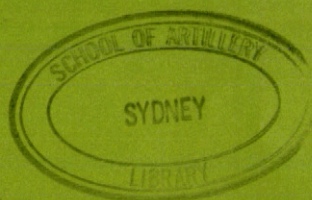


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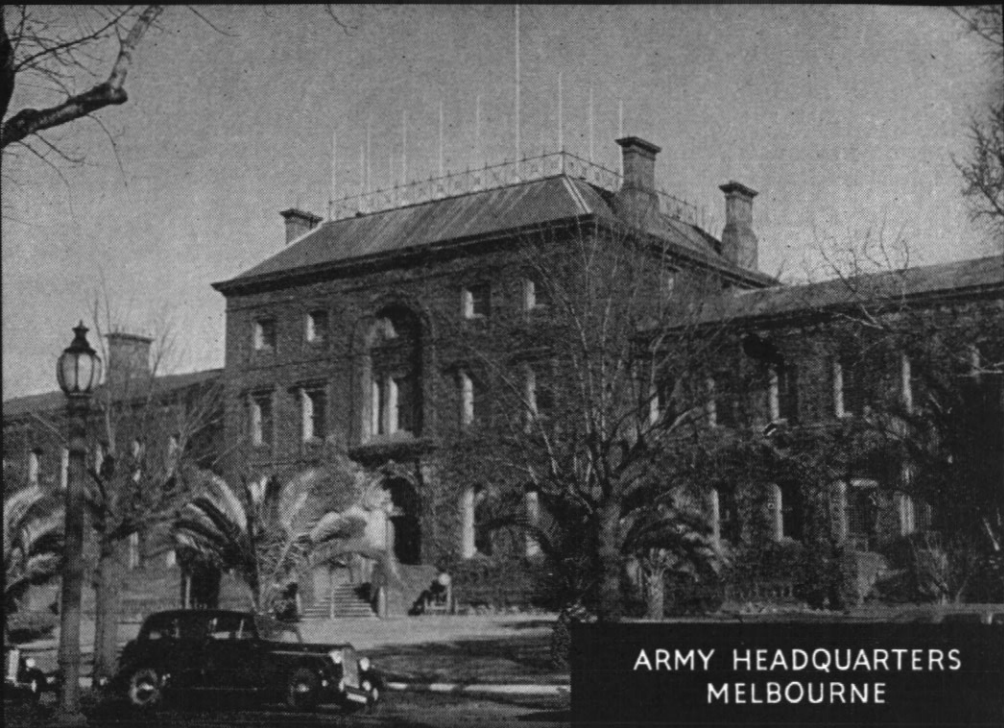
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ARMY HEADQUARTERS  
MELBOURNE

## AUSTRALIAN ARMY JOURNAL

*Editor:*

COLONEL E. G. KEOGH, ED (RL).

*Staff Artist:*

MR. CYRIL ROSS.

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# ARMY AVIATION

## and the

# FUTURE



Major K. J. Oram,  
Royal Australian Artillery.

Army Aviation is a small, but highly important, part of any modern land force. Fostered by the United States Army and later by the Royal Artillery, it is to be seen now in varying quantities in all the modern armies of the world. To discuss future trends and possibilities as this article attempts to do in some small measure, we must understand fully the functions and the past development of this organisation.

Army Aviation is not in any sense an "Army Air Force." The principles of concentration of force and economy of effort both clearly overrule any such idea. It is simply the employment, by the Army, of aircraft of such types and under such conditions as lie outside the scope of normal Air Force operations. For the Air Force to accept the responsibility for these aircraft and for the work done by them, would involve decentralisation of maintenance effort to localities where it would become valueless to the parent service. The reasons for

this decentralisation will become more apparent as we discuss the function of Army aircraft later.

The Royal Artillery were first to appreciate the value of aircraft within the British Army, and an airborne observation post was introduced within the ranks of the gunners as the Air OP Flight in 1939. This light aircraft, flown by a gunner officer, was supplementary to both the ground observer and the Air Force aircraft flying artillery reconnaissance; it is not used if a ground OP can engage the target effectively, nor does it fly beyond the line of our FDLs.

So successful did this venture prove, even under conditions of enemy air superiority, that other arms and services were soon clamouring to use these aircraft on a variety of tasks other than their primary function with the guns. This was not entirely acceptable to the Royal Artillery, whose requirements utilised the aircraft to the full, and so a further stage of army aviation was born. There is with the

British field force in Korea a flight of light aircraft for the use of all arms and services, and flown by all ranks.

#### The Case for Army Aircraft.

The modern air force, with its jet aircraft and vast mass of complex instrumentation needed to win the air battle, has met the same major problems that confront all services — lack of manpower and finance. Faced with the presence of an already powerful and ever-growing Russian air force, these problems are most alarming.

It may be that in World War III, should it occur, we may never see a single allied aircraft in action. If this is occasioned by our air forces achieving their plan to ensure we never see a hostile aircraft as well, then we ask nothing more from them. Indeed, they will have made a most valuable contribution to the ultimate winning of the land battle. Should the Army find a type of aircraft which, while admirably suited to operations with the Army, is of little or no value to the Air Force, either by virtue of its type or its rôle, then we must assume responsibility for that aircraft and operate it as we do any other form of army transportation.

During the last war considerable use was made of light aircraft by American, and, to a lesser degree, British forces in all theatres of war. At one stage in NW Europe the late General Patton had amassed enough "puddle jumpers" to lift 400 assault troops across the Rhine. Unfortunately for the chronicler of army aviation, a surface crossing was made, and the armada dispersed unused. Although the first of the Army's aircraft were, to say the

least, primitive, the aircraft industry has produced larger aircraft with staff-car comfort for up to six people, and still with the same ability to operate from any 200-yards-long farm paddock with a fair surface.

One of the biggest peace-time uses of such aircraft is the speedy and comfortable transport of commanders and their staffs on visits to outlying camps and training areas. No longer is it necessary to endure those bone-shaking rides along some of our not-so-well-surfaced country roads. Some idea of the time saved can be gained from the following table of average journey times using an aircraft recently purchased in quantity by the United States Army:—

#### N.S.W.:

Sydney to Singleton . . . 40 min.

Sydney to Canberra . . . . 60 min.

#### Victoria:

Melbourne to Seymour . . 20 min.

Melbourne to Queenscliff 10 min.

#### Tasmania:

Hobart to Launceston . . . 40 min.

Impressive?—yes, but perhaps you personally are a little doubtful about trusting yourself to a small aircraft flown by an army pilot?—Yet you use an army vehicle to take you to that outlying training depot, and flying light aircraft is no more difficult than driving a staff car through our crowded city streets—and much safer.

Once a light aircraft has been used on any one task, a multitude of uses will become apparent to the passenger. An unequalled time-saver in reconnaissance, it is also valuable for cable-laying over difficult terrain, courier duty between forward headquarters, message de-

livery, and casualty evacuation. Korea has shown that speedy and careful evacuation by air can save lives otherwise lost due to slow evacuation in the difficult terrain. It will correspondingly lessen the strain on the medical services by reducing the number of intermediate posts needed for evacuation.

All these uses lead to the main reason for a "light" aircraft for this work. Aircraft designed for the private owner or for "light" military purposes all have one major feature in common — the ability to operate from a relatively small space in safety. In fact they need never even see an airfield. The current specification for most of these machines requires an ability to land over and take off over a 50-foot obstacle in a distance of 250 yards from a standing start in conditions of no wind. Our Air OP aircraft can, therefore, operate from a normal paddock alongside the regimental headquarters it is serving to minimise any delay in becoming airborne and to keep the pilot fully up to date with the tactical situation. Other light aircraft can operate from similar fields at divisional and brigade headquarters, while carrying commanders on visits and reconnaissance. Elsewhere patients may be evacuated from advanced dressing stations or regimental aid posts direct to base hospital in some reasonable degree of comfort and with speed unparallelled on land.

It will become apparent that these aircraft, like the jeep, must always be on hand in the area of the headquarters or unit served. They will fly from one unit to another, in and out of small strips cut from the bush or made by closing a section of road. The maintenance of these aircraft must be done on these strips,

and since no large aircraft can use the same landing areas, this effort becomes one specially allotted to light aircraft. Since a modern air force has no use for aircraft of this type, and cannot make use of maintenance facilities dispersed in such a fashion, it is only reasonable for the Army to be prepared to accept the responsibility for maintenance, and so, ultimately, become a fully independent army organisation.

#### Review of Fixed-Wing Aircraft.

To gain further ideas on the use of these aircraft we must examine them in some detail, and be prepared for future improvements. The following is a brief summary of two equipments available at the moment of writing, but it must be remembered that an up-to-date knowledge of these aircraft can only be maintained by a continual study of the subject.

The present Air Observation Post aircraft of the British Army is the AUSTER Mk VI. This aircraft, in a later version, the Mk VII, can be converted readily from operational fittings to a dual control trainer, and has a good small-field performance. The motor is the world-famed D.H. Gipsy Major, of 145 h.p., which could be serviced and overhauled by its parent firm in Australia. The aircraft carries a pilot and assorted combinations of passenger, wireless, camera, stretcher and small freight load for a range of about 300 miles. It is not equipped with full blind flying or navigational instruments, and provides rather cramped accommodation for long-distance travel. Failing the availability of dollars to purchase US aircraft, it is the best machine for this work at present.

Air Observation Post duties place a premium upon the ability to ope-

rate from small fields, and, as a result, refinements for long-distance flying and the carriage of passengers are not part of the machine's characteristics. If we are to cope satisfactorily with the long distances involved in liaison flights in Australia, and be able to carry passengers in some degree of comfort, a more substantial aircraft must be employed.

The logical contender for this type of work is the De Havilland BEAVER, a product of the Canadian branch of this world-wide organisation. This machine is bigger, heavier and more comfortable than the Auster, yet is capable of operating from fields of almost the same size. In a variety of cabin fittings it can seat up to six passengers, or carry a pay load of some 2,000 lbs., including items as bulky as 44-gallon drums; behind one of the most rugged and reliable engines in the world — the Pratt and Whitney Wasp Junior — already made in Australia. Here we have comfortable cruising at 150 mph, with full blind-flying instruments and radio navigation aids over distances of up to 1,000 miles non stop. In recent open competition against all American manufacturers, this machine secured contracts from both the USAF and the US Army. Originally designed for the bush operator of far north Canada, the aircraft operates safely and efficiently on a minimum of maintenance, and is already proving its worth in Korea.

Both the Auster and the Beaver are noted for the simplicity of their maintenance, and this feature will be examined later in this article. Sufficient for the moment to point out that in the engines alone we are dealing with one motor used by aero clubs the world over and no

more complex than a jeep motor. The other is a radial of similar design, but less complex than those used in certain tanks of World War II.

There are other aircraft similar to both the Auster and Beaver in current production today, but, as we are concerned with gaining a general impression of the characteristics, this review has been restricted to the best performers in their class only. To replace the Auster with a better aircraft would mean purchase of an American machine, and to replace the Beaver with a better machine is, at present, well-nigh impossible.

#### The Helicopter.

In reviewing both the aforementioned aircraft it has been possible to draw to some extent on practical experience by army pilots, not only of these aircraft, but of other possible contenders in these two fields. However, in now turning to the rotary-wing field, we must confine ourselves to the study of type classification and not specific aircraft, since no great experience is readily available in this country as yet.

Current helicopter design ranges from the one or two man "observation" unit, through two-four seater class, to the load-carrying category capable of lifting a platoon or light gun. Prototypes have already begun flying of designs capable of lifting and carrying a light tank.

The lightest helicopters under development are of the Hill HORNET (Fig. 1) and Saunders Roe SKEETER (Fig 2) class. These aircraft would augment and may ultimately replace the AUSTER in its Air Observation Role. They also provide a valuable



Figure 1

The Hill Hornet single place Helicopter

airborne "jeep" for commanders at all levels.

To meet the duties of the BEAVER fixed-wing class and some of the AUSTER uses, it would be necessary to employ larger helicopters of the Bristol Type 171 (Fig. 3), or Westland S-51 (Fig. 4) class. Here we find accommodation for reconnaissance and communications, as well as casualty evacuation, although neither machines have, as yet, the speed, load capacity range or ruggedness of the BEAVER.

The heavyweights of the helicopter team are represented by the Piasecki HRP-1 (Fig. 5); Cierva WII (Fig. 6), and Westland S-55 (Fig. 7) designs. In these we meet aircraft capable of load carrying nearly up to that of the 3-ton truck, and accordingly of being used as such. It may confidently be expected that these "pay loads" will comfortably be exceeded by prototypes to fly in the near future.

#### Helicopter Operations.

To ensure we understand fully the potential of the rotary-wing load carrier as an Army vehicle, let us examine two cases:—

#### Case 1—The Dumping Programme.

In this very common problem a little simple mathematics will show how the helicopter eases the difficulties facing the Q staff. Using a unit of 100 Piasecki H 21 type machines, and allowing for only 75 per cent. serviceability, it is possible to maintain a steady flow of supplies at:—

134 tons/hour over 35 mile radius  
or

69 tons/hour over 60 mile radius.

