AUSTRALIAN ARMY JOURNAL

o. 196 SEPTEMBER, 1965

Number 196

September, 1965

AUSTRALIAN ARMY JOURNAL

A Periodical Review of Military Literature

Distribution:

The Journal is issued through Base Ordnance Depots on the scale of One per Officer, Officer of Cadets, and Cadet Under Officer.

AUSTRALIAN ARMY JOURNAL

Editor:
A. J. SWEETING

Staff Artist:
G. M. CAPPER

The AUSTRALIAN ARMY JOURNAL is printed and published for the Directorate of Military Training by Renown Press Pty. Ltd.

Contributions, which should be addressed to The Editor, Australian Army Journal, Directorate of Military Training, Army Headquarters, Canberra, are invited from all ranks of the Army, Cadet Corps and Reserve of Officers. £5 will be paid to the author of the best article published in each issue. In addition, annual prizes of £30 and £10 respectively will be awarded to the authors gaining first and second places for the year.

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(Australian War Memor

Salamaua, viewed from an observation post above Nuk Nuk. Its fall to the 5th Australian Division on 11th September, 1943, was the culmination of an arduous 19 months long campaign in one of the most difficult and unpleasant areas ever to confront Australian soldiers.

The Rushcutter Culverin

Brigadier J. W. A. O'Brien, DSO, ED,
Royal Australian Artillery

A PIECE of Sixteenth Century ordnance at the R.A.N. shore establishment, H.M.A.S. *Rushcutter,* is unusual enough to warrant attention from those interested in artillery and its development. It is one of the oldest massive man-made objects extant in Australia and it provides unique evidence concerning the armament of the Spanish Armada. Not the least of its interest is that its existence covers almost the entire period of the dominance of the Big Gun in naval warfare.

Cast in Naples in 1595, seven years after the defeat of the Armada and while the war between Spain and England still dragged on, the *Rushcutter* Culverin embodies the gunnery lessons Spain had gleaned from disaster, lessons that set the general pattern of naval tactics for more than 300 years.

Contrary to general popular belief concerning haughty dons and suchlike, the Spaniards, particularly King Phillip II, gave much thought and careful planning to the "Enterprise of England". The great unknowns concerning the tactical and technical aspects of the period are much akin to the problems of planners today in the new fields of guided missiles and nuclear weapons. The fleets that met in 1598 in the English Channel were something new and no one had seen two such in combat. No one could foretell what the new massing of weapons would do or the best tactics to make them most effective. It was the beginning of a new era in naval warfare that was to make the ship-of-the-line, culminating in the battleship, the dominant force at sea until 1942. When the fleets met "off Eddystone, nobody in either fleet knew how to fight a *modern* battle — no one in the world knew".

For the first time, a major fleet action was to be fought, not by ramming or boarding, but entirely as a gun duel. The whole of the true combat damage, such as it was, resulted from gun action alone.

Sixteenth Century ordnance can be grouped into four main categories — cannons, perriers, culverins and mortars. Except for a few iron cannons of inferior quality, the English and Spanish guns were of "brass", actually gunmetal, a common metallurgical composition being 100 parts pure copper, 10 parts a mixture of copper and zinc, and 8 parts of clean tin.

Cannon, and the lesser demi-cannon, were considered the ship-killing guns. They fired a much heavier shot than the other weapons (except the mortars), but only to a medium range. A typical "whole" cannon of the period was approximately 7.25 inches in the bore and some 18 calibres in length; its iron round-shot of 50 pounds weight had a point-blank range of 300 - 350 yards and an extreme, or random range of about 2,000 yards. Perriers, on the other hand, were short guns less than half the length of a "whole" cannon, but fired a heavy shot relative to the length of the piece, usually one of about 24 pounds, to a point-blank range probably of 30 yards.

Mortars were insignificant in the Armada operations. Being very short (sometimes only one and a half calibres), they could throw a stone shot of up to about 10 inches diameter and 130 pounds weight only a limited distance. For ship work the shot was often replaced by a miscellany of old iron, small stones, musket balls and such like, on the shot-gun principle.

Of the four categories of gun, the culverin — or long gun — was by far the most important of the Armada period. As with many gun names, "culverin" has a metaphorical origin and is derived from the Latin "colubra", or snake. Culverins in general, were more lightly shotted and with longer range and greater accuracy than other types of guns.

The general design and proportions of the various sizes of culverins, in common with other guns, were rigidly stan-

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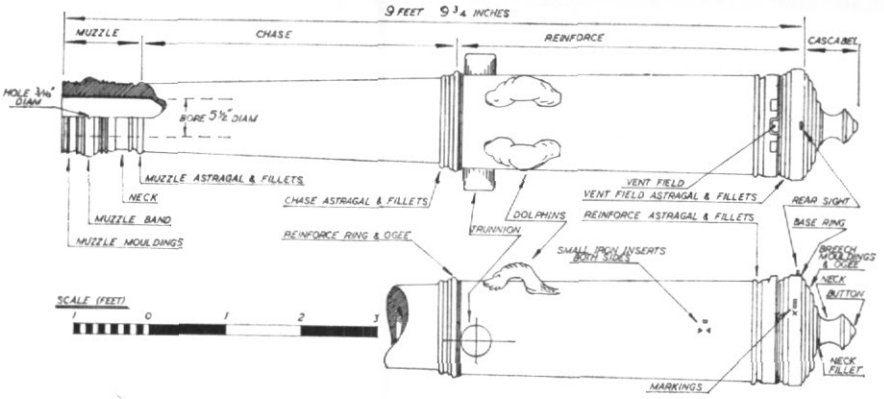
The author is by profession a consulting engineer, managing director of a Lidcombe engineering company, and an enthusiastic artilleryman with a practical as well as theoretical knowledge of the arm in which he has long specialized.

He was first appointed to the citizen forces as a lieutenant in the Garrison Artillery (Survey) in August 1928 and on the outbreak of war in 1939 was DADA at Army Headquarters. He joined the AIF as a major in May 1940 and in March 1941 was promoted lieut-colonel and appointed to command the 2/5 Fd Regt, leading that regiment throughout the Syrian Campaign where he won the DSO.

After his return to Australia in 1942 he was promoted brigadier and was briefly CRA 3 Div before his appointment in April as Director of Artillery, LHQ. In January 1943 he was appointed Deputy Master-General of the Ordnance (Equipment) and took a leading part in producing the "short" 25-pounder.

At the end of the war he went to Japan as leader of the Australian Scientific Mission; in April 1946 he was appointed Chief of the Scientific and Technical Division of General MacArthur's staff in Japan. From 1951 to 1954 he was Senior Supply and Defence representative for Australia in Washington. He is author of Guns and Gunners, *a history of the 2/5 Fd Regt, published in 1950.*



dardized and there was a complete absence of any major change for centuries. A Spaniard, Luis Collado, mathematician, historian, a native of Andalusia and, in 1592, a Royal Engineer of His Catholic Majesty's Army in Lombardy and Piedmont, is recognized as an authority on the artillery of the period. He has left us classification details of the various types of guns. The association of time and place makes it possible that he may have had some connection with culverins manufactured in Naples in 1595 and, probably even more likely, that his data was used in their design and manufacture.

Culverins, as with other guns, were further classified by wall thickness, called "fortification", in terms of calibre or bore diameter. Collado's tables (shown below) give three degrees of fortification for Spanish culverins which makes it double-fortified at the trunnions and chase and between a bastard and legitimate culverin at the vent. However, if the outside diameter of the breech ring is measured instead of at a couple of inches forward of it at the actual vent hole, the ratio becomes 8.5 or double-fortified, putting this culverin into the strongest of its class.

Type	Wall Thickness in Eighths of Calibres		
	At Vent	*At Trunnions*	*At Chase*
Bastard culverin	7	5	3
Legitimate culverin	8	5½	3½
Double-fortified culverin	9	6½	4

The relative proportions for the *Rushcutter* culverin are:

Vent	*Trunnion*	*Chase*
7.3	6.3	4.1

Earlier culverins were unhandy weapons of about 30 calibres or 14 feet. This made them valuable as "chase" guns firing fore and aft but they were most awkward to serve when broadside firing became the accepted practice. The *Rushcutter* culverin is approximately 22 calibres long, indicative of the development towards handiness in the Spanish fleets after the lessons of the Armada battles. A

double-fortified culverin of 30 calibres took a powder charge equivalent to the weight of shot or about 17 pounds. In our shorter culverin, the charge weight would have been about three-quarters of this, say 12½ pounds.

A culverin of the *Rushcutter* size is estimated to have had, very roughly, 800 yards point-blank range and 5,000 yards "at random", known to the early gunners as "greatest random" which was certainly no misnomer. Some authorities put point-blank range for culverins at 1,350 yards and greatest random at 2,500 yards. Actually the differences in these estimates are unimportant because, beyond point-blank range, the shot was most likely to be well-wide of the target and much influenced by many factors, not the least being the quarter-inch (sometimes up to a half-inch) windage between the shot and the walls of the gun. This windage caused the general line of the trajectory to be determined by the last bounce in the bore and also allowed the escape of perhaps one-quarter to one-third of the force of the powder.

Sighting devices were therefore somewhat superfluous on guns of this period although, with the *Rushcutter* culverin, some later gunner has fitted a tiny peephole sight on the breech ring and there is evidence of a corresponding acorn-type foresight on the muzzle band. The *Rushcutter* culverin has some crudely-cut elevation marks on the right side of the breech ring, the lowest being on the centre-line of the bore. There are also rusted remnants of iron fixtures let into each side of the breech ring and these also were probably efforts to improve the sighting. That all these devices were additions subsequent to manufacture seems to be confirmed by a common complaint in early times that the muzzle bands (or muzzle swell) were tending to be designed "so big that they obscured the target from the gunner as he sighted over the top of the breech ring".

The unchanging nature of gun design for nearly three centuries is well exemplified by the fact that an Armada weapon could throw a shot almost as far as a gun of about the same size in 1850. In fact, a gunner of the earlier period would have found himself quite familiar with the handling of a gun of the later period. As well as the design proportions, even minute design details and the names of them remained the same.

Sometimes this rigid adherence to tradition did stir rebellious spirits such as John Muller, Master Gunner of Woolwich, who was scathing concerning the practice of centring the trunnions on the lower line of the bore; gunners claimed this gave an upward kick when fired. Muller must have met opposition in 1756 when he raised the trunnions to the centre of the bore to lessen the strain on the carriage and to give greater accuracy because he said, "What will people do to support an old custom be it ever so absurd." But old customs persisted and one authority, writing in 1852 advised that the trunnions

"should be about half a diameter below the axis — here they bind better and do not interfere with the quarter sights."

Culverins were made with a "reinforce" (as the section between the breech and the trunnions was called) and a "chase" forward of the trunnions to the muzzle area. Cannon, on the other hand, mostly had a "first reinforce" stopping just rear of the trunnions and a "second reinforce" forward of the trunnions, always complete with astragals, fillets and ogees in fixed and formal styling. Culverins of the period were usually cast with two "dolphins" at the balance point of the gun as an aid in lifting. Dolphins seem to have been omitted on cannon. "Brass" guns of the Sixteenth Century, in particular, were most ornamental although, as iron guns tended to supersede them, there was a gradual trend to simplicity. The *Rushcutter* culverin carries Spanish inscriptions on the top of its reinforce and breech ring, together with King Phillip's magnificent coat-of-arms. Translated, these inscriptions read:

1595 A.D.
Weight 22 Cantari, 79 Rotoli
Juan Vasquez of Acuna
Captain General of
the Artillery
the Kingdom of Naples

(and surrounding the Royal Coat-of-Arms)

Phillip II, King of Spain,
Defender of the Faith

Constructional and layout details of the Spanish and English ships of the Armada period are surprisingly scanty and many features are still not

explainable. It is not possible to compile an exact list of the vessels on each side nor of their armaments but the following details are probably as nearly correct as is possible:

Vessels

	Number of Ships	Average no. of Guns per Ship
The Spanish Fleet	124	9.0
The English Fleet	112	11.5

Armament

	Cannon	Perriers	Culverins	Totals
Spanish	163	326	635	1,124
English	55	43	1,874	1,972

Proportion of Armament Types

	Cannon	Perriers	Culverins
Spanish	14.5%	29%	56.5%
English	2.8%	2.2%	95.0%

Shot Weight (in lbs.)

