

ARTILLERY

2nd Lt G. Gertsch

Introduction

How strange appears today the state of confusion over modern warfare, in which the rumble and roar of technological wonders have replaced the traditional clash of steel and twang of bow strings. How different from the days when an army could turn its victory upon the routing of a band of clodhopping peasants, armed only with brickbats and pitchforks. A strange milieu for the average 20th century man — bristling with lethal weapons yet terrified of the latest devilish devices thought up by latter-day alchemists; as vulnerable to the foe as ever a warrior was.

Science and technology have produced a greater transformation of the physical conditions and apparatus of life in the past century than had taken place in the previous two thousand years, and modern nations have, as a result, become possessed of complicated instruments for multiple destruction at long range.

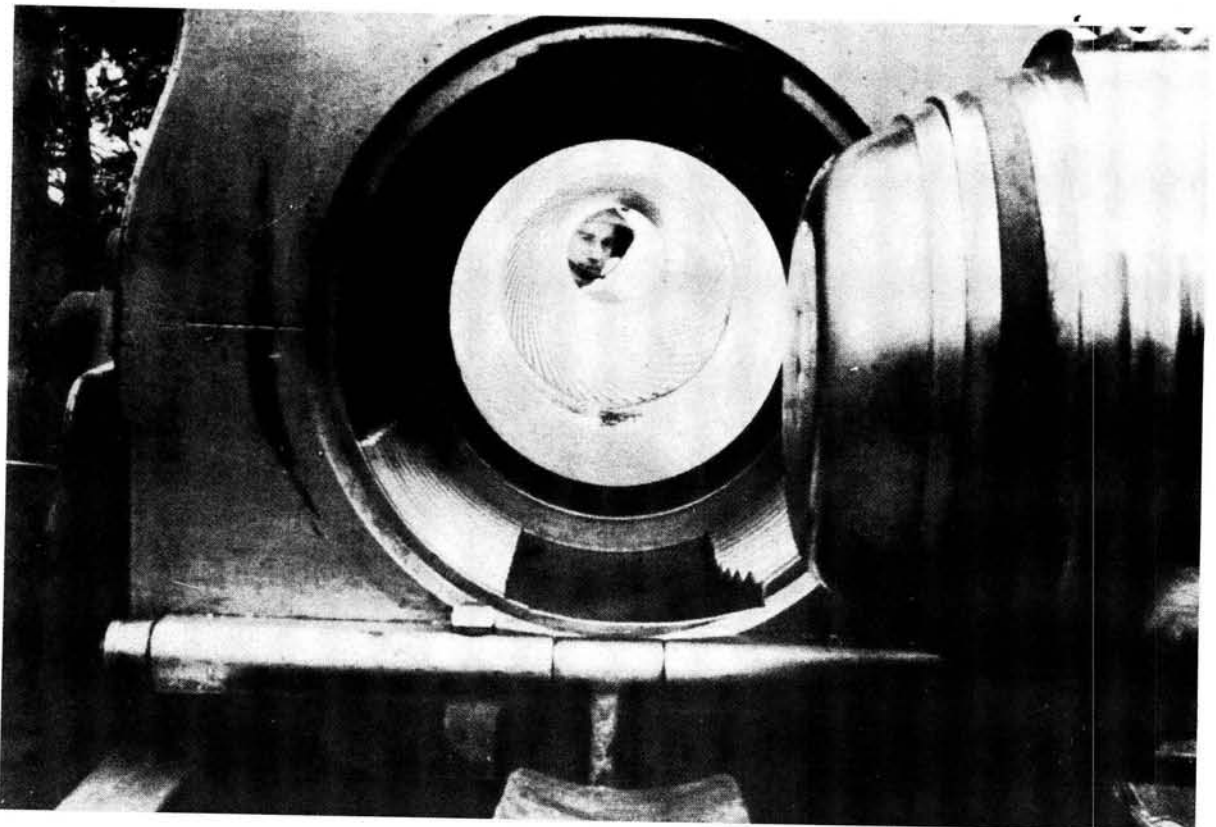
Put together this background with the following two comments, taking cognizance of the very different eras from which they come, and one may well aver that confusion can overcome any attempt at a clear perspective on nations protecting their sovereignty:

It is absolutely beyond all doubt that the man who shoots without stirring has the advantage of him who fires while advancing . . . It is fire effect, nowadays so powerful, which will determine the issue.

Count von Moltke (1800 - 1891).¹

It is no longer essential in nuclear war that the attacker has superiority over the defender — three or four to one was formerly considered desirable. Fire-power will make up the difference.

NATO Commander, General Hans Speidel.²



US 155 mm howitzer, as used by the Israeli Defence Force. This striking view through the bore of a modern artillery piece reveals the precision, complexity and size of today's weaponry. ('Artillery through the Ages')

