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Photo: Australian War Memorial, Canberra.

MESSINES

In World War I the Western Front in France and Flanders became locked in trench warfare, with one flank resting on the coast and the other in neutral Switzerland. The British and French Armies mounted several great offensives aimed at punching a gap in the German defence system, through which they intended to pass a large body of cavalry held in readiness. Unfortunately the offensives never succeeded in creating the conditions necessary for successful cavalry action.

The picture shows members of an Australian Light Horse Regiment waiting behind the lines at Messines during one of these offensives.

THE PAPER TARZAN

Brigadier R. T. Eason, MC, ED,
Royal Australian Artillery

I HAVE READ closely "King of the Jungle or Paper Tiger" in the April issue and I find it somewhat lacking in "battle know-how". In most discussions on the Pentropic or reorganisations, the real fundamental issue is never faced, the issue being: What is the basic philosophy that must be established before organisations can be attempted? War is an art, it is not a science and the philosophy of the unit is basic to this art.

Perhaps to enlarge on this theme, the best thing to do is to quote from "The Kind of Army We Require", a paper submitted in 1960 but not accepted for publication. The quote is as follows.—

"The Unit

History also throws light on a matter of such vital importance as to be worthy of special mention. In war and in all army organisations there is a vital need for what is called a basic unit. This unit must be such that it reflects utterly the personality and drive of the Commander. Every soldier in this unit must feel individually and personally the force of his Commander's will and personality, and this application of will and personality must be of an intimate nature both in training and action. Whatever the unit is, the Commander must be able at all times to:—

(a) Know the state of morale and training of almost every individual soldier.
(b) Motivate the whole unit in the shortest possible time. He must personally see it retains morale and efficiency or 'Lift it' at short notice.
(c) Think at least two down when placing it in defence

Brigadier R. T. Eason was serving in the CMF when war broke out in 1939. Enlisting in the AIF, he was commissioned in 1940 and served with 6 Division Artillery in Libya, Greece and Crete and later in the South West Pacific theatre. Rejoining the CMF in 1948, he was Commander, Royal Artillery, 3 Division, from 1 July 1958 to 30 June 1961, and is now on the Unattached List.

and have time to do a proper reconnaissance to achieve this absolutely vital requirement.

(d) With his gunner adviser personally create and coordinate his defence and fire plan in a period of time that is not excessive and without undue exertion. The numbers must be such that reasonable dispersion does not preclude the above.

(e) Drive it with a ruthless will that is felt down to the individual during fighting and/or movement.

(f) With his gunner adviser do the reconnaissance for an attack and create his own fire plan.

(g) Work with a *minimum of staff* so that his contact with subordinates on all matters is direct, mainly verbal, and has the maximum impact. Even dispersion must not weaken his *control*.

(h) Feel that this unit is a live aggressive body that *reacts immediately* to his orders, and have such control that the addition of extra support units placed under his command or in support, only adds to his efficiency.

(j) Personally supervise the training of his officers and NCOs. (It has been said that sergeants are the backbone of the Army and that junior officers win wars but if this unit Commander does not have the time to personally supervise their training they will not be equal to the task.)

"History gives the verdict that this unit is composed of approximately 800 all ranks and is usually known as a Battalion. If the numbers rise much above this figure then personal contact is lost, staffs increase out of all proportion and the unit commander becomes a minor Brigadier with almost equal staff and insufficient time or tools to do a Brigadier's job. Furthermore if the unit commander becomes remote you will find a sub-unit Commander doing the personal command job on an insufficient number of troops. This is wasteful and will not get the desired results in battle. It is essential that the unit be of the correct size so that the Army has the optimum number of these units in which personal command gives maximum fighting efficiency, and only by having such units can a senior commander make his will felt to the greatest number, and to the lowest level, in the shortest possible time.

"All other things being equal, the Army that has the best units of the correct size will be victorious. This unit commander is the *unique* commander in an Army and it is he who will always be the deciding factor in war. Therefore if his command is either too big or too small the Army is immediately crippled.

"To put all this in a nutshell, war demands that this commander be responsible for everything that happens in his unit and therefore although he should be given the maximum number it is important to see that he is not asked to command too many."

Of course, in the same paper the unit was also derived from a study of the tasks, requirements

and numbers for sections, platoons and companies, etc., and the figure was approximately the same.

When it is remembered that *this is the final level of one man's* absolute responsibility, then this unit gives the optimum (all things considered) maximum fighting power that one man can command with optimum maxi*mum effciency*.

This unit concept is basic with the British who are at the moment fighting in all kinds of terrain. They do not have an excellent organisation for Europe and a second class one for the jungles. They try for the best possible units for all arms of the service and combine, amend and tailor to suit the terrain.

Futhermore, the Americans are now following a similar concept. This may surprise those who find it difficult to get beyond the word-screen of "ROADS", "Mixes", etc. Simply put, the Americans have devised basic units for all arms of the services and they also combine, amend and tailor to suit the occasion. *The basic unit, for the American infantry, is now approximately 800 all ranks*. The significance of this should need no further comment.

Now for a few comments on statements made in the April article, always remembering as we proceed that the Pentropic Division has five swollen units while the Old Division had nine "optimum" units.

Under the heading of Viability, three points are raised on which it is claimed "there can be little argument". The first of these points is: "The Regular Army can supply a significant part of a division for fire-brigade duties, or for an early contribution to an Allied Force." This is like saying that once upon a time I had six apples and three oranges, but now I have dispensed with four apples, so the oranges are now a significant part of the total. It is hard to see just where this gets us unless significance for significance sake is required.

However, it is the second point that is the important one and it states: "The division can now be deployed in fifths instead of thirds — a fundamental improvement in flexibility." To say the fives as against threes is a fundamental improvement in flexibility is to make a fundamental error and show little knowledge of flexibility — *it being the ability to take advantage of fleeting opportunities*. To have such a "number mistique" is to reduce military writing to the level of a numerology publication.

The truth of the matter is that the old division was deployed in nines, not threes, and battalions could be used individually or brigades tailored to the job in hand and/or used as task forces without any ad hoc arrangements for command and signals. If one is looking for combinations alone, there are plenty within the nine and in actual fact the brigades headquarters were not inserted to give a "triangular" structure. They were put there to give the division maximum fighting power and flexibility, and to keep the divisional Commander out of the

battalion battle. At one stage it was thought there should be four battalions to a brigade, but resources available forced the figure down to three. Five as far as I know was not considered and being right on the limit of a Commander's span of control would tend to decrease the flexibility in spite of giving more "combinations".

In defence, the old division reacted (flexibility) very quickly to various situations. A battalion commander who had been seriously mauled knew that his job was to help stabilise the situation while his brigade commander with whom he was in continuous contact would then take the necessary action to restore the situation. This action would have usually been rehearsed. Whereas, if a pentropic battalion commander is in such a position and a task force has to be organised to restore the situation (this will happen), the odds on his survival will be small.

The third point: "There is a significant increase in the fire power-to-man power ratio" is to my mind, not true. Anyone can cut 2,000 off a division and organise more sections from what is left, but the test comes when this new organisation has to be commanded, supplied and administered in battle — so here I will be content to point out that there are only approximately the same guns and mortars per section as in the old division.

Another statement I would like to take issue with is: "The division can dominate more ground in defence and has greater offensive capacity." Most people will be able to see the fallacy of the first part of this statement by doing a deployment T.E.W.T. for the pentropic division (five battalions) and then do the same exercise with nine optimum battalions. However, it is the phrase "offensive capacity" that requires elaboration here. In this context capacity means the ability to cope with really rugged fighting in an attack and still have the power to "Maintain the Objective." Imagine a pentropic division in attack that has had two battalions very seriously mauled and rendered temporarily ineffective, then it is apparent that the offensive capacity of the division is seriously diminished. Now take the same situation with the old division, always remembering that the optimum unit has somewhat the same fighting power as the pentropic unit, then it is apparent that the old division still retains great offensive capacity and flexibility. As a divisional commander, in which situation would you care to be? With its seven effective units, the old division could continue to maintain its objective, the pentropic could not, and this is the real test of capacity. Capacity is not altogether the outcome of the numbers of sections, mortars and guns that exist, but is the result of the command organisation that controls and applies all this fire power. It has some relation to time or "carry-through" and is almost synonymous with stamina.

Where a division in battle is concerned there is always the time of the heavy clash when

both sides tend to reel with a bloody nose. This is the occasion when the "capacity" to react, and apply the most fire power according to the Principles of War, will gain the initiative. The old division had this capacity, but not so the Pentropic.

Of course, to achieve this capacity, the organisation should be such as to overcome real difficulties of command and control and where a pentropic division is concerned, the following applies:—

(a) It is not good enough to say that a battalion will react better because the divisional commander is in direct contact with the battalion. Of more importance is how the battalion reacts within itself to the task given. The end result is the thing that counts. For instance, it takes hours to mount a battalion attack and time is saved not in by-passing a brigade headquarters, but in having a unit best designed to cut this time to the minimum.

(b) Also, in a heavy clash, the Pentropic divisional commander will find himself fighting divisional, brigade and battalion battles all at one and the same time. This in itself will probably slow him down in giving orders to battalions.

In conclusion I would like to quote from my 1960 paper previously mentioned. The opinions expressed were gained from T.E.W.T.S. and exercises and at this stage I see no reason to change them.

The Pentropic Organisation In Attack

"In the light of the foregoing and when given a critical examination, the Battle Group does not appear to be a lean, tough fighting organisation, but merely a bloated battalion which will be slow in doing a battalion's job and quite unable to do the job of a Brigade.

"There is of course, no doubt that with the fire support available, a battle group could overcome a company and in any case a company can be by-passed without great risk, but to pit a battle group against a battalion composed of anything but poor troops would be an entirely different matter. It has neither the numbers nor the support fire to give it victory without suffering unacceptable casualties. The very minimum requirement here would be two battle groups and this then demands the organising of a task force with its almost ad hoc arrangements of command and signals. Of course, the commander has five companies which he may use in manoeuvre, but it is dangerous to think of by-passing or moving to the rear of a battalion without strong follow up forces and fire support. A battle group gives no indication of being able to do this with safety, and it therefore cannot attack a battalion with confidence or out-manoeuvre it.

"The very nature of this Battle Group with five large companies will compel an attempt to manoeuvre and separated companies even in attack, and this will more than magnify the problems of fire support which

will come from short range guns making concentrations and resupply more than difficult. The enemy will be well supported with tanks, guns, and mortars and he uses them confidently, quickly, and concentrated, making the counter-mortar and counter-battery problem alone a difficult proposition. Added to this will be the covering fire for attacking troops, fire to break up counter-attacks, and defensive fire, etc., and one company (pentropic) would need the support of the two batteries plus the medium regiment on these tasks during an attack. By good fire planning, and thinning out the covering fire, a second company could be used but this appears to be the maximum and decides that a Battle Group could only attack a company with confidence and certainly not a battalion; of course, ground may allow a phased attack but this should not be relied upon.

"A suggestion here that the sixteen mortars be grouped and held well forward is worth considering, but this merely leads to the thought that perhaps the Battle Group would be better off with a light battery in place of company mortars.

