MARCH 1957 50c



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THE TARGET THAT SHOOTS BACK

THE BULLET THAT LOST AN EMPIRE

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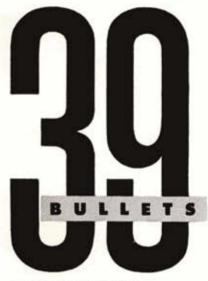
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MARCH, 1957

MAGAZINE

VOL. III, NO. 3-27

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COVER	
One of the guns under consideration for adoption as the new shoulder weapon the United States Armed Forces in the 6¾ pound full-automatic AR-10, built aluminum and plastic by the "Armalite" division of Fairchild Engine and Airp Corporation, Los Angeles, California. Chambered for the .30 NATO cartridge, AR-10 uses 20-round magazines but can be fed from 250-round belts, two of wl can be back-packed by the rifleman. It may add up to 500 rounds of full-autom firepower per infantryman.	of lane the hich
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SHOOTING NEWS

Dearborn, Michigan. The 1st Michigan Artillery Volunteers of Detroit, a group of hobbyists who wear Civil War uniforms, carried off top honors at the 2nd annual Muzzle Loader's Turkey Shoot held at Greenfield Village, Dearborn, Mich. .. Competing against two similar groups in tests of marksmanship, the 1st Michigan took two firsts and a second . . . The Huron Rangers Riflemen from Port Huron, Mich., named after Co. E of the 5th Michigan (1861-'65) Infy., and the lllth Ohio Volunteer Infantry of Toledo, tied for second . . . The 8-man military teams used balloon, metal container, and wooden stake targets at 50 yards . . . Ninety-seven shooters also went after turkey prizes and 15 succeeded. The object was to hit a disappearing simulated turkey head at 25 yards offhand . . . In an exhibition match of old versus new, two 8-man muzzle loader teams defeated two-man teams of regular Army and the Marine marksmen. With each group blazing away at 16 balloons 50 yards away, the 1st Michigan team nosed out by seconds Marine T/Sgts. Phillip Sanborn of Flint, Mich., and Leroy Wallace of Evansville, Indiana . . . Frank Gay, Richland, Mich., of the Southern Mich. Gun Club, won the 25-yard rifle event . . . Smoking up the 25-yard pistol range was first place winner Carl Brabec of Roseville, Mich., member of the Wolverine Muzzle-loaders . . . E. D. Campbell of the Grosse Ile, Mich., Wyandotte M-L club took first in the 25-yard revolver shoot . . . the 50-yard off-hand rifle event was copped by Clark Frazier of the Shawnee Long Rifles of Rawson, Ohio, and O. D. Dickinson of Lincoln Park, Mich., won first place in the bench rest match.

<u>Middlefield, Conn.</u> In the Conn. State big bore league <u>Roslyn</u> took top honors with a brilliant tally of 148 wins and only two lost matches throughout the entire season. <u>Middlefield</u> took second place, 142-8, and the <u>Magnum</u> club rated third, winning 135 and losing but 15 . . . At the end of the list, <u>Bogota</u> and <u>Naugatuck</u> tied for last place, 0 wins, 150 lost. Why? . . . The very beautiful Wonsicki Memorial Trophy was put into league competition this year and <u>Fred</u> <u>Willing</u> of Roslyn was the winner with an average of 122.8 . . . Second place and silver medal went to <u>Don Bush</u> with a season's average of 121.6 . . . To <u>Tony</u> <u>Zarlick</u> with 120.6 went the third place bronze metal . . . In the Nutmeg Rifle League recent scores left <u>Middlefield</u> with five clean wins, no lost games; Enfield with 4-1; and <u>New Britain</u> in third place showing three wins, two lost . . . In the Mohegan Rifle League, <u>Pachaug</u> stands 4-0, with <u>Sprague</u> second having won four, lost one, and the <u>Mystic</u> team 3-1.

New Haven, Conn. The long range indoor match held at the Winchester club range was supposed to be a disappointment because only 59 competitors attended, but from where we sit it compares darn favorably with some of the less enthusiastic shooting circles in other parts of the country . . . Barbara Norton won the 50yard metallic sight event with a score of 200-16X . . . Second was Walter Tomsen firing 200-13X . . . Marjorie Firrantello, a junior from Stratford, took third place with 199-16X. This isn't the first time Marjorie has been on these pages: we predict it won't be the last . . . Expert Kermit Montross wore the laurels of the 50-yard any-sight event barely missing a completely perfect score by shooting 200-18X. . . Tomsen made his mark again with second place, 200-18X, and Carl Johnson scored 200-17X for third. . . All the aggregates fell to Tomsen who scored finally 400-31X in the 50-yard event, 400-30X in the scope aggy, and 600-43X in the grand aggy . . . Jill Haig was second with 399-27X and K. J. Montross third with 398-26X in the 50 yard aggregate . . . H. L. Stone scored second in tallying up the scope finals, 400-23X, with Carl Johnson third racking up 397-26X . . . Grand aggy second was Lloyd Norton who shot 596-36X. Jill Haig took third honors with 595-36X.

Wheaton, Ill. The roundup of the Western league shows Wheaton still top dog, with Plachy, Deal, Borgfeldt, Knight, and Putman clubbing together to punch out 967 over St. Charles' team tally of 955. But they had a little matter of chance on their side: 18 of the Weaton "Bulldogs' showed up at their home kennel as compared to the 10 of the St. Charles men who had to drive a distance to shoot . . Grease-monkey Overtoom who practices in his garage puts the skids on the Austin team by heading the Oak Park quintet comprising Hanson, Prchal, Volz, and old 40-X Mullins who just barely shot three points ahead of Austin on the latter's range, 959 over 956. Austinites Johnson, Schmiedl, Edwards, Patla, and D'Amore were the top five of 19 Austin schooters . . . Des Plaines put up a good fight but lost out to Elgin at the latter's range. The Des Plaines fivesome were the top of 12 shooters. Statistics don't always give the palm to the biggest club: Elgin numbered only nine men, but they evidently had "just enough to win." Des Plaines: 919; Elgin: 924 . . . Still low men on the totem pole despite not one but at least two really keen gunners, the Joliet club lost out to Aurora on Joliet's range. Some 12 Aurora shooters travelled an aggregate of well over 1000 miles to attend that match: seven Joliet shooters drove around the corner to lose, 916 to 955. But the Joliet scores weren't bad. W. Richards, a sparkplug of the club, fired 193. R. Surges shot 188. F. Johansen, a real wheel horse on any team, didn't do so well with only 185. R. Repenn shot 178 and H. Kimble scored 172. Jacking each man up five points would change that Joliet tale of woe.

<u>Fresno, California.</u> The eighth annual shoot for the California state muzzle loading championships will be held April 25, 26, 27 and 28 on the <u>Cal State ML Rifle</u> <u>Association</u> range near Fresno . . . This is one of the top shooting events of the golden west, and combines spectator interest with competition as tough as the 1000-yard range at Perry. Numerous events and many prizes will be featured at this important shoot. Full information for entrants from Association secretary <u>Charles Holmstrom</u>, 3948 Bartley Drive, Sacramento 22, California.

Coral Gables, Florida. Thirty-two pistol shooters came in out of the benign Florida sunshine to compete at the Police Pistol Club's last indoor match . . . High man in the open class was L. D. Santman with 1679 for a gold trophy. Santman copped first honors by firing 554 in the .45 course altho he ran third in smaller bores . . . <u>Ken Cowan</u>, a shooter whose name is pretty familiar in the winner's ranks from the sunshine state, fired first in the .22 with 575 for a gold trophy, second in the centerfire match with only 553, and 549 in the .45 joust for second overall and a silver trophy . . Top expert was <u>M.Sgt. Goodfellow</u> who ran away with gold trophies in all minor matches for a gold trophy leading the aggy with 1654 . . . Second expert <u>O. H. Council</u> fired 1611 . . . First sharpshooter <u>R. Pow</u> scored 1557; first marksman was <u>Joe Altman</u> who gained a silver trophy in the centerfire and won the aggy with 1445. Good shooting for a marksman, guess they'll be boosting him up a rung if he wins too many more . . . Goodfellow and <u>Harvey Dunn</u> linked up to win the team match by a terrific 574, thirty-seven points ahead of experts <u>A. L. Peltier</u> and <u>H. L. Baker</u> who took second with 537.

Norman, Oklahoma. Seven dead-eye Dicks of Oklahoma U's rifle team regained any school honors they may have lost at last month's Claremore match by defeating the University of Missouri rifle team at the Norman range in what would be comparable to a runaway match in football. . . . The Oklahoma University shooters posted their highest score of the season, a terrific 1897 total, to win over Missouri's 1726. . . Looks like the "Show Me" guys must have just lost heart somewhere midway in the match, and no wonder. . . . Fine scores characterized the O. U. Army team's win, Bob Loschke firing 386, Robert Lewellen second with 383, Jonathan Hankins with an even 380, Vance Carson, 375, Ken Baltes shooting 373, Dave Stritzinger, 371, and Robert Cobb, 352. . . . These undefeated Army team marksmen who also constitute most of the University's collegiate team have won four shoulder to shoulder matches and eight postal matches without defeat this year. The Missouri match was the last shoulder to shoulder match for the season. . . . The "Sooner" team under coach M/Sgt. Mike Carp is optimistic about their chances in the Fourth Army Area Intercollegiate Matches and the Hearst Trophy Matches. Guess they earn their nickname-they'd "sooner" win than lose.



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being the perfect revolver was well written.

perfect revolver, it certainly is a fine weapon

in its own right. This seems to be the heart

of the controversy. People like either single

actions or double action because they prefer

the revolver giving them the best service for

their personal satisfaction. This determines

the choice of arms more than anything else.

It also applies to the automatic versus re-

makes little impression as they appeal to two

different ideas of perfection. A person who

has a preference for a particular design

learns the capabilities of the arm and him-

self, thus becoming proficient in the manner

of operation required. One who has learned

the operation of a double action cannot be

expected to appreciate the single action. The

feel and operation are quite different from

This book of yours is a very good book.

Every month I break my neck trying to get

it. Keep up the good work. Only how about

getting more copies to more newsstands so

More To Shooting Than Rifles

Some folks like rifles, some pistols, some

like modern and some like antiques, but if

you bothered to read last month's issue of

GUNS you'll find that you are really getting

into a rut. What happened to the format of

the early issues, well rounded and featuring

shooting notables of history? There is a lot

more to the shooting game than just rifles.

I have with interest read Nils Kvale's

articles on shooting in Scandinavia (in the

June and September issues of GUNS). While

in no way wishing to gainsay Kvale, I'd like

to add a few observations. One might easily

get the impression that Sweden is more or

less the shooters' mecca where everything

and everyone favours shooting. Brother, it

ain't so. The overwhelming majority of all

shooting is done in clubs affiliated either to

the Swedish Rifle Association or the Swedish

Pistol Association which are both closely

connected with and rigidly ruled by the

and particularly those you wrote of.

Gun Laws In Scandinavia

Richard E. Ponshock

Seattle, Washington

Larry Penney

Al Meyers

Joliet, Illinois

Hutchinson, Kansas

the arm he is familiar with.

Good But Hard to Get

more people can buy it?

Arguing on what one or the other will do

volver argument.

Although the single action isn't quite the

Wants Blueprints

Your magazine is pretty near complete. You have the section "My Favorite Gun," for people who want to know about other gun collectors, "Shooting News," for people who like to read about championships and contests, and other departments for hunters, shooters, and collectors.

The suggestion I'm about to make would give your magazine more variety and interest for the gunsmith, do-it-yourselfer, or any person that likes to make guns of any sort, whether steel and working, or wood and paint. My idea is to have one plan for a gun in each issue. To a person who would like to make a model of a gun, it would be of great convenience to have a magazine to look up to for plans. Take a whole page, like your "Shooting News," and make a full size blueprint of a pistol.

> Kenneth Jepsen Fresno, California

More On Quick Draw

In the letter from Ed Conroy of Kansas City about Hugh O'Brien and speed with a six-gun, I must disagree that one second would be very fast. Two-fifths and hit the target would be pretty good, especially with a single action, although some men get off a first shot just as fast with a single as a double action. Ed McGivern claimed that Elmer Keith could.

I never did hear how fast these two men were on the draw. But if McGivern could do the trick of dropping a can with his gun hand and hitting it waist high, as I have heard he could, he was much faster than two-fifths of a second. One-fifth would be more like it. I also saw once where Mc-Givern could get off five shots in two-fifths of a second double action, but I would have to see that.

Arvo Ojala is supposed to be able to make a single action draw in one-sixth of a second. If he does that coin trick, he would have to be very fast.

I have practiced quick draw for over 25 years and although I do not consider myself in a class with Ojala I am probably well above the average and believe I can make a single action draw in close to twofifths of a second; but to get an accurate shot takes a little longer. Double action is faster but not as accurate.

A slow-motion movie camera would be the best way to time a quick draw. The ordinary stop watch, as Mr. Conroy says, would not work at all. Electric timers would work but I'm afraid they would be apt to hinder the man making the draw.

Glen Clopton Townsend, Montana military. Nothing like the activities of NRA in the U. S. in the legal field is being done.

Those who want to own a gun are completely in the hands of the police (who admittedly are fair and square *now* but who knows what might happen). To get more than two guns (or even one of the same calibre) is difficult or impossible. In order to help members to qualify for a gun permit (the marksmanship part of it), the clubsupply army issue pistols. This may seem fair enough—until you see the misshapen monstrocity they use for a pistol in this man's army. Actually many beginners are discouraged by these guns and the rotten scores they make with them.

Also the rules are entirely decided by military ideas and opinion. Believe it or not. before 1950 revolvers were not even allowed to be used. Interest in guns as such, gunsmithing, gun history, or gun collecting is very slight. Mostly I believe because of the fact that we do not have any magazines like your own topnotch one. What I have written gives of course only the dark aspects of the picture and after all people in many other countries are much worse off.

Christian Cederberg Karlstadt, Sweden

Neurotic Killer?

I have been a subscriber to GUNS for eleven months and I find the subject matter and the way it is presented most interesting. But in the December, '56 issue there was one article which upset me very much---"Hunting King of the Orient," by Col. Chas. Askins. The two main points, as I interpret them, were (1) Ngo Van Chi shot everything in sight and (2) he had many wives.

I must concede that Chi no doubt possesses a great amount of courage and is an accurate shot. He has also probably saved many lives through his many kills of dangerous animals such as tigers, etc. But this, by no means, gives any man the right to shoot everything in sight. I believe that only those animals which are dangerous to the inhabitants of the area, those wounded, or others which are needed for food should be killed. There is a beauty in all living things and they should not be needlessly destroyed. I think that a more appropriate title for tharticle would have been "Neurotic Killer of the Orient."