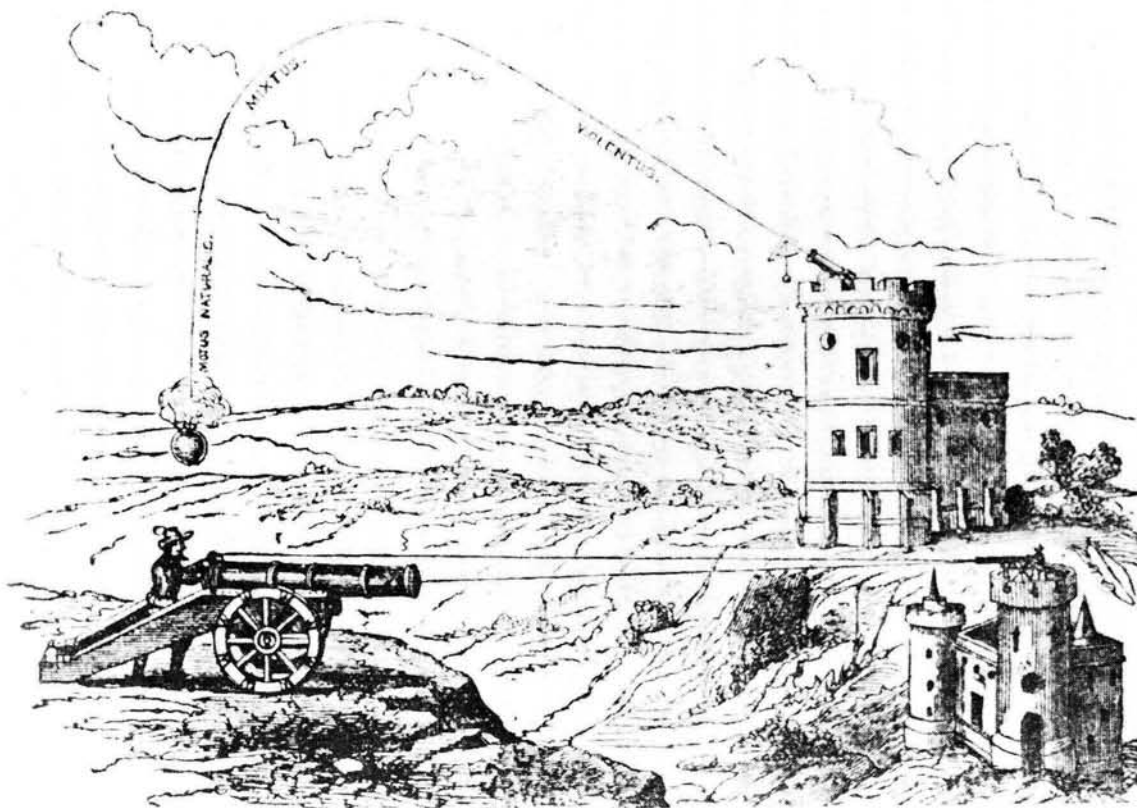
To introduce artillery, the Queen of the Battlefield, into this kaleidoscopic medium of intermingled air, fire, earth and steel can well lead one to believe that it has been a constant element of warfare through the ages. Consider that in China around 1200 AD, a roll of yellow paper, to a thickness of 16 layers, filled with rudimentary explosives, fixed at one end and stopped at the other with scraps of iron, was fired at opposing troops with mortal effect.

Across this immense field of time and conflict, man's ingenuity has created various patterns of warfare, various methods of curtailing the enemy's ability to exercise his will, from the Chinese example above, to Shakespeare's 'vile guns' of the Renaissance period, to the electronic wizardry which turned the battle for the Israelis during October 1973. An incredible leap from the crude to the marvellous. But throughout, the role of artillery has been controversial, although its importance has been emphasized by figures as dramatically opposed to each other — in both temperament and military outlook — as Stalin and Goering. It was Stalin who once remarked that artillery was the *god of war*, and

Goering who exhorted the German people to remember that *guns will make us powerful; butter will only make us fat*. A brief look at some of its history will put present day artillery into perspective (but just a definition: the term 'artillery' may be taken to cover any non-personal offensive weapon in which gas pressure derived from the combustion of a propelled charge ejects a missile. The gun is in fact a form of temporary closed vessel, one wall of which is weaker than the others and so inclined to give way under pressure. Thus the gun and its charge form one unit. Neither can function in a propelling capacity without the other, and the idea of a cannon would have remained still-born without the discovery of gunpowder).³

History

The introduction of the cannon, which had already been known in Europe for some 20 years at the outbreak of the Hundred Years War in 1337, was linked to a greater development — gunpowder. There is no questioning that the employment of artillery literally revolutionized the art of war as it had been practised during the later Middle Ages. For one thing it made possible



A drawing of about 1620 illustrating the ballistic beliefs of the time : that direct-fire guns shoot in straight lines and mortars have a three-piece trajectory. (Hogg: 'A History of Artillery')

the reduction in merely a few weeks of enemy-held defensive positions that had formerly been considered impregnable for centuries.⁴ *With the discovery of gunpowder, says Maj Genl J. F. C. Fuller, war passed into its technological phase. Valour gave way to mechanical art: he who could wield the superior weapon was the more formidable foe, irrespective of his social status or his courage. For as Carlyle has said, the genuine use of gunpowder is 'that it makes all men alike fall.' In short, it democratizes fighting.*⁵

Its appearance on the world's stage thus introduced a further factor into the art of war and made new modes of attack and defence available to commanders in the field, an event which ultimately caused the whole notion of battle to be modified. Artillery was the major breakthrough of the fourteenth century, comparable to that of splitting the atom in the twentieth. But its arrival created less stir on the military scene except for its novelty, noise and smoke, and was often regarded as more of a hindrance than a help in the pursuit of victory — its main value as a weapon during its incipient stage was its power to terrorise the superstitious. As a short, pot-bellied, vase-shaped instrument, weak in its effect, uncertain in its performance and perilous in its use, the early cannon was a parody of things to come. The gunners craft, meanwhile, was regarded as verging on the miraculous and this was held to account for the profanity of the artilleryman's language all over Europe — those

who dabbled in infernal substances were said to partake of the devil!

But broadly speaking, artillery material rested on what laurels it had till the middle of the nineteenth century. Progress then set in with a vengeance and the slow 'arithmetical' advance of the preceding five hundred years gave way to the 'geometrical' progression of the last century.

In conventional warfare the main fire-power producer was the light, direct-fire artillery piece, deployed in the forefront of the battle at the shortest possible range. It relied on teams of horses for its mobility and used an efficient and sophisticated modern development of 'spherical case' — Shrapnel — which emitted a pattern of sub-missiles suitable for killing infantry in the open and for searching behind reverse slopes and into trenches. The increased efficiency of artillery made counter-battery a suicidal business at short ranges; in addition the South African war had demonstrated that infantry small arms could kill the gunners and immobilize the horses at ranges hitherto the exclusive prerogative of the artillery. The field artillery was therefore driven from the battlefield to take cover from fire and to use indirect-fire techniques, whereby the target was invisible from the guns, the relative position of the gun, targets and a forward observer fixed by survey methods, and fire controlled by the forward observers via telephone.

