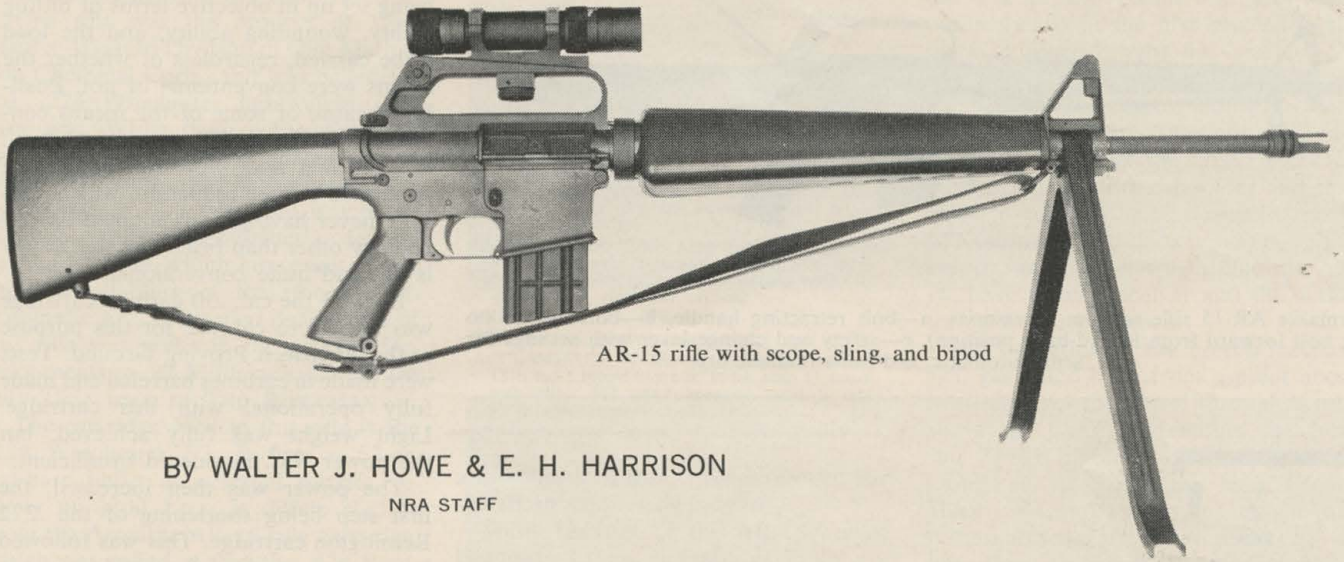
THE ARMALITE AR-15 RIFLE



AR-15 rifle with scope, sling, and bipod

By WALTER J. HOWE & E. H. HARRISON
NRA STAFF

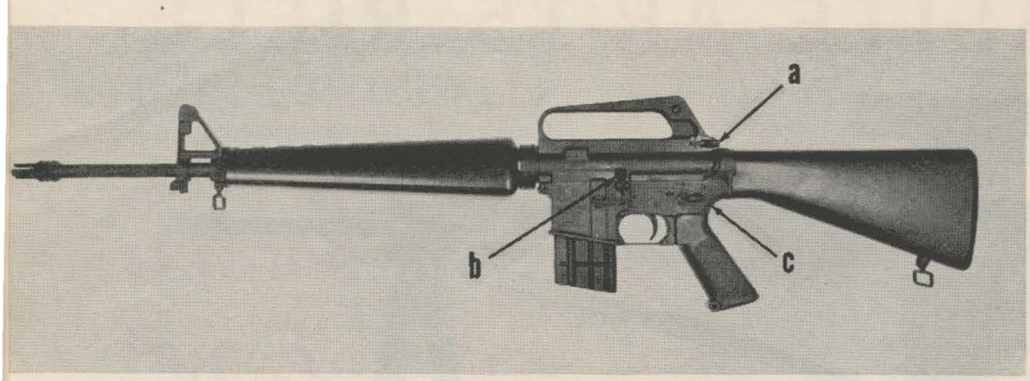
A complete report on a .22 caliber rifle being offered for military purposes

News and publicity releases on a .22 center-fire rifle offered for military purposes, the Armalite AR-15, have raised the question as to whether it should replace the present standard M14 rifle of 7.62 mm. NATO caliber.

