

Royal Artillery Day

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About 20,000 people turned up at the School of Artillery, Larkhill, to see the annual fire power and static demonstration. More than seventy guns of calibres from 105 mm to 175 mm fired concentrations, engaged tank targets and demonstrated their mobility and speed in and out of action. Personnel and guns arrived in the arena by helicopter, from landed C130 aircraft, by parachute and abseil, by SP guns, Landrovers and even on skis on a specially laid 'track'. Radar controlled Bofors 40 mm light air defence guns 'engaged' low flying Jaguar aircraft and gunners used medium machine guns on their Abbot SP guns to shoot down a radio controlled MATS model aircraft. These fast flying models are now in regular use for AA practice.

The principle guns used in the fire power demonstration were the Italian 105 mm pack guns in use by the Commando and light regiments today but soon being replaced by the new British 105 light gun described in a number of military journals. The Junior Leaders Regiment manned the last battery of 25 pdrs still in service, 3rd Regiment RHA used the 5.5 inch for the last time, they are converting to become the Swingfire anti-tank regiment in Germany, and there were bat-

teries of the SP Abbots as used in the SP regiments of the RA. The SP 155 mm and SP 175 mm were also represented during the firing. The US MGM 52C Lance missile is replacing the Honest John as the nuclear weapon in the field army. The first Lance have been fired on the Hebrides range recently. The Lance has a range of 140 km and weighs 2,900 lbs. The launcher is mounted on the US SPL M752 which has a speed of 25 mph and a range of 280 ml; it can swim in still water at 3 knots.

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Swingfire now an artillery weapon

The static display covered the whole range of weapons and equipment in service with the Royal Artillery or about to be introduced. The Swingfire has only recently become a Gunner weapon consequent upon the decision to return the responsibility for long range anti-tank defence from the Royal Armoured Corps to the Royal Artillery. (The humorists say that this is because the infantry were unable to fit a bayonet on the front end and the cavalry were unable to get any manure out of the back end!)

The Swingfire regiment in BAOR will be forned

Firing line at Larkhill; in the centre the Commando Light Regiment, trained for operations on NATO's northern flank



with 96 launchers mounted on FV438 APC type vehicles and 24 on the new Striker, a derivative of the Scorpion CVR (T) vehicle. The batteries will operate independently in the divisions and will provide the long range anti-tank defence for the battle groups. The Swingfire has a range of from 150 to 4000 m, it weighs 26.7 kg and has a flight duration of 26 seconds. The missile is wire guided by line of sight but the controller can be sited up to 100 m from the launcher itself. The missile, when fired, is automatically 'gathered' into the line of sight. The engine is a two stage solid fuel rocket motor which provides a speed of up to 400 mph, the warhead is HEAT type anti-tank with a high kill probability. It takes two minutes to come into action in the direct role but a little longer if the controller is away from the vehicle. The FV438 carries 14 missiles and the Striker 10.

Air defence by Blowpipes and Rapiers

The Gunners have also taken over the Blowpipe shoulder fired air defence missile for use against low flying aircraft. The launcher weighs 28 lbs and the missile 19, the weapon is a slender tube 55 in long. The warhead is in the centre section, the forpart is the guidance system and the rear a rocket motor. When fired the missile accelerates rapidly to supersonic speed and then glides like a dart. The operator uses an aiming unit which consists of a radar, an autogatherer and an interrogator unit. The range is 3 kms, the system takes 30 sec to bring into action and only 5 sec to reload. The detachment is three men and they and the Blowpipe are carried in a Spartan CVR (T) or a Landrover. Detachments will be deployed to battle group areas and probably be controlled by the direct support field regiments.

The BAC Rapier is now in regimental service and is proving one of the finest air defence systems against low level attack operational today. The system is basically in three main parts, the fire unit, the tracker and the power unit. The fire unit has its own built-in radar search system, an automatic target interrogator and a computer and is loaded with four ready missiles. The tracker unit is operated by one man and is on a separate mounting. The power pack is a small and simple generator. The fire unit, with the generator attached, is towed by a Landrover and the remainder of the equipment and three men can be carried in the vehicle itself. (BAC have designed

an SP model for the Iranian Army which is mounted on a US M113 type tracked vehicle.)