	Total Weight Thrown	Average Weight of Shot	Average Weight of shot per ship
Spanish	19,369	17.2	156
English	14,677	7.4	85

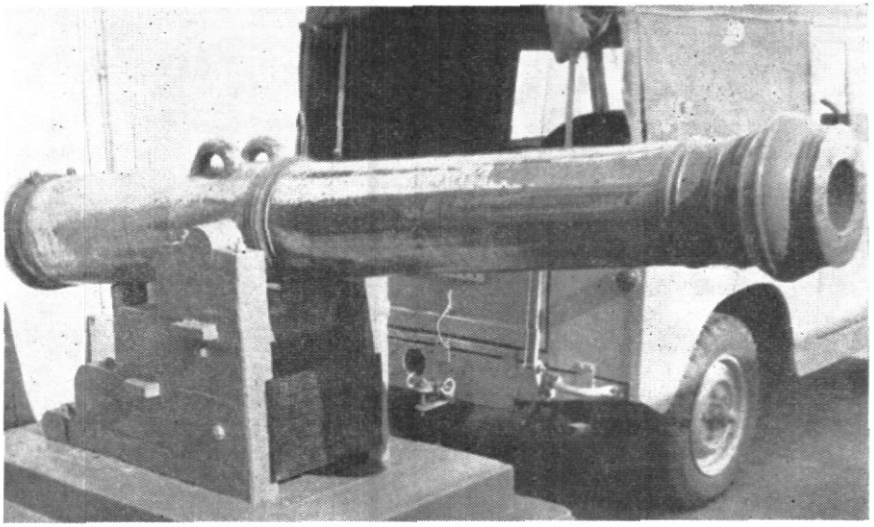
The Spanish Fleet included 4 galleasses, which were highly specialized warships supplied by Naples, and 33 galleons. The galleasses averaged 8 cannon, 8 perriers and 10 culverins per ship compared with an average of 4 cannon, 5 perriers and 10 culverins in each galleon.

Thus, with about three times as many cannon and more than seven times as many perriers as the English, the Spanish had concentrated on weight of shot. The English, on the other hand, were "range conscious" with three times the number of culverins compared to the Spanish and this was the category in which the numbers in both fleets were the greatest. Obviously the Spanish plan of tactics must be to close and board the enemy relying then on the great advantage of their nearly invincible soldiery. This, of course, they could expect to do only after they had managed to crush the enemy with their heavy ship-battery fire at close range — fire which, incidentally, was to be a safe-guard against the English adopting the same tactics of boarding.

If the Spanish could close and batter, the weight of shot per ship would have been greatly to their advantage, and almost double that of the English. However, the Spanish artillery was at a serious disadvantage resulting from, at least in part, the traditional indifference and the contempt of the Spanish nobles to what they considered an "ignoble arm" that enabled the base-born to humble blue blood from afar and out of reach of the "noble" weapons. In all the Armada, there were less than 100 gunners, supplemented by about 50 assistants. Most of these men were not even Spaniards and they were kept apart in small groups as though their "ignobility" might be contagious to the proud soldiery.

The depth of this antipathy is illustrated in a report by some Spanish prisoners concerning one ship which was "set on fire by reason the captain falling into a rage with the gunner and threatening to kill him if he shot no righter. The gunner cast fire into the powder barrels and threw himself overboard."

The gunnery tactics of the Spanish were to fire on the upward roll to immobilize the enemy ships by bringing down the masts and yards and then to move into ship-battering



distance prior to boarding. The English, on the other hand, preferred to fire on the downward roll to pentrate the hulls and so spread death and destruction inside the ships from the flying splinters of wood.

The largest possible gun for the "range-seeking" English ships was a "whole culverin", about 14 feet in length and 5¼ inches bore, firing a 17-pound shot. A culverin-type gun firing an equivalent weight of shot (50 pounds) to a cannon (but of course to longer range) would have needed to be of 7½-inch bore and some 20 feet long, an impractical length in a ship of the period. One could therefore have weight of shot or length of range but not both. The Spanish opted for the former, the English for the latter and herein lies the key to the Armada battles.

King Phillip was not ignorant of the deficiencies of the Spanish armament and he made strenuous efforts to develop the "range" aspect to compare more favourably with that of the British. He scoured the world for culverins, including English ones, then regarded as the best available, but was only partially successful. His forecast of the English tactics was remarkably accurate for, in his instruction of 1st April, 1588, he stated: "Above all, it must be borne in mind that the enemy's object will be to fight at a long distance, in consequence of his advantage in artillery, and the large number of artificial fires with which he will be furnished. The aim of our men, on the contrary, must be to bring him to close quarters and grapple with him, and you will have to be very careful to have this carried out. For your information a statement is sent to you describing the way in which the enemy employs his artillery, in order to deliver his fire low and sink his opponent's ships."

The Spanish forecast of requirements of powder and shot for this new type of fleet action was also excellent. The Spanish powder was of the fine, round type suitable for both guns and muskets and, what was most important, the Armada carried some half-million pounds of it. On the other hand, the whole of England could scarcely produce a fifth of that amount and provision had to be made from these scanty stocks to supply the land service artillery in case the Spaniards managed to get ashore. Furthermore, the English used coarse powder which kept badly and was unsuited for muskets. Regarding shot, the evidence seems to be that the Spanish carried more than three times as many rounds per gun as the English.

Despite their accurate anticipation of the English tactics, the Spanish erred greatly in their estimates of the amount of damage their guns could do. In the actions, the English persistently held the weather gauge and kept the range open, relying on the superior "carry" of their culverin-predominant armament. This was possible because of the sailing superiority of the English seamen and the English ships. Despite having the means in their many heavy-shotted guns to smash the English, the Spanish artillery failed. The Spaniards could not get within effective range, primarily because of the clumsiness of their vessels. On the other hand, the English culverins were too light to smash into the Spanish hulls at the distance necessary to keep out of the effective range of the Spanish cannon. Hakluyt's Flemish correspondent, Meleren, reported that the lower works of the Spanish galleons were formed of planks and ribs four to five feet thick and that these could not be pierced except "hard at hand". For the greater part of the Armada battles, both sides attempted the exact tactics that they had each planned but without any decisive results to either.

By the time the Armada had reached the Straits of Dover, both sides had run out of shot, the English frequently out of powder as well. The English were able to do some replenishment, but the only hope for the Spanish was to close to grappling range — and the English were not to be so accommodating. In the concluding stages, with the Spanish guns silent, the English did close the range enough for their light culverin shot to have some effect before their small replenished stocks of powder were completely exhausted.

The most remarkable feature of this fierce exchange of fire from great guns extending over several days was its innocuousness. Probably most of us in our early studies of history at school learnt that the small and saucy English ships blasted the great galleons by running in so close that the guns on the towering walls of the latter could not be depressed enough to do damage. Actually, the battles were not David and Goliath contests — in fact, David was nearly as tall as Goliath and much better

equipped for the task. The English command system was far superior to that of the Spanish which also suffered from the over-centralization which was a characteristic defect of King Phillip.

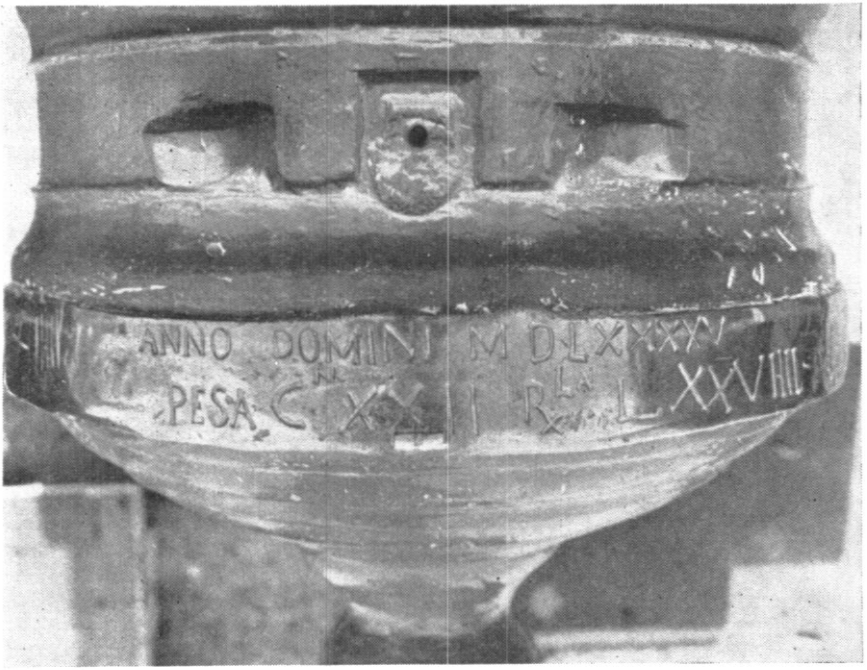
The score of damage to men and ships on both sides by gunfire was negligible. Although the Spanish fired more than 120,000 shots the English losses were probably less than fifty men and no ships. The Spanish losses, at least up to the final days at Gravelines, were not much more while there was only moderate damage to masts and spars. At Calais, one of the great galleasses broke her rudder and ran ashore, proving the Spanish Admiral's forecast that these vessels, made for Mediterranean waters, were "really too fragile for such heavy seas" (as the Atlantic and the Channel). Despite being battered while aground, not one shot pierced the hull of this ship and this seems to have been the case with the remainder of the Spanish fleet.

In the final action at Gravelines, when the Spaniards could not reply to the English fire, some worthwhile damage was done, Spanish hulls were riddled, guns were dismounted, crews were killed and galleons were wrecked, all by gunfire from ships keeping just outside grappling range.

The Spanish ships not wrecked or destroyed mostly went north-about around the British Isles and in the channel to encounter severe storms off the Irish west coast. More than half of the original Armada reached Spain, albeit much battered. Only four of the Royal ships built to suit Atlantic weather failed to return, but about 33 converted merchantmen and many of the lightly-built galleasses were lost on the homeward journey.

The real lesson of the Armada actions was the combination of good sailing qualities with hard-hitting guns rather than range and with the use of guns heavier than the English culverins. Both sides missed the true lesson for half a century or more. The Spanish, as is often the case with the defeated, strove to emulate the tactics and equipment which had beaten them. The English, secure in victory, were content to rest on their achievements. However, before the end of the Sixteenth Century, there was a tendency to reduce the length of culverins from about 14 feet to 10 feet, probably because of a realization that the Armada ranges had been too great, and that it was necessary to lessen the clumsiness of the long guns since broadside ports had generally replaced bow and stern guns.

It was Blake and his contemporaries who brought about the big revolution in gunnery tactics by seeking action from windward with heavy-shotted, short-range guns and these tactics reached their ultimate with Nelson. In the Armada battles both sides failed as artillerists — the Spanish absolutely on four days out of four, the English likewise on three days and partially so on the fourth day.



Thus it is that the *Rushcutter* culverin embodies the lessons of the Armada as seen by the Spanish immediately after the battles. This applied particularly to length and gun weights. The mysteries and complications of Sixteenth Century Spanish weights are even exceeded by those of the Italian. Almost every district had its own values but often with similar names. The *Rushcutter* culverin is unique in that much of the evidence concerning these particulars of Armada guns relies on it. It is marked "CRAXXII RLA LXXVIIII" or "22 Cantara 79 Rotoli". The rotolo was the Neapolitan unit of weight and the cantara equalled 10 rotoli. This makes the *Rushcutter* culverin 2,279 rotoli. The actual weight of the gun is 4,431 pounds (or almost two long tons) and establishes this rotolo at 82 grammes out of all the differing values ascribed to it at various periods and in various places.