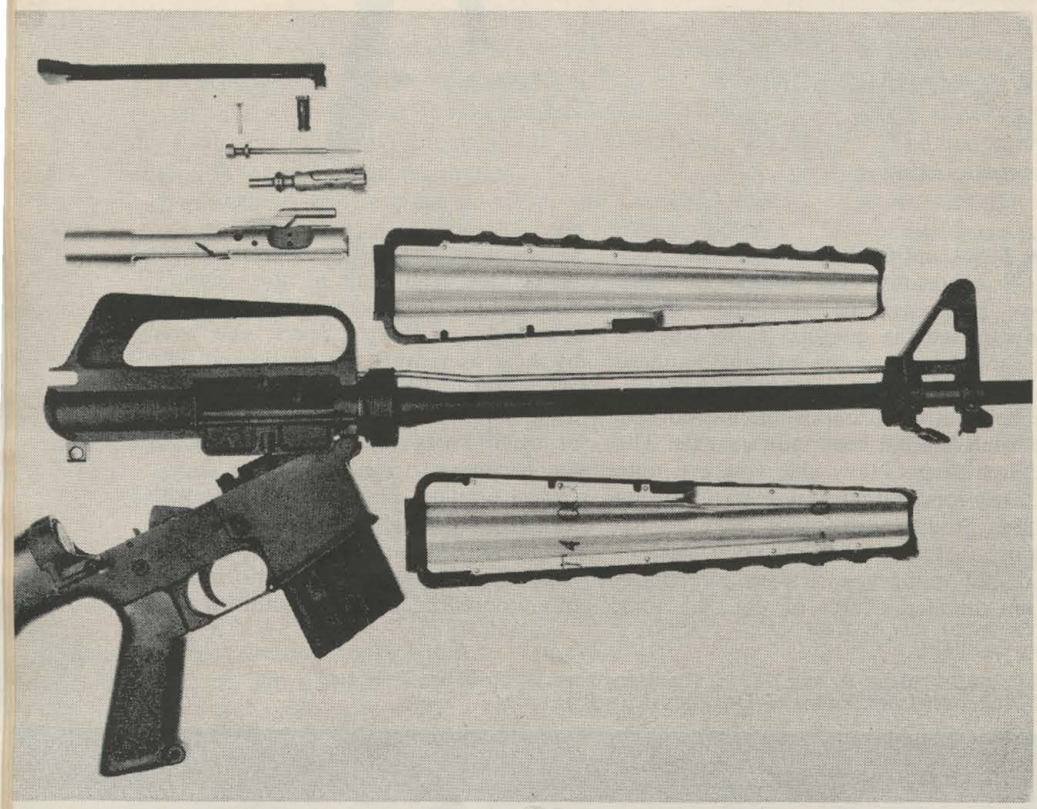
It is not at all impossible to conceive of such a small bore military rifle. The United States Navy rifle was a 6 mm. (.236) for a number of years following 1895. Studies were made by most nations, including the United States, of cal. .22 military cartridges, sometimes even smaller. Rifles of cal. 6.5 mm. (.256) were adopted by several nations before the beginning of this century. The fact that they were adopted by very few major military powers, and even by those users were not considered fully successful in the test of World War II, need not prevent renewed consideration of small bores under requirements of the present.

The primary advantage possible with a small bore is lightness of rifle and ammunition, and this is important. A small bore rifle with a given number of rounds of ammunition can weigh materially less

Examining completed AR-15 rifle in Colt plant. (l. to r.) E. H. Harrison; Fred A. Roff, Jr., President of Colt's; and Walter J. Howe, Editor of THE AMERICAN RIFLEMAN



Armalite AR-15 rifle without accessories. **a**—bolt retracting handle, **b**—bolt release (to let bolt forward from locked-back position), **c**—safety and change lever with settings for safe, semi-automatic, and full-automatic fire



AR-15 rifle field stripped and handguard removed

than in cal. .30 or 7.62 mm. NATO, or for the same weight many more rounds of ammunition can be carried.

Another advantage of the small bore rifle is reduced recoil (though this is less important than formerly, since present gas-operated breech mechanisms make the perceptible recoil much softer than from a hand-operated rifle). Light recoil facilitates training by lessening the shooter's fear of recoil. It has been hoped, and sometimes stated, that this will be reflected in better shooting and more hits under combat conditions.

Caliber reduction is in line with past development. Adoption of a breech-loading rifle by the United States brought a reduction in caliber from .58 to .50 and then to .45, and adoption of smokeless powder brought a further reduction to .30. Each of these steps was accompanied by a marked increase in effective range and power.

However, further caliber reduction would entail a marked reduction in range and power. It would also change the infantry weapons systems in major respects. *This is because a modern system is necessarily composed of a number of weapons which are carefully interrelated.*

The development of new weapons concepts is very far from having been neglected. As early as 1952, even before a replacement for the M1 rifle had been developed, thought was given as to what was to follow. This eventually resulted in adoption of the present weapons system of which the M14 rifle is a part. Study was continued, the problem being set up in objective terms of hitting ability, wounding ability, and the load to be carried, regardless of whether the means were conventional or not. Possibly because of some of the means considered, the project was named "Salvo". We will first note, however, the line of continued caliber reduction, which (despite never having been adopted by our country other than briefly by the Navy) is old and quite conventional.

In 1953 the cal. .30 carbine cartridge was necked to cal. .22 for this purpose at the Aberdeen Proving Ground. Tests were made in carbines barreled and made fully operational with this cartridge. Light weight was fully achieved, but the power was considered insufficient.

The power was then increased, the first step being shortening of the .222 Remington cartridge. This was followed by a whole series of cartridges made from the 7.62 mm. NATO, beginning with cal. .22. M1 rifles were fabricated for these experimental cartridges. The mechanical and tactical performance of the cartridges was carefully tested.

Other investigations

Other investigations were made at the Proving Ground, some going down as far as cal. .18. One investigation was made of a cal. .22 scaled reduction of the well-known cal. .30 M1 ball bullet, which accordingly weighed 68 grs. It was fired at a muzzle velocity of 3400 ft. per second (f.p.s.). The work was done thoroughly. In the design of barrels for this cartridge, it was determined that satisfactory performance under extreme conditions of ground use required a twist of rifling of one turn in 8".

Remington Arms Co., Inc., designed still another .22 cartridge under contract to the Springfield Armory. This, however, was ultimately not used in the rifles which were under consideration for it. Remington then brought out the cartridge in sporting form as the .222 Remington Magnum.