For a short period with 100 per cent. serviceability these figures

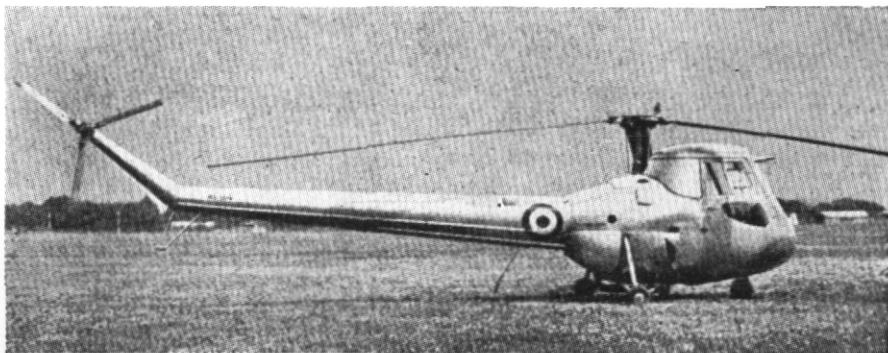


Fig. 2—Saunders Roe two place Helicopter



would rise to 200 tons/hour over 35 miles radius. This delivery by ground would involve approximately 240 trucks of 2½ ton load capacity. However, it is not in numbers alone that the comparison is interesting. Over the 60-mile route, deliveries would begin some three hours earlier and there would be **NO ROAD SPACE PROBLEM**. In other words, the supply helicopters are simply loaded and despatched along broad, predetermined bands, and no traffic control is needed. There are no defiles or crossing delays. The machines are camouflaged and fly low with no road to draw the attention of hostile aircraft, and certainly would be immune to long-range harassing fire.

With the modern design and its slow flying characteristics the heli-

copter can operate in very poor flying weather, and even then at speeds considerably in excess of road traffic.

#### Case 2—The Amphibious Assault.

Now it is no longer a "must" to establish the initial beachhead on the coast. Using helicopters in quantity it becomes relatively simple to place assault troops on the most suitable objective and develop operations from there. All troops can be landed in battle formation and heavy equipment brought in speedily. Gone are the days of the unsatisfactory "area landing" by parachute and glider — a real concentration of force is achieved with the helicopter. As already mentioned the helicopter is an ideal medium for urgent casualty evacuation.



Fig. 3—Bristol 171 Helicopter.



Figure 4

Westland 5-51 in shipboard operations.

### The Present Position in the ARA.

Already officers of the Royal Australian Artillery are being trained as airborne observers by Army instructors. This year has seen the beginning of training for liaison pilots by aero clubs throughout the country. At the moment the only aircraft available are Auster Mk IIIs of the RAAF, which form the Air OP Flight at Canberra.

It is here we meet the first difficulties in forming a really efficient Army light aviation organisation. Firstly the aircraft are few and obsolete. In addition most were in use during the last war and have reached a stage of temperamental, if not unreliable operation. Secondly, all the aircraft are still owned, controlled and maintained by another service. This does not simplify their operation.

The problems that confront us for the immediate future, are, therefore, these:—

1. Procurement of new aircraft.
2. Further training of aircrew.
3. Assuming full control over all activities of the aircraft.
4. Provision of maintenance personnel and facilities.

5. Organisation of units to ensure continued training of all personnel and co-operation with all units concerned.

It should be clear to all that, if these problems are to be overcome and the units to function in time for the next war, action should be taken to establish the organisation now. Should we find ourselves without suitable aircraft at the outbreak of hostilities, then we shall have little chance of obtaining them for several years. The rest of the training all hinges upon the aircraft. Unlike gun drill, you can't learn to fly or maintain a plane by running round a row of stones on the ground. The remainder of this article is devoted to suggestions for overcoming the problem of this specialist training and operation within our own service.

### The Future.

The procurement of new aircraft is a very urgent problem and not quite as simple as it may seem. As has already been stated the limited number of aircraft available for training at present are too old to be regarded as satisfactory, and, if confidence is to be gained in this branch of Army activity, reliability is of great importance. In most items of equipment we are able to follow directly the lead of Great Britain with most satisfactory results.

However, in the sphere of light aircraft we are faced with the vital problem of distance, and an inherent lack of range in the aircraft in use with the British forces. Almost all British aircraft of this type are designed with an eye on the civil market in the United Kingdom, and Europe, where distances are small by our standards. The results for

Australian military purposes are not exactly satisfactory.

The equipment in use in this country at present is the Auster Mk 3. Let us imagine ourselves with one of these aircraft at Canberra, faced with a request to fly with a CMF unit in Brisbane. To reach Brisbane will involve the use of the auxiliary fuel tank, and, if we are wise enough to plan a reserve for possible adverse winds, will involve a flight plan of four stages:—

Statute air miles

Canberra—Sydney . . .	141
Sydney—Old Bar . . .	151
Old Bar—South Grafton	147
South Grafton—Brisbane	150

With full fuel tanks in this aircraft we have the choice of a passenger OR a wireless set after personal baggage has been loaded. So if the wireless is needed, as it surely will be, the usual mechanic for ground crew duty must precede us by other means. Even the Auster Mk 6 would only reduce this

staging to three legs, and much time is still lost in ground stops.

It becomes obvious now, that with these aircraft it is not possible to travel interstate in Australia with the freedom of movement associated with air travel by an airline. If we wish to overcome this failing we must be prepared to make our own evaluation of the aircraft offering to decide upon the machine to be used. The range problem is not insurmountable. In the United States, where distances are comparable to this country, there are at least two types of light service aircraft which could fly Canberra to Brisbane non stop.

If we are wise, this problem should not be dismissed lightly. Such a flight as described has already been undertaken, and even the short and regular trips from Canberra to the field firing range at Singleton necessitates a refuelling stop at Sydney with our present aircraft.

If we decide that one type of



Fig. 5—Piasieski HRP-1 Helicopter.

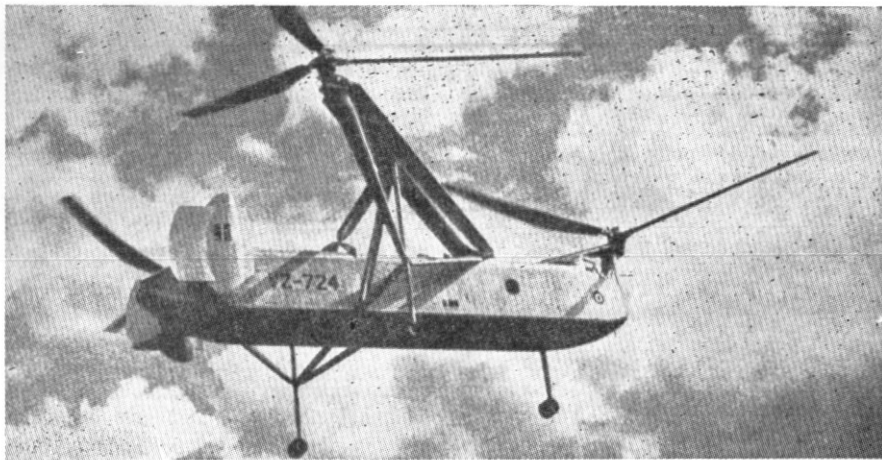


Fig. 6—Cierva W11 Airhorse

machine only will be employed then we must ensure that it will adequately perform ALL the tasks ever asked of any light aircraft with the army in the field. To do this there is only one aircraft available at present — the De Havilland BEAVER, the same aircraft now serving with USAF and US Army in Korea. It is considerably more expensive than the AUSTER, machine for machine, but if Austers are to be employed we will need not only the Mark VI or VII for normal training and Air OP duties, but will also require a different machine for casualty evacuation and small load carrying. These duties are met by AUSTER'S B4, which is undergoing trials at present and has not been fully proven by the services. That it will meet the Army's needs in this regard seems most likely, but we are still faced with the difficulty of operating two aircraft types against the BEAVER'S one.

A further factor in favour of the BEAVER is that it is suitable as a basic trainer, and our pilots can be

taught to fly on their operational aircraft. It is the opinion of the writer and most other service-trained pilots that the AUSTER does not present the most suitable characteristics for a basic trainer if other types are to be flown by the pilot at a later date. Many a private pilot has been killed by trying to do something with a more exacting aircraft than his AUSTER has allowed him to do safely in the past.

As a suggestion, why should not the Army purchase one or two BEAVERS and put them through evaluation trials under local conditions? These trials could be conducted very effectively by the Research and Development Unit of the RAAF with a couple of the Army's flying instructors attached to aid in the project and to ensure that the trials covered all the Army's requirements.

Finally, on the subject of purchasing aircraft, when a type has been decided, the agent for that aircraft should be consulted to ensure that

the initial order covers sufficient essential operating spare parts to keep the aircraft functioning while our Q service builds up the parts supply channel.

The next problem to face is that of training our pilots. It is on this subject that our present system can be subjected to some criticism.

The Air OP Course involves basic flying training organised by the RAAF at the Army's request, but with a civilian aero club. The result to date has been that one club has completed training of one course without ever seeing a syllabus for flying or theory training of the students. If the training of Army personnel is to be undertaken by a civil organization, there is no need for the Air Force to have any part in it at all, if for no other reason than to eliminate a link in the chain.

Similarly our light aviation pilots are to be aero club trained up to "A" licence standard. At this stage they will be reasonably competent at operating their aircraft from the local airfield of about half a mile square. They will have received no special training in small field operations, restricted take-offs and landings, or crowded approaches — exacting manoeuvres forming a large part of their operational flying.

We are, therefore, faced with the problem of effective training in a highly specialized art. The answer is already available to us in the technique of the Royal Air Force basic training units in the United Kingdom. There a civil firm provides the organization for maintenance and administration, while RAF instructors train the students.

In Australia there are several large firms which could readily duplicate this very satisfactory method

of training. The suggested project would involve establishment of a training school by the firm concerned. This would include instructional and maintenance staff as well as administrative personnel. The training unit so formed would be commanded by an Army officer with as many Army instructors added to the staff as the Army saw fit to employ there. The training aircraft would be provided by the firm and the operational machines by the Army. All aircraft would be maintained by the firm. By such means the Army's requirements are always kept in view by the commanding officer and the training directed to that end. Army other ranks could be posted to the unit and detached to the firm to be taught aircraft maintenance so that in due course all light aviation units would be self contained, only requiring a visit to the factories for major overhauls. This method of civil contract not only meets all our aircrew requirements satisfactorily, but also provides an immediate training organisation later producing maintenance personnel from normal Army troops. It would be possible to develop this theme in great detail, but sufficient has been said already to show how simple and effective it would be in practice.

By the civil contract method we produce aircrew and ground staff, and assume full operational control over our own aircraft, thus overcoming the remaining problems in Army aviation. This alone should make it the ideal solution to all aspects of this new weapon of war.

#### **The Objections.**

In the past there have been, and, unfortunately, still are, some objections to the Army taking its own



aircraft into service. Sometimes these objections have been voiced by the Air Force, feeling we were about to launch ourselves into their domain. Other objections along similar lines have come from within our own service.

The first is that we have a complete service of experts in aviation in the Air Force and we should not attempt to handle anything that they could do. At first sight this seems a reasonable attitude, but nothing could be more false or misleading. The reader will have realised by now that we are not attempting to steal any of the Air Force's thunder, but simply to introduce into our own service aircraft of a type, and on special duties, which are quite foreign to any air force. There can be no argument that the Army MUST operate these aircraft whether they be fixed or rotary wing. The Army managed to operate its own small ships unit, and the Air Force handles its own vehicle transport without assistance from another service. In the case of the RAF Regiment the complete ground defences of an airfield are often entirely in Air Force hands. It is purely A QUESTION OF OPERATIONAL CONTROL. As Mr. Winston Churchill pointed out in 1936, when the then Fleet Air Arm was first formed, it is of no importance at all whether the aircraft has wheels, floats or skids; whether the weapon has wings, wheels or tracks—it is its function that is the governing principle in its operational control.

If this operational control is to be effective, then the same service must have control of the training and organisation of the personnel and units concerned. In addition it must have complete freedom in the

procurement of its own equipment. The British Army has already had one sad lesson in the realm of design and development. No one can deny that the RAF is the finest air force in the world, but during the years of World War II, the Air Ministry and Ministry of Supply developed the famed SPITFIRE to the Mark 24 — the acme of single seat propeller-driven fighters. In the same period, the same authorities developed air OP aircraft to the AUSTER Mark 4 — only very little better than the original Taylorcraft prototype, and hampered by all manner of requirements that were quite useless for its Army role.

Possibly the clearest pointer comes from the largest user of army aircraft, the United States. On the formation of the USAF as a separate service, the power to issue specifications and contracts for army aircraft through the Air Material Command was retained by the US Army, and they now receive aircraft designed and built specifically for their use.

Obviously, the Australian Army is not in a position at present to issue detailed specifications for its future aircraft. However, there is a sound aircraft industry in this country, and, provided we are clear on the role we want filled and the overall restrictions on the machine, the technical assistance will be readily forthcoming. Further it seems reasonable to assume that the country which produced Hargreaves, Hinkler, Kingsford Smith, Ulm, Taylor, and others, will, in time, produce sound aviators within the ranks of its regular army.