Nothing is known for sure as to what happened to the *Rushcutter* culverin from the time it was cast in Naples in 1595 until it came into the possession of the New South Wales contingent to the Boxer War in North China in 1900, but what a fascinating story it would probably make! However, a few possibilities can be considered. Muzzle-loading guns, being durable, highly-prized and little affected by design changes, were often subjected to many variations of ownership and locality. The *Rushcutter* culverin carries its war scars — one is the result

apparently of a head-on hit by a cannon ball that carried away part of the lower reinforce for about an inch deep and another is on the left-hand side, probably the result of a glancing blow.

Sydney newspapers on the arrival of the gun in Australia in 1901 stated that it was "Marked as a présent from Phillip II to the Chinese." It is doubtful if this could be the truth. Two years after the culverin was cast in Naples, Phillip sent out a second "Enterprise of England" which, dodging the English ships, reached the Bay of Biscay. Here the badly-manned galleons encountered fierce storms and it was a much-disorganized fleet which returned to port. It has been said that Phillip's despondency at this failure brought about his death in 1598. With the strenuous efforts that must have been made to avenge the first Armada, it hardly seems likely that Phillip would have parted with one of his modern culverins to a country as far distant as China. The Spanish knew well that it was in this category that they were weakest.

However, early in the Seventeenth Century, a Jesuit priest, Father Matteo Ricci, obtained permission to send a small mission from the Court of Akbar to Cathay. It was Phillip III who financed this expedition and, probably together with some other Jesuits who had come by sea, a small establishment was set up in the Court of Peking in 1625. The Chinese at this time were holding the part of the Great Wall of China in that area against the Manchus. The Jesuits were most welcome, not because of the Gospel they brought but because of their scientific knowledge of astronomy, calendar reform, clockmaking, prediction of eclipses and suchlike but, most of all, gun-founding and gunnery. Mounted on wheels or tripods of iron or copper, the guns were placed at strategic points along the Wall and were called the "Weapons of the Gods" by the Chinese. The rank of general was bestowed officially on each major weapon and some received divine honours; the Jesuits' reactions must have been interesting. Instead of Phillip II, it is possible that Phillip III, with his special interest in the Far East, might have sent the *Rushcutter* culverin through the Jesuits as a gift or perhaps as a sample.

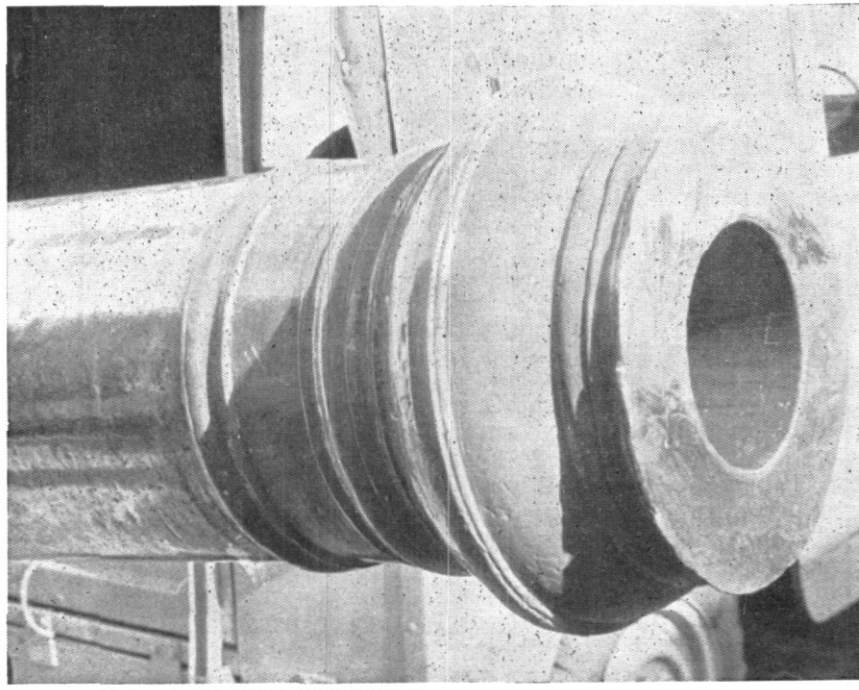
The Chinese characters for "Sky 12" are engraved on the top of the reinforce and probably designate the number of the gun in a battery the same as we today use A2, B3, etc. for similar identification.

Since 1900, the history of the culverin is fairly clear. On 28th June, 1900 New South Wales offered a naval brigade contingent to accompany ships of the Australian Squadron ordered to the Boxer War. This unit was formed and sailed in the remarkably short space of four days. It was later joined in China by men and ships from other Australian States but none was in time to see action. The land units carried out un-

usual and unrewarding tasks, even to collecting tickets on the railways. The New South Wales contingent returned to Sydney, with the *Rushcutter* culverin as a trophy, on 5th May, 1901. The home-coming was rather subdued probably because it was overshadowed by the Boer War and by the visit of the Duke (later King George V) and Duchess of York to open Federal Parliament while the contingent had to go into quarantine at North Head for some time.

A newspaper of the day, reporting the return of the contingent, described the culverin as "10 feet long, weight 2 tons, 5½" calibre" and that it was "presented to the public of this State by Lieutenant-General Gaselee," who had commanded the British Imperial Troops in China. No other comment seems to have been made while any information that may have existed in China regarding the weapon probably disappeared in the welter of looting that took place after Peking was relieved.

The *Rushcutter* culverin gives us not only a direct link with the Armada and the beginning of naval gunnery in fleet action but it is a visible reminder of the rigidity of naval tactics and equipment for a long period prior to World War I. The virtually stagnant situation for more than three centuries of the 350 years during which the Big Gun dominated naval war-



fare is well-exemplified by HMS *Terrible,* launched in 1898 and soon the best-shooting ship of the Royal Navy. Although considered the last word in heavy armoured cruisers, *Terrible's* armament and planned fighting tactics really differed little in principle to those of the Armada days. A long-range gun (9.2-inch) firing forward and another firing aft were supplemented by twelve 6-inch guns and eighteen 12-pounder guns in broadside plus some lighter weapons at off spots and machine-guns in the fighting tops.

We have what is obviously intended to be a flattering description of *Terrible's* practice firings in 1901. Tactics and fighting ranges disclosed in this report would not have seemed nearly as strange to the Elizabethan sailor as they are to us only a few years afterwards. Few, if any, seemed to think it extraordinary or archaic that, in the Twentieth Century, "Annual Prize firing is not now the perfunctorily - performed functional event it formerly was, but has become the examination day of the year — at prize-firing, the ship steams up and down a base line marked off by buoys and fires at canvas-rigged screens laid off . . . from 1,400 yards to 1,600 yards for the heavy guns . . . The mechanically-worked 12 and 9.2 inch guns are allowed a 6-minutes run at eight knots speed . . . the distance changed during the run between the outer buoys. Thus at 1,400 yards range from the central buoy, the distance is increased to 1,600 yards at the outer buoys".

The authorities had at hand the recent experience of *Terrible's* own gunners on land service with 6-inch naval guns on improvised mountings, engaging the Boers in excess of 16,000 yards range and with 7,000 yards being a medium fighting range. The fixation of naval tradition on Nelsonian methods and achievements was still too strong to be easily overcome.

Terrible's own captain, Percy (later Admiral Sir Percy) Scott, was one of the few who correctly foresaw the future. Most of his fifty years of service were spent in a frustrating struggle to convert a reluctant navy to the realization that good gunnery was vitally important. Perhaps his persistence created its own resistance but his autobiography is one long tale of encountering stubborn opposition to improvement so that, 150 years later, he could indeed echo Muller's complaint, mentioned earlier, about "what people will do to support an old custom be it ever so absurd." Fortunately, for the safety of the Realm, the efforts of Scott and a few others slowly brought about some improvements. Then, after centuries of stagnation, great gunnery changes took place almost overnight, culminating in the Japanese *Yamato* of 70,000 tons and carrying nine 18.2-inch monsters. Less than two decades after Admiral Fisher (later Lord Fisher of Kilverstone) announced at the 1898 Mediter-

ranean manoevres that future fleet actions would be at less than 5,000 yards, naval guns were engaging — and getting hits — at ranges approaching 30,000 yards. By 1942 new methods and new equipment meant the end of the long period of the dominance of the heavy gun in naval warfare. It is a period well-symbolized in history by the "*Rushcutter* culverin".

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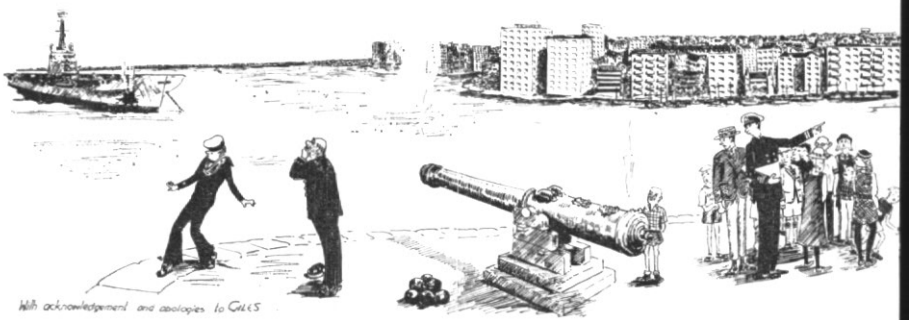

WAR IN THE ENEMY'S CAMP

Otto Heilbrunn

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

IN TWO OF the guerilla wars going on at the present time, the guerilla forces are being supported by a foreign country — North Vietnam controls the guerilla forces operating in South Vietnam; Indonesia controls the guerilla forces operating in Malaysia.

Recently, it has been suggested that, in such cases, the counter-guerilla forces should carry the fight into the foreign country which supports the guerilla fighters and do as much damage within that country as possible. Then, the advocates point out, the foreign country would find the support of guerilla operations no longer profitable and would end the war.

Little has been written on this subject, but there are a number of implications behind such a strategy, and a clarification of the issues involved seems warranted. For purposes of discussion, I refer in this article to the theoretical country "North" when speaking of the foreign power which supports guerilla forces, and to the theoretical country "South" as the country in which the guerilla war is being fought.

Past guerilla wars afford little guidance. The Greek post-World War II guerilla forces were supplied from Yugoslavia, Albania, and Bulgaria, but counter-guerilla operations were restricted to Greek territory. Likewise, the French fought against the Viet Minh and the FLN (Front of National Liberation) only on Indochinese and Algerian soil, although their opponents received assistance from beyond the borders. Because Greek and French resources were stretched almost to the breaking point, operations beyond the borders of Indochina and Algeria were hardly practicable.

Clarify Meaning

To begin, we must clarify exactly what we mean when we speak about carrying the war into the enemy's camp. Using our two theoretical countries — North and South — as examples, we may mean:

- A full-scale invasion of the North by the South.

- Air and naval bombardment, or air or naval bombardment alone, of the North.
- A naval blockade of the North's ports.
- Guerilla activities against the North, its leaders, regular forces, industry, and agriculture, and against the military and logistics installations which support the guerilla forces operating in the South.

It is obvious, so far as a full-scale invasion of the North by the South is concerned, that the South can succeed only if an ally with strong combat forces enters the combat on its side. This should not be difficult to understand. The South has hitherto been unable even to suppress guerilla activities in its territory. To fight against Northern regular forces on the North's own territory would require strong allied reinforcements of the South's existing military units.

This seems a needlessly risky way to end a guerilla war, not only because the North in turn may receive support from an ally, but also because the South would be severely handicapped from the start by the presence of strong enemy guerilla forces in its rear.