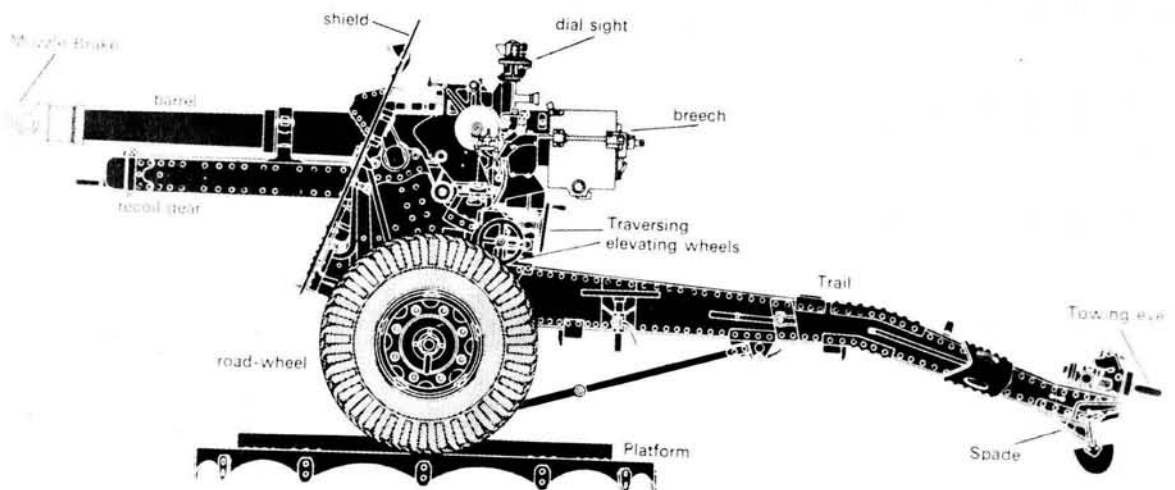


Fig. 1.1 Anatomy of the Gun

Anatomy of the gun. (Brassey: 'Artillery of the World')

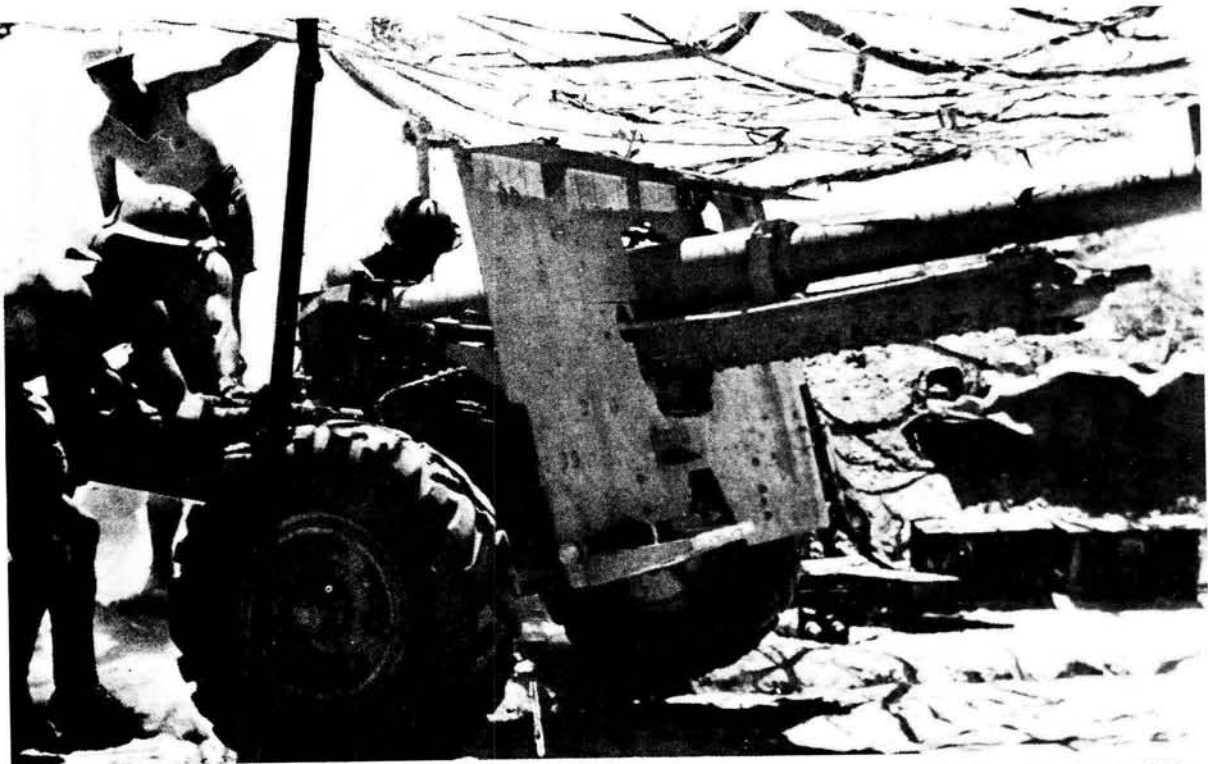
The machine gun, the most decisive weapon of the war, posed a problem: the difficulty of using artillery against machine guns was that at the longer ranges, with the indirect methods entailed, there was a falling-off of accuracy, which meant that belts of fire had to be laid down in the hope of blanketing all the likely positions.⁶

The role of indirect fire now seemed to be limited to what used to be the role of siege artillery; to preliminary battering of enemy positions and cutting gaps in wire obstacles. The whole artillery system was seen as obsolete because it was thought to be essentially static. This was a misconception since in the event indirect-fire artillery progressed as a system for the same reason as did the tanks: because of new methods of radio-communication and better propulsion.

The natural consequence of the barrage techniques which were then developed was a struggle for artillery dominance. Between 1914 and 1917 the science of artillery advanced from an occasional resort to indirect fire to its universal use at so refined a pitch that it was possible to fire a full-scale bombardment on calculations from meteorological, ballistic and survey data without any 'ranging' or preliminary adjustment of fire.

However, being driven away from the front of the battle was not a diminution in the strength and effectiveness of the artillery arm, but, paradoxically, an enormous increase. Lying well back in its concealed positions it greeted an attacker with a galling fire from guns he could not see, and to which he could not retaliate with any certainty. The fire of many guns could be brought to bear on any point all across the front by a mere turning of handwheels by the layers without the need to move the guns. In an attack a mass of artillery could be collected secretly at the decisive point to strike a blow without warning to achieve the most valuable thing in war — surprise.

Practice was not to follow theory, however, for the concept of the 'rolling barrage' which evolved during the latter half of the war was a failure — battery faced battery, and a quantitative escalation of effort and lives led to the 'war of attrition'.⁷ The deadlock in tactics was due primarily to the imperfection at that stage of artillery as a 'weapon system';⁸ also to its lack of range, its lack of mobility and above all to its lack of a reliable system of signal communications. From 1917 onwards, there was no doubt that the one essential thing was to get away from the siege mentality of Flanders and restore mobility and flexibility to the operations of war. The



The British 25-pounder (3.45 in) field gun-howitzers. With a range of 13 400 yards and a formidable anti-tank capability, it was undoubtedly the best all-round gun of the 1939-45 war, and also saw extensive service in the Arab-Israeli wars. ('Artillery')

sophisticated invention of indirect fire-power was therefore followed by an effective regression to direct fire in the shape of the armoured fighting vehicle, which in turn was effectively countered by the aerial weapon-platform of great sophistication, and so on.