The other major objection to assuming absolute command over our own aircraft comes from those

# ARMY AVIATION WING.

## WING HQ

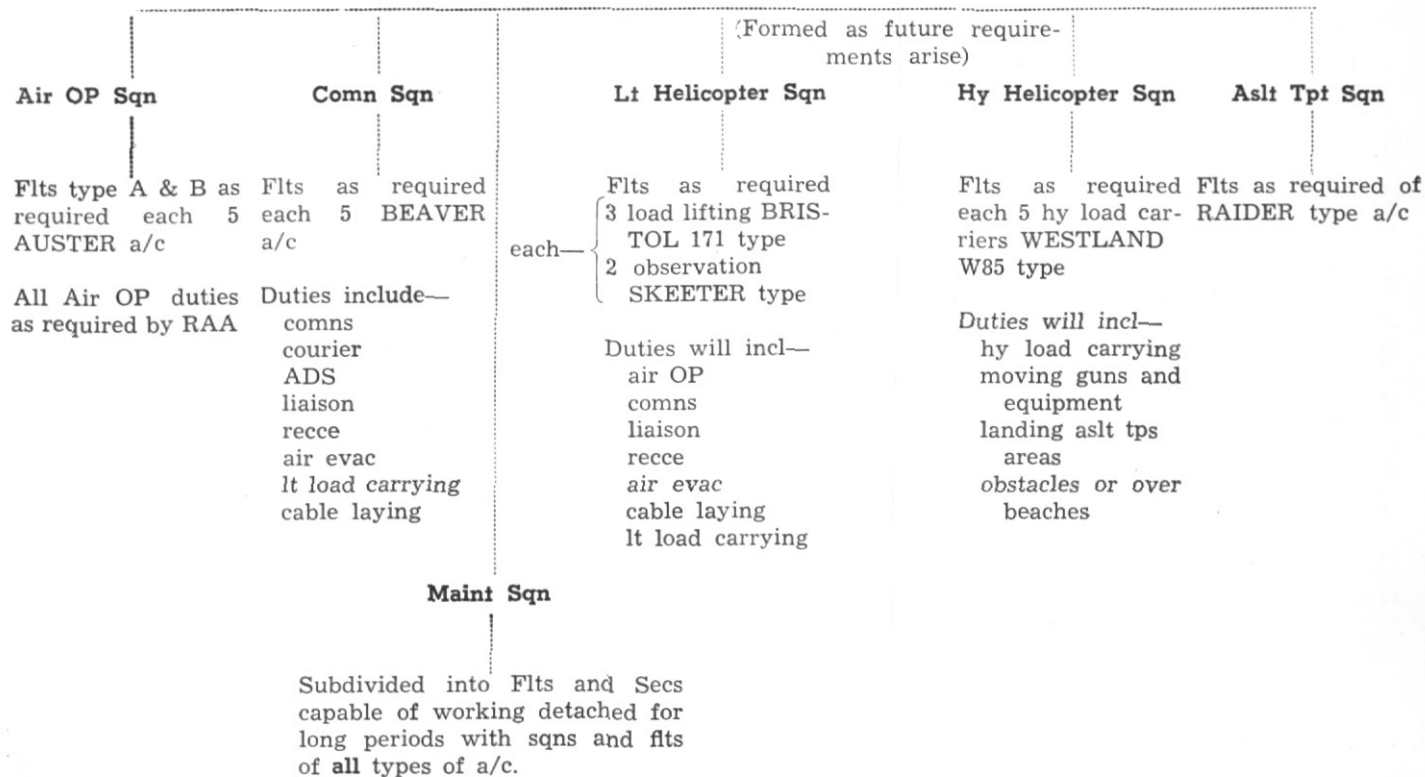


Fig 8.

who point out that this method has not yet been fully employed in the United Kingdom, and we have little, if any, precedent to guide us. In answer to this criticism, surely it is sufficient to say we did not have much in the way of precedent when our troops first faced the jungles of New Guinea, but we managed to acquit ourselves creditably. If we tackle the development of army aviation in peace time we shall have a really effective organisation functioning to meet the threat of any future war.

#### **Maintenance and Organisation.**

Earlier in this article it has been pointed out how civil resources can do the initial maintenance of army aircraft. It now remains to assure anyone still in doubt that the ordinary soldier can be trained to maintain an aircraft.

For some years now, the general attitude towards maintenance of aircraft has been one of mysticism, and no one was ever considered capable in this sphere unless he (or she) wore an Air Force uniform. Yet, strangely enough, the Air Force ground staff come from the same community as do the ordinary rank and file of the Army.

The Royal Australian Navy can prove the point. Within recent experience, we have seen servicing of combat aircraft by navy crews, of which any air force would be duly proud. On one occasion a SEA FURY fighter aircraft was completely rebuilt while the carrier HMAS SYDNEY was en route from the United Kingdom to Australia. More recently, an aircraft badly damaged in a barrier accident on landing, was repaired overnight, with the carrier at sea, and flown the next morning.

Surely then, there can be no doubt of the ability of the ARA to operate and service machines which, among other features, are designed for ease of maintenance.

The final aspect of this new army weapon is that of organisation. It is most desirable that we begin operations at the earliest and yet be able to expand as the occasion arises. To this end an AHQ unit, such as the Army Aviation Wing (Fig. 8), could be raised.

Initially this would be very closely integrated with the civil firm responsible for training, the commanding officer of the training unit being the CO of the Wing. As pilots became available the Air OP and Communications Squadrons would be raised at part strength. Later, when the first ground crew graduated from the civil factory, the Maintenance Squadron would come into being. If suitable helicopters became available then flights could be added to the fixed-wing squadrons until there were sufficient to warrant raising separate squadrons.

The complete wing would be established at the same airfield as the training unit, and if this were carefully selected initially in conjunction with the civil firm, it is probable that one of the ex-service fields would serve and provide at least a limited amount of accommodation for equipment and personnel immediately.

This organisation allows detached flights or sections with ground crew to join units in the field for camp or exercise periods and provide air transportation for commanders and their staff all over the Commonwealth.

In its complete form the Wing would also allow for the taking into

service of any type of aircraft not used by the Air Force and not yet considered by the Army. It may be that in the near future there will arise a definite army requirement for aircraft of the small transport or VIP type, such as the Australian De Havilland DROVER, or for the North American RAIDER, which is already replacing the glider in airborne assault formations.

#### Conclusion.

Though necessarily brief, this article has suggested one method to place Army Aviation on a better footing and to prepare it for the future.

The action needed for both present and future is quite clear and simple:—

1. Purchase of suitable aircraft by the Army.
2. Contracting with a suitable civil firm to undertake training of aircrew, ground staff and maintenance of aircraft.

3. Raising of an Army unit to provide overall control. This last item is particularly important, since the whole organisation is better commanded by a pilot, or preferably a flying instructor, than by any other officer.

Within these few pages has been discussed a unit that will become so much part of our Army in the next five years that we will then wonder how we ever functioned without our fleet of "airborne jeeps."

Finally, a plea to those, to whom this idea appeals, don't let it stop at this, but continue to think of new uses for army aircraft. Next time you are on a TEWT just give the problem a little thought in the light of sufficient helicopters to land troops right on their objective, the use of a small aircraft for reconnaissance, the ease of cable laying from the air, and the speedy movement of commanders to neighbouring headquarters.



Fig. 7—Westland S-55 Helicopter

# THE QUALITIES of A GOOD OFFICER



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Speech by Field Marshal Sir William Slim, GCB, GBE, DSO, MC, Chief of the Imperial General Staff at The Sovereign's Parade, at the Royal Military Academy, Sandhurst, on December 15, 1949.

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Officer Cadets of The Royal Military Academy. Many of you become officers today; all of you will become officers in the near future. That means that your Sovereign has selected you to lead your fellow-countrymen in battle, and than that there is no greater honour that your King and Country can do you.

In return for that honour, when you go from here, you will maintain those standards of conduct which have always been the glory of the offi-

cers of the British Army. You will show the qualities of leadership which are particularly required of you at a time like this. Remember, the be-all and end-all of an officer is to be a leader. The qualities that distinguish an officer from other men are courage, initiative, will - power and knowledge.



To take these qualities in turn. The kind of courage required is

the courage that endures. Anybody can be brave for a little while, but the officer goes on being brave when others falter. He has a moral

—From "Canadian Army Journal."



courage which makes him do his duty — do what is right without any thought of the consequences to himself.

Initiative means that you don't sit down and wait for something to happen. If, in war, you wait for something to happen it will happen all right and it will be damned unpleasant when it does. Initiative, for the officer, means that he thinks ahead, that he is always two or three jumps ahead of the men he leads and of the enemy. Keep your brains bright and flexible.

Will-power means that you will force through what you consider it to be your duty to do, against not only the opposition of the King's enemies, but against the opposition of well-meaning friends, and of all the doubts and difficulties of men and nature which will assail you.

Knowledge means that you have no business to be an officer unless you know how to do the job in hand better than those you lead. When you leave here you won't have finished learning. You will never finish learning. The officer is always learning.

If you have these qualities of courage, initiative, will-power and knowledge you will be a leader,

but you won't necessarily be a good leader, or a leader for good, and you won't have that grip you must have on men when things go wrong. When a man's heart sinks into his empty belly with fear; when ammunition doesn't come through; when there are no rations, and your air force is being shot out of the skies; when the enemy is beating the living daylight out of you — then you will want one other quality, and unless you have got it you will not be a leader. That quality is self-sacrifice, and as far as you are concerned it means simply this, that you will put first the honour and the interest of your King and Country, that next you will put the safety, the well-being and the security of the men under your command; and that last, and last all the time, you will put your own interest, your own safety and your own comfort. Then you will be a good officer.

I would like you to carry away from this Parade one thought, and that is this. In the British Army there are no good battalions and no bad battalions, no good regiments and no bad regiments. There are only good and bad officers. See to it that you are good officers. And good luck to you.

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# THE PRINCIPLES OF WAR

Captain K. C. Kennedy,  
Lord Strathcona's Horse (Royal Canadian)

SOME time ago I re-read an article upon the Principles of War, published in the "Canadian Army Journal." The occasion of my re-reading being the private study required for the Pre-Staff examination, the article led me to think more than I might otherwise have done, and seemed therefore to crystallize ideas that previously had been but nebulous in my mind.

Certain points strike me as important relative to this article, and indeed relative to a great deal of the current military thinking and writing. These points seem pertinent even in regard to the accepted doctrines.

A reader who pays attention to the meanings of words cannot, I believe, accept in whole any of the lists of the "principles" of war, for these lists invariably include many advices that are not principles at all. Despite their present soundness they are not principles; and herein lies much that is bad about military writing and which places it so far below that of the other arts and sciences. The very fact that such lists are subject to frequent change should be sufficient to emphasize this. It is true that from time to time accepted "facts" are proved false — but this merely serves to show that they were not

facts in the first place. The same is true of so-called "principles." Facts and principles are immutable.

Let us be taught a list of principles that remains constant; and let us be taught that only the methods of application alter. Let us be taught that good generalship is achieved in its highest form by an understanding of these principles (the science of war), and by the ability to relate modern application to them both collectively and severally (the art of war).

However, this is not simply an essay in pedantry nor a play upon the meanings of words, and it would be as well, therefore, to do more than search for the definition of the word "Principle."

The criticism of democracies is that they invariably prepare for the war that has just been fought. That the criticism is true is because of the nature of democracy, which is neither aggressive nor wishes to be.

This does not mean that this condition must ever remain, because it is within the capabilities of men of intelligence to prepare for contingencies, the fulfilment of which they do not relish. It does mean, however, that unless intelligent and forceful (even if distasteful) application of thought to the science and art of war is put forward it

—From "Canadian Army Journal."

will remain true. All of which brings us back to the question: "What are the Principles of War?" It brings us, moreover, to the secondary and hardly less important question: "What are the modern applications of these principles?"

If correctly answered the former question is resolved for all time. The latter is subject to constant change. In the study of these two questions lies the point of this article.

Principles may differ in specific application. Invariably they do; for the human factor is an unknown quantity both physically — in the strains that bodies will endure and the equipments that humans may produce, and mentally — in the depths and shallows of human intellects. The principles themselves remain untouched by these vicissitudes.

To examine very briefly some of the currently advertised "principles," and to propose those that seem to justify themselves as such, in contrast to others in the selected lists of the military staffs that do not:—

#### **The Object.**

It is far from the whole truth to say that the **Object** of war is victory of arms. Wars are fought, whether aggressively or defensively, for the establishment of one or more purposes. Victory of arms is merely a means to an end, and of itself is therefore insufficient. The **Object** must be the attainment of the purposes for which the war is fought, and will constantly govern the conduct of the war. Destruction of men-at-arms is nothing more than the destruction of an enemy's instrument for achieving his own purposes, for the denial of which we are fighting. A defensive war must

therefore be so ordered that at its conclusion the victor is still capable of upholding his denial. In the case of an aggressive war the circumstances are reversed and the outcome must be that having won, one is capable of imposing one's will upon the vanquished at least to the extent of one's original purpose.

Maintenance of the **Object** is definitely a principle, for by its nature it is not likely to be suddenly dropped from the list.

#### **Surprise.**

Here, too, is a true principle that will ever remain. Methods of achievement vary, as indeed does the importance of achieving **Surprise** in accordance with the relative strengths of one's own and the enemy forces. But the outcome of truly ultimate **Surprise** will always be victory without damage to oneself, and must therefore be striven for.