In 1957 the Continental Army Command requested 2 manufacturers to provide new rifles and a new cal. .22 military cartridge. This is entirely in accord with the American tradition of arms development. *The great majority of all small arms types since the introduction of the breech-loader in our Army have been designed and supplied by commercial sources.* (A long list of these was given in the Question and Answer "U. S. Arms Sources" in THE AMERICAN RIFLEMAN for June 1959.) Some were also sold by the manufacturers to other governmental agencies and to individuals over many years. The cal. .45 M1911 pistol by Colt is one example.

By prompt action of these manufacturers, test quantities of both rifles and ammunition became available in 1957.

One rifle was the product of Winchester-Western Division of Olin Mathieson Chemical Corp., and was called the cal. .224 Winchester lightweight military rifle. While quite conventional, it was a mature and sophisticated design. The parts were few and simple. The cyclic rate of its mechanism was materially lowered by a construction feature for the purpose, which improved greatly the controllability of the rifle in full-automatic fire. A detailed description of this rifle was given in the article "Developments in .22 Military Rifles" in the July 1958 issue of THE RIFLEMAN.

The cartridge used in this rifle is the .224 Winchester E2. It fires a 53-gr. flat-base bullet at a stated muzzle velocity of 3300 f.p.s. It differs slightly from the Armalite AR-15 rifle cartridge, which was called at first the .222 Remington Special and now the .223 Remington. The .223 fires a 55-gr. boat-tail bullet at a stated muzzle velocity of 3265 f.p.s. Both the .224 and the .223 differ slightly in cartridge case from the .222 Remington Magnum commercial cartridge. Their performance is about at the level of the .222 Magnum, which is familiar to shooters.

The AR-15 rifle was developed by the Armalite Division of Fairchild Engine & Airplane Corp., with the great personal interest of its then President, the late Richard S. Boutelle. It is mainly a scaled-down copy of the Fairchild Armalite AR-10 rifle, which had been offered for some years in 7.62 mm. NATO and other military calibers. A composite steel-aluminum barrel and a complicated flash suppressor originally used in the AR-10 proved unsuccessful. The AR-15 has an all-steel barrel and a short form of the Army-developed bar type flash suppressor instead.

Specifications

COLT ARMALITE AR-15 RIFLE

MECHANISM TYPE: Gas-operated, semi-automatic and automatic

CALIBER: .223

WEIGHT: 6 lbs. 10 ozs. with empty magazine, without accessories

BARREL LENGTH: 20" (21¼" with flash suppressor)

OVER-ALL LENGTH: 38¾"

MAGAZINE CAPACITY: 20 rounds

STOCK DIMENSIONS: Length of pull 13", drop 2" (top of stock is level), pitch down at front sight 2"

SIGHTS: Rear: 2-leg peep for 300 and 500 yds., adjustable laterally in 1-minute steps for zeroing. Front: post, adjustable vertically in 1-minute steps for zeroing

SIGHT RADIUS: 19¾"

RIFLING: 6 grooves, right twist, 1 turn in 14"

ACCESSORIES: Telescope sight and mount 13½ ozs.; bipod 9½ ozs. (with case 13 ozs.); web sling 4½ ozs.; grenade sight 1 oz.; extra magazines 4½ ozs. each

Many features of the AR-15 are of European origin and not generally familiar to American shooters, but they were already long tried and have worked out well in this case.

The AR-15 can be hinged open somewhat like a double-barrel shotgun, permitting easy bolt removal and bore inspection. This feature goes back to the Czech ZH or ZB 29 rifle. It will be recognized as a feature of the Fabrique Nationale rifle which has been adopted as standard by Belgium, Great Britain, Canada, and Australia. As the T48, the FN was very thoroughly tested by the United States in competition with the Springfield-designed T44, the latter ultimately winning adoption as our M14.

The rear sight of the AR-15 is built into a fixed carrying handle, like that of the British EM 2 rifle which was considered at about the time the 7.62 mm. NATO caliber was standardized, and which was even adopted for a short time by Great Britain. The ejection port is covered with a hinged lid, which keeps dirt out of the action and flies open automatically at the first shot as in the German Sturmgewehr 44.

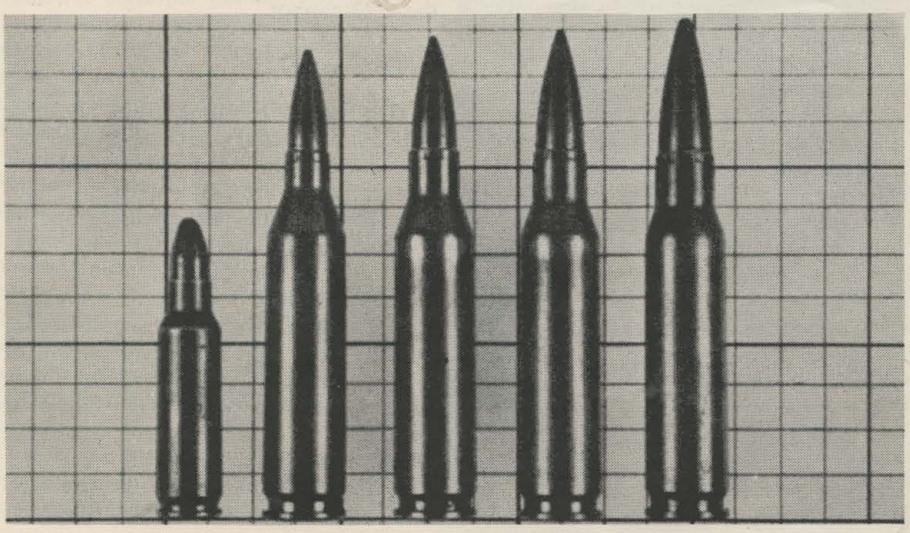
The stock is straight, with separate hand grip. This conformation has been used in many full-automatic shoulder weapons. It brings the recoil force almost in line with the shoulder and thus helps to control the tendency to rise in full-automatic fire. It also adapts well to breech mechanisms which, like the AR-15, have a long receiver and the action spring in the buttstock.