The new battlefield

Mobility, hitting-power, protection — these have been, through countless situations of conflict, the keys (or some of them: morale, for example) to victory.⁹ Where other things — surprise, or concentration at the decisive time and place, or skilful manoeuvre — have won battles, they have usually derived from superiority in mobility, hitting-power and protection, or from superiority in one or two of these qualities.

In the years between 1917 and 1948, artillery lost its role as the dominant weapon of the battlefield, in the face of sweeping changes: the development of deep infiltration as a basic tactical principle, and the development of new weapons that, used together, became for a period decisive — the essential feature of those weapons, the tank and the plane, being that they can move very much more rapidly than any decisive weapons hitherto possessed by armies.¹⁰ Decisive strategic manoeuvre had before 1917 been tied to the pace of men marching and the rate of advance of the rolling barrage before them. With the change in mobility, artillery lost, during the Second World War, its role as a strategic offensive weapon, its former functions being largely taken over by air-power. It was no longer, with the infantry, the paramount striking arm of 1914-18. Yet, in the Second World War, armour and artillery possessed much greater fire-power, and the mobility of the new weapons made more mobile tactics possible. Scientific and technological progress made great strides and enabled the contestants to overcome many of the natural obstacles that had hindered earlier armies. The improved performance of land vehicles increased the momentum of the battle and, at the same time, the fire-power and effectiveness of guns were such that the value of static fortifications was greatly reduced. Furthermore, field artillery, which had been up till then relatively immobile, was wedded to the tank chassis to produce the self-propelled gun, which meant that artillery could advance and deploy much more quickly than had been the case in previous wars. Difficult country, that had been churned into a morass in the First World War, was

traversed with comparative ease by tracked vehicles.

It is still a weapon of first importance, though, as has been demonstrated in modern battles: by the Vietnamese against the French at *Dien Bien Phu*, by the Israelis against the Arabs in 1967, and notably by the North Vietnamese against the South in 1972. All good systems are capable of evolution and improvement, and modern artillery derives its strength from its mobility, its flexibility, its ability to exploit new methods of control using computers and new methods of movement like helicopters. The artillery of the First World War was, it is perfectly true, relatively static, its projectiles less lethal and it depended largely on telephone cables subject to endless breakage by shellfire. Nevertheless, it was indirect-fire artillery which first really evolved into a true weapon system, and this on the largest scale.

The Arab-Israeli conflict

The Israeli Defence Force, or the 'Zahal' was established in 1948 at the close of the War of Independence. It inherited from the volunteer force a tradition of spirited fighting, a penchant for improvisation, and eighty-four medium mortars, their heaviest weapons.

From 1948 it became apparent to Israel's planners that, because of the country's unusual situation, its strategy and tactics could not be of general applicability; they were conceived in direct response to the geographic setting and the specific nature of Arab military forces. A relational approach such as this had three main facets: a 'short-war' assumption, an offensive orientation and a first-strike requirement, which magnified the importance of a pre-emptive attack since it was thought that neither side would have enough time to recover from the effects of a powerful opening blow. Taken together, these factors dictated the structure of the *IDF*, which was reshaped around fast-moving armoured forces on the ground and a strong Air Force.

The basic field formation was the brigade, or regimental combat team, which varied in size from about 3 000 to 4 500 men, depending upon its type. The Israelis normally mobilized up to fifteen brigades at a time, usually a mixture of armoured, mechanised and infantry, and including three artillery brigades.¹¹ Starting with this handful of old field guns and a cadre of ex-Red

Army gunners in 1948, the artillery was always recognized as dependable and technically proficient; its problem was that in a movement-orientated Army the value of heavy indirect fire from static positions had been underestimated. It was not until the Sinai battles of 1967 that the gunners were finally given an opportunity to show what they could do.

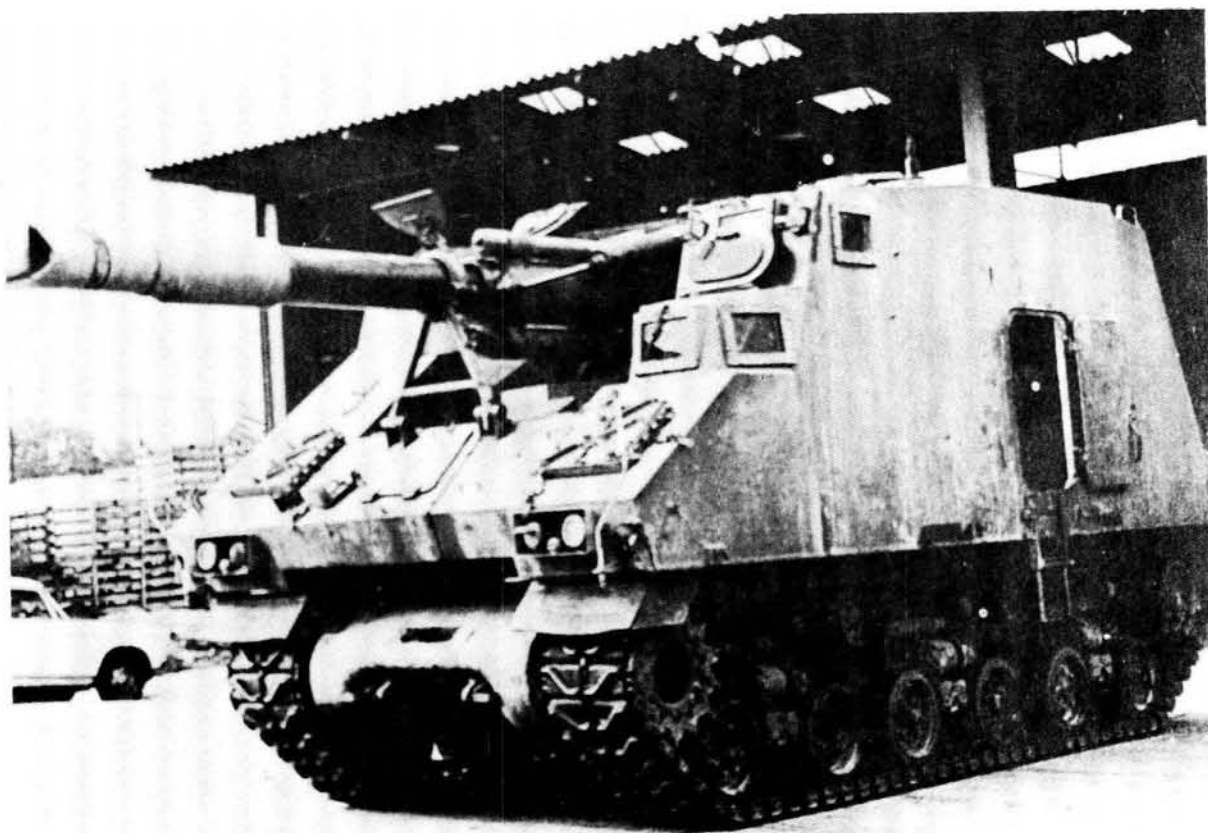
In the meantime, the artillery did not receive a high priority, and its equipment was mostly antiquated: cheap, Israeli-made heavy mortars (120 mm and 160 mm), towed or mounted on ubiquitous M3 half-trucks, and old towed weapons of British origin (twenty-five pounders and some anti-tank eighteen pounders).¹² The only modern self-propelled weapons were 155 mm howitzers mounted on an Israeli-converted Sherman tank chassis and French-made 105 mm howitzers (*AMX-105*). Both were grossly out-ranged by the Russian field guns of Egypt, but both were mobile and during the 1967 War they usually managed to come within shooting range of their targets without hindrance. However the lack of long-range guns did not make itself felt until well after the 1967 War, when the War of