#### **Flexibility.**

Provided the word is given its true meaning, **Flexibility** is a third principle. Its true meaning is its widest meaning, encompassing not only **Flexibility** of troop manoeuvre, of systems of command and types of equipment (which must be permitted change and modification to meet new enemy equipments and methods of use), but also—and more important than its other facets — **Flexibility** of thought on the part of commanders. **Flexibility** is the antidote to surprise. So long as **Surprise** remains a principle, then so long, too, must **Flexibility** be its answer. The greater truth of this is highlighted when one realizes that given an enemy skilled in **Flexibility** of thought and manoeuvre,

even greater **Flexibility** must be applied by oneself to achieve surprise over him. **Flexibility**, or at least the meaning of the word, must remain on the list.

#### **Concentration.**

Here is a fourth principle. Again the lessons of its meaning must be learnt. **Concentration** is not **Mass**. Nor is it blind doggedness. **Concentration** is both mental and physical. It may be practised successfully even if imperceptibly, and the paradox of this principle is that it is generally practised more successfully when unnoticed. It is therefore rarely synonymous with **Mass**. Colonel Lawrence was probably the greatest modern master of this principle, and at times his concentration was so imperceptible that he deceived his own superiors in equal measure as he did the enemy. **Concentration** is inextricably wrapped up with the principle of object. It is, however, truly a principle, and our fourth.

#### **Command.**

As a fifth principle I would place **Command**. This is a new word as far as the lists are concerned, but to me it seems to over-ride **Co-operation** because it is more fundamental, which is the nature of principles. They are the ultimate beyond which we cannot go. They are first points from which others stem. The principle of **Command** means that co-operation is no longer a difficulty to be overcome by hard work, good liaison, and "give and take" between units and services. By **Command** a one-ness is achieved to a degree that co-operation can never hope for. **Command** must be single. Nations are already heading towards the principle of **Command**, even if the means to its complete attain-

ment are not yet to hand. One should always strive towards perfection even if entertaining few illusions as to its immediate possibility. In this respect co-operation is at present a substitute and should be recognized as such. Future wars will stress this more strongly, tending ever more closely to reach the principle of **Command**. Eventually **Command** will be so supreme in the hands of one individual or unified group that wars will no longer be possible or necessary. In the meantime the principle of **Command** (reposing in one head) must attempt to overcome the expedient of **Co-operation**.

#### **Offensive Action.**

This is our last principle, but simply it means that winning wars depends upon attempting to win them. This is the principle of **Offensive Action**. The application of **Offensive Action** rests for its success upon close adherence to the above five principles together with an understanding of them. There is little more that can be said about it in this short paper.

Having thus disposed sketchily of what I believe to be the only true Principles of War, there remains a bewildering list of other "principles." These are (perhaps not entirely, for the list grows daily):—

**Movement**  
**Administration**  
**Mass**  
**Economy of Force**  
**Security**  
**Simplicity**  
**Mobility**  
**Maintenance of Morale**

I do not intend to examine each in turn for the article would outgrow its value by so doing. What is true of one is true mainly of

others. To look at but some of them:—

**Maintenance of Morale.**—This is a very worthy objective and by all means let us not forget it. It is not a principle, however, for many wars have been won without it. It is also strange in that it can be met both by resounding victories and by resounding defeats. (Morale in England was never higher than immediately after Dunkirk.) Nor is it an end in itself. It is merely one of the things a good commander employs to gain the maximum from his troops. It is but a mechanic of war, and nothing more.

**Administration.**—This likewise is an adjunct of **Command**. A very necessary and by-no-means-to-be-overlooked asset without which wars are unlikely to be won. I hesitate to class it as a Principle of War.

**Mobility**, too, expresses nothing but a portion of the principle of **Flexibility**, and a very poor portion at that, as it tends to lead one to the erroneous conclusion that by dashing to and fro across a battlefield more quickly than the enemy one can defeat him. It takes no note of mental manoeuvre, nor of physical movement upon a fixed spot. The truth of the matter is that if one is forced to move—and in itself this is a disadvantage—then the smaller the radius of one's movement the better. Movement in itself is generally the outcome of being forced to move, either because one's adversary cannot be overcome from where one is (which would be much more convenient), or because by his menacing attitudes towards oneself it is obvious that by movement alone can one escape

defeat (which is also inconvenient). One might as well list discretion as a principle because at times it is expedient to display it. **Movement** is no god to bow to, but an evil to be overcome. It must be practised and ever improved, but not treated as an aim in itself.

**Simplicity** is another evil imposed upon us by reason of our limited intellect. This, too, is not a principle at all. One would like not to have to be simple, but unfortunately at present to be complex would be disastrous. Training is after all nothing but an attempt to overcome the limitations that impose the need for simplicity. If one can train sufficiently, let us by all means be complex. In the meantime, however, it is well to remember this tenet because it generally applies; but let us not proclaim it to be a principle, which it is not.

So, too, for **Mass** . . . Success is not on the side of the big battalions, but on the side of the intelligent ones. **Mass** in the wrong place is infinitely more harmful than little in the wrong place, and of itself is no panacea.

To revert now to the jibe that democracies invariably prepare for past wars. Provided one is prepared to change the so-called Principles of War from time to time, the logical procedure would be to change them in the light of past events. This, indeed, is what we do. If, for example, we have fought a war wherein success was achieved by **Movement**, we place this on our post-war list of principles. There it remains until eventually we (or someone else) fight a war in which, by reason of excessive movement, we became defeated. The principle of **Movement** is then replaced by



the contrary principle of **Immobility**. So, too, with **Mass**, **Simplicity**, **Co-operation**, **Security**, etc. All appear on our lists not in the light of the future, and in relation to the true principles of war, but because of the shadows of the past. A deal of study is expended upon matters that fast become obsolete.

It were as if olden days the Athenians, after the fall of Troy, were to write as a principle "**Wooden Horse**" instead of contenting themselves with the deeper and more perma-

nent truth and correctly writing "**Surprise**."

This then is my theme. Past wars require analysis and understanding. It is to the principles that we should look, however, and not to that particular application which by reason of its timeliness and consideration of such factors as terrain, scientific ability and so on, prevailed at the time. These latter will always have a fleeting interest at least, but should not become dogma for a generation.

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An army should be ready every day, every night, and at all times of the day and night, to oppose all the resistance of which it is capable.

—*Napoleon.*

# THE MOON

## in war and training

Brigadier C. M. L. Elliott, OBE.

THE importance of the light of the moon in movement and concealment at night is well known. What are not so well known are certain basic facts about the moon. As gross errors are so often made in training exercises, it is proposed to set out very briefly the more important facts. These facts have been put in so simplified a form as to be not strictly accurate, but they are near enough for most practical training.

The moon is theoretically "full" when, as seen from the earth, it is diametrically opposite to the sun; that is, when the earth is approximately between the sun and the moon. As the period full moon to full moon is approximately  $29\frac{1}{2}$  days we can represent the phases of the moon as shown in Figure 1.

Because the moon drops back from the sun at the rate of 24 hours in 30 days **THE MOON RISES APPROXIMATELY 50 MINUTES LATER EACH NIGHT.**

The percentage of light (compared with full moon) given by a moon can be represented approximately by a straight line from 0 to 100, except that it is slightly

rounded near 0 and near 100. This means that the moon gives little or no light for its first and last two days (a period of four days in all) and is near 100 per cent. for one or two days before and after full moon. (See Figure 2.)

The higher the moon is in the sky the more light it sheds on the ground. So the light from a moon just risen or just setting is quite a lot less than the light from the same moon once it gets reasonably high in the sky. In fact the curve representing the moon's nightly light is somewhat similar to the one in Figure 2.

In war, for a given month, year and latitude, Night Illumination Diagrams are produced. From these diagrams it is possible to read off the amount of light likely to be available on any particular night, provided, of course, that cloud does not obscure the moon. Since each diagram covers only a narrow band of latitude and they are fairly expensive to produce, they are not used in peace training in Australia.

There is an old saying that "in winter the full moon rides high." Close observers will have noted that






	NEW MOON (NOT VISIBLE)	WAXING $\frac{1}{2}$ MOON	FULL MOON	WANING $\frac{1}{2}$ MOON	NEW MOON
APPEARANCE					
DAY	1	8	15	22	29
PERCENTAGE OF LIGHT COMPARED WITH FULL MOON	0%	50%	100%	50%	0%

Figure 1

the full moon is higher in the sky in Australia in winter than in summer, so that the full moon in winter will shed more light than the full moon in summer. In the northern hemisphere the same is true. The important fact that follows this "riding high" is that when the full moon is high it is visible for many hours longer than when it is low in the sky. The phenomenon is due to the inclination of the plane of the moon's orbit to the plane of the equator, to the turning of the earth, and to the latitude of the observer. For example, in England in mid-

winter the full moon rises about 1600 hours and sets about 0900 hours; it is "up" for 17 hours. In mid-summer, however, the full moon rises at 2100 hours, sets about 0300 hours; it is "up" for only 6 hours. In Melbourne (Long. 145 deg. E Lat. 38 deg. S) the full moon in mid-winter rises about 1645 hours and sets about 0838 hours; it is "up" for 15 $\frac{3}{4}$  hours. In mid-summer, however, the full moon rises about 1930 hours and sets about 0445 hours; it is "up" for about 9 $\frac{1}{4}$  hours.

The moon is commonly spoken of as having four phases:—

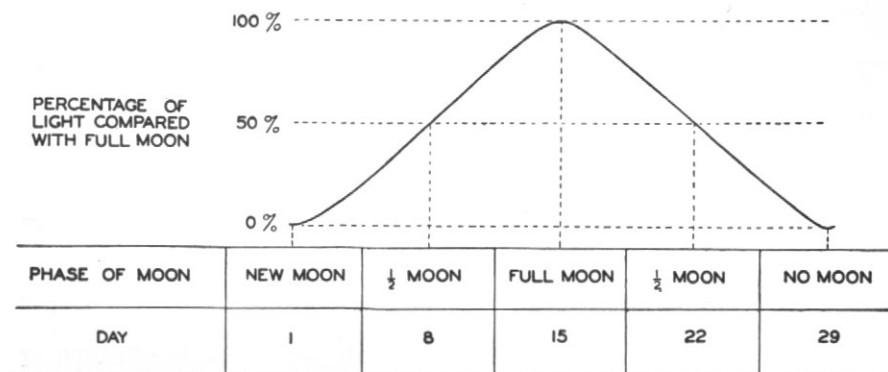


Figure 2

New moon.—New moon to half moon (waxing).

First quarter.—Half moon to full moon (waxing).

Full moon.—Full moon to half moon (waning).

Last quarter.—Half moon to new moon (waning).

As each phase covers 7 days, and as the moon rises 50 minutes later each day, there is a variation of nearly 6 hours between moonrise on the first day of a quarter and moonrise on the last day of a quarter. It is therefore of little or no value in an exercise to give such information as:—

"The moon is in its last phase."

This is so indefinite as to lead to endless argument — all it means is that the moon will give something varying between half moonlight to no light, and that moonrise is approximately in the six-hour period 0000 hours to 0600 hours. Moonset is usually as important as moonrise in tactics.

It is suggested that the only sound way to give the necessary information is to say:—

- (a) "Moonrise, half moon 0100 hours 3 May"  
"Moonset, 0900 hours 4 May"  
or
- (b) "Quarter moon rises 0900 hours and sets 2000 hours 3 May"  
or
- (c) "Full moon rises 1700 hours 3 May and sets 0400 hours 4 May."

It is obvious that weather conditions at the time will dictate whether clouds partially or totally interfere with the moonlight. In certain climates and areas one can

reasonably forecast well ahead the likely cloud conditions; in others it is most difficult, if not impossible.

Granted no clouds interfere, the student given the foregoing information will be able to plan on reasonable darkness from last light 2 May till 0130 hours 3 May, then the light of a half moon (the nearer overhead the brighter) till first light.

To determine well ahead the time of "last light," leaving out the atmospheric conditions of the day, look up "Nautical Twilight" as given in the HM Nautical Almanac and work out the time for the required latitude in the manner shown in the Almanac on the page giving sunset and twilight. Last light for practical purposes is when the setting sun has reached 12 degrees below the horizon. First light begins when the rising sun has reached to within 12 degrees of the horizon.

Attention is directed to the rapid variation in the bearing to the rising moon as compared with that to the rising sun. In Melbourne the bearing to the rising sun varies between 30 degrees SOUTH of EAST (in mid-summer) to 30 degrees NORTH of EAST (in mid-winter), a variation of 60 degrees in 6 months, or nearly one-third of a degree a day. But the bearing to the rising moon varies between 36½ degrees SOUTH of EAST to 36½ degrees NORTH of EAST in 14 days, or an average of over 5 degrees a day.

Two things seldom realized are:—

- (a) In Melbourne the sun in mid-winter rises and sets well SOUTH of the EAST-WEST line. The further SOUTH the latitude the further SOUTH of EAST the sun rises and sets in summer

(b) In Melbourne the rising (and setting) moon moves 73 degrees NORTH from its most southerly point of rising (or setting) and 73 degrees SOUTH again in approximately 30 days.

It may be of literary interest to review three types of moon commonly written about:—

**Gibbous moon (gibbous—  
protuberant)**

Is a moon showing more than a semicircle and less than a circle; i.e., a moon in its second and third week of life, excluding the few days when it is full.

**Crescent moon.**

Is a moon showing less than a semicircle; i.e., a moon in its first or last week of life.

**The Harvest moon and The  
Hunters' moon.**

The full moon which rises near the autumnal equinox rises at nearly the same time about sunset on several consecutive evenings. In early times it was thought that this was specially ordained to add to the time of "daylight" to facilitate the ingathering of the crops, and these full moons were therefore called "the harvest moon." The following moon was called "the hunters' moon."