> William Francis Davie, Memphis, Tennesee

New Member of the Family

I have just recently discovered your magazine and have read it from cover to cover, that is the September 1956 issue, and I'd like to take this opportunity to offer my congratulations on the type of stories and general coverage of the shooting game that you evidently are offering the public.

You will find my check for one year's subscription enclosed, which I'd like started with the October issue.

Getting back to the magazine—I was really surprised, pleasantly so, to find as much interest for myself, particularly after being starved to death for interesting reading by other gun publications and I hope that you continue in the vein that is apparent in the one that I have read.

Earl M. Saunders Louisville, Kentucky

8



QUICK DRAW and trick shooting holds the spotlight in this issue of GUNS, with the story of the Robot Gunman. Timed to a split second, this mechanical dueller devised for police training gives the shooter the uncanny sensation of facing a target that shoots back. Constructing the electronic-mechanical target as shown in the story is within the ability of any mechanically minded gun crank, and could end some of this argument over who is the fastest gun.

Incidentally, GUNS offers its apologies to Ed McGivern and to Arvo Ojala in connection with an error in the Hollywood Gunfighters story which appeared in the January issue. Ojala was credited with shooting a .22 rifle bullet through the hole in a Lifesaver, without breaking the candy. Says Ojala, "This is not correct and I have never claimed to be able to do it." Says Ed McGivern, "I didn't write it that way." Says Guns editors, right they both are. The fact is, the story was originally credited to Paramount's shooting expert, Rodd Redwing, and the reference to him was accidentally dropped in editing copy. That Rodd Redwing is credited with doing this makes it not one bit less amazing.

Meanwhile, Colt's is readying the pair of silver plated Frontiers to be awarded to the "Top gun of the West," and McGivern's team is standing by ready to go. Where are the offers? Hugh O'Brian has stated that since a Texas gentleman wants to test his speed with live bullets south of the border, because the *original* Wyatt Earp ran said Texan's grandfather out of the country, he, O'Brian, must decline all such invitations.

Shooting for fun is the theme of Vic Swift's story about the accuracy and limits of gas and air rifles. Shooting must be fun, else we wouldn't spend our time doing it, argues Swift, and in his article he shows how more people can do more shooting, both for recreation and as training for the "big leagues" of competition.

New as tomorrow is the approach of an aircraft company to the problem of manufacturing firearms, as told by Gene Jaderquist, in "Is This The New G.I. Rifle?" The ideas behind the development of the Fairchild Aircraft Co. light automatic rifle will affect sporting arms within the next two years.

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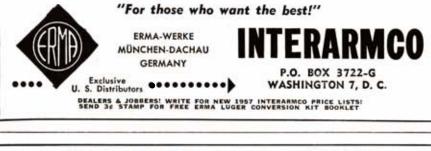
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The new ERMA caliber .22 automatic conversion unit for Luger pistols is a development and improvement of the ERMA conversion unit for the Luger which was produced prior to 1945 for the German armed forces. At the end of World War II the great ERMA factory at Erfurt, Germany, was completely destroyed by the Russians, but has now been re-located and re-built under its old leadership near Munich, Germany, and, once again, with all the skill of generations of master arms makers and the advanced techniques of German tool and die makers and metallurgists, the ERMA factory is producing only the finest in small arms and small arms accessories and conversion units . . . products which can be absolutely relied upon in the highest German arms tradition.

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□ In Manila, Antonio Ferrer shot a hawk that had been preying on his chickens. As he picked up the bird, it revived and clawed him. Mr. Ferrer struck back, using the rifle as a club. The weapon discharged. Ferrer died of a bullet wound.

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[©] Walt Winters, of Wellington, Tex., an avid hunter, made a device to imitate the yelps of a wolf, hoping to lure the animals to his gun. The call worked so well that a large bobcat jumped from a tree, knocked him down, and scratched his face before running away.

000

^{ID} Miffed because a rat was chewing up a saddle he kept in a barn, Arne Friestad, of Hailey, Ida., shot away with his shotgun, demolishing the rat—and also the barn when pellets struck • nearby box of dynamite.

000

□ A story making the rounds: The Atomic Energy commission wished to test a new type of miniature A-bomb without attracting wide publicity. So instead of choosing the Nevada desert or a Pacific island for the explosion. they selected an isolated and supposedly uninhabited valley in the Great Smokies. The day after the bomb was dropped, an old mountaineer with a long beard and a rusty squirrel rifle turned up at a crossroads settlement "Ah don't know what General Lee's a-fixin' to do," he said. "but ah'm gonna surrendah!"

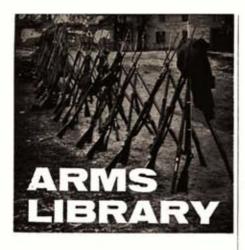
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[©] Officer C. B. Bikle of Hagerstown, Md., was shot while on duty . . . domestic duty, that is. A lawnmower did it. The blade of the mower struck and discharged a live bullet lying on the ground. Officer Bikle suffered a leg flesh wound.

000

Police Chief W. E. Traylor of Peterburg, Va., ordered daily target practice for his men after they fired 21 times at a restaurant burglar they were set for and failed to even score a scratch wound.



HUNTING WHITETAILS by F. C. Edminster (Merrow \$3.75)

The dust jacket pretty well sums up the interest and value of this deer-hunting handbook by Frank Edminster. "For experienced hunters who want to add final touches to their techniques, as well as for novices who for the first time will encounter many of the problems he has faced, Mr. Edminster supplies the hundreds of details that only a seasoned hunter can pass on to others." Hunting methods, dressing out the kill, rophy preservation, rifles for deer hunting, range and habits of deer and some historical notes on deer hunting through the years, are the substance of this handy volume. Making no pretense at flossy writing, "Hunting Whitetails" conveys information in easily grasped form of absorbing interest to millions

FHE LAST PASSENGER By James Ralph Johnson (Macmillan, \$2.75)

According to the records, the last passenger pigeon died in the Cincinnati Zoo in 1914. But James Ralph Johnson has preferred to think of his "last passenger" in freedom and flight rather than in captivity, and has written here an imaginative recreation of the life of Blue, one of the last of the birds that once darkened the skies over America. Audubon himself wrote of a trip during which, he said, the sky all day long was full of pigeons moving in a flock. Yet in less than a hundred years these flocks, which must have included untold millions of birds, have disappeared. Hunters slaughtered them literally by the hundreds of thousands. Disease and predators also took their toll and today the passenger is extinct.

This is the life story of a single passenger in the latter years of the existence of the species. Major Johnson has traveled widely in Europe and the United States and wildlife is one of his major interests. "The Last Passenger" is a moving, high readable -tory of a wildlife epic .- EBM.

ACROSS THE CIMARRON By James Ralph Johnson (Crown, \$5.00)

For every Bat Masterson, Wyatt Earp, or Wild Bill Hickok whose sagas have filled books of untold pages, there were a dozen men whose work in the taming of the West made history but whose names are virtually unknown except to the researcher. "Cimarron George" Bolds was one of these-one of

(Continued on Page 52)



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MY FAVORITE GUN



By JOHN T. AMBER **Editor of Gun Digest**

Fine rifles, both old and new, have interested me for many years, and it would be hard to choose just one as a favorite. Among my older rifles I'd select this Sharps Model 1874 in .40-90-25%" caliber that was rebuilt about 1876 by Frank W. Freund, the famous and fabulous frontier gunmaker of Cheyenne, Denver, and elsewhere. In modern rifles, the companion of many hunts has been, and still is, a Winchester Model 70 .30-06 that I got the first year they were made. It performs excellently still,

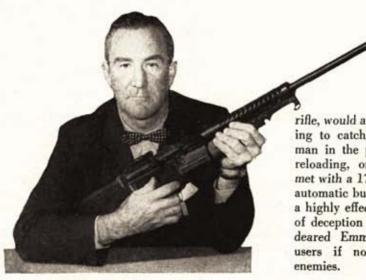
in spite of much rough handling and the passage through it of thousands of rounds of ammunition. It is an old friend that has never failed me.

By MELVIN MAYNARD JOHNSON

Engineer and gun designer

After many years "Emma", the Johnson Model 1941 light machine gun. is still my favorite gun. If I were to put Emma on the trail again now. new and lighter alloys, light plastics, and the light .308 Winchester (7.62 mm NATO) could be used in her. Emma today could weigh eight pounds, instead of twelve.

During operations in Italy, members of the First Special Service Force loaded Emma with 26 rounds, fired eight semi-automatic, then switched to full automatic. Germans, thinking the first shots were from an M1

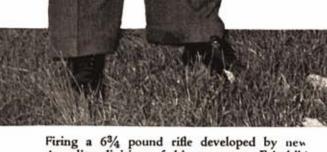


rifle, would attack, hoping to catch the rifleman in the process of reloading, only to be met with a 17-shot fullautomatic burst. It was a highly effective piece of deception which endeared Emma to her users if not to her



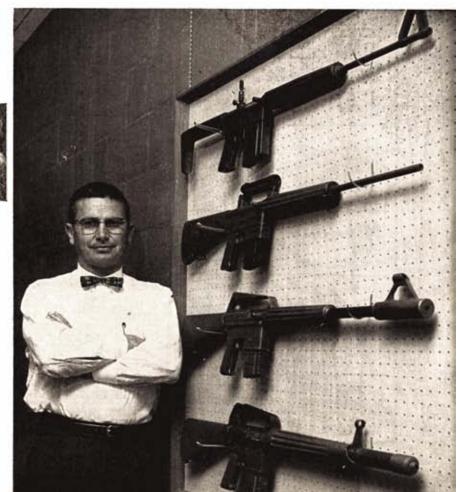
IS THIS THE

LIGHT ALLOYS AND CREATIVE CIVILIAN THINKING PRODUCE 6³/₄ POUND AUTO RIFLE TO BE FED FROM 500-ROUND BELTS CARRIED ON SHOOTER'S BACK



Firing a 63/4 pound rifle developed by new Armalite division of his company, Fairchild Aircraft president Richard Boutelle tests full-auto weapon in backyard of his home.

Peg board displays development models of new plastic and aluminum rifles which are product of team research guided by Gene Stoner. Armalite's chief small-arms engineer (at left).



NEXT G.I. RIFLE?



Warren Runnals, gunsmith on Armalite staff, test-fires the new AR-10 rifle.

By EUGENE JADERQUIST

FOR EIGHT YEARS, California hunters have been unnerved by the sudden appearance of George Sullivan in the field. There is nothing peculiar about Sullivan himself when he's out hunting. It is just his weapons that prompt a fast double-take. Most guns just don't have light, silvery barrels, bright red breech actions, and Kelly-green stocks. But Sullivan's guns are a little unusual in more ways than color. They are the advance guard of a major airplane company's entry into the gun-making field.

Top brass in the Pentagon were as startled as the California hunters when they first saw Sullivan and his guns. This time, it was not the color which shocked them, since Sullivan knew better than to show camouflage-conscious military specialists bright colors and highly polished surfaces. Instead, it was the story Sullivan had to tell. He spoke of a new rifle that weighed about 6³/₄ pounds, and could fire full automatic, handling the standard service .30 NATO cartridge with as much accuracy as the present M1 rifle. He showed them a 20-round magazine of wafflecreased sheet aluminum that weighed four ounces. An infantryman's load of 100 rounds in these pre-loaded expendable magazines would weigh no more than an equal amount of ammunition involving the regular BAR box that required reloading, plus the ammunition stripper clips.

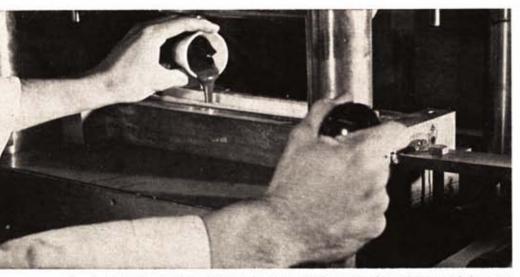
Sullivan painted a picture of infantry firepower that got the attention of the most conservative officers. What

New weapon uses innovations including predominantly light alloy and plastic construction. Breech, broken for field stripping, uses multi-lug bolt (at right) turned by small slot on sleeve which gas pipe blows back in firing.





Light rifles issued to other nations forces, such as Russian SKS-46's used by near-eastern nations, stresses need for light rifle designing like U.S.'s Armalite.



Pouring plastic mix from Dixie cup to mould front handguard is one of the most difficult steps in making AR-10 rifle which is engineered for easy production.

Stoner and plant superintendent Charles Dorchester (right) discuss drawings of AR-10 in Stoner's office where chief engineer's gun collection is displayed.



Sullivan presented was the idea of a shoulder rifle so light, so controllable in full-automatic fire, that each soldier could advance at a run firing up to 500 shots, *continuously*. Sullivan's rifle used standard detachable clip magazines, but the California lawyerinventor intended to feed the gun from two 250-pound canisters strapped on the soldier's back, weighing in all hardly more than 20 pounds. Such a bullet shield would allow the attackers to advance behind a leaden umbrella during the most dangerous phase of the assault.

The Pentagon was interested. Mass issue of light, full-automatic rifles to the armies of even minor powers like Egypt had brought the Army at last to the long-delayed moment of decision. They were now ready to adopt a fully automatic shoulder rifle if somebody would show how ammunition supply for such weapons could be maintained. The double back-packs holding 500 rounds would be an answer. After all, if the mission is accomplished, no ammunition supply problem is too difficult.

Sullivan recently showed the Army his AR-10, the first aluminum and plastic gun to be considered seriously for adoption by the U.S. Army, and one of the first non-ferrous guns to be made anywhere. But of as much interest to the average gun enthusiast are the other weapons Sullivan has allowed to gather dust while he's been devoting all the possible time to AR-10. In the office at Fairchild Engine and Airplane Corporation's "Armalite" division in Los Angeles are half a dozen working shotguns and sporting rifles of super-lightweight alloy and plastics. Most of these have been tested and found satisfactory in the field. Development of the AR-10 has brought these experimental weapons near to production. And the manufacturing lessons learned on the AR-10 can be applied to sporting guns. AR-10 can now be produced economically in mass quantities, with no special production equipment other than that already being used for production of other aluminum and plastic products.