Attrition (1969-71) taught the Israelis the virtues of heavy artillery in a static contest of fire superiority.

To sustain the pressure on all fronts, but primarily to contain the Russo-Egyptian offensive, the Israelis had to deploy an unprecedented defensive effort after 1961. Ta'as, the weapon-production affiliate of the Ministry of Defence, set out to make Israel self-sufficient in light arms and all types of ammunition. Two new weapons, a 160 mm heavy mortar mounted on rebuilt Sherman chassis, and a 90 mm anti-tank gun mounted on half-track carriers, were produced for the artillery.

Israeli battle tactics had, since 1956, utilized the 'armoured punch' (concentrated head-on assault by tanks), deep penetration and the pincer movement. Pride of place in the Israeli Army was given to the armoured corps, just edging out the air force, while the other arms had a lesser priority. It is here that the seeds of their close failure in the 1973 War may be found.

The blitzkrieg era began in 1918 when the introduction of the tank restored tactical mobility



155mm self-propelled howitzer L33. The first heavy artillery weapon to be designed and built in Israel, the L33 consists of a Tampella-designed M68 howitzer mounted on a modified M4 Super-Sherman tank chassis, and has been in use since 1950, largely in a counterbattery role. (Brassey: 'Artillery of the World')

to a war in which gains of a few hundred yards previously had been hailed as victories. It reached its apogee in Luderian's famous race to the Channel during the German campaign of 1940 against France and the Low Countries. The essence of Blitzkrieg was the utilization of the tank's mobility and shock power to smash through tactical defences.¹³

However, the tank's exalted position as arbiter of the land battle — which guaranteed the superiority of the tactical offensive — progressively eroded in the face of resolute defences employing a combination of deep fixed positions and concentrated fire-power designed to absorb and break up armoured assaults. The superiority of tactical defence over tactical offense was conclusively restored in the Yom Kippur War, the supremacy of defence stemming from the enormous increase in recent years in fire-power at the expense of mobility and protection; a development attributable, in large part, to the proliferation of comparatively cheap, simple and highly accurate weapons capable of destroying armoured fighting vehicles and aircraft.

Israeli obliviousness to the implications of the revolution taking place in fire-power — symbolized by the advent of precision guided weapons capable of being produced and used on a massive scale — was evident in the *IDF's* continuing heavy investment in armour at the expense of mechanized infantry and artillery.

No less infatuated with the quick, decisive victory promised by a Luderian-style Blitzkrieg were the Arab military establishments whose forces and doctrine were modelled along Soviet lines. Experiences from the Second World War provide the basis for most of current Soviet offensive doctrine — the war saw an increasing reliance on the use of massed artillery to facilitate offensive operations, and massed fire and extensive artillery fire support became firmly entrenched in doctrine.¹⁴

Although the requirements for the fire support persist, the Soviets believe that several aspects of future conflicts will differ widely from those of the Second World War: *mobility* — future conflict will be violent and swift; artillery will no longer be afforded the luxury of being able to group behind the frontlines of a solid front and conduct organized displacements; and *lethality*: the ABC warfare environment, the use of anti-tank guided missiles, improved conventional muni-

tions, and more capable ground attack aircraft, significantly decrease the chances of survival. With the need to furnish the kind of fire support the Soviets call essential under the new stresses of the 'modern battlefield', it is not surprising that *SP*artillery began to appear in the early 1970's in the Soviet Army.

There are two major types of artillery support in the Soviet scheme of manoeuvre:

- a. *indirect fire by division artillery from concealed positions*
- b. *direct fire furnished predominantly by artillery (normally organic to the motorized rifle regiment) accompanying tank and infantry units in the same attack formations.*¹⁵

The remarkable degree to which Soviet force structure and doctrine seems to reflect allegiance to a mode of warfare now demonstrably obsolescent, has been seen as one of the most notable military curiosities of our time.

A corollary to this inconsistent obsession with the Blitzkrieg was of course the relative lack of attention given by Israel to tactical artillery support. The success in 1967 of the Israeli Air Force providing close ground support caused their artillery arm to be sorely neglected, and in fact the very success of armour and airforce in the six-day war obliterated the fact that a serious force structuring error was present.¹⁶

As noted above, air-power in previous wars had taken over the task of the artillery of delivering fire-power — a transition from indirect to direct fire as a consequence of the heightened interest in mobility. This strength of air-power had become very plain to Israel in 1967; as a result the air arm had become the premier arm in support of the tanks.¹⁷ It was felt that, in collaboration, tanks and aircraft could win any war, and because of this fact, the need for artillery was correspondingly reduced.