"Also this Battle Group cannot disperse into all arms bricks and concentrate again quickly and smoothly and this could be the main requirement for nuclear warfare. It is also interesting to note that the Battle Group has no increase in support firepower (conventional) as it has roughly the same number of mortars and guns per section as the old battalion.

In Defence

"Here there is no doubt that the companies are meant, in conventional war, to be dispersed even beyond the limits imposed by the range of small arms, and it should be remembered that when the numbers and distances are doubled it more than doubles the ground to be covered by fire.

"It seems fairly certain that if five large companies are placed in a defensive position with dispersion of 600 yards or more between companies then:—

(a) The requirement of fire support in:—
DFs including those in depth,
Counter Battery and Mortar Tasks,
Harrassing fire,
Observed fire to break up attacks, and covering fire for counter attacks, would be too great for the available artillery.

(b) The commander would be in no better position, when attacked, than the old battallion commander. It would be relatively easy for an enemy battalion to take out one of his companies and then unless he caught the enemy really off balance and badly reorganised he would have to use the rest of his command for counter attacking. Even then he just has not got sufficient tools. It would probably need another battle group to save him.

(c) The commander would not have sufficient time to do his reconnaissance on the basis of thinking two down, nor

would he be able, with his gunner adviser, to create and co-ordinate his fire plan. A lot of this last would have to be delegated to B.C.s. This is depressing when it is realised that "firepower dictates the tactics" and dominates the battlefield.

(d) The commander would have to try to use his 16 mortars grouped to increase his firepower. This would be essential as they would then give more real support to the companies and the Battle Group as a whole than when ten are dispersed among the companies. An interesting exercise for this who are interested would be to study the ammunition supply difficulties and signal arrangements to allow the two mortars inbuilt into each company to give vital and immediate support to other companies. Also, who will decide where they are to fire and when. Of course, in wide dispersion companies will need their own mortars but this does not conflict with the principle[1] previously stated and it must be remembered that inbuilt support is like inbuilt furniture, it is hard to move and rearrange.

No comments are made about this static defence if nuclear weapons were used. It would be destroyed when located, no attack would be necessary.

It is fairly apparent that the battle group is such that the commander has become too remote, he is neither the unit Commander nor a Brigadier and he cannot carry out the job of either commander efficiently.

All personal command by the *unique* commander has been lost and in both attack and defence it is more than likely the organisation will prove to be slow and unwieldy. It is also fairly clear that he will, when on his own, never be able to fully employ his infantry without unacceptable casualties.

He also needs too many staff for the comparative number he has to handle and in any case why five companies? The reasoning that a mediocre commander will handle an odd number better than an even number is a fallacy. A mediocre commander will handle any number in a mediocre way and conversely a good commander will do well with any number.

It is admitted that the Battle Group could be successful against insurgents or isolated groups without air and artillery support as were the Japanese we faced in islands in the last war, but against trained phantom forces with their strong supporting firepower it would prove to be unequal to the task."

The Pentropic is indeed a Paper Tarzan and like all wild creatures of the jungle, he will be hard to command and lacking in stamina.

[1]. Support fire power should be centralised under the highest commander capable of exercising this command.

KEEPING LIMITED WAR LIMITED

Major Alton R. Wheelock
United States Army

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Staff College, Fort Leavenworth, Kansas, USA.

The views expressed in this article are the author's and are not necessarily those of the Department of the Army, Department of Defence, or the U.S. Army Command and General Staff College.

— Editor, Military Review.

AT THE TURN of the present decade, debate centred on the question of limited war. One of the most serious facets of the debate revolved around the problem of escalation.

Opponents to the proposal that US Armed Forces be trained and equipped to fight a limited war used the escalation factor as a potent argument. They said, in effect, that no matter what courses of action this country might adopt to limit war, a limited engagement would blossom rapidly into an all-out nuclear exchange.

In retrospect, the possibility of escalation at that time was relatively remote. Weaponry had not reached the point that would produce a true escalation. An all-out nuclear exchange probably would have been sudden and pre-emptive in nature, rather than the gradual expansion of a limited engagement. In the early days of the 1960s, there was no continuum of sophisticated weapons that would permit a limited engagement to expand, through increasingly devastating nuclear blows, to an all-out nuclear exchange at national levels.

Today, however, weaponry has progressed to the point where true escalation can develop. The range of missiles has become longer; the missiles are more accurate; and the yield of the warheads has become more discrete: The mobility of missile-launching platforms has increased a thousandfold, particularly with the advent of the Polaris - carrying nuclear submarine. A former question as to when missiles and their nuclear warheads cease to be tactical and become strategic is no longer theoretical; it is very real. The hardware now exists that permits a nuclear explosion of

any size to be placed from Vietnam to Moscow to Washington.

Today, too, the United States is enhancing her capability to engage in limited war. It is no secret that the US Army has increased its ground for strength, mobility, firepower, and command control. The presumption can only be that US foreign policy provides for the willingness to engage, or threaten to engage, in limited war.

Unfortunately, our knowledge of the problems and constraints of limited war has not increased accordingly. We know more about weapons effects than we do about how to keep a limited war limited. What principles can be devised to avoid escalation? What problems do these principles raise? What constraints will exist in limited war that are foreign to our military and political thinking today?

Limited Objective

Students of limited war contend quite correctly that limited war can only have as its purpose a limited objective. To carry this one step further, the limited objective must be attainable and in consonance with well-defined national objective. This must be, not only so that it can be distinctly communicated to a hostile government, but so that it will be believed as well.

In support of this precept, the limited objective must be within the capability of limited war forces without committing or appearing to require the commitment of forces necessary to deter or to fight a general war. To commit the latter forces — or to appear to require the commitment of these forces — would destroy the creditability of the determination to keep the war limited. Thus the commitment of large deterrent forces would serve to trigger the very event they were designed to deter — an all-out nuclear exchange.

The limited objective and the arena of war should be identifiable; they should consist of a "38th Parallel" and a "Yalu". Difficult as such limitations might be, they are necessary to ensure that the military commander knows the limits within which he has authority to act, and outside of which he has no unilateral authority. It would also assist if the military force were scaled to the size of the task.

All of this would enable us to signal when we achieved our objective, facilitate the communication to the hostile government of our intent to proceed no farther than certain limits, and provide planners an opportunity to ensure the consolidation of the gain.

The objective should be subject to change. It might be wise to expand the objective to achieve some advantage which a low-risk situation presents, or the objective might be contracted. The latter might occur when further pursuit of the original objective entails newly discovered threats which outweigh any advantages that might be gained. It might also be prudent to contract the objective to the existing line of contact for the sake of gain in another

geopolitical area. Most painful for the military professional, the objective might be contracted when military reverses combine with politico - economic considerations to dictate a cessation of hostilities at a negotiated line of demarcation.

Communication of Intent

The necessity of communicating to a hostile government our intent to wage only a limited war has been threaded throughout much of the foregoing. It is easy to demonstrate that the maintenance of communication in its broadest sense between hostile nuclear powers must be one of the primary principles of limited war. But the requirement contains aspects that are hazardous and poses problems that are not easily solved.

Consider, first, the positive aspects. Certainly, we wish to communicate our limited purpose of war and our intent not to threaten the existence of the hostile nuclear power. It may also be useful under certain conditions to publicise our intent with regard to the use or non-use of nuclear weapons. Should we declare our intent not to tolerate the use of "strategic" weapons against a "tactical" target without certain specific blows in return? How can we accurately and convincingly convey the point beyond which we would interpret hostile acts as overpowering threats jeopardising national survival?

There are also the negative aspects. In certain instances, what about rendering our top decision makers inaccessible — by such means as vacations, conferences, and political conventions — at the moment when negotiations could not possibly be fruitful to us, or when it is to our advantage, with little risk, not to be "communicative".

The underlying assumption of all that has been written about communications is that the aggressor with whom we are communicating is the correct one to receive it. But exactly who is the agressor high command?

Moscow or Peking?

Recent events in Laos and Vietnam appear to raise the question of whether Moscow or Peking is really calling the plays. Indeed, the same question can be raised about Cuba. Political analysts must always bear in mind that the situation may be confused even within the capitals of Peking and Moscow as the result of shifting powers and the political dialogue taking place at any instant. One needs to be aware that such an ambiguous situation may be deliberately perpetrated.

But the correct assessment must be made as to the identity of the actual aggressor because it bears upon the degree of risk in escalation. The Soviet Union has a far more sophisticated weapons arsenal than Communist China; she also has a far greater industrial commercial base at risk. In comparison with Red China, the Soviet Union has far more "valuable" population. The combination of recognising the greater risk of escalation from the sophisticated arsenal — because it is a continuum to national disaster — together with the greater value placed

upon its national resource can easily render Soviet leaders more conservative.

At the same time, the identity of the true high command is vital to our understanding of the nature of the limited war in which we might engage. Only by identifying the aggressor government can we reasonably be certain of correctly identifying his limited objective, the values he might place thereon, its relation to his strategy, and the risks he ponders. The Soviets would presumably place less value on a limited objective in south-east Asia than would Red China.

All of this simply demonstrates that the risk of escalation varies according to the true aggressor, and that many factors bear upon that government's analysis of the risks and potential gains. The correct assessment of the identity of the high command is vital.

Political Primacy

Civilian control is a basic precept of the Military Establishment in the United States. Historically, this civilian control has been general in nature, and, until Korea, there had been no marked instance where international political consideration outweighed strictly military necessity.

Under the conditions of limited war, however, the interplay between international politics and military operations would be intense. The escalation factor will depend entirely upon the degree to which political considerations limit or expand the military operations. Therefore, political primacy over limited military operations may presumably be a basic principle.

This can be easily demonstrated, but it is not an easy task to design the machinery to accomplish political primacy. How does a government provide the military command structure, the complex military communication and control systems, and the field commander's authority to conduct successful limited war operations under tight political control?

One of three methods might be employed. The first would be to give the military commander a carefully drawn charter delineating unequivocably his limits of authority, and covering every contingency. Because of the numerous contingencies, such a charter would be lengthy and highly complex. Even if such a charter could be drawn, the subtleties of risk assessment would require that the numerous contingencies be continually reviewed and up-dated. While appearing adequate on paper, such a charter would fail to provide both sufficient freedom of action and the ability to assess what military action should or should not be taken in the national interest.

Another method would be to place a Defence-State Department command team in the field. Unfortunately, such a team arrangement requires a degree of mutual respect hitherto not always found. The military commander would tend to believe that the State Department official does not appreciate military cause, whereas the State

official may be convinced his counterpart cares nothing about escalation. In short, nothing would have been achieved over the first course of action except bitter feeling.

The third method would be to create a Defence-State Department command team at Washington. Such a team would report to the President, not only for the authority it would give the team, but also to facilitate the communication with the enemy government through the highest office in the country. This command group would require a sophisticated communication link with the field military commander. The transmission of data only would not be enough. The communication link should include television to bring into play the personal leadership possible only through face-to-face communication.

Regardless of the choice of command structure, the situation will call for an understanding by the military man of the political aspects of limited war, and a respect by the civilian authority for the necessity of minimising casualties. It is not clear that the senior service schools are achieving this understanding among their students; it is clear that it is vitally needed.