Sullivan had already licked the critical manufacturing problem, the use of light alloys. Working with engineers of Alcoa, Harvey, and other aluminum companies, he had developed the strongest aluminum alloy yet seen. The precise composition of the alloy is secret, but it is predominantly aluminum with small proportions of silicon, manganese, magnesium, and other elements. The ultimate tensile strength of the alloy is 100,000 pounds per square inch, a figure that can be compared with the 150,000 pounds per square inch ultimate tensile strength of steel barrels. Armalite engineer Eugene Stoner, a former Marine and Army ordnance man, points out that the yield rather than the ultimate tensile strength of steel is more closely comparable to the aluminum figure. Aluminum's yield point and ultimate strengths do not vary as widely as steel's. The yield strength of steel barrels is 125,000 pounds per square inch.

For normal sporting use, aluminum for the barrel is adequate. In "cold barrel operation" such as might be expected in a sporter Sullivan uses barrels of aluminum. For the military full-automatic AR-10, a steel liner is inserted into the aluminum barrel. The full automatic rifle fires its 20shot magazine in two seconds—600 rounds per minute—and barrel temperatures rise almost immediately to 600 degrees Centigrade.

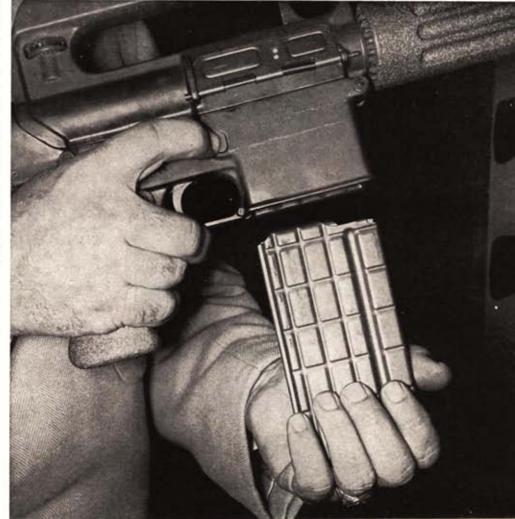
The aluminum barrel is fabricated by extrusion, on machinery already developed for other uses. The steel liner can be made by conventional machinery. There are two advantages to this aluminum-steel construction. The first advantage is the cooling. Aluminum dissipates heat three times as fast as steel. Armalite engineers have aided this cooling process by grooving deep cooling fins into the steel-lined barrel, thus exposing more radiating surface to the air. The second advantage is that the steel liner can be made of harder steel than is possible with the all-steel barrel. This is because the rifling is rolled into the inner surface of the thin bore liner by swedging the barrel tube around a rifled mandrel. This prints the rifling marks from the mandrel into the steel of the barrel, at the same time compressing the steel and work-hardening it. The result is a glass-smooth bore surface, and steel of far greater strength than in drilled barrels. Such swedged rifling barrels have longer barrel life and greater strength. And there is a considerable weight saving in the aluminum barrel. The steel barrel of the old M1 weighed 21/2 pounds; the AR-10 barrel, complete with steel liner, weighs only 11/2 pounds.

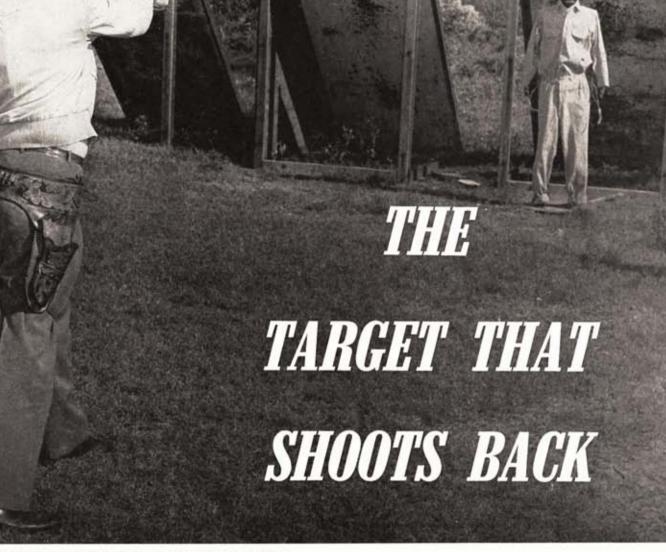
Another advantage claimed by Armalite engineers is the damping of longitudinal (Continued on page 45)



Swaging machine forms aluminum barrel jacket over stainless steel liner in fast operation for low-cost construction of erosion-resistant AR-10 barrels.

AR-10 breech is protected from dust and dirt since spring cover closes ejection port and strong waffle-creased clip is shrouded by frame.





F. J. Walsh, photographer, yields to temptation by taking dead aim at robot after mechanical man was disarmed.

Electrically activated robot packs two blank-loaded guns which he fires at opponents who fail to out-draw him.



MECHANICAL GUNMAN OFFERS NEXT BEST THING TO REAL DUELLING CONDITIONS AS TEST OF QUICK-DRAW

By ARTHUR C. ROSS

A LOT OF PEOPLE talk about quick-draw combat shooting, but only a few men ever really match their drawand-fire speed against a shooting-back target. Now you can do just that—without risking anything more important than some personal embarrassment. You can do it by shooting it out with the Robot Dueller, the mechanical man who matches your reflex time and your gun speed and accuRuled line indicates approximate lethal area of target. Robot's eyes light to start contest, so that times include shooter's reaction as well as draw time.

Timing device shows time elapsed between starting signal and impact of bullet on target. Author Ross checks time against record score of .7 second.

racy against his electrical impulses—and shoots back if you fail to beat him.

Many factors enter into the actual man-to-man shoot-out of the type made famous by old time western gunfighters, of the type experienced all too frequently today by law enforcement officers and sometimes by combat soldiers. Success in such an encounter—and in this instance success means survival—means far more than mere speed in getting a gun out of its holster, pocket, or any carrying position selected, and blasting a shot through the barrel. It means (a) how long does it take you to get into effective action after you are warned of danger, (b) how fast can your muscles perform the functions of the draw-and-fire, and (c) how accurately can you place that first shot on a target. No one of these tests—nor even any two of them is enough if you are pitted against a man who will kill you unless you kill him first.

There is another factor in this equation-the most important factor of all, perhaps, in the business of combat





Chief of Police G. B. Doublas of Port Arthur, Texas, believes Robot Dueller is tops for police combat training.

shooting. That factor has been called "the will (or willingness) to kill." The Robot Dueller is willing, his nerves are cold metal, and there is no emotion in him. Your willingness to kill is not really tested when you shoot against him, because you know that he is a man of metal and gadgets, not flesh and blood. But it is odd how real he seems when you face him. Particularly when you have faced him before and know that he will shoot back if you fail to beat him.

The Robot Dueller was built to simulate as nearly as possible the conditions a shooter would face in an encounter with a fairly fast gunman. It

Competitive tension of duel against shooting-back target shows in face and posture as inventor-author Ross makes draw.

Position of guns shows robot and his inventor nearly evenly matched as Ross draws and cocks a Single-action revolver.







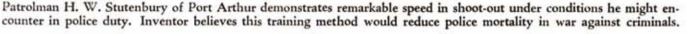
Fast time of .7 of a second from starting signal to lethal hit is recorded by Detective A. L. Whitnedge of Port Arthur, Texas, using double action service revolver.

Chief Ray Sanders of Orange, Texas, wants Dueller for police training.

was and is the belief of the robot's inventor that shooting against this kind of competitive target would be not only interesting and fun, but that it would be of very real value in the training of law enforcement officers and military personnel. This belief is borne out by enthusiastic testimonials from every such shooter who has tried, or been tried by, the robot. And it *is* fun. It is the most fascinating form of shooting competition I have experienced and I have tried them all.

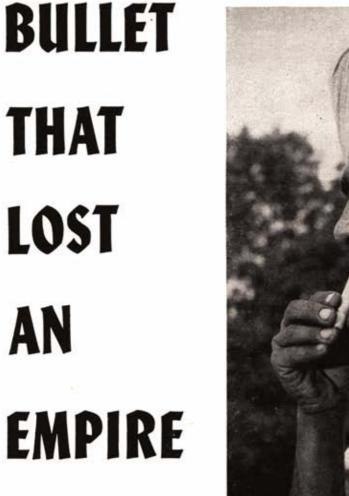
The specifications we set up for ourselves in building the Dueller were these: he would be a target of man size and appearance, electrically operated so as to give out a starting signal and then time the interval between the starting signal and the completion of the test. He must be so designed that he would actually draw and shoot if not stopped, and so that he would stop if hit by a bullet within specified time limits. He must have a timing device that would show expired time in terms of hundredths of a second, and a bell that would ring when a killing hit is scored on the robot. Killing hit means a hit that would make a live gunman harmless to his opponent.

The Robot Dueller fills all of these specifications, and fills them in a manner true to the code of the old West. He stands facing you at a distance of ten, twenty, thirty or more feet; it's your option. When you are set, a button is pressed and the robot's eyes light up. You don't know exactly when this is going to happen, any more than you would know exactly when a gunman might make up his mind to kill you. The lighted eyes are your cue to "go for your gun." You draw, fire. The robot's timer is set to touch off *his* shots exactly 1.3 seconds after the starting button is pressed to light his eyes. If you hit him inside the killing area in less than 1.3 seconds, a gong sounds, the robot cuts off, and *(Continued on page 41)*



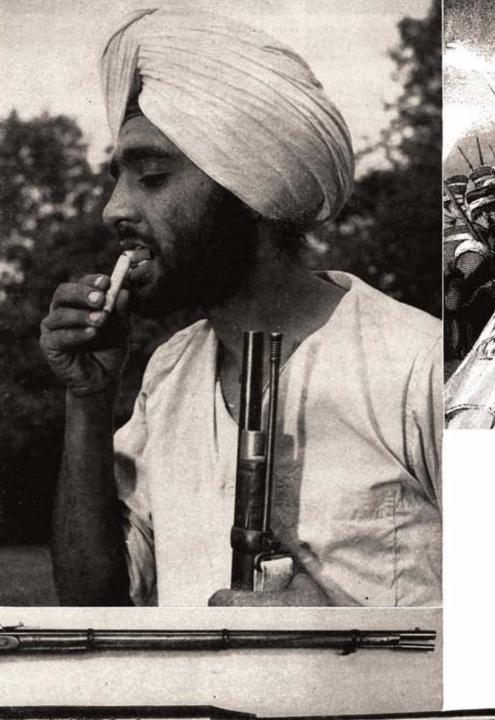


ENFIELD LUBRICATED CARTRIDGE, BRANDED "UNCLEAN" BY NATIVE TROOPS, TOUCHED OFF MUTINY THAT UPSET BRITISH RULE IN INDIA. REBELLION COULD HAVE BEEN AVOIDED BY USE OF COLT PATENT RAMROD



Biting greased bullet was step in loading Enfield rifle (below), led to rebellion, but Colt patent oiler which lubricated dry bullets on ramming might have avoided war.

THE



I ALL BEGAN innocently enough with the adoption by Great Britain of the new Enfield rifle as the official shoulder weapon of the British army. It was high time they adopted a new rifle; the old Brown Bess musket had served its time. And the Enfield was a good rifle. Yet no gun in the history of the world ever back-fired so disastrously as the Enfield did for Britain. It touched off the Sepoy rebellion of 1857, wrecked British power in India,

and rocked the world-wide British Empire wth a blow from which it never fully recovered.

The "New Enfield Rifle Musket" was the prototype, in appearance and general characteristics, of military rifles issued all over the world in the following decade. It weighed nine pounds three ounces with triangular socket bayonet. It had a bore diameter of .577 inch, using a Minié-type bullet over 21/4 drams of F. G. powder. It was



Sepoy mutineers, enraged by cartridges they believed to be an insult to their religions, press home their attack on Redan Battery at Lucknow, July 30, 1857.



Heavy .57 caliber bullet is inserted point first into rolled paper tube containing powder charge. Tube is then crimped at ends.



highly effective up to 800 yards range.

The booby-trap lay in the cartridges —a tubular roll of brown paper with the bullet in one end, with the rest of the tube filled with 50 to 80 grains of black powder, held in place by doubling over the end of the tube and by the bullet-lubricating wax with which the tube was coated.

The bullet was .568 inch in diameter --smaller than bore diameter to permit easy loading from the muzzle. It was a heavy slug, 530 grains in weight, with a concave base. The hollow in the base caused the explosion of the powder to expand the bullet which filled the rifling grooves in the barrel, thus providing rifled spin for better accuracy at long ranges.

But because the new "ball" did, after expansion, fit tightly in the barrel, the normal fouling produced by black powder was a serious obstacle to continuous firing. This problem was solved by providing, as an integral part of the cartridge itself, a lubricant which prevented the powder fouling from hardening. Kept soft, the foul-

Enfield rifle musket had bore diameter of .577 inch, fired a Minié-type bullet .568 inch in diameter weighing 530 grains. British ordnance credited rifle with excellent accuracy up to about 800 yards range.

Powder from broken cartridge tube was poured down barrel, then bullet was inserted and rammed home. Handling "greasy" cartridge offended both Hindu and Moslem religions, "defiling" users.



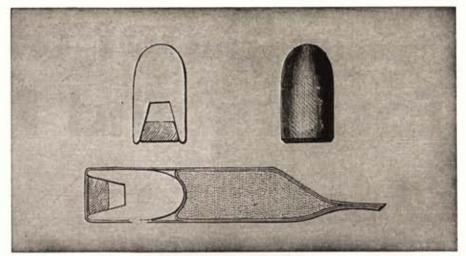
ing would blow out with each succeeding bullet. The lubricant was a part of the wax coating with which the cartridge was sealed. It was mutton-tallow mixed with the wax.

So far, so good. But the boobytrap went off with a bang when Britain sent these rifles—and these cartridges —to their armies in India.

The two great religious groups in India are the Hindu and the Mohammedan. Native leaders who smarted under British rule in India passed the word secretly that the lubricant contained in the new Enfield load was a mixture of hog and beef tallow. If true, this meant that the cartridge in native hands was an insult to the soldiers of both Indian religions. A truly religious Hindu will die before he will touch any part of a killed animal. In his faith, the taking of life is an unpardonable sin. A devout Mohammedan has no aversion to the taking of life, but he has very definite beliefs about which animals are clean and which are unclean. A pig, in Moslem eyes, is just about the uncleanest thing on earth. To eat or touch pig flesh is to be forever barred from the joys of heaven. And the Enfield cartridge was loaded by biting through the bullet end of the paper tube, breaking out the bullet, pouring the powder down into the barrel and ramming the bullet in after.

