phenomenal growth—the development of America's Army air arm from a handful of men and ancient machines at the beginning of the Second World War into a force of unprecedented range and striking power. This story, and the record of that force's achievements in the early phases of the air war against the European Axis form the content of two massive volumes,[1] first to appear in a series of seven being produced by the Office of Air Force History, Headquarters, United States Air Force.

The first volume tells of the Army air arm's struggle for recognition between the wars and the significant acceptance by America of the doctrine of strategic bombardment; describes the accelerated programme of expansion from 1939 to 1941 as the Air Corps prepared for war; and deals intensively with its fortunes from the disaster of Pearl Harbor to the exciting day in August 1942,

[1] *The Army Air Forces in World War II* (University of Chicago Press; Toronto, W. J. Gage & Co.) (Prepared under the editorship of Wesley Frank Craven and James Lee Cate): Vol. I, *Plans and Early Operations, January 1939 to August 1942* (1948). Vol. II, *Europe, Torch to Pointblank, August 1942 to December 1943* (1949).

when twelve American Flying Fortresses took off from England and successfully carried out their first bombing mission over Europe. The second volume is concerned with the American air effort against Germany and Italy in the seventeen-month period (August 1942 to the end of 1943) which saw in the Mediterranean the invasions of North Africa (Operation "Torch"), Sicily and Italy, and in North-West Europe the launching of the Combined Bomber Offensive ("Pointblank"). Both volumes contain an illuminating account of the development of over-all Allied strategy during the first four years of the war.

"It is very important that the true facts, the causes and consequences that make our military history, should be matters of common knowledge". Military historians generally will endorse this counsel of General George C. Marshall; it appears to have guided well the dozen contributors to these volumes. Indeed, few could be better equipped to give the American public "the true facts" concerning its Army Air Force than this group of professionally trained historians who have had unrestricted access to A.A.F. records and have enjoyed, we are told in the foreword, the full co-operation of Headquarters, United States Air Force. They write with authority, and adequate documentation reflects the authenticity of their work. Particularly praiseworthy is the manner in which they exercise an impartial judgement when assessing the contributions of other Allied nations to the common cause; perhaps even more laudable is their unbiassed treatment of American inter-service controversies. A series of maps serve to clarify the story of operations: frankly, these fall somewhat below the generally high level of the text. The addition to each of a simple mileage scale would greatly have aided the reader who, for example, in studying certain operations, may want to relate specific geographical distances to the known range of the aircraft employed. Canadian readers especially will appreciate the glossary of abbreviations and code names which each volume contains.

From the wealth of material at their disposal the writers of the chapters that deal more exclusively with operations have produced clear and fascinating descriptions of actions in which A.A.F. units took part: whether it be the heroic fight of a desperately harassed pursuit squadron's last ten P–40s against 50 escorted Japanese bombers over Port Darwin in the grim days of early 1942; the brilliantly conceived and boldly executed but costly mission against the Ploesti oil refineries in August, 1943; or, what must rank as the most dramatic venture of all, the Doolittle Raid of 18 April 1942, when for the

first and last time in the war, heavily laden medium bombers were launched from carriers at sea under actual combat conditions, and a surprised Tokyo felt the weight of Allied bombs.

Of interest to Canadian readers of the first volume will be those sections which deal with planning and operations in the North American zone. The account of the Japanese carrier-borne attack on Dutch Harbour which covered the enemy landings on Kiska will remind many of the state of tension which the news created among the civilian population of British Columbia. The race to develop air bases in the Aleutian Islands recalls the service of R.C.A.F. reconnaissance and fighter squadrons in the treacherous fogs and williwaws that made flying conditions along the Chain more hazardous than in any other theatre of operations. Reinforcement of American air strength in Alaska was dependent upon the use of an inland route running to the east of the Canadian Rockies. It is somewhat surprising to find that the author who discusses this strategically important line of communication treats its development as an exclusively United States enterprise, taking little notice of the substantial amount of construction carried out by the Canadian government, completely ignoring the part played by the Permanent Joint Board on Defence in establishing the undertaking on an international basis, and not once using the name by which the P.J.B.D. (and most Canadians) recognize the project—the Northwest Staging Route.