It may be held that the South could send equally strong guerilla forces to the North and thus restore the balance. It is doubtful, however, whether those guerillas would receive enough popular support to maintain themselves and to fight effectively. While Communist guerillas can compel such support by applying terror methods, non-Communist guerillas must create good will to obtain it.

Experience in other theatres of operations suggests that the South can count on sustained popular support in the North only if it can protect the population there during the hostilities, and, as must be emphasised, the Northern people believe in the final victory of the South. The South must, therefore, first achieve victories in the field before it can hope to maintain sizeable guerilla forces in the North.

Strong Support

But once the South has demonstrated that it can win the war, the North is almost bound to receive strong support from an ally. The South, therefore, finds itself on the horns of a dilemma:

- It can keep pressure against the North so low that the Northern ally has no reason for intervention. But if the South deliberately refrains from inflicting severe damage on the North, the North will not be induced to call off its guerilla war. Furthermore, the Northern population will refuse to aid the South.
- It can press so hard that the Northern ally enters the war by sending "volunteers", and the South is then faced with a Korean-type war. It is likely that the guerillas in the South will remain active in such a war, and it should not be forgotten that, in the Korean War, the North Koreans conducted guerilla operations in South

Korea as long as they could.

The likely result is that regardless of whether the South aims at all-out victory or conducts only nuisance operations, it will have to fight against the guerillas in its midst and, in addition, against the regular forces of the North and possibly its ally. The South, therefore, gains nothing by conducting regular operations against the North; it only increases its difficulties.

Air and Navy

If the South refrains from an invasion of the North and restricts itself to air and naval warfare against the North, the North may not resort to regular ground warfare operations. It may, in fact, retaliate, step up guerilla operations in the South, or call off the guerilla war. How the North will react cannot be foreseen, and, for that reason, air and naval operations against the North can hardly be regarded as a reliable contribution toward ending the guerilla war.

In fact, the risk inherent in such operations is unacceptable. Besides, the South can fight the war on Northern soil in a much less risky way — by extending the guerilla war to the North.

Morale Factor

For obvious reasons, the South's ally should not enter Northern territory in strength. and even the South, unless it is strongly reinforced by an ally, cannot send large forces to the North. If it were to do so, fewer troops would be left in the South for fighting the guerillas there and protecting the population. The immediate consequence would be a lowering of morale in the South. This would result in: an increased unwillingness of the population to assist in its protection against guerillas and supply information to the counter-insurgents; and an increased unwillingness of the indigenous counter-insurgents to fight — in the South as well as the North.

Both factors would greatly assist the North's guerillas in the South, bring them new successes, and depress further the morale of the population and the counter-insurgents. This vicious process of corrosive interaction can only be stopped by counter-insurgency victories in the South under the eyes of the population, assisted by political, economic, and social reforms.

Therefore, the mass of the counter-insurgency forces is tied to the South. Small Southern forces sent to the North can make an impression there only if they manage to inflict maximum damage. Wasteful operations must be avoided at all costs. Only in exceptional cases should guerilla communication lines from the North to the South be cut in the North since this can be done just as effectively in the South — if the Northern supply lines are known, their continuation on Southern territory should be known as well.

The purposes of any operations beyond the border should be to reduce the North's capability and willingness to give aid to the guerillas, leading either

to their recall or their isolation, and to reduce the fighting capabilities and, especially, the morale of the North's guerillas.

Both measures go hand in hand. If the North's guerillas can be isolated, their power of resistance will be reduced. Conversely, if they are considerably weakened, the North will no longer consider assistance worthwhile.

If the South's forces fight against the North, they operate as guerillas, and if they fight against the guerillas over the border, they operate as counter-guerillas. In the first case, they will be opposed by regular government forces, and, in the second, by guerillas, possibly reinforced by regular government forces.

Limitations

There are limitations to this type of warfare over the border. Since Southern forces cannot count on popular support in the North, at least not at the outset, they cannot establish permanent bases in the North! they can stay there for only limited periods as roving-type forces. Their missions must, therefore, be modelled on those of the British SAS (Special Air Service) which is trained to carry out, in small parties of from three to 50 men, long-range penetration and raiding operations in enemy-held country. Their operations include reconnaissance, ambushes, sabotage, kidnapping, and creating alarm and despondency. In Malaya the SAS destroyed rebel camps and prevented the establishment of new ones, acting, therefore, in both a guerilla and a counter-guerilla role.

As far as the campaign against the Northern government is concerned, it should not be difficult for the South to select vulnerable targets in sufficient numbers. It may be more difficult to strike effectively against the guerillas in the North.

Generally speaking, guerillas without the necessary facilities of their own are most dependent on outside aid when they start their campaign, and they become increasingly less dependent the longer the war lasts. After a few years, they usually have built up their manpower, received their military and political training, and obtained sophisticated equipment.

The most propitious moment for striking at the guerillas beyond the border is at the beginning of an emergency, or when foreign assistance is first obtained. If they are promptly attacked at that time, they must defend their foreign bases and depots; they have to give battle in orthodox war fashion for which they are not trained and equipped. As a result, their movement might collapse.

Nuisance Value

No such results can be expected after the guerillas are firmly established in the South, and operations against them in the North will probably have no more than nuisance value. The same consideration applies to operations directed against the Northern Government. If operations had been promptly undertaken at the beginning of the

emergency, when guerilla activities were still on a small scale, the South could have spared much larger forces and could have sent as many men to the North at the North could have mobilised against them. The South could then do as much damage in the North as the North could do in the South.

Southern counter-measures in the North increasingly lose their persuasiveness until the moment arrives when they are no longer worth the effort, and when the South better employs all its forces, including allied forces, in operations in its own territory against the guerillas there. This point, it appears, has certainly been reached when the guerillas no longer receive decisive support from the North and are considerably more numerous than any forces which the South can spare for operations in the North.

General Orde Wingate of Chindit fame maintained that the answer to penetration is counter-penetration. This maxim is certainly correct for regular warfare. It also applies to guerilla warfare supported from over the border — but only as long as effective counter-pressure can be applied.

THE MEDICAL SERVICES IN CAPTIVITY

In this story of three and a half years of endurance we have been . . . more intimately concerned with the Australian forces [in Japanese hands] and chiefly with the efforts made by the medical services to protect them from illness and death. That these efforts were not more successful was not due to lack of quality in the work carried out by the medical services of the A.I.F. and other national forces, who worked together in one cause. If the story has in it elements of repetition, it is because of the constantly recurring menaces of sub-nutrition, oppressive hardship and infectious disease. Against these trials of the flesh and the greater trials of the spirit the forces on the whole kept their heads high. There were times when courage flagged, especially with the sick. Now and then the patients and others needed encouragement to eat unpalatable food, and there were those who in extremity like Hezekiah turned their face to the wall and would have died; sometimes the will to live flickered and failed, but in the main the greatest asset of the medical services was the spirit of the men themselves and in particular of their leaders. There were a few who would stoop to meanness and degradation, but the dark places of the heart revealed in the hours of extreme trial are small compared with the light that shines. It is appropriate here to pay special tribute to the orderlies, both trained and untrained in medical work, and the willing volunteers who in performing the most menial, trying and dangerous tasks for those whose health and lives were in the balance sometimes gave their own lives.

— *Allan S. Walker, Middle East and Far East (1953).*

THE SWEDISH TYPE 'S' TANK

Captain M. J. Ryan
Royal Australian Infantry

BOTH WORLD WAR II and the refinement of low-yield tactical nuclear weapons led during the 1950s to a rapid competitive escalation in weights and gun calibres of armoured fighting vehicles which is only now declining. Faced with the impending obsolescence of its British-built Centurions, the Swedish Army, long regarded as connoisseurs of armaments, decided to design and build its own replacement tank in collaboration with local industry.

Basic requirements were that the new tank should be capable of winning duels with any tank now known, and of providing effective support for other arms. With these conventional aims in mind, it was further required that the tank:

(i) must have a high weapon efficiency, a high rate of fire and the ability to engage targets rapidly;
(ii) must be highly mobile and fast-moving on both roads and across country;
(iii) should be able to cross water by floating;
(iv) should weigh in the region of 30 tons;
(v) should be robust, present a small target and have tough, suitably built armour.

In short the new tank must at least equal in design the best features of the current generation of AFVs, and wherever possible better them.

The end result of several years of close collaboration between the Swedish Army Ordnance Board and a number of civilian organizations was the "S" Tank, Sweden's answer to design problems for which compromise solutions have been many and varied. In the recent past articles have appeared in the *AAJ* recommending flying tanks, ultra-lightweight missile-equipped armoured reconnaissance vehicles, armoured ground-

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The author is Manager of the Military and Special Products Division of Cannon Electrics (Australia) Pty. Ltd.

He underwent National Service training from December 1955 to January 1956, joined the Melbourne University Regiment in March 1956 and was appointed lieutenant in October 1958. He was promoted captain in March 1962 and has held various postings, as a company commander in the MUR, and on 3 Div HQ. He was seconded to the United States 4 Armd Div in 1963-64, serving with 1 Armd Rifle Bn, 160th Infantry.

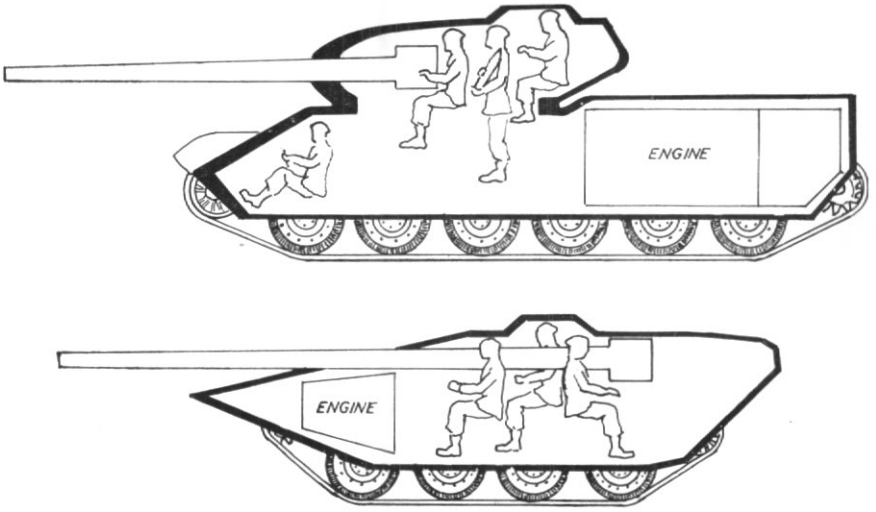
TANK TYPE	Gun Calibre (mm)	Weight fully-laden (tons)	Overall Height ft ins	Engine Type *	Maximum BHP	Maximum Road Speed (mph)	BHP per ton
CENTURION 10	105	51	9 9	S.I.	635	21.5	12.5
CHIEFTAIN	120	50	8 0	C.I.	700	25	14
M48A2	90	46.9	10 1	S.I.	825	32	17.6
M 60	105	45.5	9 10	C.I.	750	30	16.5
STANDARDPANZER	105	38.5	7 10	C.I.	815	41	21.2
AMX-30	105	32	7 6	S.I.	710	31	22.2
"S" TANK	**105**	**36.5**	**7 0**	**C.I. & G.T.**	**570**	**30**	**15.6**
T 54	100	35.5	7 10	C.I.	512	30	14.4

* KEY: S.I. = spark ignition. C.I. = compression ignition. G.T. = gas turbine.

effect machines, and the total replacement of the tank with armed helicopters. By its recent £50 million purchase of the Bofors Type "S" tank, the Swedish Army has adopted a radical solution which involves a total departure from a number of previously cherished design conventions. Although much of the design data is still secret, sufficient details have been released to enable a preliminary evaluation of the Type "S".