For operation of the breech mechanism, gas is led back from a point about two-thirds up the barrel through a tube above the barrel and within the fore-end. This is much like the Swedish M42 Ljungman rifle, and the later French MAS 1944 and 1949 rifles. A gas-tube system also was used in the Swiss SK-46 rifle. The operating gas is introduced between the 2 parts of the bolt, forcing the head to unlock and then forcing both parts to the rear.

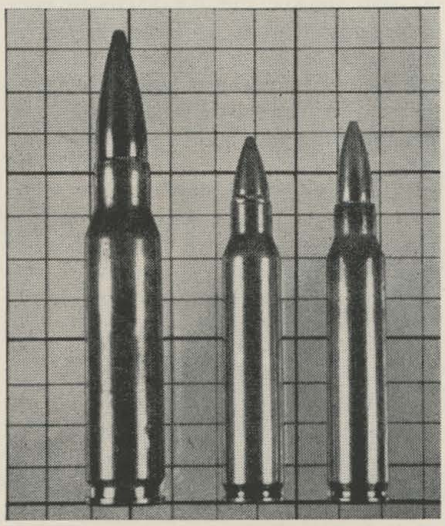
The gas-tube system obviously eliminates an operating rod or slide, and on that account has sometimes been stated to be a material design simplification. However, eliminating the operating slide requires that the bolt be made in 2 parts, instead of the usual one-piece bolt, so the number of parts remains the same as before. The moving parts must be given a certain mass to carry through the cycle after the initial gas impulse, and elimination of the operating slide requires a correspondingly heavier bolt. Thus both the number of parts and their weight remain substantially the same as in other designs.

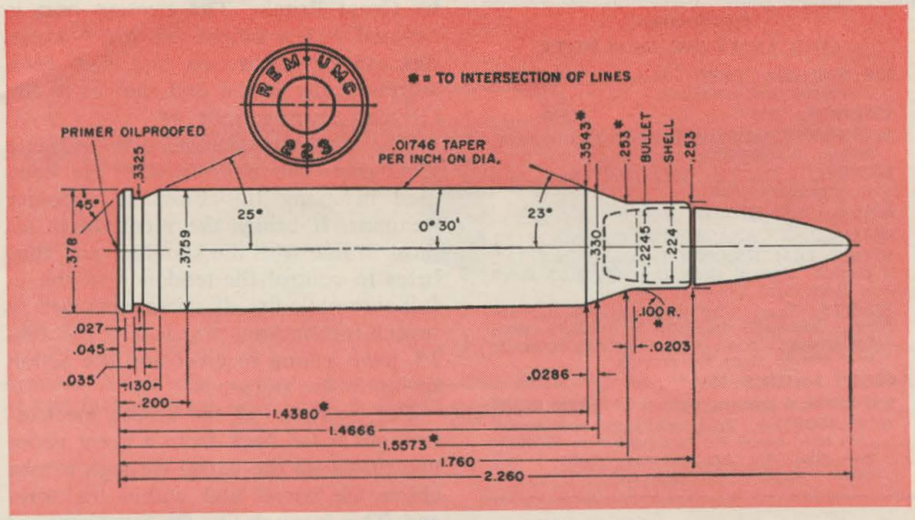
Likewise, the extensive use of aluminum has not resulted in an unusually light rifle. The AR-15 weighs nearly ½

One series of cartridges fabricated and tested by the Army before appearance of the AR-15 rifle: (l. to r.) .22 on shortened .222 Remington cartridge case; .22, .25, and .27 on 7.62 mm. NATO case; and 7.62 mm. NATO for comparison

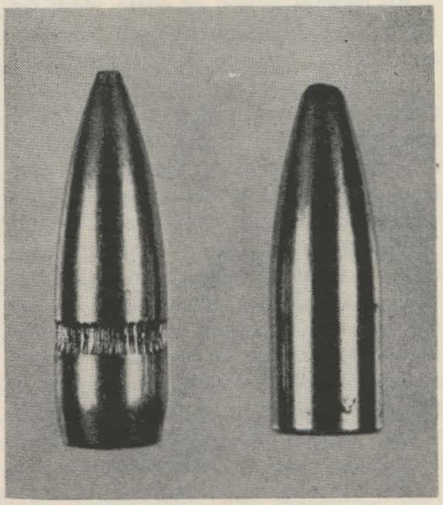


7.62 mm. NATO, Winchester .224 E2, and Remington .223 cartridges





Dimensions of Remington .223 cartridge



Remington .223 boattail and Speer .22 flat-base bullets, both 55-gr.

lb. more than the steel Winchester rifle.

The receiver including the carrying handle, the trigger guard, and the grip, is made of aluminum alloy. The magazine also is made of aluminum alloy, as in a number of other present-day rifles. Aluminum is easily fabricated and can be anodized to a superior non-reflective and durable finish. Necessary strength is provided by a steel barrel extension into which the bolt head locks.

Stocked with plastic

Fore-end and buttstock are of a light green plastic. This has a pleasing feel and appears to be quite successful. The fore-end stands clear of the barrel and is lined to resist barrel heat.