Summary

Today, the United States is gearing for limited war at the very time that escalation is becoming more and more a possibility. Three principles, properly understood and applied, must be observed to keep a limited war limited:

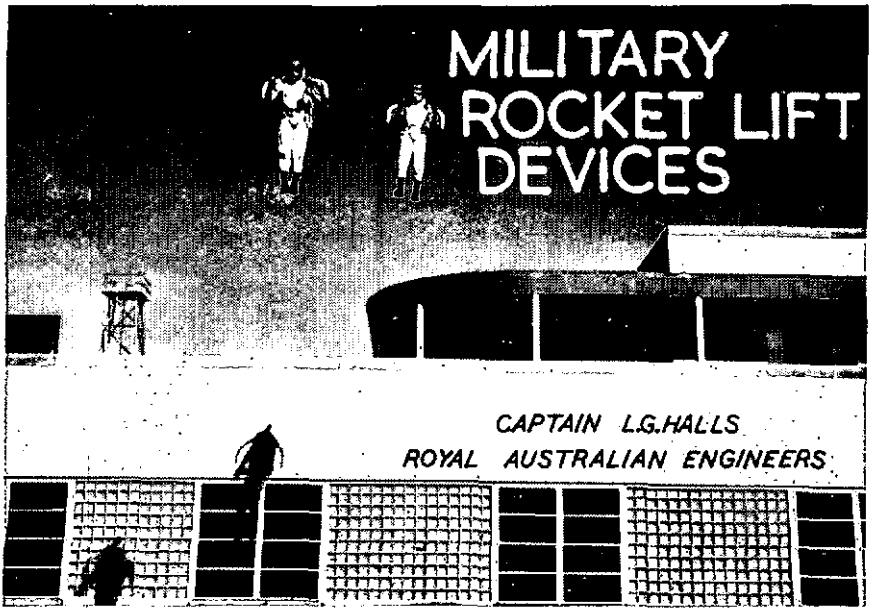
- The limited objective.
- Communication of intent.
- Political primacy.

All are necessary; all are interdependent.

The application of the three principles requires the devising of an organisation to conduct a limited war, obtaining the communication hardware to serve that organisation, and training of personnel to handle the organisation.

In World War II, Japan intended to wage a war for the limited purpose of expanding her periphery of influence — not to subdue the United States. She not only failed to assess correctly the value we placed upon our Pacific bases, she made no move to communicate her limited purpose to us.

It is no comfort to the survivors of Hiroshima that the Japanese Government understood so little about waging limited war.



CAPTAIN L.G.HALLS
ROYAL AUSTRALIAN ENGINEERS

THIS ARTICLE outlines the beginning of another chapter in the story of flight. Only a few years ago the rocket belt belonged in the realm of science fiction. Today it is an accomplished fact and man has at last achieved controlled free-flight without the aid of wings, rotors, or gas filled balloons.

The author is indebted to the Bell Aerosystems Company for providing much of the information about the Bell rocket belt, the forerunner of a new generation of flying devices.

Development

The idea of personal air transportation is not new. Early experiments centred around flying platforms and one man helicopters, but they all had the one disadvantage, man was still tied to a rather hefty piece of machinery on which he rode.

Then in 1953, what was to be the world's first practical rocket belt was conceived by Wendell F. Moore, a rocket engineer at Bell Aerosystems Company. His idea was to integrate a man with a rocket in one unit, supported by the thrust of the rocket alone.

The next step was to test the feasibility of the idea, particularly with regard to stability problems. A test rig was made using compressed nitrogen for thrust, and in 1958 tethered tests were begun.

About this time the US Army became interested in the project. A study programme was set up and the configuration of a SRLD (Small Rocket Lift Device) was defined. Bell was then awarded a contract from US Army TRECOM (Transportation, Research and Engineering Command). This involved fabrication of the

SRLD and a manned flight programme, first tethered for safety and experience, and then finally free and controlled flight with the SRLD.

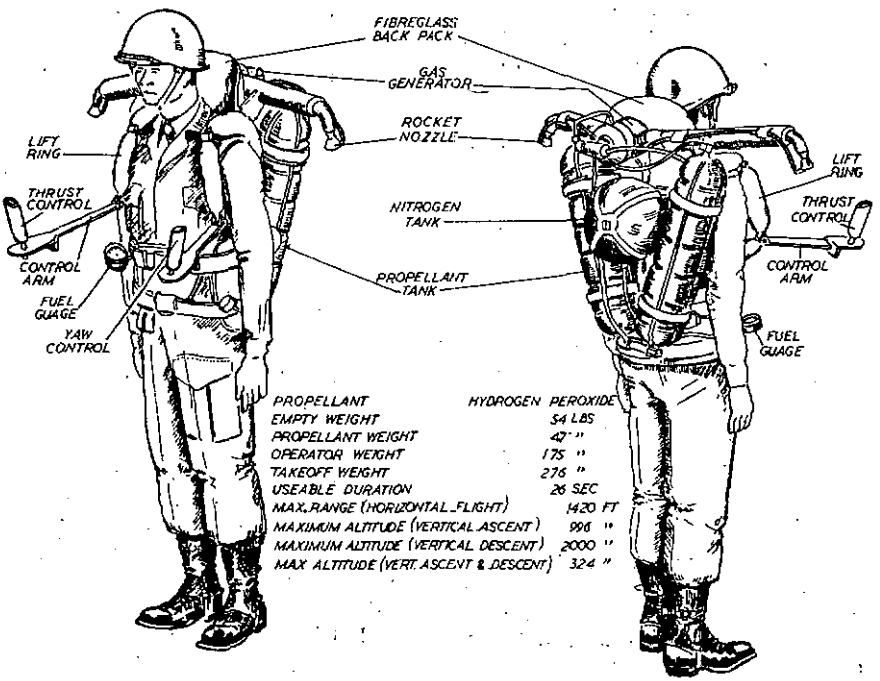
Since this was a limited feasibility study, the first SRLDs were assembled from "off the shelf" items such as oxygen breathing cylinders, and components from similar rocket systems used in the Mercury space capsules.

After completion of the tethered test programme the first free flight of the SRLD was made on 20 April, 1961. Since that time more than 800 flights have been made with the Bell rocket belt and a record of 100% reliability has been obtained with the rocket system.

The SRLD

The small rocket lift device consists of a twin-nozzle hydrogen peroxide propulsion system mounted on a fibreglass back pack. It is worn by the operator slipping his arms through padded lift rings and securing the unit with two quick-release safety belts around his body.

Two control tubes extend forward from the lift rings on each side of the operator. A control stick on one provides a yaw control so that the operator may change his flight direction, while the other has a twist-grip throttle to regulate the amount of rocket thrust, thus giving control over the rate of climb and descent.



SRLD — Component parts and Specification.

This rocket propulsion system is fully throttleable. When the hand throttle is operated, compressed nitrogen forces the propellant (90% hydrogen peroxide) into the gas generator where it contacts a silver catalyst bed. The reaction between the hydrogen peroxide and the silver catalyst causes a rapid deterioration of the propellant into steam and heat.

The steam escapes through the two rocket nozzles to provide the thrust. This thrust is directed down towards the ground while small jet deflectors in the nozzles provide the yaw control.

Pitch and roll control are obtained by movement of the operator's body.

The specification table shows many of the performance features which give the SRLD its operational potential. In addition horizontal speeds of up to 60 m.p.h. have been obtained.

At its present stage in development, however, the SRLD also has several disadvantages. Due to the fuel used in the present system the duration and range are considered too short. In addition the fuel is expensive and requires some special handling.

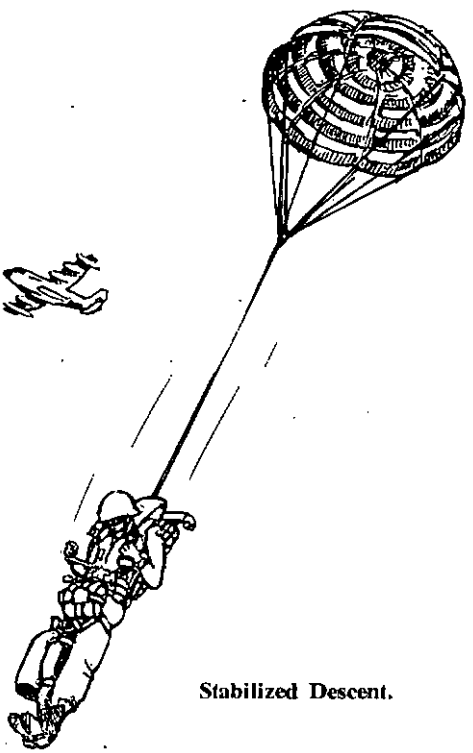
For use in the field, the steam exhaust also creates a few problems. It is extremely noisy, and in cold weather the otherwise invisible exhaust condenses into a white cloud.

Bell engineers are, however, working to overcome these limitations and it should not be long before a production model appears.

Tactical Employment

It is not difficult to imagine many situations in which the obstacle leaping capabilities of SRLD equipped troops could be used to great advantage. These are such obvious tasks as cliff scaling, assault river crossing, minefield crossing, and so on. There are also numerous cases where they could be used for small scale vertical envelopment operations, particularly where there are obstacles, such as jungle or barbed wire, to be overcome first.

The author also believes that eventually the SRLD may replace the parachute in airborne operations. Whether static-line



Stabilized Descent.

or pre-dropping techniques are used, the great advantages of a fully controlled descent can not be overlooked.

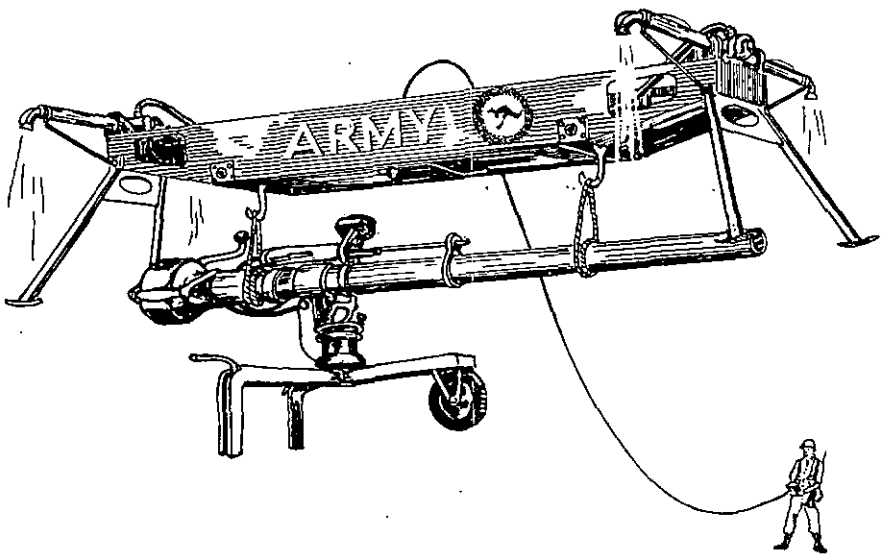
Very large dropping zones would no longer be required. In fact any small clearing would be enough. Therefore the use of airborne troops would no longer be dictated by the availability of suitable DZs but by the actual tactical situation. A drop could be made with pin-point accuracy and landings could be made in tactical formation.