Design

The tank is turretless, with a steeply-sloped 75 degrees glacis-front armour panel which is almost certainly the ultimate in deflective-armour design. Total height, including the cupola machine-gun, is two metres, and all observation devices are centralized in the highest part of the tank. By replacing the loader and his working space with a fixed automatic gun, a weight saving of roughly fifteen tons has



Relative crew positioning in a conventional and Type "S" tank.

Frontal view of the Type "S" tank and a *Centurion* tank.

been achieved. Ab Bofors' post-war analysis of armour casualty statistics has led them to the conclusion that mean ground-surface irregularities discourage frequent instances of hits on AFVs below a height of about one metre; in lowering the tank silhouette by deletion of the turret, the target height normally shown in combat has been reduced by 30 to 50 per cent. The tank can ford up to 1.5 metres of water with no preparation other than elevation of the gun and with its integral fabric screens raised is fully amphibious with a water speed of three to four knots.

Armament

Main armament consists of a 105 - mm automatic gun, designed to accommodate the standard UK tank-gun ammunition, but having a longer barrel than the current UK gun (62 calibres as against 51). This serves to increase muzzle velocity for any given type of shell, resulting in greater penetration and/or longer range — combat range is roughly 500 metres better than that of "Chieftain's" gun. Spent shell casings are automatically ejected after each shot by way of a hinged aperture in the tank's rear armour.

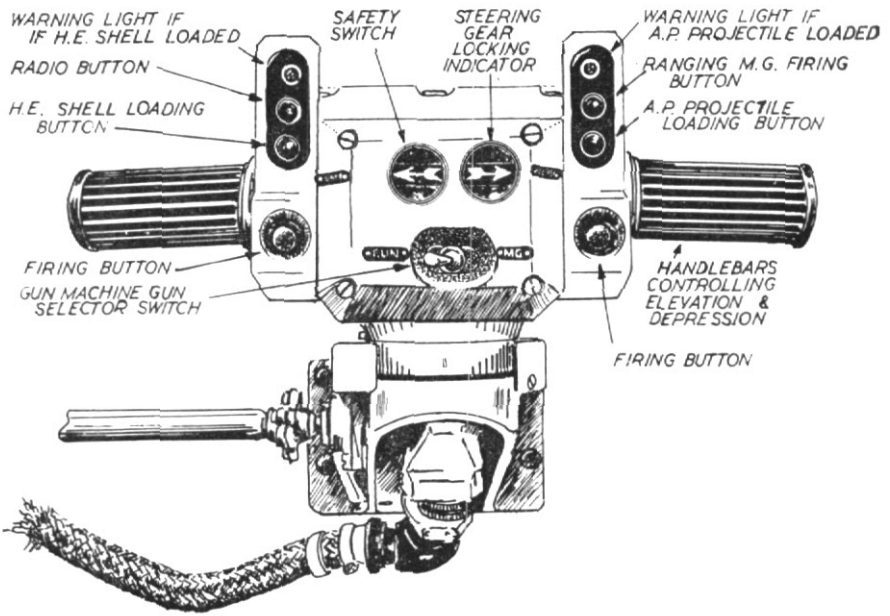
In traverse the gun is aimed by turning the whole body of the tank, just as a fighter aircraft is aimed at its target. Tracking speeds in horizontal traverse are a minimum of less than one mil per second, and a maximum of 125 mils per second. Both the gunner's and tank commander's control units can traverse the tank onto its target, fine aiming normally

being performed by means of regenerative steering. A 90 degrees turn can be effected in 3.5 seconds by a moving tank, and roughly 7 seconds by a tank in a stationary position, times which compare favourably with turret-traverse speeds of conventional tanks.

Elevation is carried out by lifting or depressing the forward end of the tank with simultaneous depressing or lifting of the rear end over the end support wheels by means of the tank's hydro-pneumatic suspension system. Elevation limits are from minus 10 degrees to plus 12 degrees, and elevation speeds are a minimum of one mil per second and a maximum of six degrees per second. Handles of the dual elevating-control units can be secured in fixed positions corresponding to an elevation of the barrel of one and five degrees respectively.

The large magazine compartment is located at the rear of the crew accommodation space and is split into two halves on the tank's centreline — one for APDS rounds, and one for HE shells. The rounds are gravity-fed from storage racks to a hydraulically - operated automatic ramming and loading system which increases the rate of fire to such an extent that particularly dangerous targets can be smothered in burst of 105-mm fire.

In addition to the main armament, the Type "S" mounts two 7.62-mm machine-guns in an armoured box in the left of the glacis-plate, and a .5-inch ranging machine-gun in a similar box on the right; all three are co-axial with the main armament and fired by remote control. The commander's rotating cupola has an independent 7.62-mm gun and



Console control panel in a Type "S" tank.

Bofors have produced an armoured automatic 20-mm cannon in a dome mounting as an alternative weapon for this position.

Control

Crew accommodation and control devices have been designed on the lines of fighter aircraft to achieve maximum flexibility and speed of communication in the minimum reaction time. The commander's and driver's positions have dual control consoles for driving, aiming and firing. These consist of a control unit box with two side-mounted hand-grips; rotation of the unit about its vertical axis steers the tank, and twisting of the hand-grips forward or back alters the pitch of the hull and therefore the elevation of the gun. The control box incorporates a number of push-buttons for loading and firing the main and secondary armaments. Both positions have accelerator and brake pedals so that either can operate the vehicle, the commander being able to over-ride the driver. The driver is normally required to act also as gunner, but if a target is to be engaged quickly the commander, who is likely to acquire it first, can assume all driving and gunnery functions. The commander's all-round observation cupola is stabilized in azimuth and elevation to provide exceptional opportunities for on-the-move observation.

The rearward-facing radio-operator's position has a simplified set of driving controls so that he can drive the tank in reverse as readily as forward, leaving main armament and

armour facing the enemy. In emergencies the tank can operate effectively in combat with a one-man crew.

Power Plant

The new power-plant, developed in collaboration with Ab Volvo, consists of a 240-bhp Rolls Royce K-60 multi-fuel engine with an automatic hydraulic gearbox, combined for simultaneous or individual operation with a 330-bhp Boeing gas turbine type 502-10MA, less heat exchanger. Transmission system consists of a transfer gear, a bevel gear and a planetary gear-box. The transfer gear, which links the two engines, is provided with lockable idling gears, enabling simple engagement or disengagement of both or either engines. The engine unit is mounted on a monoblock pallet frame, enabling quick and easy removal from the tank for maintenance or replacement. The use of two engines, either of which can drive the tank to full capability level, greatly reduces the risk of immobilization due to engine breakdown or minor battle damage. Total developed power is 600 bhp.

Interchangeability

In keeping with the current trends towards standardization of components and simplification of maintenance, the Type "S" Tank

- Utilizes 105-mm ammunition identical with that of the Centurion, Chieftain, M-60 and Standardpanzer, and standard NATO 7.62-mm and .5-inch machine-gun ammunition.
- Employs Centurion road-wheels to simplify the supply of spares.
- Is able to mount virtually any 7.62-mm or .5-inch remotely controlled gun.
- Uses the British opposed-piston two-stroke multi-fuel engine which is rapidly becoming the type criterion in NATO armour design.

Conclusion

While the ultimate test of its design and potential will be realized only in battle, the Bofors Type "S" tank already offers an interesting and unconventional design which incorporates several important new operational and tactical advantages, and signposts considerable development potential for the future.

CAMPAIGNING IN THE CRIMEA

The embarkation had the gay informality of a picnic. Officers took their wives with them, some took their mothers, there were several young brides. Lady Erroll, wife of the Commanding Officer of the 60th Rifles, was accompanied by her French maid and sailed wearing a habit with long trailing skirt and a swallow-tailed coatee with rows of shining buttons. She had permission to share a tent with her husband on the campaign, but it proved to have only one bed. Years later one of her grandchildren asked her if the bed was comfortable. "I don't know my dear," she replied: "His Lordship had the bed, and I slept on the ground."

— Cecil Woodham-Smith, The Reason Why (London, 1953).

HOW SHOULD THE ARMY FIGHT?

Combat Developments Command Seeks Answers for the Future

Lieutenant-General Dwight E. Beach, USA

ON 20TH JUNE 1962 a unique organization came into being within the United States Army. This new organization, the US Army Combat Developments Command (USACDC) was also given a unique mission — the design of the army, for today and for the future.

With its headquarters at Fort Belvoir, Virginia, and with field commands and agencies located across the length and breadth of the continental United States, USACDC was originally commanded by the late Lieutenant-General John P. Daley and was made up of bits and pieces from the US Continental Army Command, the Army's service schools, portions of some of the offices of the Chiefs of Technical Services, and other miscellaneous commands and agencies.

Lieutenant-General Beach was until recently Commanding General, US Combat Developments Command, and led the United States delegation to Teal IX, held at the Jungle Training Centre, Canungra, in May this year. He has now been appointed Commanding General, Eighth Army, Korea.

His article is reprinted by permission of the Army Navy Air Force Journal and Register, and will be followed by one written by the Australian Directorate of Combat Development in an early issue of the AAJ.

Fitted carefully together by General Daley and his planning group, the Army's Combat Developments Command is today a viable, forward-looking organization which has already proved its mettle under the stresses of crash actions and the more mundane pressures of the day-to-day output of studies, field manuals, tables of organization and equipment, and materiel objectives and requirements.

Very simply stated, the US Army Combat Developments Command has the job of answering three basic questions.

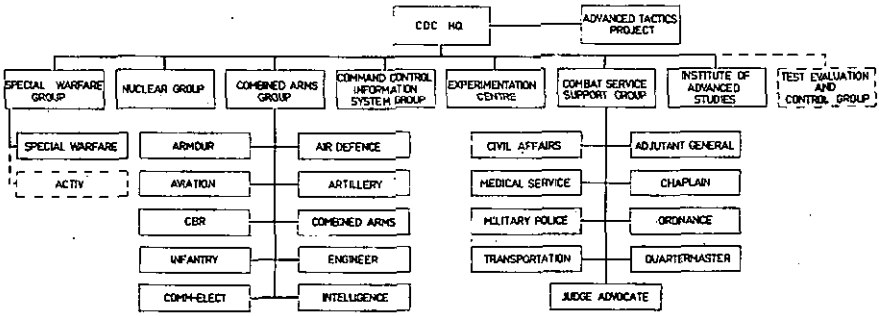
How should the Army fight?

How should the Army be equipped?

How should the Army be organized?

How well we are able to answer these questions will, in large measure, determine the Army's combat effectiveness next year, five years from now, or as far into the future as we can foresee.

Let me emphasize the order of these three questions—"How should the Army fight?" is first. We feel that there is great danger that the materiel tail can, and frequently has, wagged the doctrinal dog.



Our past military history is replete with examples wherein the introduction of new hardware with new capabilities has not been reflected in the development of new doctrine and tactics to take advantage of this change in capabilities. Consequently, we stress the development of doctrine at least concurrently with — and hopefully ahead — of hardware development. The reasons, I feel, are apparent. We must give our industrial developers objectives to strive for within the framework of what needs to be done to give the Army the capability it requires, rather than developing hardware in a doctrinal void.

Subordinate Commands

To collect, sort, collate and evaluate conceptual data and reduce it to recommended materiel requirements, doctrine and organizations, the Combat Developments Command has seven subordinate commands, one special group, and 20 field agencies located throughout the continental United States.

(1) The *Special Warfare Group,* located at Fort Belvoir, which concerns itself with activities in support of special warfare and counter-insurgency operations by both indigenous and United States forces.

(2) The *Nuclear Group* at Fort Bliss, Texas, which works on nuclear energy matters concerning Army employment of nuclear weapons and other nuclear devices and the defence against nuclear weapons used by the enemy.

(3) The *Combined Arms Group* co-located with the Command and General Staff College at Fort Leavenworth, Kansas, which commands field agencies for the combined arms. It develops current and future doctrines and materiel for the combat and combat support elements. The Commandant of C&GSC is also the commander of the Combined Arms Group.