The rear sight is a simple 2-leg peep, adjustable laterally. The front sight is adjustable vertically. These adjustments are readily made with a point of a cartridge as the only tool. They are intended for zeroing only. Obviously such sights are not meant for target shooting, but they are reliable in service.

Firing trial by THE RIFLEMAN Staff in 1959 showed the AR-15 to be very easy and pleasant to shoot in semi-automatic fire. The inherently light recoil of the small cartridge is further reduced in effect by the straight stock. Functioning was notably positive, regular, and reliable.

The unrestricted high cyclic rate of about 750 shots per minute brings the recoil impulses in such fast succession that, despite the straight stock, it was found comparatively difficult to hold the rifle down on aim in full-automatic fire. Facility in full-automatic fire can come only with practice. A less desirable feature of this stock is that it is distinctly less easy to throw to the shoulder and catch aim than a good stock of usual form. Once in position the stock is very comfortable.

Details of the AR-15 were reported in the article "The Armalite AR-15 Rifle" in the June 1959 issue of THE AMERICAN RIFLEMAN.

In 1958 the Army made 3 extensive tests of both the Winchester and the AR-15 rifles.

The first was an engineering test at the Aberdeen Proving Ground. As in such tests in general, it consisted in examination of the rifle as a machine. Construction, reliability of functioning under a variety of conditions, and accuracy of shooting under normally favorable conditions, were the main points covered in the examination.

The next testing was by the Infantry Board, principally at Ft. Benning, Ga. This included all the features regularly investigated in items which are under consideration for possible adoption.

For an item of this kind, the Board prepares a plan of test and coordinates it with both the using and the technical branches, the Armor and other test boards, the Infantry School, and the Continental Army Command, to insure completeness. Subjects include:

Physical and operating characteristics.

Assembly and disassembly.

Carrying and cleaning, including the tools required.

Accessory-type items (bayonets, grenade launchers, etc.).

Feed system suitability, including clip charging.

Suitability of the sighting system.

Firing under adverse conditions (rain, mud, water, etc.) without care or cleaning.

Position-disclosing effect of firing.

Test of penetration in a variety of materials.

Known-distance firing.

Transition firing course.

Combat firing course, with comparable Service rifles.

Air delivery.

Use by parachutists, including firing test after jumping.

Following these temperate zone tests at Ft. Benning, Arctic tests were carried out at Ft. Greeley, Alaska. It is a general requirement of Army equipment that it must perform satisfactorily at temperatures down to −65°F.

The third group of tests was performed at the Combat Development Experiment Center, at Ft. Ord, Calif. The regular purpose of this test is to determine the effect of using different armaments of the Infantry squad. The carrying, handling, and use characteristics of the weapons are carefully observed, and their effectiveness measured by rate of hits on silhouette targets under conditions which are made to reproduce combat situations as closely as possible.

The tests at Ft. Benning and Ft. Greeley were made in coordination with a Human Resources Organization, maintained by the Infantry Board to fit weapons to human requirements.

Firings in the above tests were done with the Winchester .224 cartridge, since it can be used in both rifles while the .223 cannot.

Test results

The reports resulting from all these tests were of course extensive and detailed. Following were the most important points brought out:

a. The .22 rifles were much liked by the soldiers throughout, for their lightness and easy handling.

b. Mechanical functioning was excellent. This was especially favorable considering the stage of development of these weapons, in comparison with Service weapons which have had long periods of use and improvement and are expected to be reliable.

c. Target accuracy, while considerably below that of the M14 rifle, was

adequate during temperate weather.

d. However, the improvement in hitting rate under combat conditions, which had been expected from the favorable handling qualities and light recoil of the .22 rifles, was limited and disappointing.

e. Penetration in various materials was also disappointing.

f. Firing in Arctic conditions, it proved impossible to hit the regular Army B target (6 ft. square) at 500 yds. in a dozen shots.

Following the tests, Winchester ceased work on cal. .22 military rifles.

The management of Fairchild Engine & Airplane Corp. decided to divest themselves of the AR-15 rifle. License to produce the AR-15 was acquired by Colt's Patent Fire Arms Manufacturing Co., Inc. The firm of Cooper-Macdonald, Inc., Baltimore, Md., was selected to promote the AR-15 rifle in the United States and certain foreign countries. Extensive efforts have been made by Cooper-Macdonald to interest the military forces of friendly nations in southeast Asia, where the small stature of the people makes a small, light rifle especially attractive.

Production possibilities

The U. S. Air Force tested the Armalite AR-15 rifle at Lackland Air Force Base, Tex., in 1960, as a replacement for the cal. .30 carbine in the Air Force.

In December 1961 THE RIFLEMAN Staff team visited Colt's Patent Fire Arms Mfg. Co. in Hartford, Conn., where AR-15 rifle production is being carried on in the same plant where Colt handguns are made. Production is on conventional general-purpose machine tools of small and moderate size, with jigs and fixtures as required for AR-15 parts. There appeared to be no special production problems in the present operation.

Production at that time was at the rate of 1000 rifles per month. The present single-shift capacity is considered by Colt's to be 2000 per month, which could be increased to a maximum of 7500 per month by going to 3 shifts. Colt's states that tooling for production of 20,000 rifles per month could be completed within 3 months. Then the production level of 20,000 per month with 2 shifts could be reached within 6 months thereafter, or a total of 9 months after initiation of expansion. It is the frequent experience that quantity production rates are not reached at the time expected or without difficulties, nevertheless the above does give an indication of what is possible at Colt's.

THE RIFLEMAN also examined and tested late production AR-15 rifles. The rifle is substantially identical with that formerly produced by Fairchild. A 3X scope sight is now available, the same as that offered with the AR-10 rifle.