The Rapier fire unit searches a given area; when an aircraft appears it is automatically interrogated. If no correct response is received the operator is warned and the tracker slews towards the target. The operator then lays the visual sight onto the target and tracks it. When in range (up to 10,000 ft) he fires the missile, a TV in the tracker automatically follows the missile; any error between the missile and the TV sight, which is aligned with the optical sight, is transmitted to the computer. This calculates the change needed to bring the missile back on course and passes a guidance message to the missile to do this. So long as the operator keeps his sight 'on', the target must be destroyed. A radar can be 'clipped' on to carry out the duties of the operator in fog or dark conditions.

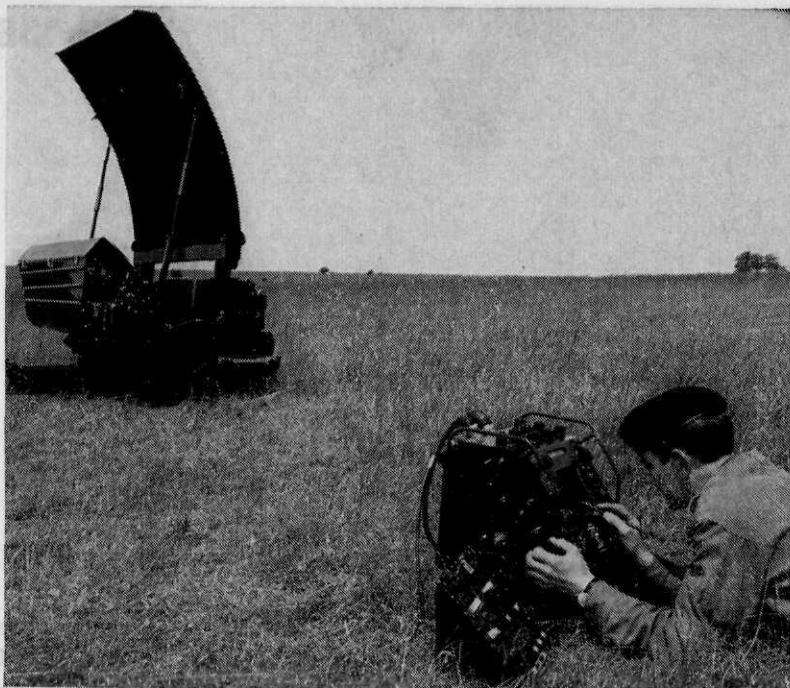
Modern target detection and location and survey

Target location is an important part of the duties of the Gunners. Considerable advances have been made during the last few years. Long range gun location is still carried out by sound ranging but radio link is used between the microphones and the command post and advanced posts. No longer are miles of telephone cable required. Up to seven microphones are emplaced, they are switched on by the advanced post when a gun fires. When the sound of the gun reaches a microphone an impulse is sent by radio to the CP. These impulses are recorded on film which is read by means of a cursor, the readings are fed into a desk computer which produces the grid reference of the enemy gun. A field gun up to 30 km in front of the microphones can be detected and located and the CP can be up to 13 km behind them. The locating error is less than 50 m at normal ranges. The CPs and APs are mounted in FV432 armoured vehicles.

Mortar location is carried out by the use of the Cymbeline radar FA No. 15 Mk2. This has a range of 20 km and the locating time from mortar firing to location is only 15 sec. The accuracy is 50 m at 8 km. The locating radar and command post are in and on a FV432, the whole system is extremely mobile and very robust. This radar can also be used for the control of light aircraft and the observation of artillery fire.