(4) The *Command Control Information Systems Group,* located at Fort Belvoir with a subordinate office at Fort Huachuca, Arizona, which conducts our programme for the development of data processing equipment and related systems to reduce reaction time during combat operations.

(5) The *Combat Developments Experimentation Centre,* familiarly known as CDEC, located at

Fort Ord, California. The centre serves as a field laboratory for the evaluation of concepts and operations, both tactical and administrative. It has an organic capability to conduct field experiments through battalion level and is supported on a contract basis by the Stanford Research Institute. I might mention that two-thirds of our personnel strength is committed to the Experimentation Centre.

(6) The *Combat Service Support Group* at Fort Lee, Virginia, which commands the agencies involved in logistical and administrative support. It performs functions similar to those of the Combined Arms Group, but in the area of combat service support matters.

(7) The *Army Institute of Advanced Studies,* co-located with the Army War College, Carlisle Barracks, Philadelphia, which is responsible for preparing very long range conceptual studies on the broad international, national and departmental level. These studies deal primarily with the organization, employment and strategic operations of the theatre army and major subordinate elements above field army level. Included also are studies on joint operations.

(8) The *Test, Evaluation, Control Group,* a subordinate organization, located at Fort Benning, Georgia. It has the mission of drawing up the detailed test plans for the 11th Air Assault Division, controlling the tests as conducted, and evaluating the results.

It is important to note that all of the Combat Developments field agencies — except the Chaplain Agency — are co-located with their respective service schools, the Armour Agency being with the Armour schools, for example. Though entirely separate from the schools organizationally, these agencies of USACDC work closely with the schools to insure compatability of instruction and doctrine, both present and future.

Tactical Mobility

Next, I want to discuss briefly some of our current studies.

First there is the Army Tactical Mobility Programme, begun by the study conducted by the Howze Board three years ago. The Combat Developments Command has been given the responsibility for continuing the actions initiated by the Howze Board. That Board took a bold new approach to the problem of mobility and came up with the recommendations for the testing of three new organizations: the Air Assault Division, the Air Transport Brigade, and the Air Cavalry Brigade.

The Air Assault Division is now undergoing organization, training and testing of a battalion-size force. This has been completed.

Phase II is the organization, training and testing of the division. Further tests were conducted in October and November last year. In addition to the activities of the Test, Evaluation and Control Group I discussed earlier, we also have a mammoth effort — studies, war games and field experiments — being con-

ducted by almost every element of my command as we look into all aspects of air mobility for the Army.

Tests conducted to date show problems and promises but the final evaluation will not be available until the tests are completed.

Command and Control

Next, CCIS which stands for Command Control Information Systems. The objectives of the CCIS programme are:

To develop automatic data processing techniques for the Army in the field, which will result in significant operational gains through reduction in reaction time.

To provide compatible automatic data processing systems at acceptable cost in terms of men, money and equipment required.

And, to integrate various automated functional areas on a time-phase basis where it appears feasible and desirable to do so, thus permitting a gradual phase-by-phase introduction of the systems into the Army in the field.

Functions which appear to offer the most promise for Automatic Data Processing techniques are:

(1) Operations
(2) Fire support
(3) Intelligence
(4) Logistics
(5) Personnel and Administration.

The Operations Sub-system will automate certain functions to assist the commander in monitoring and controlling the tactical situation.

The Fire Support Sub-system provides for automation of selected artillery functions to enable the commander to use the fire support provided in the most effective manner.

The Intelligence Sub-system will enable improvement, both in timeliness and accuracy, of the production and dissemination of tactical intelligence.

The Logistics Sub-system will extend Automatic Data Processing to selected Logistics functions of combat service support in the Field Army and the Personnel and Administrative Subsystem will automate selected functions of the administrative elements of the Field Army.

These two studies are representative of the many we are presently conducting to accomplish our mission.

New T.O. & E's Result

Based upon the results of studies such as the ones I have just described, we develop new or revised doctrine which we include in field manuals. Our new organizational concepts are the basis for new tables of organization and equipment, and our materiel objectives are refined into Qualitative Materiel Development Objectives, Qualitative Materiel Requrements and Small Development Requirements.

The Qualitative Materiel Development Objective or QMDO states a requirement for an item whose technical feasibility is unknown. The Qualita-

tive Materiel Requirement or QMR states a requirement for an item which is technically feasible, but which is of a lesser magnitude with respect to cost, complexity and lead time than a QMDO. Most of our training devices and conventional ammunition fall into the category of SDR.

To give some indication of what is involved in the preparation of these documents, I might point out that each QMR contains a complete lay-out of what a new piece of equipment is supposed to do, what it will replace, how it will be used, its projected useful life and a myriad of other details. Each QMR is a study in itself and may require months of preparation, coordination and staffing.

USACDC has produced 51 QMRs since it was organized and older QMR on the books have been revised and up-dated as necessary. The magnitude of the projects range from a new main battle tank to small pieces of individual equipment for the combat soldier. Let me emphasize that in generating a materiel requirement, we try to generate the doctrine for its use concurrently within the overall framework of approved concepts. Thus, we attempt to keep doctrine and technology in balance as I discussed earlier.

Evaluation Techniques

Now let me turn to our evaluation programme. The Army Materiel Command, of course, evaluates hardware, although we have a voice in the decision for acceptance or rejection. On the other hand, before final acceptance of a revised doctrine, or a new organization, USACDC must check it out to insure it fulfils our needs. We have many techniques to use including war gaming, operations research and similar methodology. Two of our most important tools are field experiments and troop tests.

A field experiment is a field trial employing specially trained units under controlled conditions. It is oriented towards a specific problem area and is designed to collect objective data for scientific evaluation. A field experiment is "problem" orientated, extends over a relatively long period of time, may have several replications which are really mirror-image repetitions, and is characterized by extensive control. It is specifically designed to test organizations and doctrine, not hardware as such.

Troop tests, on the other hand, are tests conducted in the field, using TOE units, and are designed to evaluate operational or organized concepts, doctrine, techniques, procedures, or sometimes, to gain further information on materiel as it affects concepts, doctrine and/or organizations. Normally these troop tests are conducted in conjunction with tactical field exercises and, as opposed to field experiments, are "unit" orientated, extend over a relatively short period of time and are characterized by less control.

Our Field Experimentation programme is conducted by our Experimentation Centre at Fort

Ord. The Experimentation Centre with support from the Stanford Research Institute, performs scientific field evaluations of new concepts, doctrine, and organizations. It is a unique facility in the Free World in that it conducts controlled field experimentation from which scientific data is collected. All aspects of the experiments conducted at the Experimentation Centre are accomplished by joint-military-scientific effort.

The troop command consists of an armoured brigade, an umpire-controller group and supporting elements located at Fort Ord, Camp Roberts and Hunter-Liggett Military Reservation. The brigade provides all tactical players and conducts the detailed training required for experiments. They are totally committed on this mission and are not available for troop testing or other missions.

The Stanford Research Institute, located at Menlo Park, California, furnishes scientific support through its Research Office at the Centre headquarters at Fort Ord.

Look to the Future

As USACDC starts a fourth year of operation, the command's increasing impact on the Army indicates that its activation in June 1962 marked a milestone in both the philosophy and management of combat developments. This milestone is embodied in the concept that all of our effort is devoted to creating concepts, doctrine, tactics and requirements within the framework of their total effort on the Army's battlefield effectiveness, projected to many years in the future and to all possible environments.

In conclusion, I should like to emphasize that USACDC does not create a product, but performs a service for the Army. This service is performed with two thoughts paramount. First, future success for the Army will come only if we capitalize upon the very finest weapons and equipment which technology can provide, combined with the very best thinking in the form of doctrine to make these weapons and equipment most effective. Second, in the final analysis, the key to our success is just one man: that lonely individual at the end of the line, the combat soldier on the battlefield.

MONTHLY A.A.J. AWARDS

The Board of Review has awarded the £5 prize for the best original article published in the June issue of the journal to Major E. C. Beacroft for his contribution entitled "Battlefield Mobility".

THE ROLE OF IDEOLOGY IN USSR FOREIGN POLICY

Brigadier A. T. J. Bell, OBE,
Australian Staff Corps

IT IS OFTEN SAID that the Western world is pragmatic in its approach to problems of foreign policy and tends to deal with each situation in isolation. On the other hand, it is claimed that Communist ideology based on Marxist doctrine has given the USSR an overall framework in which to consider its foreign policy. Although the USSR has tended to apply this ideology too rigidly at times and not to appreciate the strength of local nationalist feelings, nevertheless it is alleged that it has given the USSR a continuity in long term foreign policy aims especially in Asia.

Before proceeding to examine this contention, it is proposed to state briefly what the Marxist doctrine contains in this context. Very generally Marx produced a theory of social reorganization to remedy what he thought to be the social evils of his time. The workers or proletariat were to rise, seize control of the economy from the capitalists and establish a classless state where man would no longer be exploited by man. Lenin adapted this theory to enable his Communist *elite* to overthrow the existing outdated Russian Government and force the rapid industrialization of Russia. He believed that the proletariat in other countries would realize that their hour had come. They would then overthrow their governments and a world-wide Socialist revolution would follow. Thus the peaceful security and

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The writer wishes also to acknowledge gratefully the advice and suggestions of Mr. B. Grant of Melbourne University.

The author is a 1933 RMC graduate, a Bachelor of Engineering (Civil) and an Associate Member of the Institution of Engineers, Aust.

He joined the AIF in October 1939, serving as adjutant of the 6th Division RAE in the First Libyan Campaign, as BM of the 19th Brigade in Greece and Crete, and in a variety of Grade II and Grade I staff, training and engineer appointments, including SORE I Adv LHQ and GSO 1 (Technical Training) in 1944-45.

His chief postwar appointments were CE HQ BCOF (1947-49), CE Southern Command (1949-53), Director of Quartering AHQ (1953-55), DQMG AHQ (1955-57), Brigadier GS GHQ FARELF (1958-60) and Engineer-in-Chief AHQ (1960-63). During 1957-58 he attended the Imperial Defence College. His present appointment is Chief of Staff Southern Command.

development of Russia would be ensured. The Marxist theory claimed that its scientific unravelment of history was based on antagonistic clashes of economic forces. These produced social progress and had led successively from slavery to feudal organization, then to Capitalism and finally to the highest form, or Socialism. Lenin said that the Capitalists had developed the idea of colonies to provide them with sources of raw materials and to provide high investment profits to bolster up their deteriorating and doomed social organization. Because of the fundamental conflict of interests between the Capitalist countries, and the dichotomy of interests between Russia and the rest of the world, Lenin thought wars were inevitable. Nevertheless the ultimate victory of Socialism was certain.

It might be thought that if we understood the above, then we could forecast the goals on which USSR foreign policy is likely to be based. There is, however, much argument among Communists on interpretation of their doctrine, and whenever a clash of interests produces an unforeseen result then they declare that this was due to faulty development of their ideology from their basic doctrine. Hence an outsider can obtain no reliable guide, certainly not to their short-term action.

Let us consider now how this ideology has influenced the USSR in its foreign policy in Asia. The Czarist policy had been one of steady eastward expansion to the Pacific coast, turning away in the south whenever it met greater strength. When the Communist Party of the Soviet Union (C.P.S.U.) achieved power in 1917, it found itself heir to this vast empire. Almost immediately it found that it had to fight White Russian armies invading Siberia. When it became clear that a world revolution was not imminent, the C.P.S.U. overcame its hesitation on foreign policy and drove out the invaders. At the same time, despite its theoretical backing of self-determination, it dealt firmly with any *bourgeoisie* nationalist parties.