This internally-adjusted scope is short and compact. Glass surfaces are anti-reflection coated. The reticle is a blunted picket, hanging down from top of the field of view. This arrangement facilitates 'holding over' on targets beyond the range for which the scope is set. It was found easy to use.

The scope is attached to the fixed carrying handle. The sight line of the scope thus mounted is 1" above the iron sight line. This makes it necessary to raise the head partway from its support on the stock when aiming. Nevertheless, shooting with this scope is reasonably easy and comfortable. Mounting the scope on the carrying handle does not interfere with carrying. The hand simply passes around the scope and under the handle without difficulty.

The mount has 2 defects, however. To attach the scope, the mounting screw thumb nut must be completely removed, the screw (attached to the scope) passed down through a hole in the carrying handle, and the thumb nut reattached, which is a somewhat long and troublesome operation. Attaching and, especially, detaching the scope would be difficult or impossible with cold hands. It was also found that the mounted scope can be pushed out of line 1/16" or more by hand pressure no matter how tightly the thumb nut is drawn up. Little alteration appears to have been made to the upward-folded surface of the carrying handle in which the scope base rests. A suitable surface to seat the scope undoubtedly could be prepared, though it has not been.

RIFLEMAN outdoor firing tests of this rifle were made on a day with practically no wind. Air temperature was about 32°F. Shooting was wild. It was impossible to keep 10 successive shots on the standard 300-meter target (which measures 3 ft. x 4 ft.) at 300 meters, in repeated attempts. At 100 yds. it was then found impossible to put 10 consecutive shots on the standard 100-yd. target paper. About 1/3 the holes in the targets at both ranges showed clearly visible yaws, some of the holes having a length twice their width.

Results with second rifle

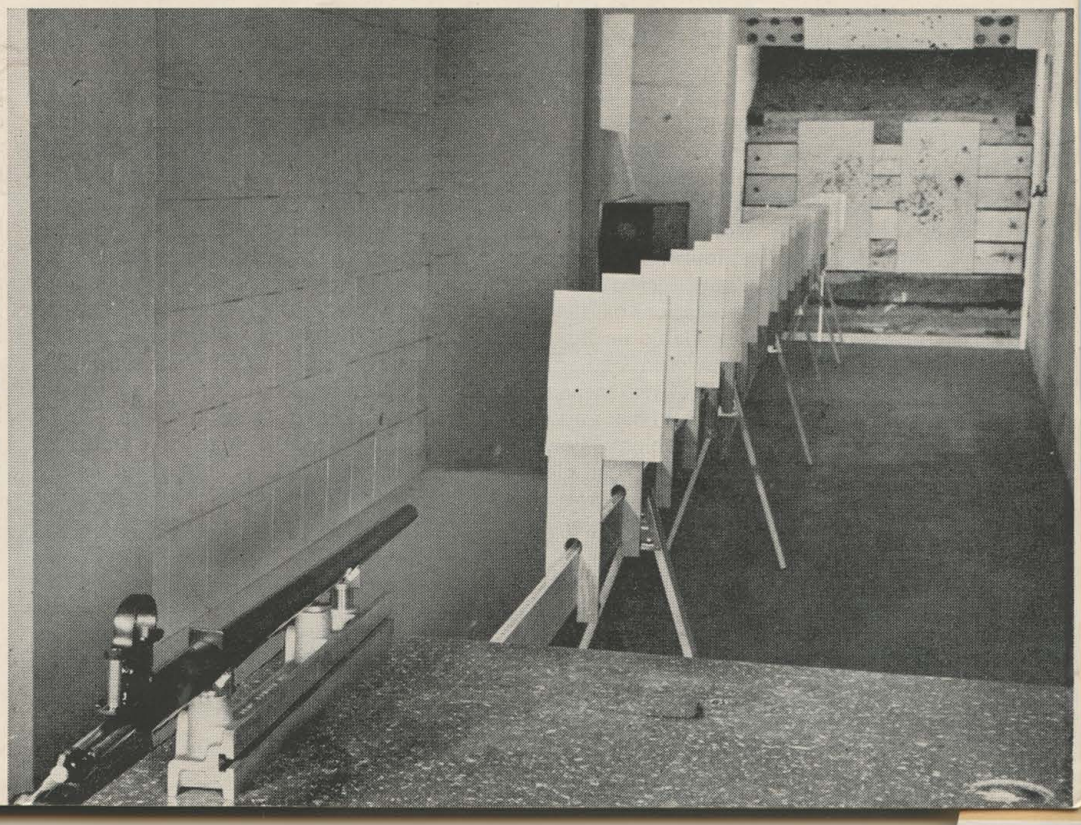
Representatives of Cooper-Macdonald were informed, and brought out another rifle which it was stated had been test fired and grouped excellently. The same wild shooting and yawing impacts were experienced. A small quantity of another lot of ammunition was tried, with the same result. Both rifles were fired from bipod and from sandbags, with scope sights and iron sights, and by 3 firers, including a Cooper-Macdonald representative, all with substantially the same results. Remington .223 ammunition supplied by Cooper-Macdonald was used.

The rifle bore was in excellent condition, having been fired only a few hundred rounds, and examination with Zeiss-Kollmorgen borescope showed no visible defect.

The rifle was returned to the manufacturer, who reported that it shot very poorly but no reason could be found. There was no report on the second rifle. The manufacturer stated that condition of the muzzle is extremely important to accuracy of the AR-15 rifle.