Yet despite this, there was one Israeli commander in the 1967 War whose use of artillery was a major innovation for the Israeli Army — Ariel Sharon. The composition of his division was a most unlikely combination of all possible types of forces and tactics; it included an infantry brigade, two paratroop battalions, the largest artillery force ever assembled by the *IDF*, and a single armoured brigade.¹⁸

His fire tactics at *Umm Katef* were to concentrate heavy volumes of fire on specific targets for a short period just before or during the attack itself. Lengthy artillery barrages in the Russian manner were ruled out. Short, sharp artillery attacks do not need vast quantities of ammunition, but they do depend on the ability to reach and hit specific targets. In a war of movement this requires mobile, self-propelled artillery so as to keep within range of moving targets and evade counter-battery fire. In contrast to this, the Egyptians followed Russian artillery doctrine, which emphasizes the value of lengthy and heavy barrages launched from static positions. Such tactics require a great deal of ammunition and a vast tube capacity, but the guns and howitzers need not be self-propelled: their fire is to move across the battlefields but the weapons themselves remain static. Accordingly, the Egyptians deployed several hundred towed field guns and howitzers in Sinai; they had no self-propelled field artillery at all.

It can be seen then that two major faults were present in the *IDF* as far as artillery was concerned: its position in the structure of the defence force, and its deployment (apart from Sharon's isolated case, which was largely seen as an erratic whim of this maverick commander) as a neglected after-thought in what was chiefly seen as a lightning war for fast armour and aircraft. These were to have serious repercussions in the war of 1973.

October 1973

Throughout the six years of conflict (called the War of Attrition : 1967-73) until the Yom Kippur War brought disillusion, Israel's military attitude had been one of complacency and self-satisfaction.¹⁹ In the first two days of the surprise war the Israelis were stunned by the force of the Arab onslaughts, and by the ineffectuality of their defences: the failure of their air support, and the breaching of the *Bar-Lev* line with its inadequate artillery reinforcement.

Through sheer expertise and the performance of her aircraft and armaments, Israel had long outmatched the Arab air forces and thus strongly influenced the whole of Arab strategy. The *SAM* defences were the Arab counter to the Israeli Air Force, and were remarkably effective.²⁰ The balance therefore shifted against the fighter-bomber, its task of delivering direct fire obviously became more difficult in the face of the dense *SAM* defences and anti-aircraft artillery.

It is now clear that the big discovery that emerged as a result of the 1973 war was that not even the *IAF* could operate freely any more — the effect of *SAM*'s and the *ZSU-23-4* artillery was to make operations by the *IAF* not free, but very expensive indeed. In effect, the Israelis found that close air support as they had come to know it was dead.

The conclusion one can therefore make from this is that, without close air support, ground forces have to rely on their own indirect fire weapons. Far from there being the reduced need for artillery, as was thought during the 1967 war, the *IDF*'s lack of adequate fire-power to cover some of its most important defensive positions became a glaring embarrassment.

It may be rather an understatement to say that Israel was unprepared for the initial Arab assault: not only were the Golan Heights and the *Bar-Lev* line undermanned, but early efforts to stem the tide while the country mobilized were ill-co-ordinated. It was reported that in Sinai artillery support was largely ineffective due to the loss of communication codes, while on the Golan Heights massed Syrian armour was halted only by a combination of exceptional bravery in the face of heavy losses, individual skill and the superior punch of the Centurion-mounted 105 mm gun.²¹ A brief look at the uses made of artillery by both sides can be seen by examining some of the aspects of the Egyptian assault into Sinai.

In the Suez theatre, the deployments of the two sides along the Canal were entirely different in size and design.²² The Egyptians massed tens of thousands of men and several hundred heavy mortars, howitzers and guns in a series of fortified lines laid out in depth behind the Canal. The Israelis only kept less than a thousand men on the other side in the *Bar-Lev line*, a chain of small strongholds from *Ras el Eish* in the north to Port Tewfik in the south. Each stronghold was quite small and self-contained, having a detachment of two or three tanks in lieu of artillery emplacements.

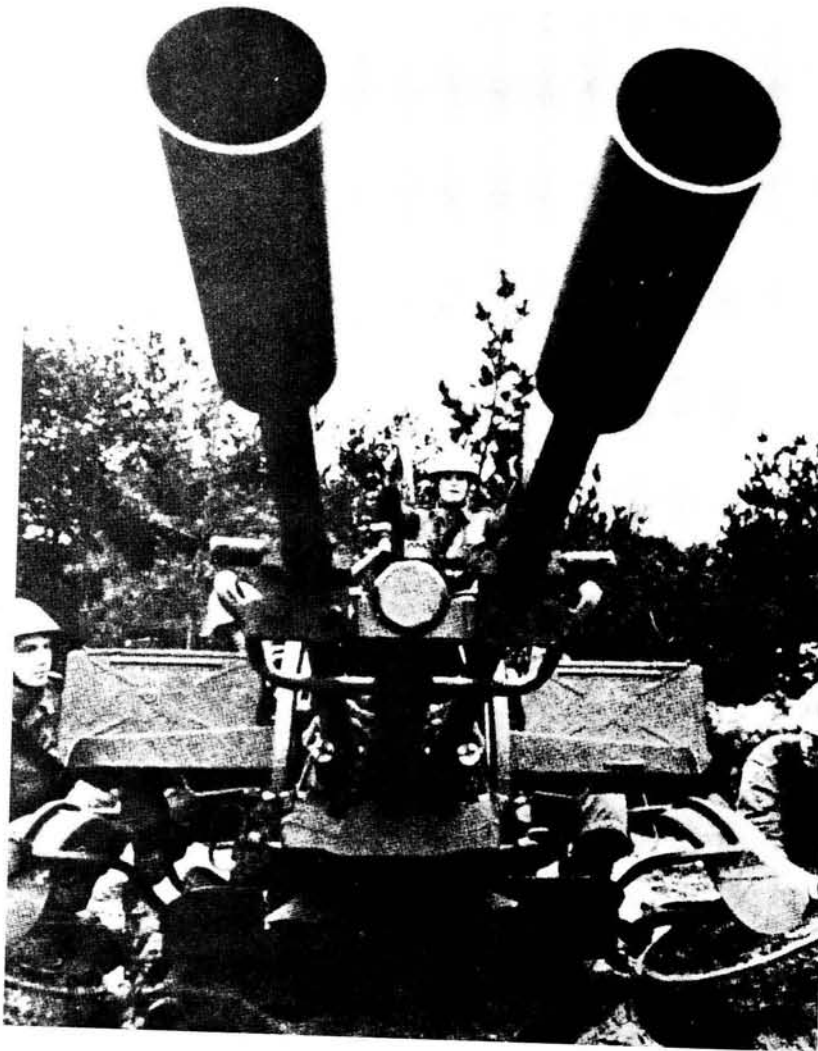
Since the Egyptians had many more artillery weapons, and since they generally outranged the Israelis, the latter could not hope to defeat or even contain the Egyptian artillery offensive by conventional means, ie, counter-battery fire. So,²³ on the night before commencement of *Operation Badr*, during the hours of darkness, the Egyptians had brought their guns and mortars

forward, immediately behind the shielding sand rampart and had positioned their tanks on the pyramids. At S Hour, 1405 hours, about two thousand weapons opened with a tremendous conventional barrage; about half were fired directly at the *Bar-Lev line*. The other half, mainly mortars and long-range artillery, used indirect fire on the targets behind the Israeli defences in four lifting phases which lasted for fifty-three minutes. In this barrage some 10 500 shells and bombs were fired at the rate of 175 a minute.