Although Soviet foreign policy developed more directly as a result of events in Europe, the above events do show how their traditional dual policy developed. Its first aim was a revolutionary conquest of the world. When Stalin realized that this could not eventuate immediately, he modified Lenin's ideology by proclaiming that a world-wide Socialist revolution before Socialism could be established was not necessary. In fact Socialism had been established in one country — in the USSR. Stalin developed the second aim of USSR policy, the active defence of the Soviet base against both war and economic pressure. This conforms to the Morgenthau theory that political realism must prevail over ideology.

In 1918, to assist in this ideological concept of world revolution, the C.P.S.U. organized the Comintern. During the 1920s nationalists throughout Asia

were urged to overthrow their colonialist governments. At this time, however, the C.P.S.U. had misjudged its timing and these nationalists were thoroughly quashed. In 1935, Stalin realized that war among the Capitalist states and perhaps against the USSR was coming. He directed local Communist Parties to co-operate with the West against Fascism under the heading of the "United Front from above". Thus again we see this dualism of Soviet foreign policy changing according to the realities of the situation.

After World War II, by all the rules of power politics the United States, armed with the atom bomb, should have established her mastery over Russia. However, in the absence of an appropriate ideology and working pragmatically, the United States chose to support Western Europe first. For some years she was not prepared to oppose the USSR in Asia. Compared with her pre-war position, the USSR had vast continental strength and prestige. On the Leninist theory she saw the position as an inevitable struggle between the Communist and non-Communist world. Again she thought Capitalism was about to collapse and the problem was to find the correct strategies to attain her long-term ideological aim of world conquest. Using the power of the victorious Red Army, she developed a protective belt around her. Where a situation was beyond her reach, she decided on a policy of co-operation with the Nationalists. Unfortunately for her, she was unable to do so in Japan. In the Japanese Peace Treaty of 1951 she was checked by being unable to dislodge the United States from Japan, the Ryukus or from Formosa.

It is now necessary to return chronologically to consider the USSR's relationship with China and see how she applied these policies. Despite the ups and downs of fortune suffered by the Chinese Communist Party, it was the only Asian one which had remained in reasonable strength during the inter-war period. The USSR had given it advice and varying degrees of assistance. At Yalta in 1945 the USSR agreed to abrogate the Russo-Japanese Pact of 1941 which she had signed in order to stabilize her eastern flank while fighting for her life in Europe. She also undertook to attack Japan three months after the end of the war in Europe. In return the Allies agreed to satisfy her territorial ambitions in the East, mainly those territories taken from her by Japan in 1904. She was to be given the former Chinese ports of Dairen and Port Arthur on lease and also joint management of the railway across Manchuria to those ports. For the legal consummation of these transfers, she signed the Sino-Soviet Treaty of 1945 with the Chinese nationalists and undertook not to help the Chinese Communists. How closely she adhered to the latter undertaking is not clear. She recommended that the Communists co-operate with the nationalists. Immediately after the dropping of the atomic bomb on Hiroshima the Red Army took over Manchuria from

the Japanese and encouraged the Communists to establish a protective belt between Manchuria and the nationalists. There is some evidence that she under-estimated the power of the Communists. These then built up their strength on a peasant base and by 1st October 1949 defeated the Nationalists and controlled all of mainland China.

On 14th February, 1950, the USSR gave full support to China by signing with Mao Tse-tung a treaty returning Dairen and Port Arthur, giving up control of the Manchurian railway, forming a close military alliance and later giving trade and economic credits. China was to supply raw materials to Russia; Russia in return, partly on payment, was to provide technical materials and advice. From an ideological point of view this treaty was a very logical one.

In 1949 both the USSR and the United States had withdrawn from their respective parts of Korea. The USSR had left behind a Communist-dominated northern government. When the United States declared her lack of interest in South Korea, the USSR encouraged North Korea to invade it. She was surprised when, in her absence from the United Nations Security Council, the UN agreed to act. If the USSR had intervened directly, she feared that global war might have resulted. Therefore the USSR encouraged the willing Chinese armies to fight. These effected a stalemate, ultimately on the 38th Parallel. As a face-saver, protracted peace negotiations were allowed to drag on until after Stalin's death. This war showed firstly the USSR trying to improve her position against the West by extending her territory with proxy forces, and secondly her realistic adaption of her ideological aim when faced by superior strength. Perhaps because of her miscalculation of the situation, the USSR advanced China's claim for moral or ideological leadership in Asia by some years.

We come now to South-East Asia where the territories were well beyond the reach of the Red Army. In 1947 the USSR appreciated that the collapse of Capitalism was not imminent and that in Asia the United States was moving actively against her. Therefore the USSR decided that every effort should be made to attain her ideological aim of severing the remaining colonialist ties and blocking the markets of South-East Asia to the United States. The Cominform was established. It directed the local Communist Parties to cease co-operation with local nationalists and declare for the Communist camp. At the Calcutta Youth Conference in 1948 most Asian countries were represented, and the urgency of the ideological struggle between the two world camps was explained to them. It was said that Pakistan, Ceylon and Burma were still held to Britain by concessions from the Imperial West and that India was still a colony. This was embarrassing to local Communist Parties which

had supported, as directed, the independence agreements. Obediently, however, there were Communist risings in Indonesia. Malaya, Burma and the Philippines. Perhaps coincidentally in 1950 the Chinese entered Tibet. Sooner in the case of Indonesia and later in Malaya all the insurrections with the exception of Indo-China were suppressed or defeated. Indo-China was helped by the presence of a common frontier with China. Tibet was in a different category.

The question is, why did these uprisings fail? Basically it would seem that they were due to Stalin's haste. In accordance with Stalin's first post-war instructions, a combined Communist and nationalist grouping had in many cases made good progress towards independence. National independence had been achieved in Pakistan, India, Ceylon, Burma and Indonesia. Stalin had misjudged the strength of these National movements relative to the local Communist Parties. He was out of touch with reality in Asia and saw everything in rigid Leninist ideological terms. Stalin realized his mistake and in 1952 at the Peking Asia and Pacific Area Conference the catchword was "peace to raise the standard of living". Despite this, the USSR had then lost further ground to China in its bid for the ideological leadership of Asia.

Malenkov learnt from Stalin to concentrate on one area of foreign politics at a time. First he hastened the Korean Peace Treaty and then turned to Indo-China. There complete victory by the Vietminh was in sight. He believed, however, that America saw Indo-China as the next testing ground for the West against the Communist camp. He feared global war and announced his willingness to participate in the Geneva Conference which ended the war.

On the succession of Bulganin and Krushchev to power, they strove, presumably with Chinese support, by a series of goodwill visits to Asian countries to foster friendly relations. A five-year trade agreement was concluded with India. The USSR writings on India and Burma were rewritten to admit that the national *bourgeoisie* could be the leaders of liberation movements. USSR economic and cultural aid was distributed around Asia, scaled strictly in size according to that estimated to be required to incline whatever government was in power towards Russia. China accepted this new fraternization policy. It suited her ends and in any case she still looked to the USSR for advice in international affairs and for technical aid. The USSR wanted to retain the *status quo* in Europe and Asia, while in accordance with the Leninist ideology she proceeded to deprive the West of its influence in its former colonies and dependent territories. Although this ideology bound the USSR and China together on their major aims, China was permitted some warlike excursions such as in Tibet, provided she was discreet about them.

In 1956, at the 20th Soviet Communist Party Congress Khruschev crystallized the

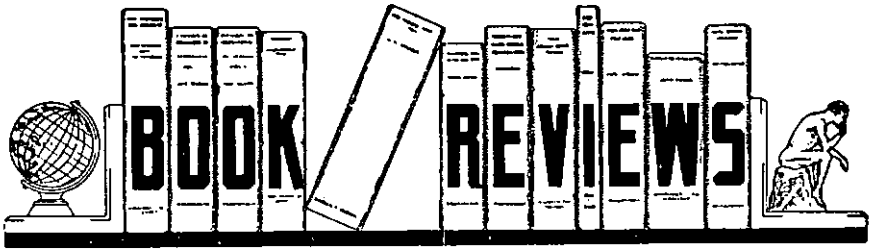
recent experience of Soviet foreign policy into ideological terms by declaring that revolution was not necessary to achieve Socialism, that the Capitalist countries were in different stages of evolution and that each needed a different approach to achieve the aim. It was possible to use parliamentary processes to attain Socialism. Khruschev also agreed that in the present stage of nuclear parity, global war was too destructive and even local wars might escalate to global war. Therefore war at present was not inevitable. This was the beginning of his ideological difference with China; China considered that this was a major ideological change and not justified by events. Further, Mao's own theory was that power grew out of the barrel of a gun and such an alteration was not in accordance with his intentions. China took a righteous stand over Hungary, ameliorated only a little by her need to cancel her "Hundred Flowers" policy. China tended to overestimate the USSR's lead over the West in rocketry, sputniks and the like. She believed that this gave her greater freedom of action than the USSR considered the facts allowed. Nevertheless when there appeared to be danger of Sino-American conflict over the "off-shore islands", the USSR agreed to warn off the United States. This she did in very abusive terms, presumably because she was afraid of possible results.

Khrushchev considered he could handle his unwieldy, excitable and sensitive China. He allowed her to announce that she had outstripped Russia in her progress towards Communism through her communes and to discover the results herself rather than by Soviet reactions against their ideological significance. However, when China appeared to be spoiling Khrushchev's aims for a Summit Conference by invading Ladakh and humiliating India, he admonished China. China replied by rejecting the USSR's views on the nuclear balance and quoted Lenin on the inevitability of war. China objected to Russian aid to neutralist nationalist governments in Asia and Africa, claiming that it would be better to direct such aid to China to enable China to build up her economy more rapidly. Probably, in this argument over ideology, the USSR's best weapon was and is the threat to withdraw her support of China in the event of war with the United States.

In the current context of US involvement in Vietnam, it is interesting to speculate on what Russia can permit to happen before she will again fear war and arrange a Big Powers Conference. How much help will she give North Vietnam and what will she allow China to do? How much damage would she permit China to suffer before she forced her to agree to a negotiated peace?

As postulated in the opening paragraph, we have seen that the USSR has a very definite ideological framework within which she considers her foreign

policy. We have seen how under Stalin she applied her ideology too rigidly. We have also seen how this ideology impels her continually to try to create a world order favourable for the ultimate triumph of Socialism. As Khrushchev put it, she has creatively extended her ideology to keep it up to date with modern developments. Thus it also accords with realism. The USSR has found that when she resorted to force, she seldom achieved her objective, especially when she was opposed to the United States. She announced at the 21st Congress in 1959 that she intended to develop her economic power to overhaul the United States as rapidly as possible. By extending her control of Asia, Africa and Latin America, she hopes also to decrease the economic power of the United States. In so doing, she believes that she can become powerful enough to control China. Thus she considers she will achieve world domination. Despite its modification, the Communist ideology has given the USSR a very real long-term aim in Asia and elsewhere.



AUSTRALIA'S DEFENCE, by Dr. T. B. Millar. (Melbourne University Press, 1965.)

Reviewed by Major-General L. E. Beavis, CB, CBE, DSO, Master-General of the Ordnance (1942-46), Chairman, New Weapons and Equipment Development Committee, Australian Guided Missile Committee (1946-47), and Australian High Commissioner to Pakistan (1952-54).

A significant number of Australians are aware of possible threats to Australia's security and are concerned — or at least interested — in the measures taken by our Government to preserve our national independence. The support given to the Government at the Senate elections in December, 1964 — after the decision to introduce National Service — appears to bear this out. But should not a far larger number of Australians have a greater knowledge of the actual and potential dangers with which they are faced and take a more active interest in the measures considered necessary to counter them?

Dr. Millar, in *Australia's Defence,* makes an important contribution towards enabling our people to obtain a more precise knowledge of our situation and our defences. The author is a graduate of RMC, a former infantry officer of the Second AIF and a fellow in international relations at the Australian National University, with wide experience of conditions in South-East Asia. He obtained his Doctorate in International Relations at the London University in 1960. If his book is as widely read as one hopes it will be, the Government will have behind it a more highly educated public opinion supporting the measures and expenditure called for, thus making it easier to meet them and provide the protection — combined with the far greater degree of protection needed from our allies — which the situation demands.