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There is a vast difference between being a staff officer and being a commander. The staff officer is never totally responsible — the commander always is. For that reason, although a good commander usually will make a good staff officer, the opposite is not necessarily true.

—General J. Lawton Collins, US Army.

# The Campaign of Ulm and Austerlitz



## A STUDY OF NAPOLEONIC STRATEGY

### Part III.

IT will be recalled that throughout the wheel of the French Grand Army from the Rhine towards the Danube the Austrian Army under Mack had remained inactive in its positions on the Iller between Ulm and Memmingen, apparently unaware that there were only negligible French forces on its front, while powerful hostile columns were moving rapidly against its communications.

On 4th October Mack became a little concerned about the security of his right rear, and despatched Kienmeyer with some 12,000 men towards Ingolstadt with orders to "Observe the Bavarians."

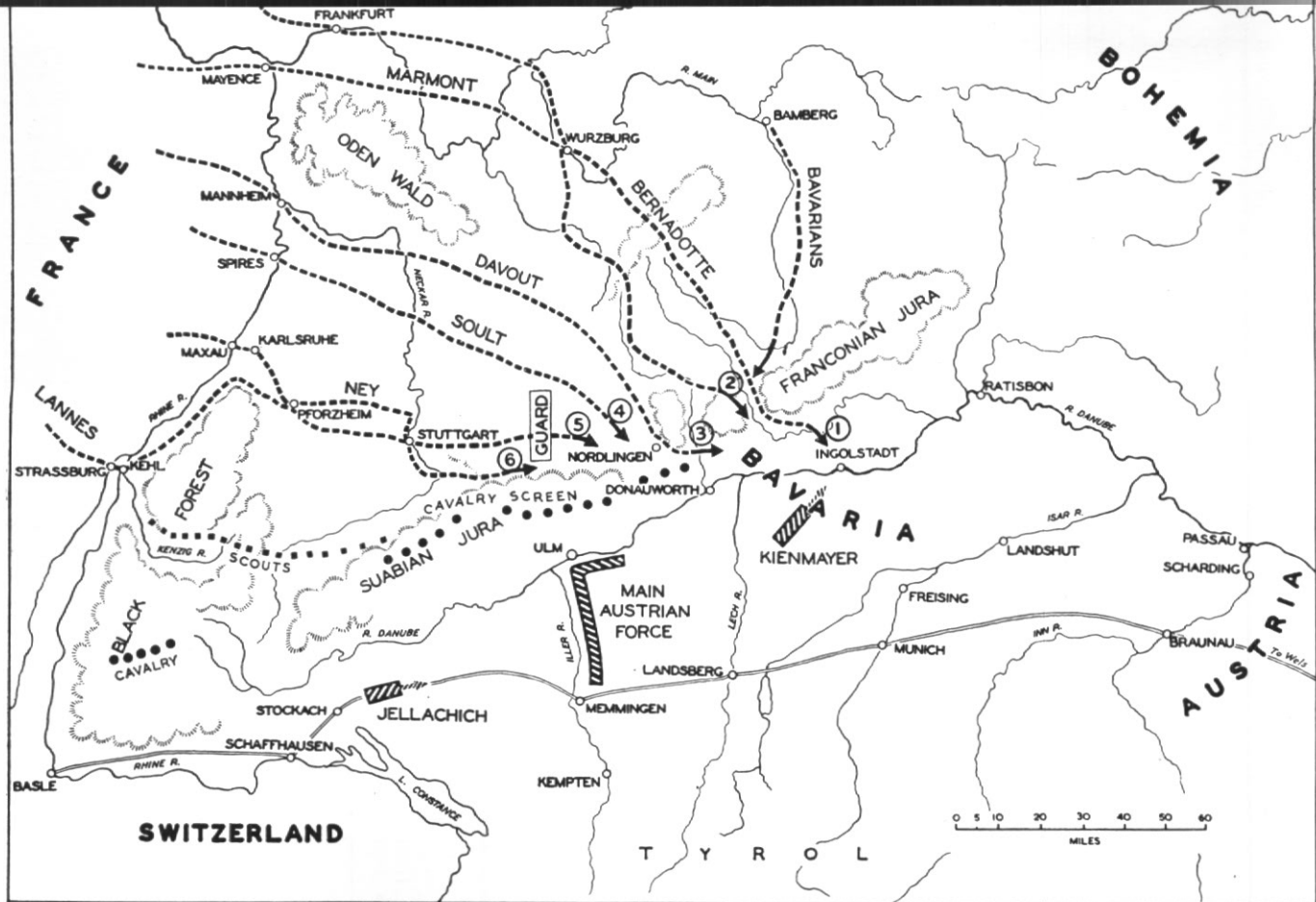
The situation, as we left it at the end of Part II of this study, is shown on Map 3.

On the map the sweep of the French columns looks smooth, effortless, the mechanical perfection of a great machine. On the ground it was not a bit like that. What Clausewitz calls the "friction of war" had set in with a vengeance. Despite the most meticulous planning, the most careful forethought, many

things had gone wrong, as many things always do. The weather had broken. Driven by a bitter wind, rain, hail and sleet lashed the columns, and turned the fields into lakes and the roads into quagmires. Many of the contractors who had undertaken to provide wagons to carry the supplies fell down on the job. Some wagons did not arrive at all, some were too fragile, or their teams too weak, to negotiate the appalling roads. Local supplies were scarce, the only commodity available in any quantity being unripe potatoes.

These are the conditions which test the spirit of an army, which test it more severely even than battle. High courage, a momentary upsurge of exaltation, may sweep an army to victory on the battlefield against great odds. But morale of a different kind is required to enable an army to endure great hardship when the excitement of battle is absent. To endure and to continue to endure when you are wet and cold and hungry, when body and soul ache for shelter and rest, when there is no apparent rea-





Map 3—Situation on 5th October

son for pressing on — that is the highest test of the moral qualities of an army.

These qualities of morale the French soldiers possessed in abundance. They were the products of an intelligent and passionate belief in the justice of their cause, of training, of confidence in themselves and in their leaders. And because of this carefully nurtured reserve of spiritual strength the columns pressed on, in the face of appalling difficulties, at a speed which would have done any army credit in the best of conditions.

The marshals and the generals, even the resplendent Murat, were everywhere at once, bespattered with mud, getting off their horses to march with the men, to share their hardships, and to cheer them on. Here was leadership at its best.

The Emperor himself was in the midst of his army, a very different figure from the portraits usually presented to us. As always in the field he travelled austere, dressed in his comfortable old campaigning clothes. Every soldier knew the slight figure in the stout riding boots, the ample breeches, the floppy slouch hat, the old grey coat, with its elbows rubbed threadbare from leaning over maps, and its back scorched from collar to tail from its owner's custom of warming himself in front of camp fires. Yes, every soldier knew his Emperor, and whenever he appeared the regiments raised a shout. Napoleon would get out of his carriage or off his horse and march with them for a while, swear with them, laugh with them, crack a joke at their expense and his own. And always he would say, "My chil-

dren, I win my battles with your legs, not with your lives."

Here is an example of that quality of leadership about which we read so much and think so little, the quality that can impart to any army an overwhelming sense of spiritual and physical unity between leader and led. The means to impart this sense of unity vary with time and circumstance and the characteristics of an army. But imparted it must be, and the means of doing so must be constantly in the thoughts of all who aspire to leadership. For it is of the very essence of leadership, and particularly the leadership of men who are free or who think themselves free. All the great commanders from Miltiades to Montgomery have known how to do it.

#### Austrian Movements.

On receiving word from Kienmayer's cavalry that strong hostile forces appeared to be marching on Donauworth, Mack at last awoke to the danger of his situation. Owing, however, to his neglect of the principle of security, he had no real ideas of what was happening north of the Danube. He could only surmise that the French were not advancing against his front, but were moving in unknown numbers towards his right rear.

Mack now decided to take up a fresh position with his left resting on Ulm and his centre around Gunzburg, preparatory to falling on the heads of the French columns as they crossed the Danube. Accordingly, he ordered Auffenberg, who had been diverted from the Tyrol and had reached Augsburg with eight battalions and thirteen squadrons, to proceed to Wertingen to form the advanced guard of his proposed

movement. Jellachich was ordered to accelerate his march so as to arrive in the concentration area by 8th October.

**Passage of the Danube.**

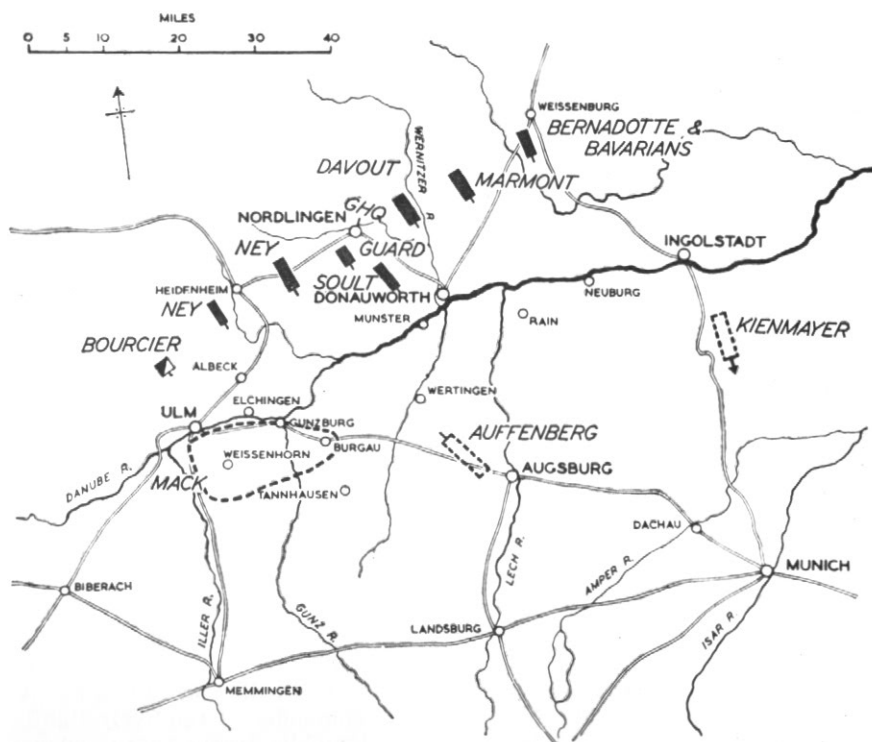
On 5th October the French corps covered a frontage of sixty miles. On the following day they were on the line Heidenheim - Eichstadt, roughly parallel to the Danube, their frontage contracted to 45 miles. In spite of the weather and administrative difficulties, Napoleon had successfully completed his "wheel to the right" and brought his army to within a day's march of the river, in such a position that

he could concentrate on his centre in twenty-four hours or on either flank in forty-eight hours.

Kienmayer's weak cavalry detachments north of the Danube fell back before the French advance. Leaving a few small bodies of troops to destroy the bridges over the river, Kienmayer retired towards Munich.

The situation on 6th October is shown on Map 4. The function of d'Hilliers and Boucier, with their dismounted dragoons, was to delay the Austrians if they crossed at Ulm and moved against the French right.

Napoleon arrived at Nordlingen on the 6th, fully expecting a battle



Map 4—Situation on 6th October

to take place in the vicinity of Donauworth. Finding no enemy he ordered his corps to cross the Danube at once — Murat and Soult at Donauworth, Lannes at Munster, Davout at Neuburg, Bernadotte and the Bavarians at Ingolstadt. The Emperor, with the Guard, would follow Soult at Donauworth.

Ney, whose corps was strengthened by the addition of one of Lannes' divisions, was ordered to remain on the Brenz, on the northern bank of the Danube, to prevent any movement against the French communications and check any Austrian attempt to break out from Ulm or Gunzburg. Bourcier and d'Hilliers were placed under his command. Thus Napoleon, for all his bold design, was taking no unnecessary risks during his passage of the river, not even with an adversary who had shown himself so unenterprising as Mack.

On the evening of the 6th, troops from Soult's columns rushed the bridge at Munster before it could be destroyed.

On the 7th, Murat, finding Soult engaged with the Austrian detachment covering the partly demolished bridge at Donauworth, galloped up the left bank of the river to Munster, where he crossed unopposed. Moving rapidly along the southern bank to the Lech, he chased the Austrian rearguard from Rain. Leaving a division of dragoons to hold the line of the Lech, he retraced his steps along the southern bank of the Danube, followed by Lannes, who had meanwhile crossed at Munster.