Performance of this kind occurs when the gyroscopic stability of the bullet is

Firing installation at NRA Test Range for measurement of stability of bullets



insufficient; that is, when the spin imparted by the rifling is insufficient to keep the bullet flying point-forward.

To determine the extent of the deficiency and the amount of correction that would be necessary, the stability of the .223 bullet in flight was measured in the NRA test range. Its stability value was 1.13 in air at 70°F.

The value 1 marks the dividing line between stability and instability. At a value of 1.13 the bullet is only weakly stable, much like a top which is spun barely fast enough to keep it upright.

In this condition it is readily made to waver by influences that a properly stabilized bullet would resist, such as small irregularities of the rifle barrel or unusual resistance to its flight in the air. Under unfavorable conditions, principally cold, the stability becomes insufficient and the bullet becomes unreliable. The effect of cold is to increase the air density and therewith the overturning effect of air resistance on the bullet. (Air density is also affected by humidity and barometric pressure, but the first is not important and changes in the second normally operate to favor the bullet since barometric pressure decreases with altitude.) It should also be remarked that projectile stability is decreased by a head wind, at the rate of about 1% for each 10 m.p.h. of wind. Standard military bullets are given an ample margin of stability to take care of such unfavorable conditions.

The rifling twist in the AR-15 is the commercial standard of one turn in 14" of barrel length. Experience has shown this to be sufficient for the comparatively short and blunt sporting bullets of this caliber, under the usual conditions. THE RIFLEMAN Staff gave consideration to what would be necessary for adequate performance of the long-pointed boattailed .223 bullet. Stability improvement can be obtained by changes in both the bullet form and the rifling. Both of these were investigated.

The least harmful change to the bullet design, from the standpoint of its other properties, is elimination of the boattail, which will improve its stability by a small amount. (The penalty is a small but definite loss of ranging power.) For an indication of the improvement readily available in this way, the stability of a somewhat similar flat-base commercial bullet was measured, and found to be 1.33. This improvement even if fully realizable in the .223 bullet, would not make it sufficiently reliable under adverse conditions, as the Army's Arctic firings with the Winchester flat-based bullet showed clearly.

The other obvious correction is to increase the twist of rifling. This is subject to the obvious objection that it does not correct rifles now in existence. However, while several thousand AR-15 rifles have been manufactured, this would be a relatively unimportant number if the rifle were adopted and used in quantity. A rifling twist of one turn in 12" could be used; rifling steeper than that might cause failure of the thin bullet jackets which are made only for the 14" twist, and therefore would require thorough tests to assure practicability. The 12" twist would raise the stability to about 1.55, adequate for most conditions. Of course the above 2 changes could be combined, giving a positively adequate correction.

Even after these corrections, there will still be certain ballistic deficiencies. Tests showed the .223 bullet has almost no penetration in some common materials, because of its fragility. It has been proposed to improve its penetration by replacing the lead core with steel. This would, however, reduce its ranging power by lightening its weight, and also make it necessary to shorten the bullet to retain even the stability it has now. Such shortening would further reduce its weight. An experiment of this kind has actually been tried, and was a failure. Effective improvement in penetration thus remains out of reach.

Colt's later supplied another AR-15 test rifle. Cold weather was no longer available. Accuracy firing at temperatures of 45°F gave apparently normal results. A wind from 12 o'clock reached gusts of about 20 m.p.h., but effort was made to fire only in the lulls. Ten-shot groups at 300 meters from bench rest averaged 11" diameter (2 groups only), at 200 yds. 8½" diameter, and at 100 yds. 4½". As an additional test, 5 groups of 10 shots each were fired from bench rest indoors at 50 yds., giving group diameters from 1¼" to 3¼". Though not especially good or uniform, this accuracy level is in general within the maximum allowable in acceptance of M14 rifles, and would therefore be acceptable. (Present M14 rifles average about half the required group size in acceptance.)

To separate as far as possible the contributions of rifle and ammunition to this dispersion, accuracy firings were carried out with a Remington 40X heavy-barrel target rifle made up and supplied by Remington in this caliber. Best accuracy was obtained by firing in a 6-point rest without the stock. A day of 65°F temperature and little wind was selected, and half the groups at each range were fired with one lot of .223 ammunition and half with another. Eight 10-shot groups at 100 yds. measured 1 7/16" to 7 5/16" diameter, and the same number at 300 meters measured 4¾" to 18⅝". Groups improved markedly as the barrel heated from firing (it was brushed out after every 10 shots). At 100 yds. about ⅓ the bullet holes showed distinct yaw. At 300 meters only there were one or 2 fliers in each of the 6 largest groups, without which they would have been about ⅔ the size. These results are, for the most part, but little better than obtained with the AR-15 rifle fired from the shoulder. They confirm that the mediocre accuracy even under favorable conditions during the tests is basic in the ammunition and the ammunition-rifling combination.

THE RIFLEMAN had measurements made by the H. P. White Laboratory, Bel Air, Md., for determination of remaining velocities. The results were used to construct the table above, based on a muzzle velocity of 3185 f.p.s. which is the average of known measured muzzle velocities of the .223 cartridge. The rate of velocity loss is unusually low for a bullet of this diameter and weight, indicating an excellent bullet form in this respect. Corresponding information is also given on the 7.62 mm. NATO cartridge.

Cartridge Performance Compared

.223 Remington, 55-gr. bullet, M.V. 3185 f.p.s.