In dealing with this question of the great need for an informed general public attitude to defence, Dr. Millar believes that the ordinary Australian citizen can quite readily comprehend the problems of defence and the proper steps to meet them, and that he can be given all the information needed without unduly disclosing information useful to potential enemies. But he considers that increased public interest in defence is not always welcome to those responsible for our defence planning and preparations at either Government, official or Service levels. On the curious reticence of Australians about discussing defence strategy, planning or equipment, or about challenging the Government's judgment on defence issues, he quite aptly says that "Perhaps the attitude springs from sheer lack of concern, from a carefree assumption that we can grow rich and comfortable in isolation, develop our country in peace, and that our place in the sun will never be challenged."

Widespread as this attitude is, it would be more so among our older people but for the realism produced in 1942 by the fall of Singapore, the bombing of Darwin, and the fear of Japanese invasion. But are the younger people today, who did not go through that experience, sufficiently aware of the situation? Is contemplation of, preparation for, or action against the threat of invasion of our country — long term as it may be — rather futile or a matter of great consequence? To some the question may seem silly, but is it? Before the war of 1939-45 influential bodies of opinion regarded the prospect of a Japanese attack on Australia as unreal. In 1946 Mr. J. A. Beasley, who had been a senior Minister in the Government from November 1941 onwards, and was then Australian High Commissioner in London, said that until the attack on Pearl Harbour by the Japanese on 7th December 1941 neither he nor those associated with him believed that an attack on Australia could be considered seriously. This was a view held quite apart from the existence of the fortress of Singapore and the advice of the United King-

dom Government that Australian defence plans should be based only on raids and not invasion — advice which to a large extent shaped our defence plans.

On this attitude of lack of appreciation of the reality of threats to our security held before the last war, Dr. Millar, in his opening chapter, The Defence Heritage, states:

"Labour's policies in opposition were generally less conducive to effective defence even than those of the Government although if it had itself constituted the Government the policies may have been different. The Nationalist and United Australia Party Governments showed, after the clouds gathered in Europe and Japan began her military expansion, little determination to think through and come to grips with the military situation" and that ". . . the basic fallacy continued to dominate the thinking or the emotions of Labour's rank and file that Australia could always be defended by staying inside it." That outlook has, of course, since changed, although remnants of it may still exist.

Today we have sections of the community including many well-meaning people who appear to regard as unreal any threat to Australia from Communist expansion in South-East Asia. There are similarities here to the situation in the United Kingdom in the 1930s when many people, including influential intellectuals and idealists, could not believe in the reality of the Nazi threat to the security of the country. It is to be hoped the doubters will read Dr. Millar's book and modify, if not change, their views regarding threats to Australia's security and the defence measures considered necessary by the Government.

Having dealt with The Defence Heritage — and incidentally pointed out that the time (if there ever was one) has long since passed when the Australian needed only to be handed a uniform and a rifle to make him a soldier — and contrasting the solid permanence of the War Memorial in Canberra with the bare adequacy of most of the Defence buildings near by, Dr. Millar asks: "Are we sufficiently aware of our new strategic position? Are the 'weapons of warfare' suitable and strong enough to meet the challenges of a world changed by technology, ideology and a population explosion? The rest of the book will be devoted to an attempt to examine these questions."

The rest of the book has chapters on Some Strategic Considerations, Threats to Australian Security, Defence Agreements and Arrangements, Australia's Defence Organization and Capacity, Regional Aspects of the Defence of Australia and Conclusions and Proposals.

In discussing strategic considerations Dr. Millar refers to the close on two thousand million Asians who are nearer to us than to any European country, who are increasing annually by several times the Australian population, and also

the strategical significance of their political and economic conditions, their ideologies, and their attitudes to each other, to us and to our friends and allies. He points out that the two threats — a far away and longer-term threat from Chinese-backed Communism and the closer, if smaller, threat from Indonesia — have prompted Australians to try to bring their country's defence and foreign policy into line. The results of this effort are set out in the chapter on Defence Agreements and Arrangements. There is not space to refer at length to other strategic considerations, important though they are, such as the need to develop the resources of our country, including the capacity for the manufacture of defence equipment of all kinds and to produce oil, and our dependence on Britain and the United States, a subject which is dealt with more fully in later chapters. But the author is not one who believes that only the United States can provide us with military aid in our hour of need and that such aid would be automatic. He points out the British interest in Malaysia and South-East Asia, where there are currently about 60,000 British servicemen, the ties of the Commonwealth of Nations and Britain's traditional identity with Australia generally and on defence matters specifically. No one will quarrel with the author's summing up that "By deepening where possible the channel of co-operation and good will with our neighbours, by making the most determined and effective use of our resources, and by assuring the active support of substantial allies we will be in a better position to avert or meet any threats to Australian security."

In his treatment of threats Dr. Millar writes with the factual approach of the kind required in a military appreciation — not the approach of the debater out to support a conclusion by exaggeration or distortion. He examines the defence situation in relation to Japan but devotes most attention to the possible threats from China and Indonesia. His conclusion is that for Australia the greatest danger would appear to come from a Chinese-dominated, Communist-controlled Indonesia. Such an eventuality brings in the activities and policies of both China and Indonesia and highlights the likely results of a Communist victory in South Vietnam in the extension of Communist influence. On the analogy that a farmer does not begin to fight a bushfire at his own front fence, Dr. Millar, writing before our Government decided to send troops to South Vietnam, says: "We have given certain undertakings with respect to the defence of South Vietnam, Thailand and Malaysia because we believe these areas constitute our own outer defence perimeter. We also believe that the Governments and peoples of these countries have a right not to be subverted or attacked by their neighbours."

Of Indonesian intentions in the present confrontation of Malaysia the author says that

we do not know whether these are final or intermediate ends, but we are entitled to suspect them to be intermediate ends in a large scheme for extending Indonesian hegemony. (Our Government appears to have been slow in appreciating this situation.) The conclusion is valid and suspicion is heightened if Dr. Sukarno is correctly reported to have said that the main objection to Malaysia is that it is an obstacle to the expansion of Indonesia. Dr. Millar discusses the situation regarding possible expansion from West Irian to what the Indonesians describe as East Irian. What happens to Malaysia matters very much nearer home, and in terms of exerting a useful influence in the region "We cannot do this by retiring to 'fortress Australia' and letting the rest of the world go by."

In the chapter on Defence Agreements the provisions and implications of the Anzam Agreement (Australia, New Zealand and the Malayan area), the Anzus Treaty (Australia, New Zealand and the United States) and the South-East Asia Collective Defence Treaty, i.e. SEATO, are fully discussed. In regard to the latter treaty the United States limits to Communist aggression its agreement to act in the event of armed attack and then only in accordance with the nation's 'constitutional processes'; that is to say action is dependent on the decision of the authorities empowered to give approval under the U.S. Constitution. The same proviso relating to 'constitutional processes' applies to the Anzus Treaty, which is our main sheet anchor so far as the United States is concerned. The author reminds us that we long relied on Britain to defend us regardless of our contribution. "There are Australians today who expect as much of the United States. This is both selfish and unrealistic. There is no complete guarantee of American protection, however much we spend on our own defence. There is little likelihood we would receive it if we did nothing for ourselves or gave nothing in return." I wonder whether prominent letter writers to the Prime Minister think of these aspects involving our treaty obligations, as well as their disbelief that the Viet Cong are supported from outside South Vietnam to establish Communist control. Of course, if there is no short or long term threat from countries to our north there is no need for treaty obligations and we could bask uninterruptedly and without fear in the sunshine of our beaches and open spaces.

A comprehensive description is given of our Defence organization, of the capacities of the three Services and of Defence Science and Civil Defence. Dr. Millar favours having the Minister of Defence as Chairman of the Defence Committee instead of the civilian Secretary of the Defence Department, parallel with the chairing of Service Boards by Ministers. "In a field so vital as defence, where different opinions may be held by the professional advisers and technical experts and not easily

reconciled, it should be the Minister of Defence and not the civilian head who reconciles, resolves or cuts across these differences, who gains the measure of the participants and a full awareness of the various positions in the debate. This is the case in Britain, the United States, Canada and other countries."

Dr. Millar combines praise and some critical comment of the Treasury which comes very much into the picture on account of the large expenditure on defence. Looking back to the outbreak of war in 1939 one "unintelligent and unimaginative exercise of power" comes to mind. The Prime Minister (who also was Treasurer) in announcing the decision to raise forces for the 2nd A.I.F. also announced among other things financial approval for the purchase of essential material requirements. Yet an Assistant Secretary of the Treasury at a subsequent meeting of Defence and Service finance and administrative officers (I was the army General Staff representative) which he chaired, refused approval for the placing of demands for urgent household needs of the men enlisted — blankets, tables and forms, cooking gear and suchlike — on the grounds that these items should have been included in the Development Programme. He stubbornly refused to accept that the money in the Programme was used for orders for armament items unprocurable from civilian sources on the principle that blankets, etc. would be readily available from civil stocks. Weeks passed before approval was given and orders placed, and when the inevitable shortages in camps occurred and received press prominence, the army incurred the odium. It is to be hoped that times have changed, and it is pleasing to know that Treasury "in recent times has been taking pains to improve the rationality of negative decisions."

Dr. Millar discusses the vexed question of the replacement of obsolete or obsolescent aircraft in his analysis of the RAAF organization and capacity and, in his comment on the RAN, the considerations affecting the navy's advocacy of a carrier-borne strike force. One consideration of importance is that even a moderate-sized carrier with its aircraft is likely to cost a hundred million pounds and views are held that more than one would be required on account of a carrier's vulnerability. The organization and capacity of the army is also described in detail, leading to the justifiable conclusion that "if war comes, we have at least a basis for rapid and orderly expansion without (as in the past) an initial period of hasty and confused reorganization. The army has a role and is in a position to develop it."

Defence Production receives consideration, and the important contribution of our Government factories, which provide almost one-fifth of the Services' needs in arms and ammunition, is acknowledged; the remaining four-fifths of requirements are provided by civil contracts placed by the

Department of Supply. Defence Science and Intelligence and Security also receive appropriate reference. The author's remark that little use is as yet made of the C.S.I.R.O. for defence purposes calls to mind the very important contribution made by that organization during the last war, and the refusal of the Chairman and Council to continue to do work for the Services after the war — despite the urgings of the Services — mainly on the ground that the role of C.S.I.R.O. was fundamental research and that the Services should provide their own establishments for their needs. It is surprising and regrettable if it is correct that "there still lingers a mixture of apathy and suspicion" to Defence Science in the Services. Much comment could be made on Defence Production and Science if space permitted, as well as on Civil Defence activities and Defence Economics. Regarding the amount we can afford for Defence expenditure it is of interest that "Try as the Cabinet may it is unlikely to increase expenditure on defence to the stage where it comes within sight of expenditure by the public on various legal forms of gambling." At the time of writing the ABC radio news has announced that in Queensland alone £72 million nas been gambled on horses in the past year.

The chapter on Regional Defence pays special attention to New Guinea in relation to neighbouring Indonesia and the various agreements affecting its defence.

Finally Dr. Millar sets out his Conclusions and Proposals which need to be examined in detail. Although in general agreement with his view that the public should be sufficiently knowledgeable to discuss or put forward proposals on major matters affecting defence preparedness there are many matters or projects, especially those relating to new forms of equipment, on which only professional and technical advisers are competent to express an opinion. Nevertheless the wider the ability of the citizen to express an opinion on defence preparedness the greater the facility of the Government in planning the expenditure required in accordance with the recommendations of its military advisers.

Dr. Millar's book is a very fine contribution towards the attainment by Australians of a higher degree of awareness of defence needs and action to provide them.