The British governor-general in Calcutta tried to rectify the blunder by sending out word that the cartridge grease was "nothing but mutton fat and bee's wax." If true, this removed the Moslem objection but it did nothing for the Hindu, since mutton fat was still a part of a killed animal. But nobody believed the governor-general. The stuff on the cartridge might be mutton fat, or it might come from cattle or pigs, or it might be a mixture of all three. A man would be a fool to chance the ire of the gods on the strength of a British promise.

The poison of the "defiled" cartridge was too much for the native soldiers who were called Sepoys: swarthy men, excellently trained and disciplined, truly formidable fighters. And the rumblings over the cartridge came at the worst possible time. There was an old phophecy in India that English rule would end exactly one hundred years to the day after its beginning and if one set the date of its beginning with Clive's victory at Plassey in 1757, the year of 1857 was the one for which (Continued on page 38)



Cross section of bullet shows hollow base with hardwood plug used to cause expansion, later eliminated. Cartridge cross section shows powder and bullet.



Two overlapping layers of thin paper were rolled over wooden mandrel to form tube. One end of tube was then folded over and fastened with paper strip.



Tube was covered with outer wrap of stiff paper, powder poured in, and bullet inserted. Bullet end was crimped and dipped in hot lubricant of tallow and wax.

Shoot at Home For Fun and Practice



Keeping teen-agers off the streets is no problem where communities provide facilities for pellet-gun practice.

SHOOTING PELLET GUNS ON CHEAP, EASY-TO-BUILD HOME BASEMENT RANGE IMPROVES HUNTING AND TARGET ACCURACY, IS FUN FOR ENTIRE FAMILY

By VIC SWIFT

Some of you he-huskies who are looking for bigger and better Magnums might turn up your noses at the idea of shooting with an air- or gas-powered pellet gun—unless somebody reminded you of a couple of pretty important angles like better hunting accuracy and the need for a better national atmosphere *for* guns and *against* anti-gun legislation. The way to get both is by getting more people to shoot . . . and a lot of people can't step out on the back porch and touch off a .270.

No question about it, small-caliber practice between hunting seasons would make a big difference in the safety and effectiveness of the shooting that goes on during the hunting seasons. Not one hunter in a hundred is truly skilled and in practice with a rifle. A tremendously high

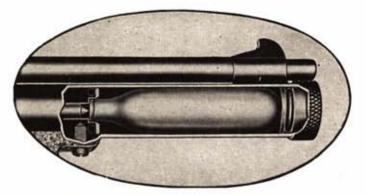


Target skill and safe gun handling are by-products of family gun enjoyed on ranges in the home or back yard.

percentage of hunters never fire a gun from one year's end to another except for the one or two, or half a dozen, shots they may fire at game during a two or three-day hunt.

There's no question either that ignorance about guns and the prejudice due to ignorance threaten your right and mine to own guns, to hunt, or to engage in target shooting sports in this country. The cure for these prejudices is to teach prejudiced people the truth about guns, to convince them that shooting is a sport like any other sport, that it's fun, that it can be fun for them. And because pellet guns can be used in thickly populated areas where regular firearms are prohibited, because pellet-gun ranges can be set up cheaply even inside a home, this kind of shooting is growing rapidly in popularity. Proof of the effectiveness of this phenomenon against gun prejudice is the fact that more Americans are shooting for sport today —shooting firearms as well as pellet weapons—than ever before in the history of sport.

Youth groups like the Police Athletic League, Y.M.C.A., and Boy Scouts are putting increasing emphasis on gun training and marksmanship instruction. Industries, social clubs, and fraternal orders are sponsoring shooting, both



Crosman's "Giant Powerlet" gas capsule is easily inserted for uniform power.





Frank Rich, famous Great Smoky Mountain marksman, readies his heirloom Long Rifle for target competition.

Ready-made backstop complete, and reel-operated target carrier are part of Crosman's home-shooting outfit.

recreational and competitive. But the place where shooting is getting its strongest impetus is right *in* the American home! Increasingly, shooting is becoming a family pastime.

Three main factors have brought about this homecentered increase in shooting. One is that there were enough of us shooters who just flatly refused to accept a state of affairs where we could not enjoy our favorite sport. The second was the development of smallbore guns that have made it possible to carry on a well-rounded program shooting within the space limitations imposed upon us by the spread of residential areas.

Typical of the kind of gun I'm talking about is the modern pellet rifle or pistol. Powered by air under high compression, or by carbon dioxide gas, these guns shoot hollow, powderless lead pellets with enough of a wallop to stop small game and varmints at distances up to 100 feet—and yet the maximum range is only about 300 feet!

As for accuracy, pellet guns are factory-tested to group shots within 3/4'' at twenty-five feet. Actually, they do considerably better than that, grouping shots within the area of a dime at this distance.

The third factor in the increase of recreational shooting is the work being done by pellet-gun manufacturers, and the leading firearms manufacturers-aided and abetted by the guns and outdoor magazines-in promoting shooting as a "family fun" sport. I went into this matter with Philip Y. Hahn, president of Crosman Arms Company, during a visit to their busy, expanding plant in Fairport, just outside Rochester, N. Y. "What we've got to sell," Hahn told me, "is controlled range and power. That's what makes it possible for the average suburban family to enjoy a year-'round program of target games, serious marksmanship, gun training for the kids, plinking and all-'round shooting fun, right in and around their own homes and in the fields nearby." The firearms manufacturers are equally enthusiastic about indoor and outdoor range developments. Actually, the two types of shooting complement each other, for the youngster or adult who tries pellet-gun shooting will almost inevitably try the .22 target game next. Similarly, the hunter or big-bore rifleman finds the air guns ideal for practice shooting at home, in the basement or back yard. Both programs are serving the interests of all shooters by creating a greater body of



Training with pellet gun now will make him a better shot and a safer hunter when he graduates to real firearms.

active shooters-men, women, and children who are shooting fans.

One indication of the rapid growth of pellet gun shooting is the fact that in 1956 over 400,000,000 rounds of pellet gun ammunition were fired, and this total includes reports of only the major manufacturers. Pellet gun shooting is expanding rapidly, to the stage where it is becoming, in many areas, as much a part of the suburban recreational scene as ping-pong and croquet.

Most of the pellet guns now on the market have certain general characteristics in common. First of all, although they are not firearms, they are real guns and must be handled with the same precautions. Power for the shot is provided by compressed air in some models, by carbon dioxide gas in others, both under high pressure. Instead of "live" ammunition these guns shoot hollow-tailed pellets of soft lead that are specially designed to flatten on impact, giving them a tendency to drop straight down from the target. The better grades of pellets are ballistically engineered to assure gyroscopic stability for high target accuracy. Most of the major pellet gun lines standardize on .22 caliber and .177 caliber barrels. Sheridan air-powered pellet guns take a special .200 caliber pellet.

In this matter of calibers, there seems to be general agreement that the smaller caliber guns will give you somewhat tighter target groups. The ammo cost is cheaper, too, though this is really a negligible factor since you'll pay less than half a cent per shot whether you use the .177 or the .22. Economy is one of the reasons (Continued on page 49)



Screen star Joan Leslie learned long ago that shooting is fun. Small bore guns with no kick are liked by women.

10,000 INSPECTIONS MAKE A SHOTGUN

AMERICAN SHOTGUNS, ALTHOUGH MASS PRODUCED, ARE REFINED AND MADE SAFE BY HAND FINISHING AND ENDLESS PRECAUTIONS

By COLONEL CHARLES ASKINS

 $T_{as much of the manufacture of}^{\text{HE AVERACE shooter knows about}}$ a modern firearm as he does about the inner machinations of the Sicilian Mafia. He is told the gun is machinemade-that is, mass produced. To him, this means that maybe they are stamped out like doughnuts. Actually, in the making of the garden-run pump shotgun, standard though it is to the last nut and bolt, 70 percent of the cost is caused by the hand-fitting and finishing. One of our finest double shotguns fetches a staggering sum simply because 95 percent of the king's ransom that goes into it is for handfinishing.

The shotgun has been slow in development. Right after the first integration effort, now variously referred

Straightening barrels is still a hand operation. Earl Rosback, Remington craftsman, studies shadow lines to see whether tube is straight. Careful, painstaking handwork by skilled stocker goes into the final checkering of a fine Ithaca trap gun.

to as the War Between the States (Southern) or Civil War (Northern), the scattergun was notable for a pair of tubes that had to be charged at the muzzle, a stock as crooked as old Bugle's hindleg, outside hammers, and magnum gauges: bores like 4, 6 and 8.

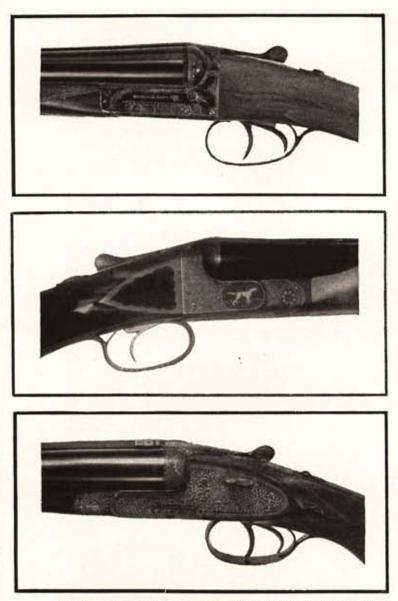
But during the shank end of the 19th century some changes took place. The Anson and Deeley action, a true hammerless, replaced the antiquated, dogeared and muzzle-charged fusee, and other changes possibly even more revolutionary became commonplace. Best of these was the inventive genius of John Browning, who produced both pump-action and auto-loading scatterguns. It was during this epoch period that shotgun barrels lost their straight cylinder barrels and gained a constriction at the muzzle which vastly improved lethality.

Just who it was who struck on the happy business of pinching down the muzzle, adding "choke" as it is called, is a matter of some debate. The English say they first discovered this handy wrinkle, and there are other claimants, none probably with a more legitimate case than Fred Kimble. This Illinois market gunner used a 6bore single-barrel and frequently sacked up a hundred mallards during a morning's powder burning. His old





Winchester Model 12's and Model 50's though mass-produced, require many hours of handwork, countless inspections.



A & D box lock action like Webley double (top) from Abercrombie & Fitch and older Ithaca side-by (middle) take less stock fitting than Holland side-locks (bottom).

6 bore had a cylinder barrel—as did all shotguns of the day—and was exceedingly short ranged. Kimble pondered the limitations of his weapon and determined to improve its killing power. He made and bored another barrel into which he purposely ground a considerable amount of muzzle constriction.

When he patterned this new tube, he found it scattered the pellets all over a barn door. Disgusted and convinced he was on the wrong track, he returned to the lathe and determined to remove all the choke. This he did and again patterned the 6 bore. Much to his delight he found he now had a remarkably close-shooting gun. It would, according to Kimble, place the entire shot load in a 30-inch circle at 40 yards. (This has not been done since!) He measured the bore diameter and closely checked the muzzle and found that instead of removing all the choke he had inadvertently left something like .05-inch of constriction. Thus was choke-boring discovered.

Word got around fast. The 'smiths on either side of the Atlantic were not slow to employ the pinched-in effect on their scatterguns. This was back during the days when Custer got his hair lifted. Surprisingly, or maybe I should say disappointingly, precious little has been done to improve the shotgun tube since the Kimble discovery. Different degrees of choke have been developed to produce patterns of varying densities, but the principle is the same.

Those were the days when shotgun barrels were made of Damascus steel. A Damascus barrel was made by twisting alternating bands of iron and steel about a mandrel. As the ribbons were slowly wound about, the core of the work was hammered to weld and flow the metal into a homogeneous mass. Various patterns were created in the outer barrel surfaces, depending on how the strips of iron and steel were interwoven. The quality of the tubes could be told almost at a glance by the pattern. The finer and more graceful the design the most costly the barrels. A fine Damascus shotgun was indeed a handsome piece of ordnance.

Twist steel barrels and laminated steel barrels were the poor cousins. Both were made after the fashion, essentially, of the Damascus, but neither was as good. Of the two, however, the laminated tube was stronger.

Damascus barrels were made in a variety of grades and



Silver soldering ventilated rib onto Ithaca pump gun barrel through use of elaborate induction brazing set-up permits modern g'an factory geared to mass production to offer hand finishing and custom styles like rib at slight extra cost. patterns: Horseshoe, Rose, Bernard, Crolle, Moire and Laminette. So popular was the Damascus that a decal was evolved so that an imitation pattern could be affixed to the cheap twist steel barrel. It is questionable that this fooled anybody, but at any rate the discerning sportsman would have sooner been caught abroad without his pants than sans his fine Damascus double.

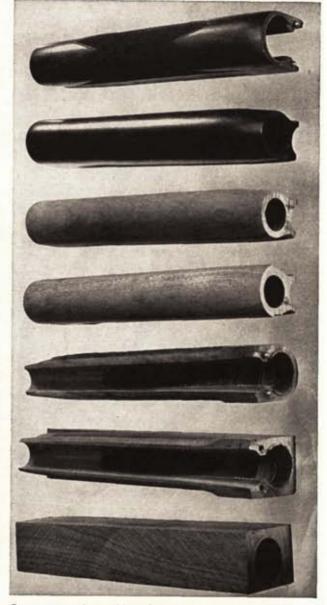
Fueled with black powder the Damascus, laminated, or twist barrel was as sound as the Monroe (not Marilyn) Doctrine. With the advent of progressive-burning smokeless powder, the old tubes could not cut the mustard. All had the inherent fault of sidewall weak spots. The very business of welding strips of iron and steel about a shaft made for variances in barrel-wall strength, depending on the quality of the weld. As a result these weak spots let go, sometimes disastrously.

The gun makers had kept pace with the development of progressive burning powders and when the new propellant commenced to gain in popularity the Damascus tube was dropped for the fluid steel barrel. This is the gun tube we use today. It will withstand our heaviest modern loadings. However, the fly in the soup were the thousands upon thousands of old twist, laminated, and Damascus jobs that were still in use. The ammunition makers immediately launched a campaign to educate these gun owners. Now, some 60 years later, that educational program is still going on. Just look on the shotshell box and you'll find there a warning not to use these cartridges in the old Damascus boobytrap.

High carbon content steel, alloyed with nickel, molybdenum, chromium and other high tensile strength metals, is poured into today's gun tubes. The gun makers are a tight-mouthed crew and would sooner let you examine their last year's income tax than reveal the alloy that is used in their shooting hardware. Each has some special name for his barrel steel. It may be "Ordnance Steel" or "Nickel Steel" or "Nitro Steel" or some other equally innocuous sobriquet.