The Egyptian artillery generally had six guns to a battery and three batteries to a regiment. It had changed from the British technique of 'all-round fire' to the Soviet mode of massed guns all firing on the same arc, usually of not more than ninety degrees.

On the other side of the Canal, it was the Israeli

intention, once the alarm went, to use their tanks as makeshift artillery, by getting them onto the firing platforms on the secondary sand rampart of each stronghold, from which they could either use their guns for overhead fire or their machine guns to the flanks to catch any attacker between the ramparts. Artillery support initially consisted of 28 self-propelled guns, which was later increased to seventy.²⁴ These were in direct support of the infantry fortifications, and therefore little suppressive fire was available for counter-tank defence. The Israelis anticipated an initial reaction time of thirty minutes in bringing their tanks up from behind the Line, but the Egyptian tank hunting teams seem to have won the time and space race — the Israeli tanks charged headlong at great speed, with hull down and sometimes firing on the move, into the barrage of Egyptian missiles and rockets, but all were halted with loss.



The twin-barrelled ZU light anti-aircraft gun manufactured by the USSR and supplied to Egypt in a highly effective 4-barrel version (ZSU-23-4) (Foss: 'Artillery of the World')

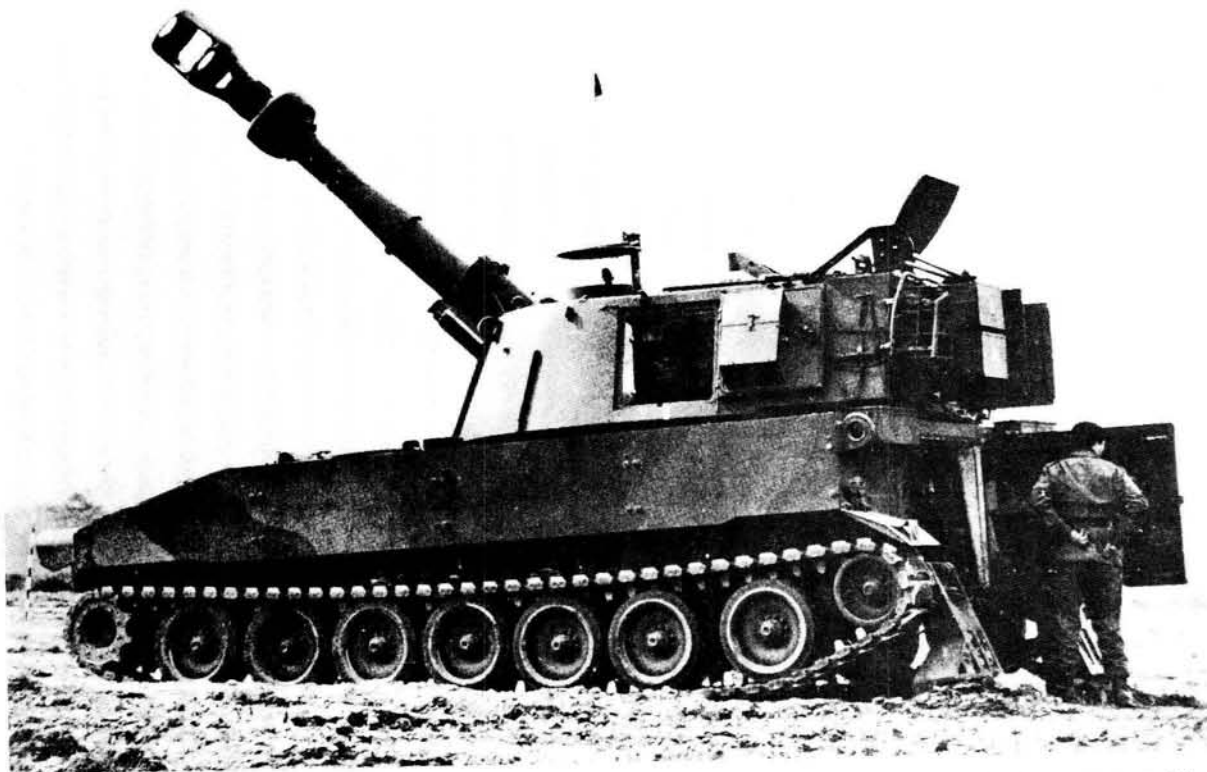
The Israeli guns at *Budapest*, one of the northernmost strongholds, were knocked out of action in the initial barrage by marine-manned guns at *Port Said*, and air strike. The barrage lasted for two hours, and shells were fired at the rate of thirty a minute. It was afterwards admitted by the Israeli director of artillery in a lecture in France that they were not able to fire at all during the war, although the position had ample ammunition.²⁵

For the Israelis on the east bank, the afternoon of the sixth (the first day) was one of great confusion that at times verged on panic. The personnel in the *Bar-Lev* line, for example, who were relied upon to pass back detailed information about the invasion force and to direct the fire of the Israeli guns, lying back in positions along Artillery Road, were unable to see what was happening because of the dense smoke blanket that had been deliberately put down by the Egyptians. There was also confusion over code words, map co-ordinates and recognition signals; no-one seemed to know what others were doing, and there were instances of Israeli tanks and guns shooting at each other.

The aim of employing tanks in place of artillery was seen before the war by the Israelis as a cost-effective method of lightly holding the *Bar-Lev* line. In theory, the armour was to lie concealed in ambush positions, hull down, and, when the Egyptians came within range, the tanks were to open fire with a few rounds and then move to alternative positions to fire again. In the event their positions were completely overrun by the Egyptian Sagger-carrying infantry.