The variations on this theme are almost infinite. Due to the horizontal movement capability of SRLDs, airdrops need not be delivered with great precision, and it may even be advantageous to the aircraft to fly over some distance from the DZ.

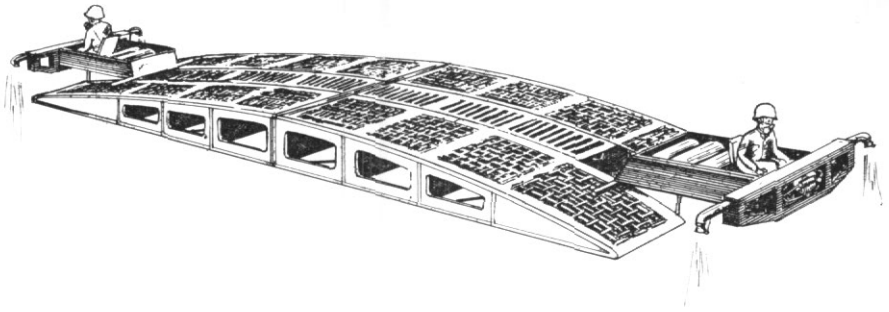
Another great advantage that could be gained from the use of SRLDs is that an airdrop could become flexible. It would not be hard, given suitable communications, for troops to be directed to or from their intended DZs to meet changing situations while they are dropping.

The author imagines that the following technique could be used for the SRLD drop. On leaving the aircraft a static-line would deploy a small (3-4 ft.) drogue chute. The operator would then continue a fast stabilised descent. On reaching the appropriate height, he would start up the SRLD, check his fall, jettison the drogue, and guide himself to the DZ.

To give an idea of the accuracy that could be attained by this method, it would be possible to drop from 3,000 ft. and land on the deck of a moving ship!



Medium Rocket Lift Device.



Heavy Rocket Lift Device attached to Assault Bridge.

The Future

In the not too distant future we can expect to see the propulsion system of the SRLD improved in efficiency, and then developed beyond the man carrying stage.

First of the new devices resulting from this development would be the MRLD (Medium Rocket Lift Device). This would have larger rocket units mounted in tandem. Operated by wire from the ground it would have a load capacity in the 500 - 1,000 lb. range and be capable of moving this load over similar obstacles to those that can be negotiated by the SRLD. The MRLD would carry its load slung beneath the power unit and could therefore be attached to practically any load within its lifting capability.

The next stage would be the development of a HRLD (Heavy Rocket Lift Device). Here the logical configuration would be twin lifting units that could be attached directly to either end of the load, or to a connecting beam with the load slung beneath.

As the payloads carried by the MRLD and HRLD would only be limited by weight, and not by size, they would be adaptable to a great many lifting tasks. Accurate placement of very bulky loads by the HRLD would probably dictate the need for the operators to ride with the load.

An example of such an application is shown in the accompanying sketch of a flying assault bridge. This could be moved very rapidly into position during an assault. It would also be much less expensive than a tank bridge layer.

Both types of units are recoverable and would only require refuelling before they could be used again. They would be far cheaper to buy and far less vulnerable in use than helicopters which they would replace for close support short haul missions. Many other applications could be found for such units on engineering tasks and the transportation of men and equipment over otherwise difficult obstacles.

Conclusion

At the time of writing, the SRLD is still under development. It will not be many years before

SRLD *Bell Aerosystems Company Photo*

the present limitations are overcome and it comes into common use. At the same time the solutions to these problems will pave the way to larger lifting devices.

We can therefore confidently look forward to the day when rockets are not only used to deliver weapons on a target, or to put satellites in orbit, but also become a valuable means of tactical transportation.

THE MILITARY HERALDRY SOCIETY

The Military Heraldry Society was formed in 1951 as a focal point for collectors of cloth formation signs, shoulder titles and patches, sleeve insignia and any other such badges worn by military formations throughout the world. The Society publishes a free illustrated quarterly bulletin with word coverage of this subject for the dissemination of information and to assist members to contact each other. A membership list is issued each year in order to facilitate correspondence. All members are encouraged to use the bulletin by sending information or queries and advertising free their requirements.

The President of the Society, Lt Col H. N. Cole, C.B.E., T.D., F.R.Hist.S., is a leading authority and the author of several books on military heraldry.

The Military Heraldry Society maintains a permanent display at the Imperial War Museum in London.

Membership of the Society is world-wide and includes museums. On a basis of area membership there are European and American representatives on the Committee. New members are welcome whether they actually collect or only wish to keep themselves informed about this wide field of interest. At present there is no entrance fee and the annual subscription of 7/- (or equivalent) entitles the member to receive the bulletin, attend any meetings, which are usually held in London, and allows free use of the Society's Library.

Anyone interested in the Society is invited to write to the Hon. Secretary, The Military Heraldry Society, c/o Major J. Waring, F.R.G.S., F.R.S.St.G., DLI, Combined Stats/Records Centre, HQ FARELF, c/o G.P.O., Singapore, Malasia, for further details.

THE HUMAN FACTOR IN WARFARE

Captain J. K. Leggett
Royal Australian Signals

THE AIM of this article is to stimulate thought, within the Australian Military Forces, on the psychological problems which face the Army today.

Introduction

The higher the degree to which armament technique results in leaving the individual soldier alone in his responsibility, the more significant the psychological factors in battle will be. Inner stability, combat morale and combat worth are an indivisible whole. In battle these allow the soldier to withstand the enormous pressures of psychological factors and influences. An Army which ignores the significance of these factors and believes itself capable of solving the problems involved solely by modern armament technique, will very quickly find itself in the maelstrom of catastrophe. Therefore everyone who is responsible for human beings must recognise the importance of the psychological factors and cooperate in the solution of the problems that arise. All the numerous applications of physics, chemistry, engineering, etc., which make up the modern arsenal are in fact at the mercy of humans, the soldiers who use or direct them.

War is fought by men. Modern war is fought by men, material and machines, a great variety of machines; but also a great variety of men with various skills and abilities. Without the men the machines are useless. Without the special skills and abilities of men for operating the machines and performing all the other complex operations of war, the armed forces would be helpless.

In a way man himself is a machine. That is to say he is a complex organism with certain properties, capacities and abilities. Some of his abilities, as well as some of his deficiencies, he has inherited. For instance, no man can see as well in the dark as in daylight, and every man who sees at all can see better at night after he has remained some time in the dark. Thus human ability and limitation, this property of the seeing eye, is inherited. Training alters the capacity only a little. There are

great differences, however, in the sensitivity of men. Some have better night vision than others, and should therefore be the ones selected for making observations at night. The military problem here is to first know the capacities and limitations of the human eye, and then to adjust the military requirements to them, so as to employ the maximal visual acuity without demanding the impossible. Here it should be remembered, as Lieutenant Colonel R. D. Bohn, United States Marine Corps, said in a recent visit to the Australian Staff College — the best known surveillance device is still the old mark one eyeball. The specifications for best seeing must be analysed and must be laid down. Then all observers must conform to the rules, and the best eyes selected for the most difficult tasks. This will require additional documentation of the individual, but with the imminent introduction of electronic data processing into the Australian Army this should not cause too great a problem. However, more of that later in this article.

Most human skills are, however, not inherited but learned. This is true of all complex skills. Men differ in their aptitudes for learning; for learning in general, and also for learning particular skills. For wartime mobilisation the Army must take two factors into account, the different skills that men have already acquired and the different capacities they have for acquiring new skills quickly. Since it is not possible to create new men for war, the Army has to adapt the men readily available. Thus the task is principally a matter of selection and training. Such selection and training must of course be equally applicable to the Citizen Military Forces as to the Regular Army.

These problems concerning human abilities and aptitudes are psychological. It is the psychologist who can help the Army to find out what human abilities are needed and how to acquire them by selection and training. Psychology is the study of human nature, and wars are fought by human beings, thus it can be argued that psychology is a military subject.

A man regarded as a machine is an extremely complicated, sensitive, and precise machine that is capable of perceiving, feeling, remembering, learning, thinking and acting. It is his action that counts in the end, because it is what he does that makes him useful to the Army. What he does is, however, dependent on the five other functions. He can act in accordance with what he perceives, for example, shoot and hit a target. He can act in accordance with his memory, for example he can identify his target today because he saw it yesterday. He can also change his actions by learning, for example, today he can shoot more accurately because he has learned his lessons in training. Man's nervous system also provides means by which memories and perceptions work together without action until some new idea that is not mere memory evolves, an idea which may lead to some new action. That is

thinking. All these capacities are the material of human nature.

The Army in employing men for war must take into account all the psychological functions and must understand their possibilities and limitations in order to make the most efficient use of the available human resources. For this reason both professional Army officers and Army psychologists must study the utilisation of these capacities.

A Brief History of Psychology As It Affects The Soldier

A brief summary of the history of psychology may serve as a backdrop for further discussion as to where this science fits into the Army sphere of influence.

Psychology did not become an experimental science until the middle of the last century. Then is was realised, for the most part by physiologists, that the laws of sensation could be worked out experimentally. There were, however, no psychological laboratories until the 1870s when a laboratory was founded at the University of Leipzig in Germany and a less pretentious one at Harvard University in America. Gradually the problems of learning, memory, attention and action were added to those of sensation and perception as topics for psychological research. In the first decade of the present century intelligence tests were devised and applied psychology came into being.

First World War

Although the Germans were the acknowledged leaders in the field of "pure" psychology, they were not so far advanced as America in "applied" psychology and the use of mental tests. They seemed to have developed no important psychology of warfare in 1914-1918 other than their efficient use of the art of propaganda.

When the United States declared war on Germany on April 6, 1917, psychologists undertook at once to promote the useful application of their science within the armed forces. Here is a partial list of the topics in which research and application were undertaken: the psychological examination of recruits, especially with respect to intelligence; the selection of men in respect of their special aptitudes, selection which included the formulation of occupational and trade test specifications, the techniques of classification and placement, and the rating of officers; the military problems of vision and hearing; the psychological problems of aviation; and the psychological problems of training and discipline. Not all these undertakings were completely analysed but at least their importance was realised as early as 1917/1918.

When the First World War ended military psychology had made a good start, but it was not thoroughly established in the American Army or Navy. The situation was best summed up in 1919 by a psychologist who had been engaged on psychological research with the Navy during the war when he said:—

"The military danger in the next few years of peace is that, with the passing of the present

crisis, so few military officers are capable of carrying on mental researches. I fear that some other nation may take up the mental analyses where we left them when the emergency ceased, and may develop a real military psychology that will be more deadly than 42 cm. guns. Our efforts, however excellent and however valuable, are only the first crude beginnings of such a military psychology."

His prediction was right. The Germans took up studies in the psychology of war and the Americans dropped it.