It used to be that nickel steel was accepted as the final word. It was boomed by one of our largest rifle-shotgun manufacturers. The Yankees who made American sportsmen nickel-steel conscious, with typical reticence, never revealed the contents of the alloy (Continued on page 35)

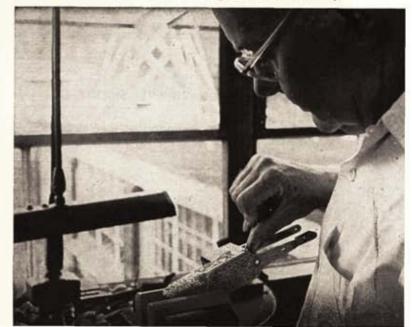
Checkering of stocks is tedious job and many manufacturers employ highly skilled women for this operation.



Seven steps in making forend for pump shotgun show use of both machine and hand tooling.



Bill McGraw, master engraver, hand-tools the frame of \$2000 Ithaca trap gun into a thing of intricate beauty.



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(Continued from Page 33)

but it was generally: carbon .35% to .45%, manganese .50% to .80%, phosphorous maximum not over .04%, sulphur about the same, i.e. .04%, and finally nickel from about 3.1% to as high as 3.75%.

Nickel steel barrels were excellent and still are. When used in breechbolts, however, especially on the bolt action rifle, the nickel tended to be "sticky" and didn't give the operating ease desired. Whether this characteristic has caused the manufacturers to shy away from such high nickel content alloys isn't known, but the turn is now to alloys containing more chrome and molybdenum. Present alloys shape up like this:

Carbon	.45% to	.50%
Manganese	.60% to	.90%
Chromium	.80% to	1.10%
Molybdenum	.15% to	
Silicon	.15% to	
Phosphorous maximum	20050-00	.04%
Resulphurize to	.04% to	

Not all scattergun makers go for the chrome-moly barrels. At least two, to my knowledge, stick to high carbon-content steel. This is perfectly okay. The shotgun develops only about 12,000 pounds per square inch pressure, and despite the fact that the tube is considerably thinner than the highintensity rifle, there is an ample safety margin. Many arms makers on the Continent claim that they are using alloyed steel. Actually, makers both here and abroad are using approximately identical high carboncontent steels alloyed about as follows: carbon .45% to .55%, manganese 1.10% to 1.35%, silicon .25% to .35%, resulphurized to .06%, phosphorus maximum .06%.

In connection with barrel strength it is interesting to note that the Nazis made several million Mauser rifles, Model '98, 7.92 mm during the Late Unpleasantness and when we got around to an analysis of the steel in barrel and receiver, we found it to be plain high carbon-content steel approximately equivalent to our SAE No. 1035, carbon content .30 percent to .40 percent.

Of equal interest were similar checks ran on the Japanese military rifle. It was found to be high carbon-content steel, running .80 to .90 percent.

General Julian Hatcher, one of our greatest arms authorities, before his retirement from the ordnance corps, one time thinned down a Springfield '06 barrel until it had a sidewall thickness just over the chamber of 1/16-inch. He fired 3 service loads (about 50,000 pounds per square inch pressure) through the paper-thin barrel and it digested them perfectly. (The normal barrel thickness, let it be noted, is %16th-inch.) A fourth round, a "blue pill"-a testing load-turning up 75,000 pounds per square inch, wrecked the tube. All of which gives rise to the suspicion that maybe, in the interests of safety, our manufacturers go further than is necessary in the use of costly chrome, molybdenum, and nickel in the fabrication of the snorkel end of the shooting iron.

A shotgun barrel is scarcely recognizable as it comes from the steel mill. It is in the shape of a billet, and must be heated and given a number of rolls to bring it roughly to size. After that it is subjected to a series





of machining operations to bring it to exact dimension. Before the final machining it is drop-forged, tempered, and carefully inspected to make sure that an entirely homogeneous mass has been achieved. While most rifle barrels are broached these days, to the best of my knowledge this has not been found desirable with the spaghetti-like shotgun tube. It is a straight boring job, and it comes out of this operation with no more choke in the muzzle than you'll find in the Holland Tunnel. The choke is added by swaging the last several inches of the muzzle. We used to think a swaged choke would shoot out, gradually returning to its original diameter. Maybe it will, too, if not stress relieved. But economies must be practiced these days to keep the price of firearms somewhere within reason. Swaging the choke instead of cutting it is one of them.

The barrel is given two "blue pills" as proofing loads. The first is fired while the tube is in the semi-finished state. The second, the definitive proof, is fired when the barrel is finished. If a barrel is going to develop any flaws, it is desirable to find them as early as possible to preclude further costly machining. Proof loads usually run an overload of 30 percent, may go as high as 50 percent.

As an indication of the goodness of our scatterguns, Winchester once fired 2,000 "blue pills" souped up to 50 percent overcharge in the Model 21 double. The gun took it without sign of pain or strain.

Our manufacturers do their own proof firing. They have always attended to this chore. In Europe, proof firing is done by the government proof house, the manufacturer submitting his weapons and getting back the gun with a certificate attesting that it withstood the tests. No so here. Our gun makers test their own and the quality of our arms attests the honesty of our manufacturers.

A shotgun receiver, the very heart of the firearm, must be made from an alloyed steel that has great tensile strength so as to soak up the shock of the heaviest cartridge and be able to do this for the thousands of shots. It must be drop-forged, heat-treated, and pass the 30 percent to 50 percent proof cartridge just as do the barrels. The receiver may be high carbon-content steel or may be an alloy containing molybdenum. At least one manufacturer to my knowledge uses both moly and chrome in his receivers. The receiver is drop forged. This is done under a hammer that delivers a 34-ton blow. After forging, it is trimmed while hot and then goes back under the hammer to correct warping. It is then permitted to cool, sometimes in charcoal so that the cooling out is slowly done. More often, simple air cooling is used.

The scale formed by the heating and cooling is then removed by pickling. After descaling, the forging may then be annealed by packing in charcoal and heating to 1600 degrees F for from 2 to 21/2 hours, and cooling in the furnace. Then it is again descaled and the machining begins. After machining it is heated in bone for 21/2 to 3 hours at temperatures of 1500-1600 degrees F and then quenched in oil. Following this it is heated to 1250 degrees in a salt bath for a period of 6 minutes and quenched in oil. As a final tempering it is subjected to 350 degrees F in an oil bath and air cooled. Such a receiver will show a hardness reading of 32 to 45 on the Rockwell C scales.

Not all manufacturers follow this method exactly. Generally speaking, however, it is the process adhered to. The resulting receiver possesses great tensile strength, has a resilient core and an extremely tough skin that accepts a good polish, and has a resistance to fatigue that contributes to long. trouble-free life.

One of the reasons double barreled shotguns are so scarce on the manufacturer's list of available models is that expensive time-consuming skill is needed in joining the tubes. The barrels are machined separately and joined by a mechanic of great skill. Ordinarily the tubes are brazed together. Winchester, however, on the Model 21 does an exceedingly clever job of interlocking the barrels mechanically.

The critical importance of the business of barrel joining is not in evidence until the weapon is targeted. One tube may shoot to center and the other may strike over by the apple orchard. This means the joiner has bungled the job. The only cure is to break the braze and re-do the job of regulating each harrel to a common center. I one time shot a fine imported over-under 12 in which the lower barrel was dead on but the upper would not shoot within a foot-and-a-half of its twin. This is a much more common fault than a lot of gunners realize.

Once the barrels are regulated, the top and bottom ribs are attached. These are generally sweated into place. Soldering is sometimes resorted to but it is not as satisfactory. When a rib loosens, as sometimes does happen, examination will almost invariably disclose a soldered joint.

Statistics indicate that the average wing gunner fires only about 50 cartridges yearly. At this rate it would take a long time to place any material strain on the shotgun. But there are exceptions. The trapshooter may burn up 20,000 cartridges in treking from the Grapefruit circuit of Florida to the Grand American at Vandalia. Once a Winchester Model 12 pump gun was fired 500,000 shots. When a shotgun passes over the counter, it may fall into the hands of the Mr. Average Sportsman who poops off only a couple of boxes of hulls per annum, or it may go to the hombre who never lets its cool. In any case it has to be able to take it.

Savage, before World War II, was the first to swing to aluminum alloys for the manufacture of shotgun receivers. Now a number of our manufacturers are utilizing this light tough metal-none more notably than the sixgun makers. After the war, Savage lost little time in swinging back to the use of the alloy. What the contents may be of this particular aluminum alloy is a well kept secret, but it is reasonable to presume that the mixture runs about: copper 3% to 5%. magnesium .3% to .6%, manganese .4% to 1.00%, with the remainder of the alloy composed of aluminum. Chromium may also be added in minute quantities. When it is present the alloy more readily responds to surface burnishing, with consequent improvement in appearance. Even so it is difficult to get a blued surface; a fact which has induced the Browning people to anodize the skin of the receiver in colors. This electrolytic sleight-of-hand has shaken the Old Guard right to their tap roots. The withoutwarning introduction of shotguns in colors, in hues ordinarily reserved for milady's cocktail gowns, has got some of the boys shaking their heads.





The aluminum alloy does not flow as well as steel but responds to drop-forging quite satisfactorily. Forging temperatures range from 880 to 920 degrees. The alloy is rather critical at high temperatures and if the high range is not very carefully controlled the alloy is inclined to crumble. Whether worked hot or cold, or in a combination of both, it can be given additional strength by heat treatment. It may also be annealed when that is desirable. Because of repeated drawings, annealing may become necessary. After annealing subsequent heat treatment will restore all the maximum physical properties, a happy circumstance.

I think we have seen only the beginning of the use of aluminum alloys in firearms manufacture. Weight in firearms is unpopular. Today's shooter wants a zephyrweight, a shooting iron no more ponderous than a piccolo, as light as an Elvis Presley brain wave, something with the heft of a Daisy air rifle. That stuff we ordinarily find in the kitchen pots and pans seems to be the answer.

Another interesting phenomenon that has horrified the Old School has been the introduction of die-casting and outright stampings in our shooting irons. Remington has lead the pack with its remarkable new family of guns.

A die-casting is made by forcing a suitable alloy, any number of which exist and those with an aluminum base being among the best, in a molten state into a mould. It goes without saying that this must be done under tremendous pressure, the force being applied from a mechanical or pneumatic source. When the mould is filled the casting is permitted to cool within. When removed it is ready for buffing, with little or no machining remaining to be done. Not only is the process quite rapid, but it is economical and surprisingly accurate. Tolerances remain within useable limits, the necessity for the employment of highly skilled labor is largely obviated, and speed is attained for quantity production.

While stampings and die-casting can materially reduce manufacturing cost, most of our guns builders prefer forged and machined parts. While some parts of a shotgun may be turned of low carbon content steel, many other must be of alloyed stock, drop-forged, tempered several times during manufacture and finally hand-fitted. Breechbolts, firing pins, hammers, ejectors, and extractors are forged, turned, finish-machined. inspected, and finally assembled to the gun. An understanding and full appreciation of the time and effort involved makes it easier to realize that fully 70% of the cost of the weapon must be accounted to skilled hand labor.

During the innumerable operations that are part and parcel of the manufacture, an endless amount of control and inspection is maintained. There are inspectors in every division, in every department, almost literally in every bay. And while the machine operator isn't carried as an inspector, actually he is one of the most important. He knows best what he is doing, is most familiar with the part he is producing, and if something goes sour he is or should be first to pick it up. Additional inspections are constantly done by the bay foreman, still others by the department foreman or his inspectors, and finally by the inspection branch of the plant which, after all, performs the most rigid examinations of all.

Col. Shelly Smith, head tycoon at the Ithaca Co., third generation of the gunsbuilding Smiths (not to be confused with the cough-drop Smiths), says thaat a very conservative estimate of the number of inspections on a single Model 37 pump repeater would be not less than 10,000!

Besides those inspections by the bench operator—who, for the sake of illustration. is finishing firing pins—there comes around the department inspector. He will pick over a basket of pins and apply his "go" and "no go" gauges. This particular operation permits a certain percentage of firing pins as rejects—say an allowable rejection rate of .05%.

If the inspector finds that the allowable rate is being exceeded, he immediately commences an energetic investigation to find the trouble. The manufacture of firing pins may be halted until the trouble is localized. This is a costly proceeding, for very soon the lack of pins will be felt on the benches where breechlocks are being assembled. It is a chain reaction sort of thing. Let it be noted that this is an example and would be a rare happening indeed. Inspection and manufacturing is so rigid and so constant that major troubles are largely avoided.

One of the final operations is bluing. Each manufacturer has his own process and the secrets of the bath are guarded like that stuff we have underground at Fort Knox. Once blued, the piece is completely assembled and goes along for final inspection. Before the bluing and after having been completely finished, it has the second and last proof load. This is called the definitive proof, and afterward the weapon is so stamped. Usually a number of functioning rounds are then poured through it. After that it is ready for a light oiling, packaging, and a trip to the jobbers.

BULLET THAT LOST AN EMPIRE

(Continued from Page 25)

Britain's enemies had waited for decades. Slowly, it began to dawn on British officers or northern India that the growing uneasiness they sensed was no ordinary soldier grumbling. Fires began to break out mysteriously in Sepoy barracks from Calcutta to Delhi. Black-eyed strangers moved quietly through the crowds in the bazaars, passing out small unleavened cakes called *chapaties*. Natives who received these little cakes would each bake four more, take these to other villages and pass them out to chosen people. It was a sort of chain-letter message. setting the date for the start of the rebellion. The English did not know the significance of the *chapaties*, but they knew that trouble was brewing. Station commanders reacted each according to his nature. Some refused to believe that the situation was serious. Some scoffed at any suggestion of possible Sepoy defection. They knew their troops, believed in their implicit loyalty. But some English commanders began sending requests to Calcutta for more troops, European troops, and more supplies.

In March, 1857, a Sepoy soldier named

Mungul Pandy stood in the middle of the parade ground at Barrackpore and called down the holy wrath of the gods on Englishmen in India. Pandy was drunk—drunk from the juice of the hemp and drunk with religious fervor. "The English plot to steal your souls!" he shouted. "Handle his new greasy cartridge and you'll be lost forever from the sight of God! Refuse them! Fling them back into the faces of the infidels!"

Before him, several yards away, the redturbaned quarterguard of the 34th Native Infantry stood motionless in line, openmouthed with wonder. Proud fighting men, for the most part tall, swarthy Hindus like Pandy but with a few Moslems scattered among them, and for the most part loyal to the service of the British flag as it flew over the East India Company, their eyes nevertheless revealed the fierce religious passion their drunken brother was stirring within them.