One of the many new terms which the war added to our vocabulary was "softening-up"—the process of bombarding enemy defence installations, communications, airfields and troop concentrations prior to the launching of an assault by sea or air, or the extension of operations on land. The description, in the second volume under review, of the devastating effect with which the Allied Air Forces applied this technique in Sicily and Italy, bears striking testimony to the tremendous contribution of air power to the success of the operations of the armies on the ground. The account of the conquest of Sicily, however, contains one statement that must be questioned—the declaration that "the Germans effected a partially successful withdrawal, saving the equivalent of at least one division with equipment". Had the authors had time to investigate fully the relevant enemy documents—they admit that the early production of these first volumes did not allow thorough examination of this valuable material—they might have reached the conclusion that the German evacuation across the Messina Straits of the major part of their

four divisions in Sicily together with most of their heavy equipment, a withdrawal carried out at all stages on a carefully timed programme in spite of all Allied Air efforts to prevent it, must be ranked as one of the masterly achievements of the war.

This is not to say that the writers of these volumes ignore the contribution to be made by enemy sources. From the Luftwaffe records that were becoming available as their work neared completion they were able to check A.A.F. claims of losses inflicted on the enemy in a number of key battles. It is a mark of their scholarship that they have not hesitated to use the most reliable figures thus obtainable, even when in one engagement this involves reducing enemy losses of 53 aircraft destroyed, 13 probably destroyed and eight damaged to two shot down and a third damaged.

While the U.S. Ninth and Twelfth Air Forces were dealing the Axis powerful blows in the Mediterranean, in the United Kingdom the Eighth Air Force was building up its potential in preparation for the vast programme of strategic bombing against Germany and occupied Europe which had been authorized at Casablanca. The impressive story of the planning and launching of this great combined effort by the strategic air forces of the R.A.F. and the U.S.A.A.F. is clearly and comprehensively told. It was a logical development of principles established in the early training and operational experience of the air forces of both nations that allotted the daylight tasks of the "around-the-clock" bombing to American groups and the night missions to the R.A.F. From the early days of the war Bomber Command favoured mass night attacks over large area targets, both because of their psychological effect upon civilian morale, and the lower operational losses that these incurred. The Americans, on the other hand, with their "traditional reverence for marksmanship which went back to the squirrel rifle of frontier days", and their pre-war belief that the nation's best defence against sea power lay in aerial pinpoint bombardment of enemy battleships, preferred daylight precision bombing, to which end they directed their training and the development of their equipment. By the end of July 1943 the Combined Bomber Offensive was in full swing, and the A.A.F. by day and the R.A.F. by night were setting new records in the destruction of the German war potential. American air power had progressed far from the dark days of unpreparedness, when on an exposed Philippiness airfield it took ten truckloads of coconut leaves to cover one B–17 from enemy eyes, and on Java desperately needed P-40s were thrust crated into the sea to prevent their capture by the Japanese.

The Journal's "New Face"

With this issue the *Journal* presents a new format which, it is hoped, will appeal to its readers. The Editorial Board decided to make this change following a survey to determine reading habits. This survey showed that the majority of the readers favoured the small-size format — something which could be easily carried in a pocket, particularly while travelling. Although smaller in size, this new issue of the *Journal* actually contains more reading material and more illustrations in colour in its 80 pages. A type-face which can be easily read has been chosen. Another change is the cover: instead of listing the contents on the cover, it has been decided to present a new cover illustration each month.

Considerable time and effort has been expended in making over the *Journal*, and the Editorial Board and the Staff hope that it will meet with the approval of the readers. The Editor will be only too pleased to receive comments on the *Journal's* "new face."

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