German Use of Psychology for Warfare

During the interval between the two world wars the relation of psychology to warfare became an important topic in Germany. As a result there grew up in Germany a practical social philosophy, the concept of total war; total war by the state with every individual giving himself to the demands of the state. Although not invented by the Nazis, this philosophy was readily put to use by them to achieve their aims of re-armarment. So the German state called on its psychologists and often, though not always, took their advice. The Government established a Psychological General Staff Group functioning under the High Command by way of the Ministry of Propaganda and the Secret Police. This group was further subdivided into four divisions, namely research, tests, defensive morale, and offensive morale. Defensive morale had the task of maintaining German morale, soldiers and civilians alike, whilst the activities of the Offensive Morale division were aimed at breaking the morale of the enemy. Among the many fields studied the following were probably the most important from a military point of view: the psychology of mobilisation, the selection of personnel, the psychology of military life (indoctrination, relations between soldiers and officers, home-sickness, suicide, sex, the treatment of eccentrics and recluses, clumsiness, cowardice, desertion, etc.), the psychology of combat (aggression, morale, fear, isolation, superstition, surprise, waiting for an attack, gas warfare, panic, etc.).

The Germans used standardised situations under which they made judgments of men by putting them under emotional stress to see how they stood up, and also by giving them problems that could only be solved with ingenuity, and observing the results.

The Second World War

During the Second World War all nations realised the importance of the study of psychology in relation to warfare. Certainly the British, Russians and Americans did. It will be shown later that the Australian Army also studied the subject to a limited degree. The American efforts, however, are the best documented and thus provide the major example during this period.

When America approached the Second World War with the drafting of recruits in 1940, the Germans were far ahead in the

use of psychology in support of war. However, a basis had been established in the First World War. The fact that total war had been forced on America helped also, for it made war highly mechanised and threw the military leaders back upon science for all the aids to victory of which the laboratories were capable. A special group under the Adjutant General was set up with the task of classifying all recruits, assigning them correctly, and reclassifying and reassigning them as special training changed the abilities of any man. Special attention was given to important abilities such as mechanical aptitude, aptitude for learning the morse code and general manual dexterity, etc. Psychological research on sensory and perceptual functions, the design and testing of equipment and weapons, and the selection and training of military specialists was also conducted. In fact the activities were very similar to those carried out by the Germans in the period between the wars.

Psychology in the Australian Army

The history of psychology in the Australian Army is a very brief one. In May 1941 the government set up an Advisory Committee on Psychology Testing to report on the applicability of psychological procedures to the Army. The entry of Japan into the war and the resulting expansion and mechanisation of the Army accelerated the introduction of psychological procedures into the Army. Early in 1942 Major H. L. Fowler, Associate Professor of Psychology at the University of Western Australia and then a battalion second in command, was appointed to Allied Land Headquarters as Staff Officer (Psychology) and directed to form a psychological organisation. Within a few months Major Fowler retired because of ill health. He was succeeded by Major (later Lieutenant Colonel) J. V. Ashburner, then ADMS of 1 Cavalry Division. By September 1942, Psychology Testing Units were operating in each of the eastern states and by March 1943, similar units were operating in all states except Tasmania. The initial tasks of these units were to assist in the control of recruits, but by the end of 1944 they were required to undertake the following duties:—

(a) Examination of soldiers for reallocation within the Army.
(b) Investigation of the problem of Army delinquency.
(c) Examinations at the request of psychiatrists.
(d) Officer pre-selection boards.
(e) Vocational guidance of soldiers being discharged.

The psychological organisation of the Army was changed in February 1945 when the Australian Army Psychology Service was formed in the Branch of the Adjutant General with a Directorate at LHQ and units of varying sizes in Commands or Lines of Communication Areas. In July 1946 Lt. Col. J. V. Ashburner was discharged and Colonel (then Major) E. F. Campbell, ED, psc, a qualified psychologist then serving on the General Staff, was appointed Director of

Psychology. After a post war "run down" the army psychologists were finally accepted as an integral part of the Australian Regular Army by the formation in 1952 of the Australian Army Psychology Corps, a corps unique in the British Commonwealth.

Broad Fields of Employment For Psychology in the Army

As a practical matter, the psychological business of the Army may be broken down into the following broad fields:—

(a) Observation.
(b) Performance.
(c) Selection.
(d) Training.
(e) Personal Adjustment.
(f) Social Relations.
(g) Opinion and Propaganda.

Observation

Perception and use of the senses has great military value. It is necessary in warfare to know about vision — how accurately the eye can see, how easily seeing is fatigued and how fatigue can be avoided, how distance is perceived visually, the rules for seeing best at night, the laws of colour perception and the facts of colour-blindness, the psychology of camouflage and counter camouflage. It is important to know about hearing too — the nature and causes of deafness, the effects of noise, the use of sound and spoken words in telecommunications, and the rules for best hearing. Smell also has military significance, not only in the perception of gases, but also in reconnaissance. Finally there is the perceptual problem of finding your way when lost and of finding your objective in strange territory, a capacity which can be learned and which depends on the use of all senses. These and allied topics make up a large proportion of the psychology with which soldiers are concerned.

When the basic psychology of all perceptions have been studied and understood, then there are four ways in which the soldier or the psychologist can use it:—

(a) The rules for best observation can be laid down. Men can be told, for instance, how to observe more effectively in the dark. This may well involve a cursory examination of how the rods and cones are activated in the eye.

(b) Since usually there are perceptual differences between individuals, the best observers should be selected for the tasks in which their special abilitiy is most useful.

(c) In many cases training is required, for in many kinds of observation accuracy can be learned. For example, the capacity to find your way in strange territory can be greatly improved by practice.

(d) Military scientists and designers also need to know about perception because the facts enter into the design of instruments. For instance, adjustments that require precise movement of levers and hand-wheels should be provided with visual scales or indicators, for it is possible to be more accurate

when vision is added to the muscle sense for guiding and checking movement of the arm and hand.

All these four uses of perception are related. The best observers should be selected for further training. The rules for best perception have to be learned and practised often, and observers must be taught the special adjustments on instruments if they are to get the best results.

Performance

The motor as well as the sensory side of human nature is important in combat. In fact, the ultimate interest of the Army in the capacities of men is to use the actual movements of their muscles. Keen perception is important because it enables the perceiver to do something that a less sensitive person could not do. For instance, a radio telegraphist must have good hearing, he must also have manual dexterity. The two capabilities enable him to operate precisely. In general, selection and training should be used to get the right man in the right job.

The particular psychological problems of performance are the problems of skill and efficiency.

Performance

Skills. The necessary skills are gained for the most part by selection of men already possessing these skills and by training others. The development of skills is also aided by the discovery of the rules for the best and most precise performance. These rules must be derived by the Army psychologist be he a university trained specialist or a generally trained army officer. Sometimes these rules require practice for their learning. For example, a soldier does not learn to squeeze instead of pull the trigger by being told just once what to do. He has to practise. On the other hand it does not take much practice to learn to throw yourself down when you hear a bomb falling.

Some skills can be improved by the designer of instruments. Levers, hand-wheels, and knobs that require frequent and precise use should always be placed on the equipment so that they will be at the operator's waist. Then the operator will be less awkward and more skilful.

Efficiency. The other psychological motor problem is efficiency. The desire to get the greatest return for the least effort is a natural consequence of all human competition and war is the ultimate in competition. Maximal efficiency is especially demanded when large forces must be found and trained quickly. Efficiency must therefore be basic to all military activities. Soldiers must learn the best work habits, and their instructors must know how men can perform work with the least effort and the least fatigue. For example, the author was amazed whilst attending an OCTU at the School of Infantry to be told that it was far less tiring when running in full equipment to shuffle rather than to lift the knees, which is after all a natural tendency. This instruction was so simple and so logical, but without the instructor pointing it out, unnecessary fatigue would have resulted. Sleep is also a military

problem: how much is needed, how little is allowable, what should the sleepy sentry do to keep awake, how can sleepy troops be awakened. Lack of sleep, fatigue, boredom and awkward habits, not uncommon among the average soldier or Staff College student for that matter, are all factors in efficiency and require control.

Besides sleepiness and fatigue there are other bodily states which affect efficiency and which become extremely important in military situations. These states depend on external conditions or on substances that enter the body. For example; what is the effect of cold on human efficiency, how can the effects of extreme temperature be diminished, how does alcohol affect efficiency, does it sometimes help morale, when may a fighting man drink? Psychology and physiology with research can furnish the answers to these and similar problems, and also provide practical rules for inclusion in our training manuals.

Selection

Because men differ so much from one another they have to be selected for their military jobs. They differ in their inherited capacities and in the skills which they have learned before enlistment. They differ in sensory capacity, in motor skills, in their abilities to learn rapidly and to remember what they have learned, in general intelligence, in specific knowledge and breadth of knowledge, in capacity for insight and originality, in emotional stability and susceptibility, and in a great variety of other ways that are generally referred to as personality.

They may have the ability for performing a certain task, or, lacking the ability, they may have aptitude for the job, the capacity for learning it quickly, or they may lack both the specific ability and the aptitude for acquiring it. Selection of men in accordance with their ability is the responsibility of the Australian Army Psychology Corps, but it is at the moment only being applied in a limited manner within the ARA. This field should be extended to cover the Citizen Military Forces as they without a doubt will provide the bulk of the Australian Army on mobilisation, yet they are not being accepted or rejected on scientific grounds.

All military jobs must be analysed to find what specific abilities are required for these. Then ways of assessing men for these abilities and aptitudes must be deduced: tests, work samples, interviews, histories of actual achievements, etc. For example, sensory tests will select men with the best night vision. Ability in truck driving can be demonstrated in actually driving over an experimental course.

Leadership ought similarly to be analysed and the leaders selected by tests, but at present the best technique for the selection of leaders appears to be a review of the man's history as a leader. Eventually leadership must be taught as a subject, certainly experience alone is a most time consuming and sometimes untrustworthy instructor,

despite current feelings to the contrary. Herein lies a vast research problem for the Australian Psychology Corps in conjunction with the Chairs of Psychology at Australian universities, and also with practising psychologists in civil life.

These are examples only. Men must be constantly reassessed and reallocated as their abilities alter during training, and as new military needs require new combinations of abilities.

Training

Most of the work of the Army is training — training for eventual combat or the support of combat. Actual combat is itself training for further combat, as the distinction between green and seasoned troops indicates, but before troops are ready for war they have normally had a long course of schooling. Some of this schooling is practice in manual skills, some of it is acquisition of abilities to handle complex machines and instruments, some of it is in book learning, some of it is solving problems indoors and in the field, and some of it is in adjustment to military life. There is no end to the training that success in battle demands.

The psychology of war must therefore include the psychology of learning. This is most important, particularly at the Staff College level where a vast amount of knowledge has to be digested over a considerable period. The leaders need to know how practice, motivation, and understanding are essential to learning, and soldiers also need to know these facts and the best rules for efficient learning. Men need to know how to learn, how to study, how to read rapidly, how to memorise, how to solve problems, and how to do all these things with the greatest efficiency. The Australian Army Psychology Corps with research, can exhibit the rules, lay down the limitations and discover the techniques that are most efficient under military conditions. The Director of Military Training should then incorporate the findings in current training directives.