The big Hindu sensed this rising excitement as he shouted and brandished his loaded musket. He wheeled suddenly and ordered the bugler to sound assembly. Terror-striken, the boy obeyed, and the Sepoys of the 34th came tumbling out of their barracks, milling excitedly behind the quarter-guard in all manner of dress and undress.

At the sound of the bugle, the sergeantmajor, an Englishman named Hewson, came running up. Pandy, calling praises to his God, levelled his musket at him and fired! The Englishman spun and fell. As he lay wounded on the ground he shouted to the officers of the guard to seize the madman. The subaltern, a native, did not move.

On the far side of the parade, the adjutant of the 34th, Lieutenant Baugh, hearing the disorder, mounted and galloped to the scene. Filled with the glory of Brahma, Pandy stepped to a field-piece beside the road, swung it about, aimed at the charging Englishman and fired. The ball sent horse and rider crashing to the ground. The Lieutenant, badly shaken but unhurt, struggled free of his dying mount and advanced upon the Hindu with drawn pistol. At ten yards he fired. The shot was too hurried, and missed. A second later, Baugh was cut down by a vicious swing of Pandy's saber.

An ominous murmur went up from the ranks of the black-whiskered Sepoys, now nearly one thousand strong on the parade line. Brigadier-general Hearsey, veteran of the Sikh campaigns, hot, red-faced, rode into that scene of sudden mutiny with his two sons who were serving as his aides. "If I fall, John, rush the bastard fast," he said, and the three rode in together. As they closed in upon him, Pandy suddenly decided he'd had enough and turned his reloaded musket upon himself!

Hearsey reined in beside the officer of the quarter-guard and, levelling a cocked pistol, ordered the man to arrest the wounded Pandy and fetch the medical officer. The subaltern stiffened and gave the command. The Brigadier then rode out before the ranks and ordered the Sepoys back to their quarters, declaring he would shoot the first man who disobeyed him. Not one man in the thousand doubted the general's intention and the Barrackpore Station slipped quickly back to its usual Sabbath calm.

But this was only the beginning. Meerut, about one thousand miles up the Ganges from Calcutta, was one of the largest military stations in Bengal. Three Sepoy regiments were quartered them—the 3rd Cavalry and the 11th and 20th Infantry under the command of an elderly English general named Hewitt. One morning in May, 1857, as the sergeants were passing out the new ammunition for drill, 85 men of a company of the cavalry regiment refused to accept theirs. They were immediately disarmed by a unit of military police and led off to the guardhouse.

The following Saturday, the 9th of May, General Hewitt, thinking to make an example of the mutineers before the rest of his command, ordered up his troops around the parade ground in company front. The 85 mutinous Sepoys, who had been courtmartialed and sentenced a couple of days previously, were taken from jail, led to the center of the hollow square of troops and stripped of their insignia and uniforms. Then, as their comrades watched in silence, heavy leg chains were brought out and hammered about their ankles. Shackled, they were led back to the guardhouse to serve sentences of ten to fifteen years at hard labor.

That night there was no sleep in the Sepoy huts, and fires burned in the bazaars until dawn. The following day was Sunday. The sun rose burning hot and all was deathly still through the day. About dusk the church bells commenced to ring and a few English officers collected at chapel. As the reverberations of the bells died away, several shots rang out on the native side of the parade ground and a group of horsemen charged across the square in the direction of the guardhouse. In a matter of seconds they had battered down the doors and freed the 85 mutineers.

A storm of gunfire and frenzied shouting rose on all sides of the station. Several English officers ran to the darkening parade and began shouting orders. One by one, they were shot down. The Colonel of the 11th, riding to the center of the square, was standing in his stirrups and trying to speak when a volley of musket fire cut him in two. The mutineers cut the single strand of telegraph wire to Calcutta, tossed burning brands onto the thatched roofs of the barracks and rode off wildly in the direction of Delhi, the ancient capitol of India about forty miles to the south.

Thus the Sepoy Mutiny began.

Throughout northern India, native companies and regiments began shooting down their English officers and hurrying off toward Delhi, plundering and burning everything English in their paths. What started as a military mutiny quickly caught up all the long burning discontent of the native population and fanned it into a veritable holy war against Englishmen. A devil's wind of violence and treachery swept over Bengal and in its wake, in every station square, the mangled bodies of English officers and their wives and families lay sprawled in the dust.

All semblance of English rule, of English law and order quickly collapsed. Only here and there remained a few hundred startled Englishmen huddled together in fairly defensible positions, within city walls, or within isolated government buildings. These little islands of safety grew for a time as fleeing civilians with their wives and families, government workers, teachers, missionaries, and scattered units of soldiers





and survivors of less fortunate places straggled into them under cover of darkness. But these scattered garrisons were soon cut off, unable to help one another, as the growing tides of Sepoys closed about them.

One such island of refuge was Cawnpore, a station 700 miles up the Ganges, where 3,000 Sepoys had mutinied and left 450 English fighting men, along with 300 women and children, bottled up in a few hospital buildings near the parade ground.

For three weeks the English at Cawnpore held out in the stifling summer heat, crouching behind their shot-torn walls and returning enemy fire as best they could. At last, worn with wounds and lack of sleep, tortured by swarms of vicious flies, their food and water low, they surrendered to the Sepoys with the understanding that they would receive safe conduct by boat to Allahabad, a strong point farther down the Ganges.

The enemy chief, Nana Sahib, agreed. offering to provide the food and boats for the trip. Next morning the English marched out, down through a ravine towards the river. As they reached the boats the Sepoys, who had taken positions on both sides of the ravine during the night, suddenly opened fire upon them, pouring down a murderous hail of ball and bullet at short range as the English tried to scramble into the boats and leap into the river. Those who stood and returned the fire were quickly shot down. Then the Sepoys charged, slashing at men. women, and children with their tulwars until finally, as the violence subsided, some 200 mud-spattered survivors were left huddling in the bottom of the ravine. These were led back to the city and confined in a small dirty building behind Nana Sahib's castle. For a fortnight they ground corn for the family and retainers and servants of the maharajah. Then one night while they slept they were backed to death by a dozen of the maharajah's best swordsmen. Their bodies were thrown into a dry well where they were discovered later by an army of outraged Englishmen.

A more fortunate island of refuge was Lucknow, not 60 miles away from Cawnpore, where 1700 men and 500 women and children were beseiged by 60,000 mutinied Sepoys.

Here, the commander, Sir Henry Lawrence, had foreseen the coming trouble and wisely stocked his Residency with guns, ammunition, and supplies. In a few abandoned government buildings, Sir Henry and his garrison held out for five long months in the smothering heat of the Ganges Valley. subsisting largely on coarse beef and unground grain. Sir Henry himself was killed in his sleep by a cannon ball, and one third of the garrison was lost; but, for the rest, life settled into a dreary routine of guard duty, repairing fortifications, shifting gun positions, caring for the sick and wounded and burying the dead in a common pit. Three times the Sepoys attacked and three times they were driven off at the very walls. Lucknow held until the very end.

Slowly the wheels of the mighty British empire started to roll in the direction of India. In September, Sir Colin Campbell arrived in Calcutta with a fresh regiment of Scotch Highlanders and several regiments of Sikhs, who hated the Moslems. There he collected all available European troops, and what loyal native troops there were, under one command and got his supplies in order. In November he sent out spearheads to relieve the pressure on Lucknow and other holding points.

At long last in March, 1858, one year after Mungul Pandy had fired the first mutinous shot, Sir Colin's army of 20,000 men began to move up the Ganges. It stretched for fifteen miles along the narrow, dusty roads-cavalry, infantry, artillery, wagons and bullock carts, camels, elephants, horses and dogs, goats, sheep, porters, grooms, water carriers, traders, and camp followers. It moved slowly, under a choking cloud of dust, under great wheeling flocks of vultures. But it moved irresistibly, smashing one enemy concentration after another, until finally, in November, 1858, the last vestiges of the mutiny were wiped out and Queen Victoria, in London, signed the act which transferred the government of India from the discredited East India Company to the Crown of England, under terms much more favorable to the Indian princes.

Pandy's rebellion was done. The "greasy" Enfield bullet had completed its bloody trajectory. The Sepoy Rebellion was over. Yet it need never have happened. Preserved today in the Tower of London arms museum is an experimental Enfield rifle musket. But it is not a common Enfield, for the ram rod used to push down the bullet is fitted with a patented oiler reservoir. Designed by Samuel Colt, who operated a gun factory in London from 1853 to 1856, the oiler was used with dry bullets. It was an obvious attempt to interest the ordnance officers of the crown in a way to load their new rifles without using greasy ammunition. Dry cartridges, such as the common, unlubricated musket loads issued to Sepoys for the preceeding century before the Enfield, would not have given the Sepoys an excuse to mutiny. But Colt's patent oiler was never adopted.

There were other causes for the Rebellion, of course. Native unrest, augmented by differences in religion and culture, had been fomenting through the century of British rule in India. The new bullet was only the spark that set off the explosion. Not for the first time, or the last, a new weapon had changed the face of the world and the course of history. And Britain, whose weapon it was, was the loser. \oplus

TARGET SHOOTS BACK

(Continued from Page 21)

you've won your battle. If you're too slow, or if your shots miss the killing area, he fires. And since he is Mr. Dead-Eye Dick, you're dead.

A lot of people who have read the current claims of various quick-draw shooters—and some who have been practicing quick-draw at home, timed by a friend with a stopwatch—are due for a rude awakening when they face the Robot Dueller. They start out by saying, "One and three-tenths seconds? Why, that's slow. A good man can do it in a quarter of a second, or less. Why, only yesterday, Jim held a stop-watch on me and I drew, fired, and busted a halfgallon jug at twenty paces in just two-tenths of a second!"

Okay, so Mr. Robot will be a cinch for you. But don't be surprised if he beats you, even at the "slow" time of 1.3 seconds.



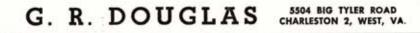
HOLLYWOOD FAST DRAW HOLSTER FINEST MADE Customed for SINGLE ACTION . . . Colts, Rugers and Gr. Westerns, also for DOUBLE ACTIONS. Designed, used and CUSTOM MADE by Hollywoods Designed, used and CUSTOM MADE by Hollywoods top fast-draw artist and instructor ARVO OJALA . . . featured in July GUNS mag. The famous and authentic fast draw holsters and belts used in the motion picture industry by leading motion picture and TV stars! Holsters and belts CUSTOM HAND MADE of finest leather and lined with same. Holsters metal lined (between lining and outside leather), designed for your par-ticular gun with exact fit. Gun belt cus-tomed to your measurements. BLACK or NATURAL WHEN ORDERING . . . send your exact waist and hip measurements, gun make, caliber and barrel length. Enclose amount in full plus \$1.00 (for postage and ins.) OR . . . for C.O.D. order, enclose 25% deposit. Satisfaction guaranteed! HOLLYWOOD FAST DRAW HOLSIEK 6509 Coldwater Canyon, North Hollywood, Calif. Phone: POplar 3-4391 **Announcing...** A BRAND NEW Rifle Caliber, the newest new "TWENTY" (.20) A "sub" caliber that shows fine promise, not handicapped with the faults that exist with other "subs". Finest ULTRARIFLED* (T. M. Reg. Pat. Pend.) barrels, blanks, and chambered barrels, as well

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Because the times he gives you are true times, starting from the warning and running to the impact of the bullet. He includes the time you require to react to his warning—just as a living gunman would do. That plus your draw-fire-and-hit time is what the clock shows against you. And you have to kill him to stop him.

The Electrical Robot Dueller consists of a series of pipes and springs supporting a bullet shield which resembles the vital area of the human body. He has a control mechanism and a time-indicating device. The legs and back-bone are of two-inch galvanized pipe, using two 90 degree elbows and two close nipples as hips. These are centrally connected to a two inch T for the backbone support. The movable relay contact points are on the spring-mounted bullet shield, while the stationary contact points are on the stationary back-bone. The bullet strikes the spring mounted bullet shield, forces it back, closes the relay points, and causes other control circuits to be disconnected, stopping the Robot's action and indicating victory for the contestant.

If these bullet-shield relay points are not closed after the signal and before 1.3 seconds have elapsed, the machinery will operate which will cause the dueller to throw up his guns and fire. From the instant the push button is pressed, all circuits and actions are completed automatically.

The contestant checks his gun and makes ready for the contest with the dueller. He presses the push button and stands by for the signal. Two, three, or more seconds may pass before the Robot's eyes light up as the "go" signal. On the signal, the contestant draws and fires as quickly and accurately as possible. Win or lose, the dueller's control mechanism returns to the ready position for the next contest.

If a contestant gets over anxious and fires before the signal and his bullet strikes true, there will be no signal, no time indication, no victory bell and no firing by the dueller. This makes a cheating contestant feel like a true bushwhacker. However, should the contestant's premature bullet fail to strike the vital area, the dueller will draw his guns and fire as scheduled. The dueller is foolproof. He cannot be cheated.

The cost of construction of this operating model is about \$500.00. The right utilization of scrap pipes and other metals should bring mass production of these robots into the approximate price range of \$600 or \$700 retail.

The control circuits are actuated by slight modifications of existing standard electrical equipment, which includes two fractional horsepower motors, speed reduction gears, and a few standard Allen Bradley magnetic relays. The control circuit is somewhat complicated, but does not constitute any staggering new discoveries.

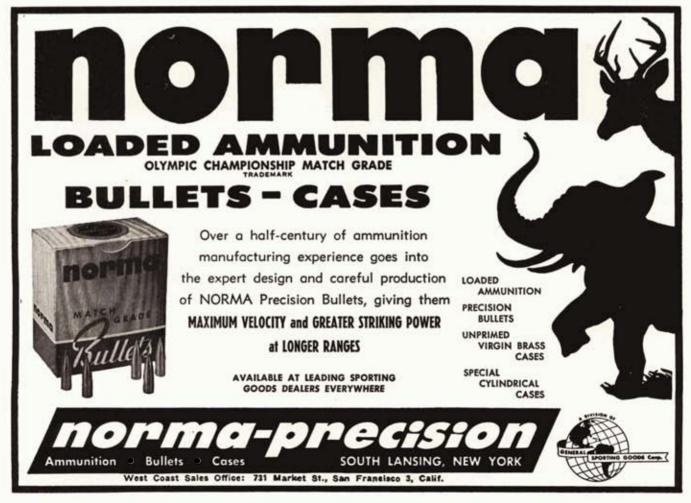
The feeling of a contestant who duels with this training instrument is one of strong compulsion to be first with a bullet. There is a very real sense of competition, similar to that which would be felt in an actual duel. Here, there is a double incentive: to beat the dueller, and to break previous time records. A policeman is likely to see the dueller as an armed robber that he has caught redhanded. He knows he must shoot fast or be killed. A sportsman might feel the keenness of the contest, and try over and over again, merely for a new time record. The gun enthusiast will shoot time after time, for it is the type of targe he has always wondered about and wanted to try. He enjoys handling that old favorite pistol and the dramatic violence of the explosion when she bucks to life in his hand.