Post-War changes

The poor showing in the Yom Kippur War of Israel's tanks and aircraft against missiles implies not only the age-old battle for superiority between methods of destruction and methods of defence, but it also emphasizes the fact that conventional warfare in the nuclear age is still a distinct possibility. That there is a role still for artillery,²⁶ in spite of the guided missile and the atom bomb, has been proved in the Arab-Israeli conflict. Conventional artillery has not become obsolete; it has to do the job where nuclear devices will not be used because the troops of both sides are in close contact or the target does



An American M109 155mm self-propelled howitzer. A standard workhorse for general support in the western world, the M109 is in service with fifteen defence forces around the world, including Israel, and embodies the most coherent attributes of modern artillery thinking. Note the prominent fume extractor and muzzle brake. (Brassey: 'Artillery of the World')

not warrant nuclear attention — the essence of the limited war.

Israel entered the October War with the firm belief that all it needed in arms and ammunition was amply available. Nevertheless, when the test came in 1973, it found itself a poor army unable to sustain a rate of expenditure and attrition that exceeded anything that had been thought possible before.

Since the War, Israel has therefore engaged in re-armament on a massive scale. The artillery, whose importance was dramatically demonstrated, has witnessed the greatest growth of all the services, the number of formations going up by as much as 85 per cent.²⁷

According to a number of sources, the 105 mm gun was found to be relatively ineffective — except for helicopter operations.²⁸ However, the medium guns, 130 mm and upwards proved effective, especially in the role of tank killers. Three regiments of 155 mm guns did stop a battalion of tanks, on several occasions. The effect was achieved because a tank which was hit, wherever the impact might be, was killed; and moreover in a thick concentration the tanks which were not hit still lost airdrops, tracks etc. Some T62's had their fuel tanks punctured by splinters, and the Israelis think that a mixture of High Explosive and White Phosphorus may be useful against the T62.

It follows from this that the divisional artillery ought, as far as the IDF can see, to be 155 mm, and that it should be used as a rule in the mass and controlled from a divisional Fire Support Control Centre. The Israelis argue further that, because of the effectiveness of guns firing in concentration, you cannot afford to dissipate artillery effort by providing a guaranteed response to calls for fire from individual units and sub-units.

The Israelis therefore regard their guns as a weapon which should be used in the mass to have a real effect on the armoured battle.

Three priorities can therefore be isolated from their experiences in the various wars fought against the Arabs:

- a. *general support.*
- b. *counter bombardment— the Egyptian gun line is formidable; since it is mostly towed,*

neutralising counterbombardment is economic and effective.

- c. *response to unit calls for fire — despite the demands of the other priorities, there is still a need for an immediate response to calls from units for indirect fire support. Just as SAM and the consequent reduction of close air support have enhanced the importance of artillery as a divisional weapon, so SAGGER and other anti-tank weaponry have emphasized the need for immediate indirect fire support in the unit and brigade battle. Put another way, great as may be the need for artillery to join in the attack on enemy tanks, there is a comparable need for indirect fire to assist in the operations and manoeuvre of our own tanks.*

An inference which can be drawn from this is that the artillery, armed with 130 mm guns or better, should be free to concentrate on their chosen task, to help in the defeat of the enemy tanks and to engage and destroy the enemy guns.

Changes in operational and tactical doctrine have thus been forced to make their appearance. Though the tank may still be king, the kings are now expected to form part of a well-integrated team embracing artillery, infantry and anti-tank troops.

Overview

Conventional artillery has undoubtedly forfeited some of its functions to rockets and missiles, but it is clear from recent experience that missile weapons have by no means superseded guns. In fact, conventional artillery seems to have experienced something of a resurgence in recent years. This trend is strongly indicated in several ways.²⁹

- a. *the continuing emphasis on conventional guns in the Soviet armed forces. It is now estimated that one-third of the Soviet ground army consists of artillery, and most of the weapons of this arm are conventional tube artillery.*
- b. *the vast programme for modernizing its conventional weapons that was carried out by the US Army during the Kennedy administration. A major target was artillery.*

This revival of conventional artillery must not be seen as indicative of a retreat from technology, but, rather, an admission that, if we are all to survive, some way must be found to meet a variety of threats to world peace.

The Arab-Israeli wars of 1967 and 1973 revealed, however, the flaw in Soviet doctrine. The army of the UAR, equipped with Soviet tanks and guns, followed Soviet tactical doctrine, and the Israeli army was equipped with American, British and French tanks and guns, most of which were SP support guns, including some heavy types on the Israeli-designed mounts. These guns acted in support of Israeli armour but did not operate directly behind the tanks, remaining beyond the range of the enemy's tank and anti-tank guns. Thus they could operate in relative safety and, by using indirect fire, provide artillery support for the armour (discounting, of course, their lack of range in comparison with Egypt's heavy artillery, their lack of numbers, and the failure in their tactical deployment). Egyptian artillery, on the other hand, was towed to a fixed position and, more often than not, remained there after Israeli armour had bypassed it or the IAF had bombed the position. It was soon evident that Soviet-built heavy guns simply could not function effectively on a modern battlefield.

APPENDIX A : Artillery supplied to Israeli Defence Force³⁰

USA manufacture:

175 mm SP gun (M107)
155 mm SP howitzer (M109)
155 mm Howitzer (M114A1)
105 mm Towed Howitzer
106 mm Recoilless Rifle (M40A2)
75 mm Recoilless Rifle (M20)
20 mm Vulcan AA gun (M61A1)

British manufacture:

105 mm Light Gun
25 pounder gun

Israeli manufacture:

155 mm Gun/Howitzer (M71)
155 mm Howitzer (M-68)
155 mm SP gun/Howitzer (M68)
160 mm Tampella mortar (M66)
120 mm Tampella mortar
120 mm Light Tampella mortar
81 mm Tampella mortar

Artillery supplied to Egyptian Defence Force³¹

Soviet manufacture:

180 mm S-23 Gun/Howitzer
152 mm Gun/Howitzer (M-37)
130 mm Field Gun (M-46)

130 mm Coastal Gun (SM-4-1)
122 mm Howitzers (D-74, D-30)
122 mm Howitzer (M-1938)
100 mm Field Gun (M-1955)
100 mm Field Gun (M-1944)
100 mm SP Anti-Tank Gun (SU-100)
85 mm SP Anti-Tank gun (M-1945 : D-44)
76 mm Divisional Gun (M.1942 : Z15-3)
57 mm AA SP Gun (ZSU-57)
twin 23mm AA Cannon (ZU-23)

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Footnotes

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