Personal Adjustment

The psychology of motivation is extremely important in war. The psychology of motivation includes a knowledge of the nature of human needs and how they determine human thought and conduct, of how needs may conflict, of how conflict leads to frustration and frustration to aggression or defence, apathy or escape, of the psychological defence and escape mechanisms whereby men make unusual and unexpected adjustments in thought and behaviour to extreme frustration and fear. These are the problems of men under stress, which should be understood by leaders, NCOs and commissioned officers alike, and must be constantly borne in mind when dealing with the problems of their subordinates. Doing this will not interfere with discipline within the unit, but it will increase morale.

There are certain concrete military problems of personal adjustment. These are:—

Morale. Morale is much more than having entertainment,

books to read, dances to attend, canteen services, etc. It means the maintenance of healthy well-adjusted personalities, co-operating under difficulties. Field Marshal Sir William Slim summed up this question of morale very well in his book *Defeat Into Victory* when he said:—

"Morale is a state of mind. It is that intangible force which will move a whole group of men to give their last ounce to achieve something, without counting the cost to themselves; that makes them feel that they are part of something greater than themselves. If they are to feel that, their morale must, if it is to endure — and the essence of morale is that it should endure— have certain foundations. These foundations are spiritual, intellectual and material, and in that order of importance. Spiritual first, because only spiritual foundations can stand real strain. Next intellectual, because men are swayed by reason as well as feeling. Material last — important, but last — because the very highest kinds of morale are often met when material things are lowest."

The leader who can secure morale in his unit understands men and is thus a practising psychologist.

Emotion. Emotion and especially fear is a common military problem. All fighting men should know about fear, respect it, not be ashamed of it, and if possible use it to make themselves efficient. The psychology of fear is an important item in the psychology of warfare, and a continuous study must be devoted to it.

Instability and Breakdown. Leaders must know the symptoms of breakdown so that they can refer cases for medical care and advice before the psychological injury becomes irremediable, after all it is not the doctor who sends you to a doctor in the first place.

Social Relations

In the Army certain social relations need to be understood so that they can be controlled and made to operate in military interests. Some very important topics of military significance are leadership, rumour, panic and the relations between different nations.

Leadership. Because leadership extends all the way through the military system it is of special importance, particularly on mobilisation when the services expand rapidly. Under these circumstances it is difficult to find the number of good leaders required. Psychology can assist in this problem. It can indicate ways by which leaders can be trained. In this respect much difficult research should be carried out in peace-time by the Psychology Corps to establish tests and rules so necessary for wartime expansion of the Army.

Rumour. Rumour affects morale adversely. It flourishes when more reliable sources of information are lacking. Understanding the nature of rumour and its spread, is the first condition for its control.

Panic. Panic can occur among the best disciplined troops. Its

conditions must be known. Leaders must understand the psychology of mobs and panicked crowds, to minimise the chance of panic among fearful or disheartened troops. Psychology should provide information about the causes of panic and the means of its control.

Relations with Different Nationalities. Difficulties arise when men with different cultural backgrounds, with different habits of thought and action, come together. The strong convictions of one man appear as prejudices to another. Difficulties arise between the troops of Allied nations, between occupying troops and the people of occupied countries. Such differences need to be understood, not only by the leaders but also by the soldier. Military psychology in conjunction with military intelligence should be able to provide practical rules for achieving unitary effort in a common cause. However, to be of any use these studies must be carried out in peace to avoid friction in war. Particularly is this so for the Australian Army which will be part of a much larger Allied force, and also possibly waging an anti-guerilla war in foreign territory.

Opinion and Propaganda

When the opinion of important groups is known, it may be part of the national policy for war to influence it towards change. This is propaganda. Propaganda is directed ordinarily toward increasing morale in the home country and allied countries or directed toward lowering morale in enemy countries. When directed against the enemy it is called Psychological Warfare; it is an essential auxiliary of military activities.

All these things constitute the psychological subject matter which should be taught to soldiers.

Some Specific Examples of Psychological Problems Facing Modern Armies

In his book *Men Against Fire* Brigadier General S. L. A. Marshall points out that the soldier must be conditioned to an understanding of the reality of the battlefield throughout all stages of his training. For if he does not acquire a soldier's view of the battlefield his image of it will be formed by reading novels or the romance written by war correspondents, or from viewing the battlefield as it is imagined by Hollywood. He also points out certain basic problems of the battlefield and their effect on the soldier and thus the outcome of operations. Among these problems which still require research to find a solution and a set of rules to be included in our training manuals are:—

Isolation on the Battle Field. In training, the soldier grows accustomed to the presence of great numbers of men and massive mechanical strength close around him. He sees this strength on parade. He watches it during field exercises and though these are supposed to approximate war, he never feels lonely. Even the forces of the enemy are materialised for him in training films, etc. He is thus

conditioned to battle as being the shock impact of large forces in a type of head-on collision between visible lines of men and machines extending as far as the eye can see. When he first enters the battlefield, however, he sees nothing; fire seems to come from nowhere in particular and causes his sub-unit to scatter or go to ground thus giving the individual soldier the feeling that he is completely alone on the battlefield.

This points out a tremendous weakness in training and conditioning methods, and offers an immediate field for research by soldiers and professionally trained psychologists alike in an endeavour to achieve greater realism and effect in training.

Inability to Fire Under Conditions of Stress. In his studies of the soldier in combat in various theatres during the Second World War, Marshall discovered that at least 75 per cent. of trained and experienced riflemen failed to make use of their weapons. This observation was later substantiated during the Korean War. German troops and Commonwealth troops in World War II and the Korean war respectively also displayed this failing. As fire together with movement is the basis of tactics, the seriousness of this problem cannot be overrated. This problem may be partly overcome by the understanding and direct intervention of junior leaders during combat, by using the voice, threatening violence, or by carrying out checks immediately after contact. However, this will not solve the basic psychological problem. This must be tackled by trained psychologists working in close conjunction with experienced Army officers. In addition, immediate action should be taken by the Operational Research Group and the Australian Army Psychology Corps to abstract the results of research in this field on a world-wide basis, analyse the results and apply any corrective measure to training doctrines considered necessary. Perhaps one method towards a solution would be to select a group who are known to have behaved aggressively consistently and analyses them as a group.

Passage of Information. Marshall also observed that information, although systematically passed from front to rear, is not passed very frequently towards the front or laterally. This is an obvious weakness that should be corrected immediately during our training for war.

Inability to React to Sudden Danger. Major J. O. Langtry pointed out in an article in AAJ No. 107 that only approximately 15 to 20 per cent. of persons confronted with sudden danger can be expected to respond purposefully, quite rapidly developing sustained effective activity. The remaining majority will be stunned and bewildered and take an appreciable time to evaluate the situation. This statement highlights the need for immediate contact drills based on the psychology of the human being. Here again is a field for conjoint action by soldiers and military psychologists.

Functions of the Australian Army Psychology Corps

MBI 93/1961 states that the functions of the Australian Army Psychology Corps are as follows:—

(a) Personnel classification and placement.
(b) Training, morale and psychological warfare.
(c) Mental health.
(d) Operational research.
(e) Personnel research.
(f) Psychological testing.

The wording of the MBI implies that these functions should be applied within and throughout the Australian Military Forces. In practice, however, they are applied only to the Regular Army. Having established earlier in this paper that there is a definite requirement for psychologists in the modern army, and that all peacetime efforts of military psychologists should be devoted to problems likely to arise in war, it seems incongruous that the Citizen Military Forces are not treated in the same manner as the Regular Army. This is a major weakness that should be corrected, as combat is no respecter of persons. For maximum efficiency on mobilisation it is essential that the members of the CMF be psychologically tested in peace, that their records be maintained in a central registry and that placement and promotion of CMF members be made on the same basis as for members of the ARA. Normally the clerical effort involved in such a programme would be prohibitive. However, the availability of computers and the imminent introduction of electronic data processing should resolve this task to workable proportions for analysis, documentation, storage and updating. At the moment the Army has two years in which to prepare for electronic data processing. These two years should be spent by the Psychology Corps on working out a detailed programme for machine analysis.

Personnel Classification and Placement

This aspect is being adequately covered in the ARA insofar as normal aptitudes are concerned. However, it should be extended to include military aptitudes such as aptitude for learning as opposed to aptitude at the time of testing, psysiological factors such as acuity of vision, hearing and smell, muscular co-ordination, etc. This is the basic data which should be fed to the memory matrix of the electronic data processing system. Subsequently the information can be automatically updated, and the information should be readily available on demand down to a unit level if necessary. As mentioned above, the CMF must also be included in this programme.

Other Functions of the Psychology Corps

It is difficult to comment on the other functions as very little publicity is given to them. This lack of publicity is in itself a weakness, as the general rank and file of the Army may be able to assist with certain observations, if only they knew what was in the mind of the Director of Psychology or the Operational Research Group. If there is at

present any tendency for the Psychology Corps to become a "private army" this should be strongly resisted. Psychology is a mutual problem of the professional psychologist and the leader in the Army, and it is suggested that complete interchange of ideas on all problems except those with a security flavour will benefit the Army in the long term.

Suggested Fields of Research

Throughout this article various psychological problems applicable to the Army have been mentioned. They may be summarised as follows:—

(a) The psychology of mobilisation.

(b) The psychology of leadership.

(c) The psychology of military life (indoctrination, relations between soldiers and officers, homesickness, clumsiness, cowardice, desertion, religion, etc.).

(d) The psychology of combat (aggression, morale, fear, isolation, surprise, waiting, panic, surrender, etc.).

(e) Defensive morale (civilian and military) to combat likely enemy psychological warfare methods.

(f) Offensive morale (rumour, propaganda, national differences in attitude and motivation).

(g) Measurement of the effectiveness of the man/weapon combination.

(h) Measurement of the effectiveness of the man/equipment combinations.

(j) Battle study. The more classified quantitative data that can be collated from battlefield reports, the greater can be the reliability of subsequent trials and analyses and war games.

All of these problems fall within the stated role of the Australian Army Psychology Corps, and these are the topics which should be analysed in peacetime in conjunction with other branches of the Army and associated defence science establishments.

A tremendous amount of research has already been conducted overseas. The results of this research should be carefully abstracted and analysed, and form the basis for research within the Australian Army.

To assist the research programme the present basic documentation of the individual soldier should be carefully reviewed and altered to allow the progressive build up of information suitable for analysis by professionally trained psychologists.

One other possible aid to this research programme is to enlist the aid of the Chairs of Psychology at the various Universities. Perhaps the Federal Government may be persuaded to make a cash grant for the best annual thesis on military psychology submitted by undergraduates or graduates in psychology.

Conclusions

There is nothing mystical in the science of psychology. In fact it is the application of common sense to human relationships and problems. Naturally

the trained psychologist has special advantages over others in that he knows the facts about human capacities, insofar as they are known, and he knows the special techniques that have been used in the past for assessing human capacity or for controlling human behaviour. However, from the time a soldier is promoted, as a junior leader he is forced to deal with human problems, and must therefore benefit from any formal basic training in military psychology the Army cares to give him. For this reason basic or elementary psychology must be regarded as a military subject, and it is recommended that:—

(a) Basic psychology be recognised as a military subject, and taught at Army Schools.
(b) The results of psychological research should if possible be publicised within the army, say through the Australian Army Journal, in addition to any amendments to training doctrine.
(c) There should be continual interchange of ideas between the Psychology Corps and the remainder of the Army.
(d) The basic documentation of the individual should be reviewed, and various psychological and physiological facts should be recorded centrally. This information should be available on demand to commanders.
(e) For the sake of wartime efficiency the Citizen Military Forces should conform to the selection and classification procedures applied to the Regular Army.