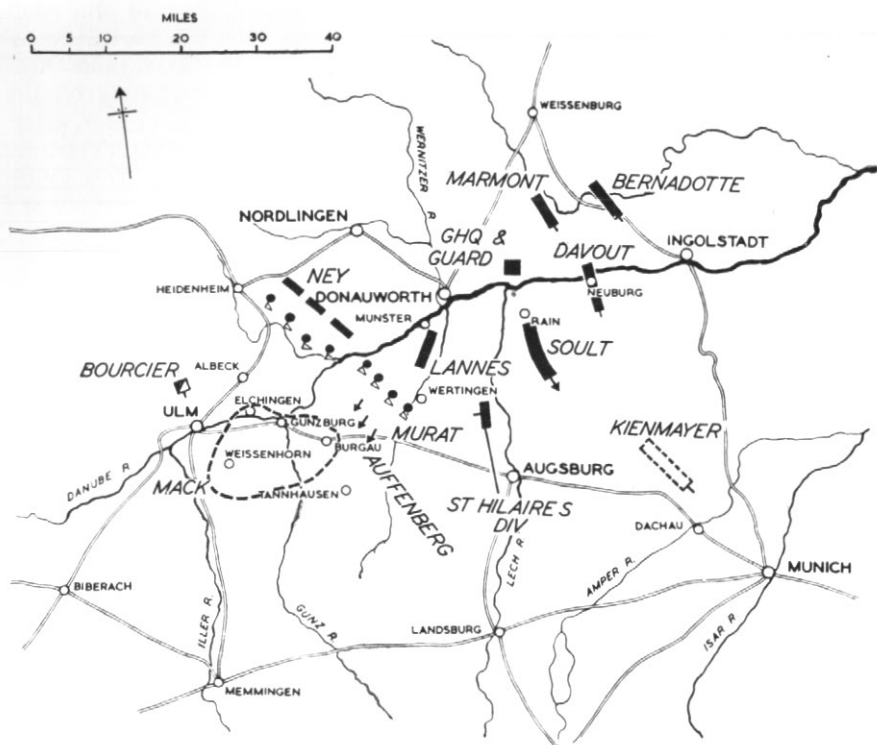
Soult, having cleared away the Austrians and repaired the bridge, crossed at Donauworth, while Davout began to cross at Neuburg.

Mack remained inactive throughout the day, while Kienmayer continued his withdrawal towards Munich.

The situation, as it developed on the 8th, is shown on Map 5. In the morning Murat's patrols came in contact with the outposts of Auffenberg's detachment, which had halted at Wertingen. Auffenberg, who had arrived there the previous evening, had received orders to fall back to cover the move of the main body to the Lech, whither Mack, still in ignorance of the strength and location of the French columns, now proposed to take his army. But Auffenberg's troops were so exhausted that he had been forced to give them a day's rest.

Taken by surprise by the appearance of the French patrols, Auffenberg attempted to delay their advance while he took up a strong defensive position in and around the village. Murat, knowing that Oudinot's Grenadier Division was close behind him, attacked at once. The covering detachment was thrown back into Wertingen in confusion, a division of dragoons forded the stream above the village, while a couple of regiments dismounted and crossed by a rickety bridge below it. Auffenberg threw his infantry into squares and attempted to retreat. But Oudinot's Grenadiers, hastening to the sound of battle, came up on his flank and soon broke up his squares with their steady and accurate fire. Auffenberg's command dissolved in flight.

Murat's victory is a good example of the manner in which speed of thought and action will often enable the commander of relatively lightly armed mobile troops to overwhelm a more powerful opponent. Murat



Map 5—Situation on 8th October

had surprised his adversary, and gave him neither time nor space in which to recover. His well-trained, enterprising troops soon found crossing places, and pressed the crowded Austrians closely on all sides. Oudinot lost no time, either. As soon as he heard the sound of heavy firing he accelerated the pace of his division, made a personal reconnaissance of the situation, and rapidly brought his troops into action on the enemy's most vulnerable flank.

Although relatively small, the action at Wertingen is a good example of initiative and rapid appreciation on the part of the French

commanders, and of dash and enterprise on the part of their troops. The French losses were negligible, while they captured 2,500 prisoners and ten guns. The Austrian force was scattered to the four winds.

#### Austrian Reaction.

On the 8th Mack did nothing, but news of Auffenberg's defeat convinced him that all hope of retreat to the Lech had to be abandoned. Although he had made the first move of the campaign, through his faulty appreciation, inactivity, and neglect of the principle of security, the initiative had slipped from his grasp.

As Mack now saw the situation two courses were open to him. Although he could no longer hope to reach the Inn he could, provided he acted promptly, make good his escape to the Tyrol and unite his army with that of the Archduke John. Their combined armies could then threaten the flank of the French if they advanced down the valley of the Danube, and cooperate with the Russians when they appeared.

He could also cross the Danube, threaten the French communications, and, marching via Nordlingen, regain the river at Passau or retire into Bohemia with a view to effecting a junction with the Russians. Whatever course he chose he would have to act vigorously and promptly, but his army had fallen into such a state of confusion from a spate of contradictory orders and much useless marching and counter-marching that it was incapable of undertaking a major operation until order had been restored. Thus Napoleon through manoeuvre alone — no major engagement had yet taken place — had almost paralysed his opponent's mind and had temporarily paralysed his army.

#### **Napoleon Re-groups.**

Napoleon had now almost completed his grand design of interposing his whole force between his adversary and his principal base, blocking his direct line of retreat, and cutting him off from his allies. He now disposed his army in three groups. Murat was given command of the right wing, consisting of the corps of Lannes and Ney, in addition to his own cavalry, and was ordered to advance on Ulm. Ber-

nadotte, in command of the left wing, composed of his own corps, Marmont and the Bavarians, was to occupy Munich and hold off the Russians should they appear. The centre, under the Emperor's personal command, and comprising Soult, Davout and the Guard, was to occupy a central position around Augsburg, from which area either wing could rapidly be reinforced.

A glance at the map will show that these dispositions placed the French army in perfect balance, and gave it the maximum degree of all-round security and flexibility.

To ensure communication between the northern and southern banks of the Danube, Ney, who had remained on the Brenz, was ordered to advance to Gunzburg and seize the bridges near that town.

Meanwhile Mack had at last made up his mind to escape into Bohemia via Nordlingen, and had ordered a concentration at Gunzburg preparatory to crossing the river. A large portion of his force arrived during the day, but, as usual, they arrived too late.

Marching at daylight on the 9th. Ney's corps reached the river the same evening. One column rushed the bridge at Elchingen. The bridge opposite Gunzburg, however, was stoutly and successfully defended by an Austrian detachment under the Archduke Ferdinand's personal command. Below the town the French carried the bridge in the face of determined opposition. The Austrians then abandoned all the bridges and retired to Ulm during the night.

Up to the 10th Napoleon had considered that Mack would make every effort to maintain his com-



munications with the Tyrol, and that the Russians could be expected to appear at any time. On that day, however, he learnt that Mack was still at Ulm, and that the Russians were beyond striking distance. In the light of this information he resolved to march with his whole army to cut Mack off from the Tyrol and hold him in Ulm, leaving only Bernadotte, supported by Davout, to oppose any Russian advance. Accordingly the Emperor fixed the position of his corps for the 11th as follows:—

Ney astride the Danube at Gunzburg.

Lannes a few miles in rear at Bargau, with Murat's cavalry in front of him on Ney's left.

Marmont, the Guard and GHQ at Augsburg.

Soult at Landsberg, whence he was to wheel right to Memmingen.

Davout at Dachau.

Bernadotte and the Bavarians at Munich.

#### **Austrian Counter-Attack.**

Urged on by the Archduke Ferdinand, Mack renewed his attempt to break out north of the Danube towards Bohemia. By the evening of the 10th he had passed the bulk of his force across the river at Ulm. To cover this movement Jellachich, with 6,000 men, was to march up the Iller, destroying the bridges as he went, and escape to the Tyrol via Memmingen.

The Austrian troops were so exhausted that it was impossible to begin the march until the afternoon of the 11th. The advanced guard was to move off at 3 p.m. towards Albeck, followed during the evening by the main body. Wernecke,

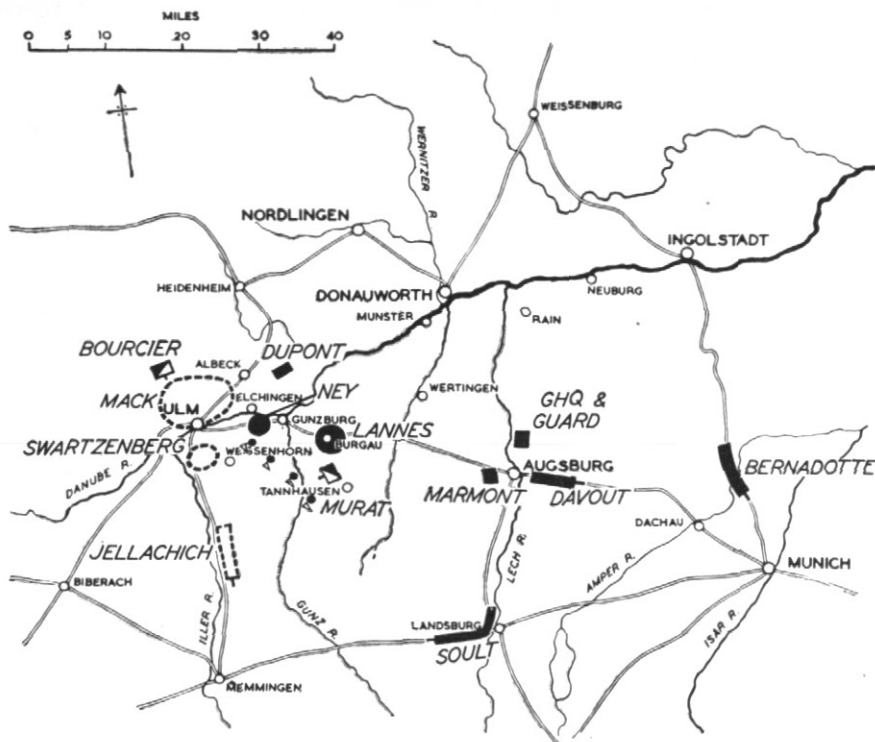
with the rear guard, was to move off at 3 a.m. on the 12th.

Meanwhile Murat had ordered Ney to bring the whole of his corps to the southern bank of the Danube. Ney protested, and pointed out that compliance with the order would leave Mack's escape route to Bohemia open and the French communications unprotected. Murat at length consented to leave Dupont's division and the dismounted dragoons of Bourcier and d'Hilliers on the north bank.

The situation towards the evening of 11th October is shown on Map 6.

On the afternoon of the 11th, Dupont, who was on the march towards Ulm, saw a large force of the enemy on some heights ahead of him. He saw at once that the Austrians were present in overwhelming strength and concluded that he had run into the head of their main army attempting to break out. To retire would ruin the Emperor's plans, to stand strictly on the defensive would lead to certain defeat. Dupont decided to attack in the hope that the Austrians would mistake his division for the advanced guard of Ney's corps.

Both sides in fact attacked simultaneously and the fight was long and bloody. The French cavalry was overwhelmed, their guns were silenced, but their infantry held on against fourfold odds by continually charging into the ranks of their opponents. Under cover of darkness Dupont withdrew to Albeck, leaving 600 dead on the field, but taking with him 4,000 prisoners, and having inflicted a loss of nearly 2,000 killed and wounded on his assailants. His resolute action had retrieved Murat's blunder and made



Map 6—Situation, evening, 11th October

such an impression on Mack that the Austrians were ordered to retire to Ulm.

#### Closing the Ring.

Napoleon, with success within his grasp, urged his columns to the utmost speed. But the weather, which had been fine for a few days, again broke in a succession of violent storms. Supplies became scarcer than ever. Despite the efforts of formation commanders and regimental officers much straggling occurred. To all appeals for a temporary halt Napoleon returned a sharp, inspiring order to keep going. To one marshal who sought

permission to shoot stragglers without trial, he replied, "What, and stop to do it? Keep going even if you arrive at your destination alone." But neither that nor any other marshal arrived at his destination alone. The hard core of the columns pressed resolutely on. Napoleon had correctly gauged the moral and physical reserves of his troops. The ability to do this, and to enforce the decisions arising therefrom, is another important attribute of command.

How did Napoleon enforce this decision? Not by remaining comfortably in his Headquarters, remote from the hardships of the

troops and the difficulties of his corps commanders, but by getting out amongst them to help and to encourage. He was at the bridge over the Lech when Marmont's corps crossed. Each regiment was formed in a circle, and he spoke to them of the situation of the enemy, the imminence of a great battle, and his confidence in them. Heavy snow was falling, the troops were up to their knees in mud and suffering from the intense cold. At the Emperor's inspiring words the soldiers forgot their privations and fatigue and became impatient for the hour of combat.

By the evening of the 12th the opposing forces were disposed as follows:—

**French:**

Ney.—South of the Danube between Gunzburg and Elchingen.

Murat. — Outposts on the line Elchingen - Weissenhorn.

Lannes. — Immediately behind (east) Murat.

Marmont.—Tannhausen.

Guard.—About midway between Augsburg and Lannes.

Soult.—Between Lansburg and Memmingen.

Davout.—Dachau.

Bernadotte.—Munich.

**Austrians:**

Main Body.—Ulm.

Jellachich.—Memmingen, on his way to the Tyrol.

Kienmayer.—20 miles south-east of Munich.

The main body of the Austrians was now almost surrounded, in two more marches the French circle would be complete. Yet even now Napoleon took no unnecessary risks. True to his principle of concentration, he wrote to Murat on the 12th: "I intend, should the enemy remain

in his present position, to accept battle, not tomorrow, but the next day, so that Marshal Soult and his 30,000 men make take part in it. He will march to the enemy's right flank and attack when he has turned it, a manoeuvre which will ensure a decisive result."