RA and RE survey has been enormously simplified by the introduction of the MRA5 tellurometer. One of these stations at each end of a line

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Cymbeline counter mortar radar FA no. 15 Mk2

measures distances from 50 m to 100 km automatically in less than 20 sec and will operate through fog, rain and darkness. The error is less than 2 cm over short distances and less than 1 m in 45 km. There is two way speech between the two stations and an antenna can be mounted on an extending mast. The tellurometer has been developed by Plessey and is in service at the School of Artillery. The introduction of the Ferranti Position and Azimuth Determining System (PADS) will solve further survey problems. PADS is an inertial navigation platform mounted in a Landrover, it is simply driven from a known point to the gun position or location of which the exact grid reference and true bearing are required. The only requirement is that the vehicle should be halted for a few seconds after every ten minutes driving to allow the instrument to 'up-date' itself.

Meteo by Midges

The British locating regiment in Germany, besides being responsible for survey and sound ranging, provides meteorological data and operates the Midge reconnaissance drones. Meteorological data are obtained by sending up balloons carrying small radio transmitters. The balloon is tracked by radar to check wind speed and direction; the radio supplies the temperature and barometric pressure. The information is fed into a computer in the AMETS portable met-station and the results

can be fed by tape to all the Gunner regiments. The Canadian-German-British Midge has been in service for three years in Germany and procedures and drills have been so improved that the commander can have the processed results of a mission within one hour of launch. Although operated by the Royal Artillery the Midge is tasked by the intelligence staff of a division or corps. Once launched the 'aircraft' flies at a speed of 400 knots and has a range of about 110 km. The flight profile is fed into the Midge's computer prior to launch and there is no requirement for any control from the ground. Its normal straight and level flight can be altered up to four times in either direction and three times in height. The 'aircraft' carries a Zeiss camera which operates day and night. It takes three pictures each time it 'clicks', one being vertical and two obliques. There can be an overlap on each photo. There is also an IRLS (Infra Red Line Scan) sensor which records the heat radiation from objects on the earth's surface; these may be hot vehicle engines, gun barrels and cooking fires. When on the launcher the Midge is automatically checked out and the appropriate data is fed in, the turbo-jet engine is started by compressed air, the launcher elevates and the engine speed increases to something over 65,000 rpm. The cord attaching the drone to external power is blown off and a Wagtail rocket boosts the drone off the launcher. Recovery is by means of a recovery beacon on



The Anglo-German-Italian FH70 in the high angle

which the drone beams, at the correct moment the engine cuts out and a drogue parachute opens to slow it down and this is followed by a main parachute. Two rubber cushions inflate to soften the landing and the drone even turns on its back in order that the film cassettes are easily removed. At last a commander can really see 'the other side of the hill'!

Co-produced 155 mm

The British-German-Italian FH70 again caused a great deal of interest to the Gunners present, old and new. The trials are going well and this 155 mm firing a standard shell to 24,000 m and a rocket assisted projectile to 30,000 m promises to be a real winner.

For the traditionalists there was much to see, the World War II Quad towing its limber and 25 pdr gun was a nostalgic sight and amongst the museum pieces on display was a World War I 18 pdr, the famous 3.7 in screw gun and World War II 6 and 17 pdr anti-tank guns. The RA Bands were as good as ever and the RA Motor Cycle Display caused the spectators to hold onto their seats. The various Wings of the School all showed their wares beautifully turned out and well described, the display of anti-tank missiles in use throughout the world was interesting and underlined the excellency of the Swingfire.

The Gunners are in good heart and are obtaining the modern and sophisticated weapons and vehicles required for modern warfare though as usual in Britain too few of them.



Maandelijks wordt de Militaire Spectator toegezonden aan alle leden van de Koninklijke Vereniging ter beoefening van de Krijgswetenschap.

Ten einde de toezending aan thans nog actief dienende officieren van Land- en Luchtmacht, tevens lid van de Koninklijke Vereniging ter beoefening van de Krijgswetenschap, ook na hun dienstverlating zeker te stellen, wordt belanghebbenden verzocht de secretaris-penningmeester van de Koninklijke Vereniging (Nassaulaan 6, Zoetermeer) in voorkomend geval ter zake in te lichten.