Reference Reading

Officers interested in further reading on this subject should read the following books and articles:—

Men Against Fire, by S. L. A. Marshall.

Psychology and the Soldier — Hartlett.

The Power of Personality in War — Maj. Gen. Baron Hugo von Freytag-Loringhoven.

Psychology for the Armed Services — National Research Council.

The Tactical Implications of Human Nature in Warfare — Major J. O. Langtry AAJ 107.

COMPETITION FOR AUTHORS

The Board of Review has awarded first place and the prize of £5 for the best original article published in the June issue to "The Vital Factor — Motivation," by Major R. D. F. Lloyd, Royal Australian Infantry.

MOUNTAIN WARFARE

Major E. H. Dar
Pakistan Army

Reprinted from the January 1964 issue of
MILITARY REVIEW, Command and General Staff College,
Fort Leavenworth, Kansas, U.S.A.

MOUNTAIN WARFARE may be likened to tank designing. A host of contradictory statements have to be reconciled — the elements of mobility, firepower; protection and administration. The choice lies in deciding which among these four elements is of paramount importance, or, if some of the elements are evenly balanced, what is the best possible compromise?

A further point should be made here. I am not discussing the conduct of mountain warfare, I am speaking only of the concept of mountain warfare. The conduct of mountain warfare, which is really a question of capacity for individual leadership, is a subject for an article in itself.

Mobility

When we speak of the element of mobility in mountain warfare, we must distinguish between a country without roads and one which is quite impassable. A country without roads need not be impassable for infantry troops.

We must also distinguish between the difficulty of marching through mountains and the difficulty of attacking mountains. These two terms have nothing in common. It is wrong to infer that because marching through mountains is difficult, then attacking mountains is more difficult.

Thus from the mobility viewpoint, the mechanical means of mobility — ground and air vehicles — are of secondary importance. What matters is the capacity to produce the desired shock effect in the given time and space. The relationship between mobility and firepower is, therefore, the decisive element in mountain warfare. The choice really lies in having foot-mobile infantry units operating within

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the restricted radius of towed guns or under an air umbrella which is dependent on enemy action or the weather — or in manoeuvring with mobile infantry which is dependent on neither.

Writing about Red Chinese mobility in the mountains, one author has said:

"In NEFA (the Northeast Frontier Agency), and on roadless terrain, they have relief for transport on Tibetan porters, yaks, and Tibetan ponies. Persistent reports are that only about one in three of the Chinese are armed. It is difficult to assess the significance of this, but since the Chinese are so reliant on man pack in difficult country, it may be that each 'gun' has his 'loader' and tiffin coolie."

It seems significant, also, that the Mongols based their organisation on two spare horses for each mounted soldier.

In NEFA, as in Korea, the Red Chinese achieved a grouping in time and space which, in its combined effect, was capable of creating, maintaining, and establishing the desired effect.

The essence of the matter of mobility is that the force has to be mobile in its entirety. Either it should be foot mobile, or completely heliborne or airborne, or completely track borne. Compromises reduce mobility. Thus infantry, dependent on wheeled vehicles or on fire support propelled by wheeled vehicles cannot move faster than the speed of those vehicles.

Firepower

In discussing the element of firepower, the question appears to be: Can a very marked capacity for manoeuvre compensate for an inferiority in fire support means?

In the Imjin River battle in Korea, the United Nations forces, although vastly superior in firepower to the Red Chinese, suffered defeat. The merit of the Red Chinese organisation lay in subordinating their firepower to their mobility. On the other hand, the UN forces were in possession of firepower means completely out of proportion to their manoeuvre capacity. Speaking of the 1962 Indian-Chinese border clashes, a writer has said:

"With better automatic weapons they (the Indians) would probably have killed more Chinese, and with adequate wire and mines would have done still better, but I very much doubt whether the outcome of the operations would have been in any way affected."

In the Sino-Indian war, an ideological and revolutionary army was opposed by a national army, organised along colonial lines, and led by officers trained in similarly constructed schools of thought. The most appropriate historical parallel can be found in the battle of Jena, and the result was the same in both cases. The difference lay in the Red Chinese use of the human mass for fire effect. The man, used in conjunction with noise, became, as it were, a gun or a missile.

From this, then, we may infer that a marked superiority in firepower is not necessarily decisive in mountain operations.

Protection and Administration

If we consider mountain warfare from the viewpoint of protection, we must distinguish between physical protection and protection in its relation to time. Protection is closely linked with administration for rather obvious reasons.

Physical protection is achieved when a force, while on the move or at rest, protects itself from all sides. This form of warfare has sometimes been referred to as frontier warfare, and it presupposes a policing operation against irregulars. Neither the elements of space nor of time play any part. It is more akin to hunting lions in the wasteland.

In its relation to time, protection distinguishes between the defence or the attack of a physical object, and a defensive or offensive battle in an area. Thus when the attacker or defender operates within a specified equation of time and space, he becomes independent of protection and administration. Time, in this context, has finite value, but, like an infinite equation, it also gains values — as when it denies time to the enemy. It is only when the values given to time are upset drastically that protection and administration start having a serious and disturbing effect on manoeuvre.

Again, the Red Chinese operations against the UN forces at the Imjin River in Korea can provide an example. It is of little import that the Red Chinese soldier can live on a bowl of rice. So did the Japanese soldier in World War II, and on half a bowl at that during the closing days of the war. But they lost.

At the Imjin River, the Red Chinese bypassed the so-called vital ground held by the UN forces near the river. It, therefore, ceased to be vital for them in that specific time bracket. Protection ceased to have any influence. On the contrary, it became an obsession with the UN forces — to their detriment and defeat. Even if huge administrative dumps have been available to the defenders, they would not have affected the course of events in the specific time equation.

It follows, therefore, that protection and administration have a direct bearing on mountain warfare insofar as:

- Whether we conceive of it as a whole or only in part.
- Whether it is to be a fluid war or a positional war.

Organisation

Mountain warfare necessitates many changes in the normal organisation of a fighting formation. The question is: Should these changes be given permanent form by creating special mountain divisions?

No organisation is permanent. Changes may be dictated by a variation in terrain, theatre, role, or combat experience. All organisations must possess flexibility to permit rapid adjustments.

The question of separate mountain divisions is dependent on whether there would be sufficient time for such changes and adjustments to be made. Operations in high altitude, with snow,

may necessitate the creation of special units because of the acclimatisation, skill, and specialist equipment involved.

A normal well-trained infantry unit can undertake mountain operations without much difficulty. This was proved during the Second World War by the experience of Pakistani and Indian formations in Eritrea, Tunisia and Italy. Acclimatisation is essential, but training in mountain warfare during peacetime will facilitate a speedy changeover. The value of the training period is enhanced if it also makes a "swap" possible between the various arms — an infantry soldier should be trained to operate a mountain gun; artillerymen should be trained to act as infantry.

Selection

One writer has said that:

"The human factor is perhaps even more important in mountain war than in any other form. This type of campaign is inevitably trying and full of hardship. It involves great fatigue, swift changes of temperature, fogs, storms, snow and frost, rare and poor billets, little repose . . . and severe suffering for the wounded and the sick."

This same writer argues that heredity is very important in the case of mountain troops. The experiences of Korea and World War II do not, however, seem to justify this statement. Nor is it possible, for social and economic reasons or the requirements for mass armies, to restrict recruitment to mountainous areas alone.

Training

It is not the type, but the training of soldiers required for mountain warfare which needs some examination. The capacity of the individual to produce results is more important than the style in which he does it. He cannot and should not be a product of the drill square — a slave of the form and predetermined words of command. He should be schooled in adventure. A soulless human machine will not win in mountains.

If we picture mountains as another type of terrain — "A surface intersected and broken with inequalities and obstacles strewed over it in the most diversified manner" — then mountain warfare is characterised by the ability of one side or the other to wage a fluid type of war, a war of manoeuvre and effect. This is achieved by subordinating firepower to mobility, and protection and administration to manoeuvre. The defender tends to occupy a series of strong positions, relying on their natural strength. The attacker resorts to turning movements, not with the view of rolling up any flank, but from the point of view of cutting off the line of retreat.

If armies have to operate in what Sun-tzu refers to as the "Heavenly Prison", they must learn their trade in all its elements. They should not be content with its outward manifestations of rigour and routine. In mountains, as elsewhere, war should be conceived as a whole and waged in its entirety.

PHOTOGRAPHY WITHIN THE ARMY

Captain R. S. Mackenzie
Royal Australian Army Education Corps

PHOTOGRAPHY requirements in the Army have grown and continue to grow so rapidly that a brief thought on these requirements might be well worthwhile.

The Australian Army uses photography in many fields, for reconnaissance, intelligence, map making, publicity, investigation, research, training and medicine, to mention just a few.

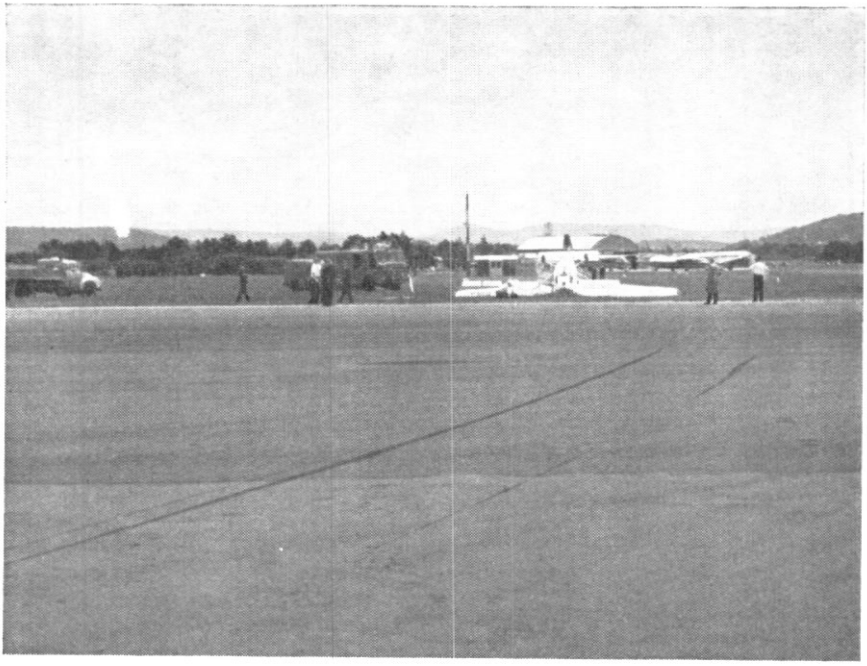
However, as wide and varied as the types of photography may be, there is no school, as such, to teach the art within the service.