This apparent caution of Napoleon, in sharp contrast to the great administrative risks he had already taken, is a very good example of the difference between a justifiable and an unnecessary risk, of the difference between audacity and recklessness. Napoleon knew full well that through audacity based on fine judgment in one sphere he had placed Mack in a hopeless position. There was nothing to be gained by risking heavy casualties if by waiting another day he could achieve a more certain, if less spectacular, success.

**Mack's Last Effort.**

Urged by the Archduke Ferdinand, Mack made another effort to escape to the north-west. He ordered:—

- (a) Wernecke, with the reserve artillery and baggage to march to Heidenheim.
- (b) A detachment under Swartzenberg to demonstrate to the south of Ulm.
- (c) Riesch to take up a position on the heights north of the Danube at Elchingen, to hold the bridge, and to cover the Heidenheim road.
- (d) As soon as Wernecke was well clear he would be followed by the main body from Ulm, then by Swartzenberg, and finally by Riesch, who would constitute the rear guard.

This movement began on the 13th, but, delayed by bad roads and the enormous train, Wernecke managed to cover only about 12 miles. Riesch remained on the heights at Elchingen, and the main body stayed in Ulm. To the south, Jellachich cleared Memmingen just before the head of Soult's column appeared. Soult captured the garrison of Memmingen — about 5,000 men — hurried on to Biberach, and then wheeled north towards Ulm.

On the same day Napoleon ordered:—

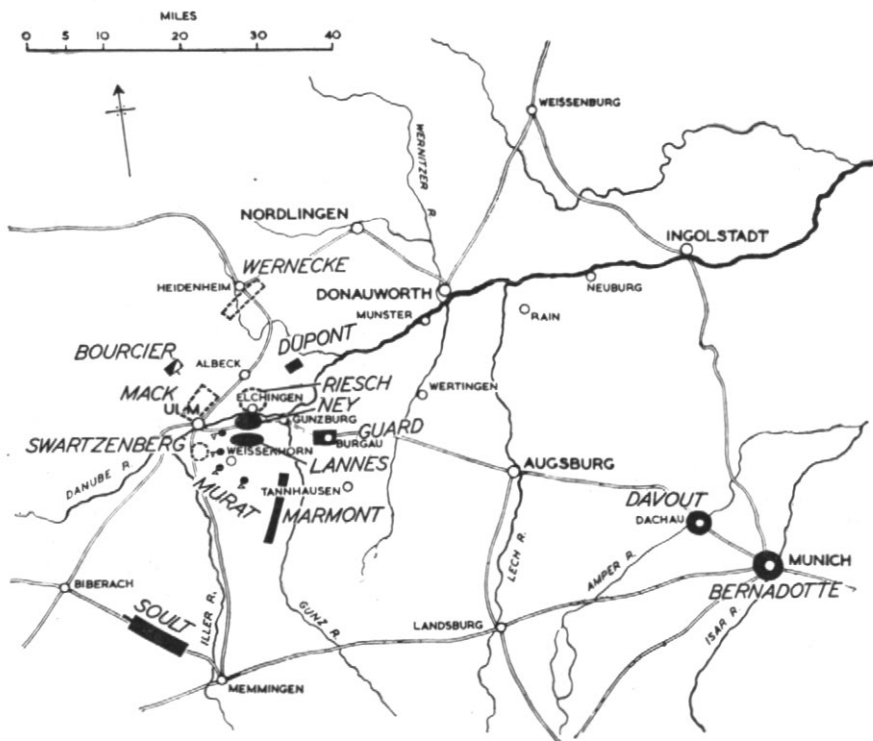
- (a) Ney to recapture the bridge at Elchingen and take his

corps to the north bank of the Danube.

- (b) Lannes and Marmont to close in towards Ulm.

The situation at daylight on 14th October is shown on Map 7.

On the morning of the 14th Ney advanced to force a crossing at the Elchingen bridge, which had been partially destroyed, and found the Austrians very strongly posted on the opposite heights. Covered by a heavy artillery concentration, the light companies of the leading division crawled across the girders and formed a bridgehead on the north bank. The pioneers rapidly repaired the roadway, and the division got



Map 7—Situation, morning, 14th October

across. Though they pressed their attack gallantly, it was not until a second division had crossed that Ney was able to carry a strongpoint in the centre of Riesch's position. Fighting stubbornly, Riesch threw his regiments into squares and withdrew to Ulm.

In this action Ney displayed the qualities of leadership and courage which made him famous. Dressed in full uniform with all his decorations, he exposed himself recklessly and aroused his troops to a high pitch of enthusiasm.

Immediately after the battle Ney moved his corps to the north of Ulm, with his headquarters at Albeck. He was replaced at Elchingen by Lannes, while the Imperial Guard and two divisions of Murat's cavalry crossed to the northern bank.

The same evening the Archduke Ferdinand with 1,000 horse escaped through a small gap between Lannes and Ney.

On the 15th the French corps closed in on the doomed town. Bourcier's detachment was on the extreme left west of Ulm, Ney was on the north, while Lannes carried the line to the river. Marmont closed in to the angle formed by the Danube and the Iller. Soult closed up on his left with his corps cavalry in contact with Bourcier. GHQ and the Guard were at Elchingen.

Meanwhile Wernecke had remained at Heidenheim on the 14th in order to allow his convoy to get well under way. He heard the sound of the guns at Elchingen, but, in doubt as to the result of the battle, could not decide on a posi-

tive course of action. Next day he sent a strong escort after his convoy and returned with the bulk of his force towards Ulm. But Dupont, who had reorganized his division, held him off from Ney's rear. While he was hesitating what to do, Wernecke received an order from Mack to return to Ulm and another from the Archduke ordering him to Aalen. Wernecke decided to obey the latter.

Napoleon had not known that any large body of Austrians had escaped, and thought at first that the troops engaged with Dupont were only fugitives from Riesch's corps. As soon as he learned the true state of affairs he ordered Murat to take up the pursuit.

Starting on the 16th, Murat overtook the Austrian rearguard at Heidenheim, overwhelmed them and pressed on to harass the main body. After a continuous running fight what was left of Wernecke's command surrendered at Nordlingen on the 18th. Murat remorselessly pressed the pursuit for two more days, capturing the whole of the Austrian baggage and reserve artillery, amounting in all to 15,000 men, 128 guns, and over 1,000 wagons. With about 2,000 horsemen the Archduke escaped over the Bohemian frontier.

#### Capitulation.

By the 16th the French batteries completely dominated Ulm, which was crowded with disorganized and dispirited Austrians. Napoleon could have stormed the town with ease, but, with his enemy firmly in his grasp, he preferred to avoid needless loss of life by waiting a few days. After an hour's bombardment negotiations were opened with

the garrison, and Mack agreed to surrender if not relieved by the 25th. By the 19th, however, the situation within the fortress had so deteriorated that Mack agreed to surrender the next day.

On 20th October Field Marshal Mack, with 30,000 men, 3,000 horses, and 80 guns, defiled past Napoleon. Describing the scene, an Austrian officer wrote in his diary: "The French Emperor, in the uniform of a common soldier, a slouch hat, a grey coat singed at the elbows and tails, without any badge of distinction, his arms crossed behind his back, and warming himself at a camp-fire, watched us file past."

Thus, by bold, carefully planned manoeuvre, by forethought, energy and determination, Napoleon had eliminated the Austrian Army of Germany at trifling loss to himself. The art of war in all its aspects has never been more strikingly demonstrated.

#### Comments.

If Napoleon's masterly movement to the Danube is followed on the map it will explain itself. The use of the great mass of cavalry to screen the movement is especially noteworthy, as, at the time, it introduced a new idea into European warfare.

Murat's mistake in withdrawing Ney to the south bank of the Danube on the 11th left the French communications dangerously exposed and opened an escape route for Mack. But for Ney's insistence on leaving Dupont on the north bank an entirely fresh situation would have had to be provided for.

Napoleon has been criticized for having finally succeeded in concentrating around Ulm only 125,000 out

of his 200,000 men. This is carrying the case for concentration to the point where the principle of security would have had to be entirely abandoned. Napoleon wisely guarded against an Austrian advance from the Inn, where he knew they had a large base, or from the Tyrol, where the Archduke John had a strong force. He had also to take into consideration the possibility that the Russians, by hard marching, might come up on his rear before he had disposed of Mack. He provided for all these contingencies and still had a superiority of nearly four to one at Ulm. This surely is the essence of economy of force.

Mack's exposed position on the Iller was due primarily to the faulty overall plans of the Allies. Not only were their forces unwisely dispersed over the whole theatre of war, but even within this theatre of operations there was a lack of concentration upon any particular place or object. This was not entirely due to Mack, as he was hedged about on all sides with interference by the Council in Vienna.

Nevertheless, Mack's active operations, when he undertook any, were half-hearted measures undertaken by portions of his force at a time. We see this in every attempt he made to break out north of the Danube. Half-hearted measures never succeed in war.

On 6th October Mack should have realized that his communications were threatened. He could have concentrated his whole force and attacked the enemy as they crossed the Danube. Instead, he waited until next day, and then directed Auffenberg, unsupported, to Wertingen, with the result that might have

been expected. He might still have marched with his whole force to the Tyrol and joined the Archduke John. Instead of this he despatched Jellachich to the Tyrol, and then with portion of his reduced force only, made an attempt on the French communications. His last chance came on the 11th, when Dupont was driven back. An enterprising commander might still have seized this opportunity to escape to

as events followed rapidly one upon another, he became progressively incapable of logical thought and action. If this explanation is correct it provides us with a striking example of the devastating effect surprise can have on even an experienced commander.

More than anything else, however, the campaign demonstrates the overriding importance of the human factor, the importance of THE



Surrender of Field Marshal Mack at Ulm.

*From a Drawing by Martinet*

Bohemia, inflicting considerable damage on the French communications on the way.

Yet Mack was an able and experienced commander. The only satisfactory explanation of his conduct of the operations is to assume that his initial surprise at Napoleon's sudden appearance on his communications was so great that he never recovered from it, and that

MAN. All Napoleon's brilliant manoeuvres, all his careful plans, would have come to naught if the French soldier had not possessed the will, the spiritual strength, to put forth the last bitter ounce of physical effort which carried him to success.

In seeking to explain the disaster the Austrian commanders claimed that their troops were incapable of



making the physical effort necessary to extricate themselves from the closing trap. This was indeed true, but the Austrians should have gone a step further and endeavoured to ascertain why their troops were incapable of this effort. Man for man they were not physically inferior to their opponents, nor were they any less brave and resolute in combat. And, since they remained quietly in their cantonments while the French were making forced marches over appalling roads, they must have been fresh and rested when at last they were called upon to march. Clearly the fault lay not in the flesh, but in the spirit.

Why was French morale so much stronger than Austrian morale? Reflection suggests that the following factors all contributed to the creation and maintenance of a spiritual strength which proved unshakable under the impact of immense exertion and great hardship:—

- (a) Throughout the long period of training for the invasion of England very careful attention had been given to the intellectual instruction of the French soldier. The ideals of the new France and the aims of her enemies were taught to him. More than any other soldier in Europe, he understood why he was about to fight, the great human issues which hung upon his constancy and skill. For him the Austrian declaration of war was clearly, unmistakably, a plot to drive free France back into despotism.
- (b) The initial confidence brought about by having at all levels leaders who had already proved themselves capable

commanders in war. This confidence was immensely strengthened by the fact that from the outset all officers, whether they had war service or not demonstrated their personal efficiency as instructors and commanders.

- (c) The confidence brought about by good instruction and sound training methods which progressively improved the soldiers' individual and collective skill.
- (d) The identification of interests between officers and men backed by sound administration.
- (e) Throughout the campaign commanders of all grades led their men rather than drove them. The Emperor and the marshals set a high standard in this aspect of leadership.
- (f) At all stages of the campaign frequent explanations kept the French soldier aware of what he was attempting and why he was attempting it.

In sharp contrast to the French methods, the Austrian commanders appear to have done little to build up a strong morale. The officers belonged to a different social strata from that of their troops, and they took care that the heavy line of demarcation was strictly maintained. There was no community of interest. Discipline was based on a severe code of punishment; there was no appeal to reason. While many officers were capable field commanders, few of them were good instructors. Consequently training suffered, and there was a distinct tendency to adhere to rigid tactical forms to which the disciplinary code lent itself.

During the operations the Austrian troops were harassed by frequent changes of plans and orders, which resulted in much obviously useless marching and counter-marching. At an early stage it became painfully apparent that the high command could not make up its mind what to do. Always in

the dark as to what was being attempted, the Austrian soldiers lost confidence in their leaders and in themselves. A fatal lethargy took possession of the army.

In the contrast between the moral qualities of the French and Austrian armies there is, surely, a lesson for us today.

(To be Continued.)

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The totalitarian control by the State of every source of independence and freedom is absolutely contrary to Nature and man. That the State, the mere organ of government and order, is the source of every law, every truth, every norm of conduct, every social and economic relationship; that no science, no music, no economic activity, no philosophy, no art, no theology is to be permitted except if it is State-licensed and State-controlled; all this is so false, so arrogant, so autocratic and tyrannical that no man who has drunk deep from the Western Platonic-Christian tradition can possibly accept it.

—Charles Habib Malik, *Lebanese Delegate to the United Nations.*

## European Opinions on . .

# THE TRENDS OF WAR

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Major-General B. T. Wilson, CB, DSO.

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THE air traveller from Northern Europe to Italy on a clear day cannot fail to be impressed with the view of the Alps as they loom up like a bastion far away on the southern horizon.