To the thrill-seeking adventurer, the Robot Dueller is a substitute for the spine chilling thrill of a death duel. Even to the novice the Electrical Robot Dueller is a fascination. I have had people who hardly knew the dangerous end of a gun insist upon testing the Dueller. The people are especially interesting, because they are a picture of confusion and hopelessness when the duel ends and they are defeated.

Under careful safety regulations, this instrument could be adapted to multiple use for combat training of military personnel. It requires nobody behind the targets in the butts, and no scoring of targets, thus offering a saving of personnel. The robot could be made to appear from behind a tree, from a foxhole, or the windows of a house, pause for a brief time, then fire a gun and disappear. If a combat trainee is alert and fast and can shoot straight, he can kill the robot. If he fails to see the robot or fires and misses, the trainee would be considered a casualty.

It is the opinion of the author that this device could improve the present training methods, save time in combat training, reduce instructor personnel, and provide a much more certain method for screening and eliminating undesirable combat people.

The general opinion of police officials is that this Electrical Robot Dueller should not



be displayed at amusement centers for the general public. This is certainly a point for consideration. Quick draw can be dangerous to the contestant and is not for children in amusement parks.

George D. Hendrick writes in *The Bad* Men of the West—"To survive, the badman needed something besides a quick draw and accuracy. Some would call it nerve, others the psychological edge over the opponent ... Men stood before mirrors practicing the draw for hours at a time and yet found themselves greatly inferior to another untrained man with the mental edge. Again a Wild Bill or a Billy the Kid was born, not made.

Another thing—a post or tin can will not 'sass-back' but an angry, desperate man will a sixgun will. So it is partly a question of mind over mind. Indeed, the victor of many a gunfight was the inferior pistol-artist, but the superior duellist merely by force of his nerve or personality."

Hendrick also cites the two instances when Wyatt Earp advised Cockeyed Frank Loving and Bob Cahill who stood challenged by different aggressors, "You take your time, aim, and hit."

It is obvious to any student of Wyatt Earp's career that he did not mean that a dueller should calmly day-dream while an aggressor spewed hot lead at him from a six shooter. He meant, "Go for your gun in a hurry, get a firm grip upon it, bring it to bear with all possible speed, aim for certain death, then pull the trigger." Earp may or may not have been the greatest gun-fighter of them all, but he survived to die in bed at a ripe age, which a lot of them didn't. Was he lucky? Perhaps. But it is my personal opinion that his success and his survival were due to his superior intelligence and his most unusual reflexes.

What are reflexes or reflex actions? How

do they figure so importantly in a gun fight? And how can they be tested and improved? To determine the answer to these questions, the author turned to mechanics and science. The Robot Dueler is his answer. With it, it is easy enough to determine the part human reflexes play in shoot-outs of this description.

The shooter's problem in the draw-andfire duel is about as follows: (a) recognize the starting signal, (b) grab the gun, (c) draw, (d) cock, (e) aim, (f) fire. Let's say your best time through these steps is .7 of a second. Tests with the electrically timed robot prove to our satisfaction that a man this fast can perform the physical movements of the draw-and-fire in about .2 of a second, and that the remaining .5 of a second is the time he takes to grasp the situation and direct his actions to meet it-in other words, his reflex time. No guick-draw claim which fails to account for this reflextime factor can possibly be credited as a fair appraisal of a man's true gun-fighting ability.

It is possible, however, for a man to capitalize on this very factor that hampers his own gun-speed. He can do this by increasing the reflex time of his opponent-and this can be done by complicating the situation. For example, a gunfighter who steps or jumps to one side as he draws forces his opponent to add new steps to his reaction problem. The opponent must identify the movement, decide how far it will carry and how fast, and move his own gun to cover the new position of the target. The moving shooter, having his movement figured out in advance, gains an advantage. If he can still shoot accurately during or after his movement, he should win. Providing, of course, that he is facing a human opponent. The Robot Dueller is not affected by such tactics.

Nevertheless, to face this machine is to

come as close as anyone will ever come to the fighting of a pistol duel without gambling life on the outcome. Here is the man of steel facing you, a gun in each hand. His intentions are to kill you. You know that he is a dead shot and lightning fast. You know that there is only one way in which he can be stopped, and that is to shoot first and strike true. You strain every nerve and muscle as you watch for that death signal. It comes, and you explode into action. Then you look at the clock and read-bad news. It shows one and three tenths of a second. the maximum time setting for the dueller. You either missed or were too slow. You picture yourself being carried off toward boothill, and you can't understand how the hell it happened. You're fast with a gun; surely faster than 1.3 seconds! Something must have gone wrong.

Fortunately, with the dueller you can try again, and after about a hundred attempts you begin to get the idea. You relax and watch for the signal. You are hardly aware of the signal when you see it. You are almost completely unaware of your actions. Chances are you will hear a loud gong and your time reading will be around nine tenths of one second. You have won. Now you can expect to win occasionally against this man of steel.

There are few notorious gunfighters today, but the gun-toting criminal is still with us. Armed robbers, escaped convicts, kidnappers, dope peddlers, impulse killers, sex fiends, protection peddlers, extortionists, are all potential killers. A glance at the casualty list of any police department will give conclusive evidence that the American badman is an even greater menace to our policemen than was the killer of yesteryear. He is sneaky, lives and fights by no code, is likely to shoot without warning.





Against this hoodlum is pitted the police officer. What sort of a man is he? He is usually a level-headed man, a good family man, with no "killer instinct." He is marked as a target by his uniform, his badge, and the obvious display of his gun. His ability with his gun is often neglected because he may have no convenient place to practice, and in most cases he must purchase his own gun and ammunition. We further handicap him by teaching him that he must warn before he shoots, or even give the criminal the first shot. The results are all too often fatal—not to the crook but to the policeman.

With practice against the Electrical Robot Dueller, the police officer can so improve his skill with his pistol that he can meet even this one-sided challenge. Through the courtesy of Police Chief G. B. Douglas of the Port Arthur, Texas, Police Department the Robot Dueller was demonstrated on that department's very fine pistol range, and the patrolmen and police officials who tried it were obsessed with the desire to try again, and again, until they were able to gain a victory over the robot.

That spirit of competition is, in itself, the best possible stimulation to shooting practice. Given that incentive and the very practical combat experience of facing a moving "shoot-back" target, the effectiveness of law enforcement officers against armed enemies could be improved tremendously—to the benefit of the citizen who depends on the police for protection, and to the benefit of all in the saving of police lives.



NEW GI RIFLE?

(Continued from Page 17)

vibrations set up under full automatic fire. The all-steel barrel has a single frequency to which it will vibrate; the aluminum-steel barrel has two separate frequencies which tend to cancel each other, producing a stiffer and inherently more accurate barrel.

Aside from the barrel, the greatest new departure from ordinary firearms design on the AR-10 is its plastic stock. Plastic stocks have been tried before, but this is the first gun to use two forms of plastic construction. The outside of the stock is a plastic shell, reinforced with layers of Fiberglass cloth. Laminated Fiberglass cloth plastics are the strongest known, and do not chip or crack as easily as solid plastics without reinforcement. Inside this strong shell is a plastic foam, injected into the shell while liquid. As it dries it expands and hardens, forming a fine honeycomb of solid plastic to further reinforce the shell. The result is a stock that resists scratches and cuts far better than wood. It will withstand more pressure than wood without cracking, and is much lighter than wood. This plastic construction saves between one and two pounds of dead weight.

The toughest job for Sullivan's team developing the AR-10 was to design a new bolt assembly that would not infringe on existing patents and also, where possible, improve on existing designs. As finally submitted to Springfield Armory, the AR-10's bolt assembly is a unique design. In most gas-operated automatic rifles the gas trapped







behind the fired bullet is fed through a gas port into a cylinder near the muzzle. In this cylinder is the piston, connected to an operating rod. When the gas pushes the piston, the piston drives the operating rod. which in turn unlocks the bolt, extracts and ejects the fired cartridge, and compresses a return spring which shoves the bolt and rod forward, chambering a fresh round and leaving the hammer cocked, ready to fire by trigger, semi-auto, or mechanical sear trip, full-auto.

In the AR-10 the gas is bled off from the bore and passes through a tiny pipe down the left side of the barrel and into the receiver. The bolt consists of two parts, a rear inertia sleeve which does the work of unlocking and locking by means of a cam track, and a multi-lug bolt head which has a stud riding in the cam track. In the locked position the multi-lug bolt head, somewhat resembling the bolt of the Johnson semi-auto recoil-operated rifle, is engaged with the locking end of the barrel. The shot is fired and the gas flows through the tiny pipe to the rear. The pipe fits inside a hole in the bolt carrier or inertia sleeve. The gas expands inside the hole and drives the carrier to the rear. The camtrack rotates the bolt head stud, unlocking the bolt from the barrel. By this time the bullet has left the bore and the gas pressure dropped to safe limits. The bolt sleeve, from inertia, pulls back on the bolt head, extracting the fired case and compressing the captive recoil spring in the Fiberglass and foam butt. As the sleeve clears the gas tube, any excess gas is vented into the action. But the pressure is slight. Presence of gas is shown by a slight smudge on the bolt and sleeve in that area.



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According to Richard Boutelle, president of Fairchild Engine and Airplane Corporation and prime mover in the Armalite project, the AR-10 becomes slightly sluggish after 500 to a 1000 rounds have been fired without cleaning. This is characteristic of gas operating weapons, more or less. The M1 rifle is not immune to the need for cleaning, and the BAR and Bren guns, both piston-gas operated weapons, have provisions to adjust for fouling sluggishness.

Because of the nozzle and sleeve Armalite design it will tend to have a self-scraping action, and should bear up well under Proving Ground tests. On two scores at least, the AR-10 will foil the experts. Made largely of non-corrodible aluminum and titanium alloys, with a minimum of steel parts, the soft gray-colored AR-10's will not rust. In the rain, when we fired them, they received a liberal baptism. Any other guns would have been stripped to the last nut and bolt to be cleaned after firing, but the aluminum and stainless surfaces of the AR-10's gradually warmed to room temperature, the water evaporated, and they were dry.

In dust and mud tests, too, the AR-10 should come through well. Three openings exist in the rifle's design: the muzzle (which is usually protected by tape in testing), the ejection port (which is covered securely by a hinged trap like the German MP 43), and the magazine well, which is filled by the staggered row 20-shot clip. Our own rainy day "proving ground test" gave good indication of the AR-10's resistance to weather and rusting.

Indeed, in these operating parts of the gun is the only use ot rustable ferrous metals. Parts of the trigger group includ-

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ing the hammer, and the locking lugs and bolt assembly, are steel. In some cases this is for strength; in one instance it is simply to provide the necessary weight in a phenomenally light mechanism. A definite mass is required in the moving bolt assembly to provide enough energy to load and cock, in recoiling after unlocking, and the carrier sleeve is of steel. All steel parts are noncorrosive treated.

The basic parts of the gun are a barrel of aluminum, finned for rapid cooling, lined with high-test steel for automatic fire; a stock of foam-filled, fiberglass-reinforced plastic which is stronger than any wood stock and far more resistant to cutting, chipping and weathering; and an action operating on classic principles but embodying a new method of transferring the pressure of the gas to the bolt mechanism. But these are only part of the story.

Because of the major reduction in weight, Armalite's engineers have tackled the recoil and kick problem in two ways. The recoil of the AR-10 is about the same as that of the Garand. However, military men have long been aware of the need for antiflash protectors on military infantry weapons. Armalite has combined an anti-flash device and a muzzle brake in one piece, looking like a perforated tin can. It is an essential part of the weapon. With the muzzle brake, the kick of the AR-10 firing the standard 7.62 mm (.308 caliber) NATO cartridge, is much less than the M1 firing the old Army .30 caliber ammunition.

The other problem of recoil is one inherent in any shoulder rifle that fires fully automatic. It is a well-known fact that, if

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the gun is gripped tightly by the shooter, the muzzle tends to rise in a slow but inexorable fashion, in an arc whose center is the center of weight of the weapon. Much of the reason for this is the stock shape of most rifles. The line from muzzle to end of bolt mechanism is straight, the stock then angling down to the shoulders from sight level. Thus the recoil force splits into two directions at the point where the stock begins to angle down to the shoulder. The major force travels down the stock into the shoulder; the smaller force is absorbed by the upward movement of the muzzle. Armalite engineers defeated this rising-muzzle problem by using straight-line construction. From the top of the barrel all the way back to the shooter's shoulder, the line of the gun is a straight line. All the impact goes straight back to the shooter's shoulder. None is absorbed by movement of the gun. The AR-10 has no muzzle rise, firing on full-auto.

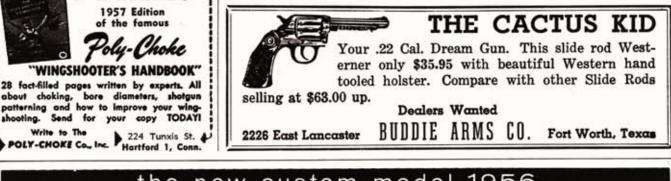
A straight-line stock is the reason for the elevated sights of the AR-10. You can't design a military gun which requires the shooter to bend his head down to shoulder level to sight along the barrel; you can't have muzzle rise in a gun that means the difference between life and death to the soldier in the field. So the sights were raised to meet the eye. An aluminum sight carrier was installed on top of the bolt mechanism three inches above the bolt. The front sight was raised to correspond in height with the rear sight. This construction has also created a convenient handle by which to carry the gun. Any M1-trained soldier will tell you just about how much this handle can mean. And Armalite swears that you can use the handle all you want without disturbing the sight. The AR-10 can be sighted to well within the accuracy limits of the Army's specification for basic infantry weapons.

The sights themselves allow elevation adjustment only. Windage adjustment is controlled by an Allen wrench, and this is not supposed to be issued to the soldier as field equipment. Windage, reasons Armalite, won't change but elevation will. Once the soldier has his gun zeroed in for windage he should leave it there.