Range (yds.)	*0*	*100*	*200*	*300*	*400*	*500*
Velocity, f.p.s.	3185	2808	2457	2138	1848	1595
Energy, ft.-lb.	1239	964	738	558	418	310

7.62 mm. NATO, 150-gr. bullet, M.V. 2750 f.p.s.

Range (yds.)	*0*	*100*	*200*	*300*	*400*	*500*
Velocity, f.p.s.	2750	2530	2322	2127	1943	1772
Energy, ft.-lb.	2521	2133	1797	1508	1258	1047

At muzzle the striking energy of the 7.62 mm. NATO is about twice that of the .223, and at 500 yds. about 3½ times that of the .223.

While this rifle is interesting in itself, for any permanent importance it would have to be adopted and used in large numbers. The following are the known possibilities.

Advantages of the AR-15's small size and light weight to some of the very small-statured people of southeast Asia have been mentioned. The AR-15 is about 2½" longer and very slightly heavier than the cal. .30 M2 carbine.

Nevertheless the AR-15 is considered to be the better. The practical extent of its superiority over the carbine makes a difference, since several million carbines are available from Army stocks at small cost while AR-15's would have to be manufactured, probably at a cost of $100 or more each. A quantity of AR-15's has been issued to South Viet Namese forces, apparently in a test of their use in comparison with the carbine, but no decision had been announced in April 1962.

The U. S. Air Force recommended after its 1960 test that the AR-15 rifle be adopted as the standard shoulder weapon in the Air Force.

By far the largest possible user of the rifle is the U. S. Army. The Army initiated and supported the experiments leading to the AR-15 rifle and its cartridge, and on their completion tested them very extensively. The AR-15 thus has received much consideration.

Before it could be adopted, the defects in the telescope mount (if the telescope is to be used) and above all the ballistic performance in unfavorable conditions, would have to be corrected. These deficiencies can be corrected only in part, but even this has not been done.

Decisive factors

All available information indicates that the following factors, as outlined in the rest of this article, are considered by the Army to be the decisive ones.

The M14 rifle was adopted in 1957. It was developed as part of a weapons system consisting of the M14 rifle and M60 machine gun, to replace the carbine, the M1 rifle, the M3 submachine gun, the Browning automatic rifle, and the cal. .30 Browning ground machine guns. Money for quantity production of the M14 did not become available until early 1959, as a consequence of the recognition of world conditions beginning with the first Soviet earth satellite launched on Oct. 4, 1957. Since 1959, the M14 rifle has been brought into large-scale production.

The M14 being our Service rifle, the National Rifle Association considered these facts so important that it gave a full account of them in the articles "New Service Rifle" in the June 1957 issue of THE AMERICAN RIFLEMAN, and "The M14 Rifle" in the October 1961 RIFLEMAN. These articles, which brought an unprecedented response, are available as RIFLEMAN reprints.

Up to Mar. 22, 1962, contracts for 846,100 M14 rifles had been awarded to 4 large-scale manufacturers (including Springfield Armory) and a further contract was being negotiated. The total number produced has not been announced. However, it is unlikely to have been less than 400,000, probably considerably more, and the rate of deliveries is still increasing. The M14 is a superior military rifle.

Adoption of a small bore rifle would leave still in existence the requirement for a machine gun of full power, and possibly a BAR type rifle as well. This would increase the number of weapon types and most of all the number of calibers and types of ammunition, a highly undesirable step unless compelling reasons for it existed.

In every instance the AR-15 has functioned well and there is no doubt it is a fine little weapon. However, there were and still are serious doubts as to the performance of a small bore round as a military cartridge for general use. These doubts were strongly confirmed by the results of tests.

In addition to all the other occasions this general subject has been considered, it was thought out very thoroughly before the 7.62 mm. NATO cartridge was adopted by NATO nations. The considerations which led to that decision do not appear to have changed. The United States insisted on a full-power cartridge for the common NATO type. The adoption of a different cartridge by the United States now would involve an overturn in NATO of a serious nature.

The extensive tests of the AR-15 rifle did not show any important advantage over the M14 except light weight, and they did show important deficiencies. Considering also the additional factors mentioned above, the Army authorities appear quite unlikely to approve adoption of the AR-15 as the principal shoulder weapon.

The hitting problem in combat is such that the Army prefers to devote its major development funds and effort toward radically different weapons systems which will give a major improvement in hit probability. Hence the intensive research on the Salvo program. THE RIFLEMAN has on past occasions invited the attention of NRA members to the existence of this program. It is a long-term research initiated by the Army in 1951 on the basis of a study by the Operations Research Office, then operated for the Army by Johns Hopkins University. It was set up to investigate every possible weapons system for the given purpose, no matter how new and radical.

As a result of early work on this program, a project is under way to improve the effectiveness of the 7.62 mm. NATO round.

Long-term solution

For the long-term solution, the decision was made some years ago by the Army Chief of Staff, Gen. Taylor, to await the final report on Salvo. This decision was confirmed by the succeeding Chiefs of Staff, Gens. Lemnitzer and Decker.

The report has now been made. As a result of conclusions reached in it, Army research and development efforts are directed toward a future infantry weapon far more effective than any conventional shoulder rifle. Development of such a radically new next-generation weapon, requiring coordination with other NATO nations as well as worldwide testing before adoption, will require a number of years.

The United States small arms industry is cooperating fully in this effort.

When the nature and details of the new weapon are made known, THE AMERICAN RIFLEMAN will inform its readers fully. ■

E. H. Harrison, NRA Technical Staff, field firing the AR-15 rifle in NRA test. In addition, extensive firing from bench rest was done for accuracy