They are not only a great massif, but also a refuge of freedom, for Switzerland has been free to settle her own affairs even since 1499, when at the peace of Basle she finally shook herself free from the shackles of Austria.

This freedom has not been vouchsafed to the Swiss without continuous exertions. In the two World Wars of this century, they held themselves ready to fight any power or group of powers which might seek to infringe "the perpetual neutrality of Switzerland" proclaimed by the Congress of Vienna in 1815.

The military strength of the country lies in its girdle of mountains, and in the spirit of its inhabitants, as manifested in the most efficient militia based on universal service.

From its central position in Europe, the Swiss Government, ad-

—From *"The Royal Engineers' Journal,"*  
UK.

vised by its very competent General Staff, watches with great vigilance all the military developments of the day — Switzerland is particularly well suited for this kind of military watchfulness. With her German, French and Italian cantons and her immense tourist traffic, she is perhaps the most internationally minded country in Europe, or indeed, the world.

In this international clearing house of ideas, including those on war, the officers of the army produce a monthly periodical called the *Schweizerische Militar Zeitschrift*, which is a mine of up-to-date information collected from all over the world.

Most of the articles are in German — very occasionally some are in French. Prominent German soldiers contribute valuable papers on their varied experiences in World War II, especially those about Russia. Many articles from American military journals appear as translations. The British campaigns in Africa, Italy and North-West Europe are closely analysed. The lessons of the war in Korea as revealed by American soldiers are

being actively discussed, so that where necessary the training of the Swiss Army may be brought up to date. The attitude of Swiss soldiers is modest, but practical and determined. They say in so many words that their army has not had recent practical experience of war and must profit by that of those which have. Without any doubt it will. It is therefore not unfair to say that the Schweizerische Militar Zeitschrift provides an unrivalled continental view of the trends of war.

The writer endeavours here to set down a résumé of a great accumulation of military opinions culled from its pages. In doing so cordial acknowledgments are made to many contributors, in particular to General Gouard for his important article "War Experiences and Home Defence," to Colonel Max Waibel for his study of Korea, and to General von Senger and Etterlin for his comments, from the German side, on Cassino and the fighting in Italy.

#### General Points.

Modern weapon design is based generally on the belief that the heavy weapon silences the light one. The 105 mm. gun-howitzer, for instance, has ousted the 75 mm. as the standard field gun. Tanks tend to carry heavier armaments and to be more heavily armoured to resist it. Within the limits of the practicable, heavier and intenser fire power is the goal of the military inventor. Fire power is more intense today than it ever has been. A modern force of whatever size, must devote its chief attention to:

- (1) Fire Power
- (2) Mobility
- (3) Training

Fire power and mobility are factors which obviously have to be reconciled with each other. Thus the new recoilless automatic rifle can be fired much faster than its predecessor, but has much lighter ammunition, so that the user can carry more of it.

Training is stressed as being all-important. Two years is regarded as the minimum time in which the modern soldier can be made efficient. As total war and brutality unfortunately go hand in hand, training must be tough. Great demands must be made on the young soldier during his training to ensure that he really is tough and that he knows it.

#### Air Power.

Although the pre-eminence of the air is constantly emphasized there are few articles on the exercise of air power as such. Anti-aircraft artillery is well covered, especially the control arrangements.

The German Army in Italy had to contend with heavy hostile air superiority. Inadequate German air reconnaissance made the German H.Q. half blind. Towards the end of the war the movement of formations to and from Italy was inordinately difficult, owing to continuous damage from the air to the railways through the Alps.

Where sea and air superiority are certain, landings on open beaches are most effective operations of war. The threat of landings is a nightmare to the defence and compels the holding of extra large reserves which usually can ill be spared.

Infantry on the defensive, expecting an enemy assault, must, in the face of air bombing and low-flying aircraft, lie close and wait

for the appearance of the hostile infantry, just as they must do under creeping artillery barrages or when attacked by armour. As such air support is not as accurate as artillery fire, it will cease or pass over in ample time for the defenders to deal effectively with the advancing enemy infantry.

Air attack on road bridges behind the forward zones in Italy usually portended an imminent large-scale British attack.

Bombing by heavy bombers at 12,000 feet or over was less effective than that of light bombers at about 6,000 feet.

#### **Armour.**

The main motif of the modern assault is "no infantry without tanks and no tanks without infantry." This motif will be dominant in all fairly-close country, such as that of Western Europe. In the Russian steppes, in deserts, and when an enemy is near complete collapse, armour may possibly be used like cavalry masses were sometimes used in the past, but not often.

The heavily-armed and armoured tank is, therefore, the chief type required in modern war.

Bridges in Europe are often not strong enough to carry such tanks, so that military engineers will often be faced with the job of underpinning them quickly.

The importance of training all infantry units to work with tanks is heavily stressed. Infantry must, in particular, understand the limitations of tanks and not misapply them if they come under command.

Special reference is made to the flame-thrower tank, as being amongst the most formidable infighting weapons on the modern battlefield.

#### **Infantry.**

The three-piece division and brigade or regiment continue to be the norm. The brigade group, or "combat command" in American parlance, with armour and anti-tank elements included in it, is mentioned as a handy formation for rapid counter-attack against a numerically superior enemy who relies on masses of men rather than on skilled battle technique.

There is a strong word of warning about the motorization of infantry, which inclines units to cling to their vehicles and the roads, thus losing the characteristic flexibility of infantry, including the capacity to carry a pack.

#### **Artillery.**

The spectacular part played by armour and dive bombers in 1940 during the German conquest of France and the Low Countries caused the over-hasty thinker to conclude that artillery was going into a decline. The war in Russia, however, soon showed that, far from going out of business, the artillery was more important than ever. At Alamein, Field-Marshal Montgomery deployed a mass of artillery which would have delighted Napoleon and used it much in the manner of 1914-18 for breaking through the Axis defences. Higher formations using guns of greatly increased range, with harder hitting shell fillings, can now cover far deeper areas with intense concentrations of artillery fire. Greatly improved air observation, radar devices and artillery survey have all added to the speed, accuracy and flexibility of fire control. A higher commander who knows how to use artillery can thus direct his battle in a very formid-

able manner especially in its opening stages.

With "atom" charges near becoming available for artillery shell and even quite conceivably for small arms as well, the fire power of the defence will tend to regain the advantage it had in 1914-18, always provided that the defenders are not overtopped in the air.

Infantry supported from the air and by the other arms on the ground is still the queen of the battlefield, but the artillery is the king-pin of the fire power structure.

When the drafts for their infantry ran short in Italy, the German commanders there resisted all efforts of the Wehrmacht HQ to turn their artillerymen into foot soldiers. It is far preferred veteran gunners who knew their job on the battlefield to the doubted gain of what would have been some bad infantry.

Reference is made to the larger amount of artillery ammunition which must be available close to the guns in any struggle between a highly-trained, well-equipped army and an army of great masses. Various writers picture over-heated guns, no shells left, and the last wave of the successive attacking echelons getting through to its objectives. It is believed that Korea has provided examples of such failure in the supply of artillery ammunition.

On the wide and loose fighting fronts which are inevitable in a war where one side disposes of great numerical superiority, the artillery itself will always require to secure its gun positions against unexpected thrusts of armour and infantry. It will not be able to rely on the cover of forward elements.

The quick-firing heavy mortar, ranging up to 4,000 yards, is now definitely an artillery close support weapon with "walkie-talkie" radio control of fire.

General reference is made to technical advances in artillery practice. They include conical bores (cf., the choke barrel of a shot gun), the hollow loading of projectiles for the production of increased effect on burst and "chained mortar bombs." The best weapon against tanks is universally agreed to be the gun, which itself must be mounted in a tank.

The enormous advance made by naval artillery in support of landings is generally recognized. Combined with air superiority it renders the plight of the defenders unenviable. The Gallipoli landings of 1915 would have been far less costly if the shore to ship fire control methods of today had been available.

### Engineers.

The sapper, like the gunner, has an increased range of indispensability. Defences of all kinds, from permanent fortifications down to the slit trench, are vital. Permanent fortifications at Odessa, Sebastopol, Mareth, and many other places, took weeks, and sometimes months, to overcome, and even then at great cost. Although not to be regarded as invincible, they economize force, take heavy toll of the enemy, and gain time for offensive action. This was always the prime purpose of defences, and still is.

The planning of demolitions is an art in itself. The element of surprise is important. Mention is made of an ingenious German practice in Italy of cratering half the width of

a road in a defile for several hundred yards and of switching the cratering from one side of the road to the other every fifteen to twenty yards or so. This enabled the road to be used by the diminishing troops of a withdrawal without much difficulty. But when the vehicles of the advancing enemy came roaring along in pursuit, considerable traffic jams were caused, especially at night, which gave opportunity for artillery and air action.

Mines are important devices which receive special mention in an article called "Minenangst," or "Fear of Mines." The Russians made considerable and masterly use of mines even during their retreat in 1941, when barbed wire and other obstacles were seldom employed. They used them especially on the forward and rear edges of forests, in the rides and in clearings. Forty-thousand mines were quite commonly laid by the Russians in the various large forests which cover Leningrad. The Germans, in their turn, on a two-division front for the defence of Lemberg, had a minefield of 200,000 mines, extending to a depth of twenty-five kilometres. Minefields of such large compass constantly held up attacks by armour and infantry so completely that they had to be mounted again, after long delay, in a totally different sector.

"Minephobia" became so pronounced that on one occasion, north-west of Moscow, an unconfirmed report credited the Russians with the possession of dogs, which were loaded with explosives and trained to brush up against tanks so as to touch off the charges. This rumour about Russian "mine dogs" so disturbed the Panzer crews that they

gave vent to their feelings by opening up on any wretched village dog that hove in sight.

Although this story seems far too good to be true, the psychological effect of mines is undoubtedly very great. Like all other such fears, it can be kept under control by careful training. Units must be trained to cross minefields in peace exercises, just as they are trained to advance under the live fire of artillery, mortars and machine-guns. In war, rehearsals can sometimes be staged in back areas. The edges of the holes in which mines have been inserted are always most difficult to conceal, so that even the inexperienced can soon learn to spot suspicious places. They may have to do so, since sappers trained to mine warfare will always be in short supply.

A controller of mines is obviously an important figure. He must think big, use his imagination, and work in the closest contact with the troops, otherwise their "minephobia" will be as bad as that of the enemy.

The use of smoke clouds in a big way is described in an American account of the crossing of the Roer west of the Rhine, by the 30 US Division in 1945. Smoke detachment using generators produced a smoke screen which was finally more effective than even the darkness of the night. Intended to last only twelve hours, it was continued at the request of the infantry for a total time of thirty-three hours, by which time the engineers had constructed a bridge for wheels, and the attack became completely successful.

In war on the wide fronts of the continent, military engineers need



to work on a big scale in the manner of the German constructor, Todd. After his death in an aeroplane crash, the Germans never quite achieved the same results again. The Americans have the right outlook in this matter. We British are too apt at first to send a boy on a man's job, although our actual engineering equipment is probably second to none, for example, the Bailey Bridge.

### Mountain Warfare.

The crests of mountains must be held and fought for. If a position on a crest is lost, it must be regained, otherwise the whole position goes. This will probably best be done from a flanking position on the same crest, rather than from reserves held well behind the crest. Lateral communication is therefore most essential.

Schooling in mountain warfare pays big dividends. The success in Italy of the French African Corps is mentioned in this connection.

The mule, carrying parties, and the oil cooker, come into their old prominence directly a formation gets pegged out in high mountains.

During a battle in mountains the acoustic effect of bursting shells and bombs is deafening and makes orders by radio most difficult to get through.

Air action is very alarming, but not very effective.

### Korea.

No really new weapons have been employed. It is a contest between masses and technique. So far the action of masses must have disappointed the USSR.

In the early stages the American divisions were sometimes so short of

drafts that they used South Koreans to fill their ranks up to 50 per cent. of their strength. This is a measure of the bitterness of the fighting.

Fire power and speed is the answer to an enemy relying on masses of men for victory. Long fronts were common, e.g., seventy-two kilometres for two U.S. divisions.

A loss of skill was manifest in air-army co-operation. Jet aircraft fly so fast that "pathfinder" machines were used with success to lead them on to ground targets.

The air transport of troops was a big feature of Korean operations.

### Defence Against Overwhelming Odds.

An interesting German article gave an account of the defence of Pomerania against the USSR right at the end of the war. A German corps of eight weak divisions with seventy tanks, on a front of 250 kilometres, is said to have been attacked by nine USSR armoured corps and fifteen infantry corps, with 1,600 tanks. The defence lasted from 22nd February to 10th March, 1945. It enabled masses of civilian refugees to escape into Western Germany.

### Some Tactical Points.

It is interesting to note that the reverse slope is in high favour for defensive positions, except, of course, in mountains, where the crests must be held.

Infiltration by night is a new feature which requires study.

The Russian peasant is accustomed from his early youth to working in the dark without lights, which stands him in good stead on night operations. Being an excel-

lent digger, he also claws on to newly-won ground very quickly, so that after a few hours he is most difficult to dislodge. If counter-attack is necessary, it will be best to go in quickly.

An interesting German opinion is

that orders by radio are better than orders by telephone. If well delivered, they are short and incisive and cannot be interrupted by the recipient during reception. A telegraphic brevity is often necessary on the battlefield.

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