The weight saving in the Armalite AR-10 construction is the difference between night and day. While the AR-10's are going through the hoops at Springfield Armory and Aberdeen proving ground, we put a couple over the jumps in a brief comparison test, using a fine German FG-42 paratrooper's 8 mm machine rifle as a control. The weather was miserable, and all guns got excellent rain tests. Exhaustive firing was not possible with either of three Armalite guns-a standard autoloading sporting rifle resembling the test T-47 in external appearance, and the two AR-10 machine rifles.

An assortment of .308 Winchester ammunition was used, including short-bullet 110-grain soft-points which frequently jam in an ordinary autoloader. But in the AR-10's which were designed solely for the long-bullet 7.62 NATO military cartridge, the short .308's functioned well. Two failures to feed were experienced, due directly to the short bullet. No failures to feed have occurred in firing the longer bullets.

Objectionable kick was nonexistent in these truly lightweight automatic rifles. The highly efficient tin-can muzzle brake and flash suppressor fitted to one AR-10 kept things to a comfortable bounce in full auto, with none of the uncontrollable climb associated with some weapons when gripped too tightly. In semi-auto fire, the kick-in spite of the fact that the gun weighs hardly more than an M1-carbine-is far less than any other gun of comparable caliber. Measured energy of recoil is a scientific figure, but "kick" is something else-nobody knows what. My impression was that the .308 AR-10 kicked less than a Model 70 Winchester bolt action rifle using the same cartridge.





As unusual as the new rifles themselves is the fact that neither of the two menbehind the guns consider themselves as "gun experts." The rifle's designer, George Sullivan, is by profession an attorney for the Lockheed Aircraft Corporation. Armalite backer Richard S. Boutelle, president of Fairchild, knows guns from his hobby only. But he knows guns pretty well. He has hunted from the tropics to the Arctic, and has dozens of rifles and pistols at his Hagerstown, Maryland, home. Once a friend of his wife's remarked, "You should buy Dick a gun cabinet." She replied, "We keep house in one."

Sullivan has acquired a good technical grounding in the business from practical experimenting. He has worked on light alloy guns for the past ten years, and fired the first aluminum-barrel weapon in 1948. Boutelle financed the special Armalite division of his corporation on October 1, 1954. The odds against them have been tremendous. Not only were they trying to build something that had never progressed beyond the dreaming stage before, but they were competing against the giants of America's small arms industry for the richest plum of all, the Army's basic infantry weapons contract. Compared to the heavier Springfield-Armory-designed T-44, and to the Belgian FN T-48 which weighs almost double the poundage of the AR-10, Armalite's 6.85pound rifle is the first light rifle to be developed since the inception in 1946 of the Army's light rifle program. If it checks out well at Aberdeen Proving Ground, the Army's weapons test center in Maryland, it should stand some chance for adoption.

The new gun is a product of teamwork and brain picking. Sullivan and his fellow engineers - Charles Dorchester, gun-crank and plastics expert, and ordnanceman Eugene Stoner, a gun hobbyist with some original ideas in arms design-are the first to admit that many features of the new gun are derived from the experience of both military and sporting gun manufacturers in the United States. They have frankly used the designs of existing bolt mechanism as springboards for their own development. But by building on the advanced construction of preceding inventors, these men of Armalite have created the first really new gun in years of conventional arms production,

The field testing that has been done in Los Angeles, at Armalite, has been sketchy at best. Armalite knows, for example, that the AR-10 can hold its own in accuracy with the M1, but it does not claim anything further. AR-10 was developed as a military weapon, a lead sprayer, not as a precision instrument. They told me very frankly that they did not try to compete with the target rifles developed in steel.

"The light weight is the great thing in itself," George Sullivan said to me. "I've carried all kinds of rifles and shotguns on hunting trips," was his comment, "and a big, 9-pound rifle begins to weigh 27 pounds before the end of the day. With these guns," and he pointed to the cabinet of plasticaluminum guns, "the end-of-the-day weight is a lot less. You don't even notice a twoand-a-half-pound saving in the morning, but by evening you're ready to credit that small saving with the difference between heavy and light load." Whether or not the Army buys the AR-10 for the next basic infantry weapon, and it must make up its mind between the T-44, the FN and the AR-10, there is no doubt that the light gun is going to be with us for the future. To date only target rifles have not been threatened by the thinking and development behind Armalite's light rifle. All the steel shotguns, deer guns, varmint guns, plinking guns can be replaced by plastic-aluminum items. Can be.

Whether they are or not depends on the very astute Sullivan-Boutelle combination. They have the gun, they have the knowhow. This adventure of an aircraft company into the firearms field may very well be the most important gun story you'll read this year.

SHOOT FOR FUN

(Continued from Page 29)

for pellet gun popularity. In general, unless you intend to use your gun primarily for serious marksmanship, you'd do well to stick with a .22 for that added oomph when you feel like switching from target work to pest control or small game hunting.

Air compression, for the pneumatic pellet guns, is built up by "pumping" a lever: the more pump-strokes, the higher the compression, so the greater the power. A word of warning here: Some guns will "air-lock" if you build the pressure too high, running into fairly expensive repairs. The Crosman people boast proudly of what they call their "Air-Trol Valve," a feature that prevents jamming by preventing over-compression.



49

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PACHMAYR GUN WORKS, INC 1220 S. Grand Ave., Los Angeles, Calif In any case, you'd rarely have occasion to pump your air gun to the locking stage. Three pump-strokes are enough to power one of the better guns for tight target groups at 25 feet. You might go up to seven or eight pump-strokes for sure killing power for varmints and pests at ranges up to about a hundred feet.

The big advantage of the pneumatic guns is their variable power. The gas-powered variety, on the other hand, uses carbon dioxide gas to do the work. With them, there's nothing to pump; just cock and shoot, like any standard firearm. The gas gun addicts prefer the absolute uniformity of power which these guns offer, as against the variability of the pump models. Here, the only work involved is the placing of the CO₂ gas cartridge when it's exhausted, and that's just a matter of seconds.

All the domestic gas guns except Crosman use the same little carbon dioxide cartridges that are used in charging home-made soda water. The first gun I owned was a Crosman rifle powered by a big ten-ounce capacity cylinder of CO2, like the kind you may have used for emergency tire inflation, blowing up air mattresses and similar laborsaving applications. This gadget, connected by a flexible hose to the pressure chamber of the gun, was good for months of fairly regular shooting. The only drawback was that it was something extra to lug around when I took my rifle out into the field. However, the new gas-powered Crosman rifles and pistols are specially made to accommodate an extra-capacity cartridge that fits right into the gun. This "Giant Powerlet" gives you from 40 to 100 shots, depending on the model of gun in which it is used

They haven't yet come up with a pellet gun that could be recommended as amplprotection against carnivore, or even for big game, but you can have lots of fun and lotof good practice with an air or gas gun. My own family's shooting program is fairly typical, and it includes serious marksman ship, target games, family shooting matches, party entertainment, first-gun training for the kids, vacation fun at the cottage and in the boat, plinking in the backyard, rabbit and squirrel shooting, and keeping the neighborhood free of starlings. You'll also find pellet guns pretty standard equipment in training and marksmanship programconducted by the NRA, Scouts, schools and colleges, military reserve units, industrial recreational clubs, fraternal orders, and State firearm license bureaus.

Obviously, a good pellet gun is no toy. Unlike BB spring-guns, the better peller rifles and pistols are precision-rifled and engineered for accuracy and power. Particularly if you've found that you're getting less and less opportunities to use your favorite firearms, you'll appreciate the fact that you can shoot your pellet gun just about whenever and wherever you want to. And you may find, as I have, that keeping in trim with a good pellet gun will help you shoot better when you line up Old Betsy's sights on a prize buck.

It's easy to set up a pellet-gun shooting range in your own basement or garage, or in the gym or recreation hall of a community huilding. Just set up a half-inch plywood backstop, or even a grocery carton stuffed with folded newspapers, twenty-five feet



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trom the line of fire. You can either Scotchtape your paper targets directly to the backboard or insert them in metal target traps. Crosman offers a Remote Control "Targlite" target which is electrically backlighted to spot hits from the firing line, and which has pulley-and-cord attachment that lets you change the paper target insert without leaving your shooting position. Outdoors, of course, particularly with beginning shooters, you'll want to keep the line of fire away from aeighboring property. But indoors or out, whenever your trigger finger gets itchy, you're in business if you've got a pellet gun.

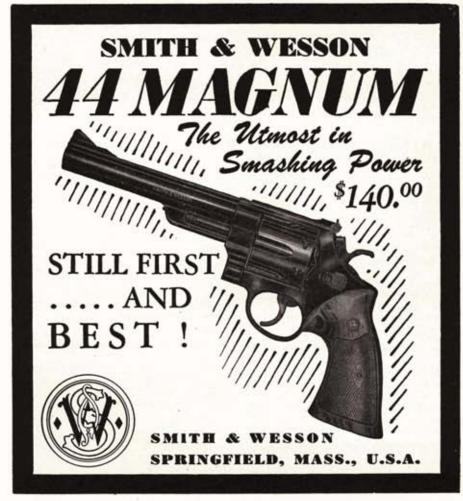
Along with the emphasis on fun, Crosman has just brought out a new kind of shooting game target that they package in an assortment called "Fun Target." There are separate targets for each of six different games: Pest Shoot, Fish in a Barrel, Golf, Anagrams, Tic-Tac-Toe, and Checkers. If you've ever gotten tired of that same old black bull's-eye glaring at you every time you want to knock off a few shots, you'll find these colorful games a welcome change and challenge.

If you've got the average complement of wife and kids you'll probably want more than one model of pellet gun. My regulation-sized gas pellet rifle was just a little too heavy for my youngsters to handle effectively, but carbine-style air- and gas-powered guns are on the market which are just the thing for smaller shooters. These weigh in the neighborhood of four pounds, are short, compact. but remarkably accurate. My wife, who had been using the rifle for her shots, now prefers to take her turn with the kids in using a carbine. We also have two air guns, both dandy guns, but it's the gas-powered models that get the big play in our household.

This whole idea of making shooting easy and attractive—of promoting it as family fun —is tied in pretty closely with the very nature of the pellet gun. For one thing, there's no noise in pellet gun shooting to alarm beginners, wake the baby or disturb neighbors; you shoot whenever you want to. Complete absence of recoil, too, makes these guns easier for new shooters to handle confidently. And you may not realize how much more readily women take to shooting when there's no smoke, powder smudge or odor.

To keep shooting alive as a sport in America, we've got to have more and more new shooters coming along all the time—with the urge, the ability, and the *opportunity* to shoot. Pellet guns and pellet gun ranges are one answer to the problem of how this can be done. Shooting is fun—and the more people we can persuade to enjoy, the sooner we will become, again, "a nation of riflemen." \bigoplus







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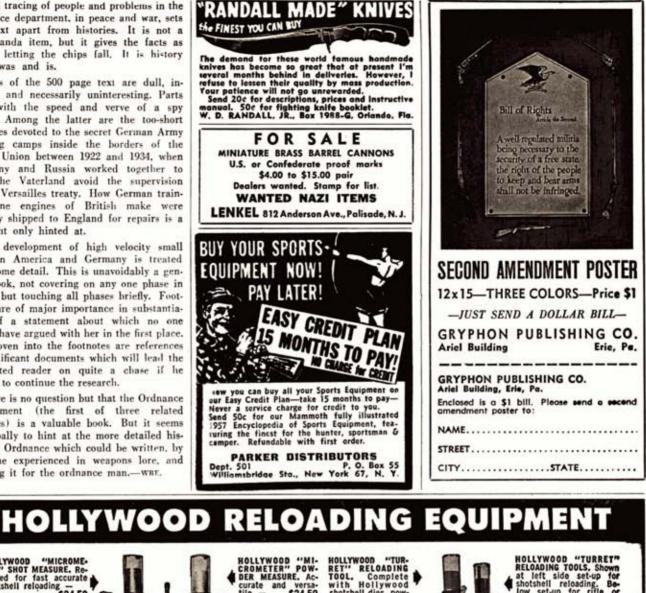


skillful tracing of people and problems in the ordnance department, in peace and war, sets this text apart from histories. It is not a propaganda item, but it gives the facts as found, letting the chips fall. It is history as it was and is.

Parts of the 500 page text are dull, involved, and necessarily uninteresting. Parts read with the speed and verve of a spy novel. Among the latter are the too-short passages devoted to the secret German Army training camps inside the borders of the Soviet Union between 1922 and 1934, when Germany and Russia worked together to help the Vaterland avoid the supervision of the Versailles treaty. How German train-ing-plane engines of British make were secretly shipped to England for repairs is a sidelight only hinted at.

The development of high velocity small arms in America and Germany is treated with some detail. This is unavoidably a general book, not covering on any one phase in detail, but touching all phases briefly. Footnotes are of major importance in substantiation of a statement about which no one would have argued with her in the first place. But woven into the footnotes are references to significant documents which will lead the interested reader on quite a chase if he wishes to continue the research.

There is no question but that the Ordnance Department (the first of three related volumes) is a valuable book. But it seems principally to hint at the more detailed history of Ordnance which could be written, by someone experienced in weapons lore, and slanting it for the ordnance man .-- WRF.







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INVENTORS—INFORMATION on Patent procedure furnished on request, without obligation. John Randolph, Registered Patent Attorney, 269 Columbian Building, Washington, D. C.

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No side play. Windage and elevation. Graduated from 25 to 100 yards. Its base is hand fitted on to the barrel (to increase accuracy) and is maintained with a set screw to facilitate assembly.

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See NOTE (Working Principle).

Stock of fine French walnut. Carefully polished and varnished. Specially designed to insure proper shooting positions. Snobble fore-end.

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No firing pin ● no extractor ● sturdy recoil spring ● Breech block made of thermically treated special steel ● "Mauser-type" 4-groove rifling of high precision, 1 turn in 450 mm (approx. 17½") ● Easy dismantling and re-assembling by hand without any tool, with the sole help of a coin.

WORKING PRINCIPLE

When you press the trigger, the breech block is thrown forward, under pressure of the main spring. (The trigger pull can be regulated.)

In its travel, it feeds a cartridge from the magazine, introduces it into the chamber of the barrel, and fires it.

Under the force of the explosion gases, the breech block is thrown back to its original position and the cartridge case is ejected.

The breech block is retained in the rear position, the recoil spring remains compressed, and the weapon is ready for further firing.

NOTE. - When firing high velocity or very powerful cartridges it is advisable to increase the inertia of the breech bolt by reversing the position of the spring guide, i. e., by placing its rimmed-base end, in front, inside the rear-end cavity of the breech block.

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