It is understandable why growth has gone almost undetected. Each user Corps tends to forget that others have their requirements too. Each has its own particular type of photography to carry out, each selects and uses the equipment considered best suited to its needs. There is little or no liaison or co-ordination between the photographic establishments.

This state of affairs may have worked out reasonably well until now and could probably go on similarly for some time. However, the Army generally is growing more conscious of the value of photography in its many branches and the requests for pictures of this, or films of that are increasing steadily from all sections of the Service.

There has always been the odd requirement for photography such as pictures to accompany reports on accidents, modifications, medical treatments and such like and the existing photographic establishments have been able to cope with these without affecting unduly their normal operations, although it's doubtful whether any have not been inconvenienced considerably at some time by having "extraneous" work forced on them.

Photographers, generally, don't mind this sort of thing. They expect to be called on to work odd hours and do the "impossible" when a "flap" is on, but they become less enthusiastic to produce the goods as the "emergencies" become more frequent.



Aircraft accident in which an Army trainee pilot was involved. Skid marks could indicate how left wheel brake locked causing aircraft to turn to the left.—Army PR photo.

People expect a better service each time they want a map copied or passport pictures taken, and what was being "requested" yesterday is being "ordered" today.

An Army photographer today, regardless of his employment classification or rank, is expected to be a master of all photographic trades. Unlike his civilian counterpart, he has to produce good results whether it is portraiture, commercial, news, process, macro or any of the other specialist branches of photography.

Most photographers enjoy a temporary break from their everyday task and relish the opportunity to try their hand at some other form of the art, but this enthusiasm has been the cause of many having "extraneous" work loaded on them to the extent where the situation would appear to be out of control and we find situations such as 35mm slides being produced with process gallery cameras and maps being photographed with press cameras — anything to achieve the result. A result, yes, but not the best. Cameras are only part of the photographic process, specific chemicals are required for specific tasks. Darkroom lighting and equipment must be designed and installed for the actual type of work to be produced. Much time and effort has been wasted in using a half

plate enlarger to print a 35mm negative and using a 15 inch tray to process a 30 inch print.

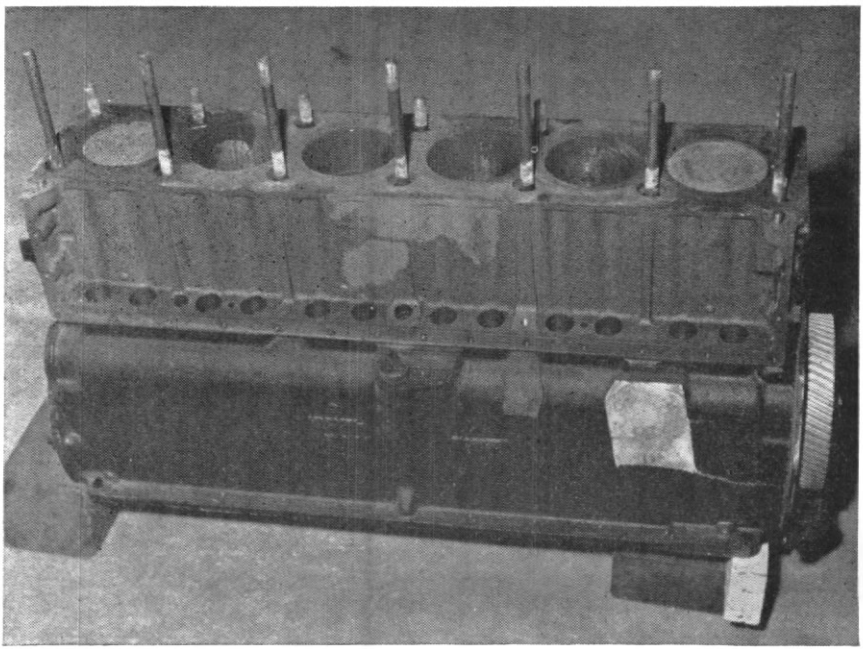
Photographs save time in explanations: "A picture is worth a thousand words," "Seeing is believing".

Photography is finding its way into many fields these days and if the Army is to keep in step with modern trends the problem of inadequate facilities, manpower and equipment should be recognised and overcome.

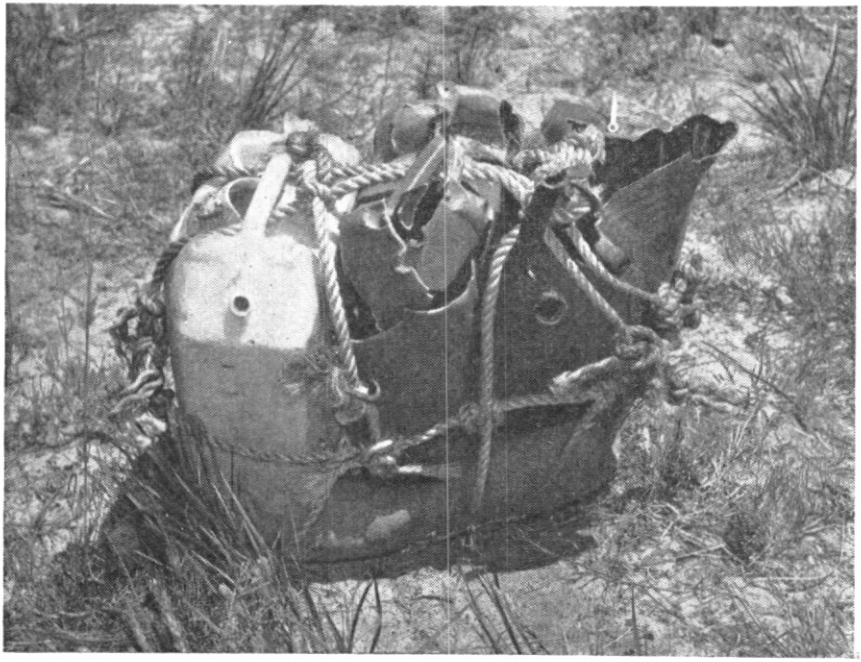
There has been a long felt need for a central photographic establishment in the Army where men can be trained in photography and where all types of photographic work can be carried out.

This establishment could be responsible for the training of photographers not only for its own requirement, but for the other users as well.

One of the biggest problems faced by Army photographic units is obtaining suitable photographers. Too often they have to take "pot luck" with men of limited or no real experience. A central photographic establishment could not only train men as basic photographers, but also select those more suited to particular fields of photography. Specialist units could draw the most suitable men — trained not only in the basics of photography but in the military skills as well.



An engine block found to be extremely corroded on unpacking.
—Army P.R. Photo.



Picture illustrates the damage caused by overfilled plastic water containers which were air-dropped.—Army P.R. Photo.

This system would allow more opportunity for the keener man to gain promotion, too. At the moment, many photographers in the Army are in postings which hold them at the rank of corporal or sergeant, whereas by attending courses at the central establishment they would be able to qualify themselves for promotion or for another field of photography.

The overall problem is far from small and manpower required to overcome it could be quite considerable, but the results that could be achieved would far outweigh the cost of equipping and manning a well-balanced photographic establishment.

It is suggested that an AHQ photographic establishment with a production wing and a training wing would enable production to proceed while photographers for commands and even units could be trained, or taught new skills within their trade.

Commands, too, should have a photographic section — quite apart from existing specialist photographers. (Public Relations, Intelligence, Ordnance, etc.)

The types of work which these sections could undertake are outlined below:—

Identification Photography

The photography of recruits for record purposes and the photography of members travelling overseas for passports, etc.

Commercial Photography

The photography of stores and equipment or buildings for submission with reports or for modifications, etc., and photography for recruiting purposes.

Investigative Photography

The photography of scenes of accidents, burglary or fire, for submission with reports, etc.

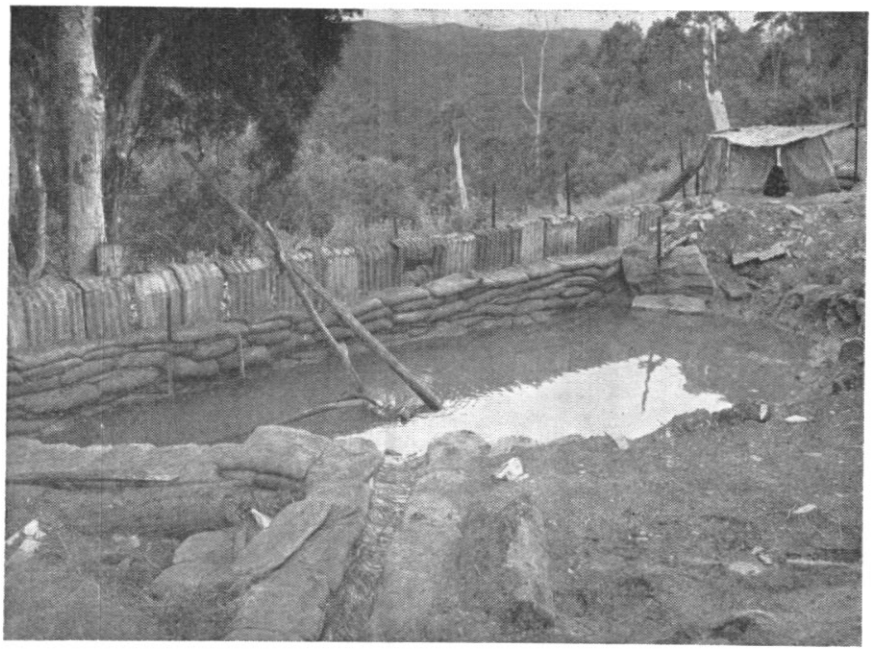
Training Photography

The photography of terrain, stores and equipment in both cine or still form for use as aids to training in lessons, lectures, briefings, etc.

These sections should be able to cope adequately with all the general command and AHQ photographic requirements. However, it might be found necessary and desirable to have a photographic section of similar organisation to those of minor Commands attached to the HQ of each Battalion.

To cope with the day-to-day photographic requirements, i.e., photos to accompany reports, submissions, identification pictures etc. of army units (particularly the more remote), cameras incorporating the "Polaroid" principle could be used effectively by any unskilled member, after a few hours instruction.

Conventional 35 mm cameras should be made available to some units also for particular require-



The water point constructed by RAE to supply all Units in the Gospers Mountain area during Exercise SKY HIGH.—Army PR. Photo.

ments. Processing for these would be done by the nearest photographic establishment.

It has been suggested that eventually all photography in the Army could be brought under the control of the Corps of Signals, similar to the system in the U.S. Army. In the American system, a Signals officer in each unit is responsible for the photography within that unit and supervises the photographers accordingly. This may well be satisfactory in the U.S. Army or in the Australian Army where there is a Signals officer posted to a unit. However, there are hundreds of smaller units in our Army which do not carry a signaller of any rank and these, presumably, would have to do without a photographer. These smaller, remote units, too, have realised the value of photography and how it can be applied, and they should have a photographer or at least a simple camera readily available to them.

To summarise, the Australian Army at present employs photographers only in establishments where photography is considered essential, such as the Survey Regiment at Bendigo, the Intelligence Centre at Middle Head or Public Relations sections. If the Army is to keep up with modern trends it will use photography more and more, and to meet this demand will need to provide a central establishment, with Command sub-units.