AN AMERICAN RIFLEMAN REPRINT R10

REMODELING . . .

The U.S. Model 1917 Rifle

Complete information on disassembly procedure, with exploded views and parts identification, on remodeling into a sporter, and on handloading the .30-'06 cartridge

THE AMERICAN RIFLEMAN is the official journal of The National Rifle Association of America (NRA). Its readership is well defined and essentially has a strong common bond of interest in firearms, ammunition, their appendages, and their legitimate use—on the target range, in the hunting fields, and as items to be acquired, collected, and enjoyed.

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50 CENTS

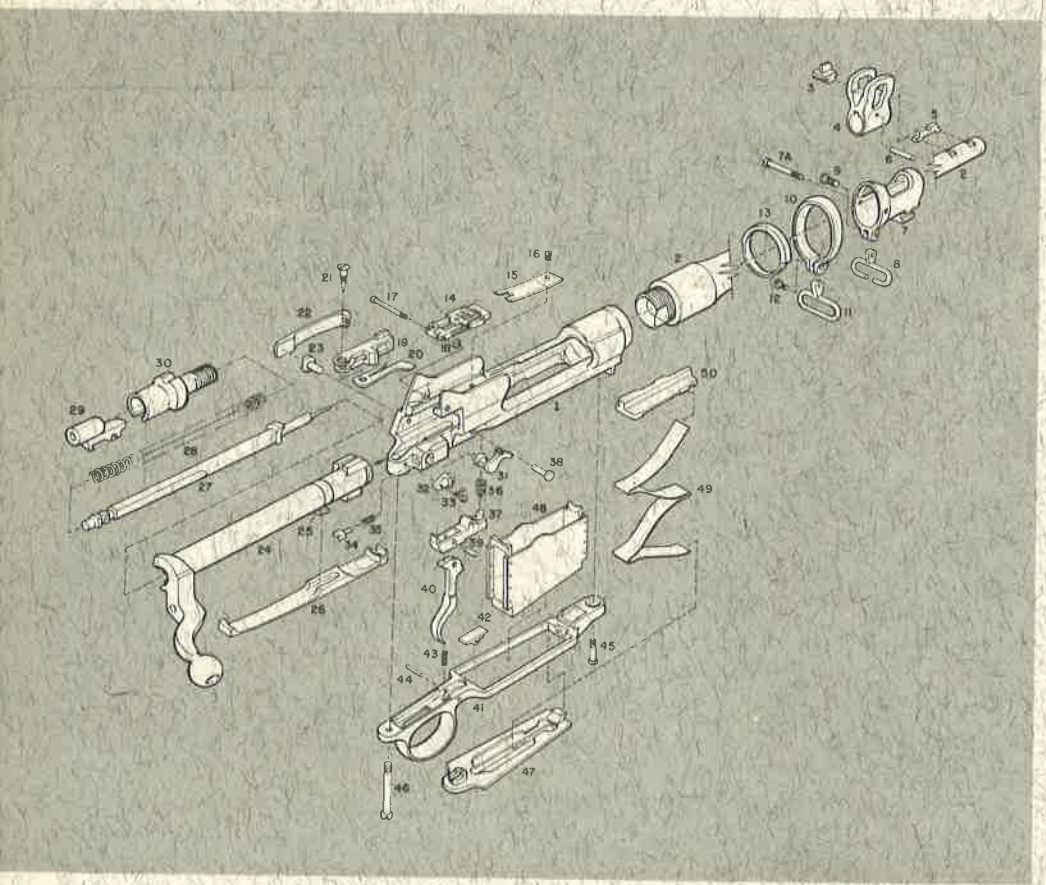
U. S. MODEL 1917 RIFLE (ENFIELD)

By James M. Triggs

THE U. S. Rifle, Cal. .30, Model of 1917, is of basic Mauser turn-bolt type with dual front locking lugs, one-piece bolt, and staggered column box magazine. Developed during World War I, it was a modification of the British Pattern 1914 Service Rifle.

In 1913 British Ordnance developed an experimental Mauser-type bolt-action rifle chambered for a cal. .276 rimless cartridge loaded with a 165-gr. pointed bullet at 2800 feet per second (f.p.s.). The intent of these experiments was to develop a replacement for the cal. .303 Lee-Enfield Service rifle. Only a limited number of cal. .276 rifles had been manufactured on a toolroom basis prior to the start of World War I, at which time the British decided to alter the experimental rifle to handle the cal. .303 rimmed cartridge.

As manufacturing facilities for the new rifle, designated Pattern 1914, did not exist in England several U. S. firms accepted contracts in 1914 to manufacture it. These were Winchester Repeating Arms Co., New Haven, Conn., Remington Arms-Union Metallic Cartridge Co., Ilion, N. Y., and Remington Arms Co. of Delaware. The latter firm operated the Eddystone Arsenal at Eddystone, Pa., which was owned by the Baldwin Locomotive Works. On Sept. 21, 1916, after a considerable number of rifles had been delivered, these contracts were canceled by the British government. This cancellation was largely due to the fact that British arsenals and factories had been able to achieve more than adequate production of SMLE rifles to satisfy troop requirements.



When the United States entered the war on Apr. 6, 1917, the supply of Model 1903 Springfield rifles on hand was relatively small and production facilities of Rock Island Arsenal and Springfield Armory were not adequate to turn out Model 1903 rifles in the large quantities necessary to equip the rapidly expanding American Army. There was not sufficient time for U. S. firms to tool up for production of the Model 1903 rifle and the idea of equipping U. S. troops with the cal. .303 Pattern 1914 rifle was not acceptable as it would have complicated ammunition supply. The alternative was to modify the Pattern 1914 rifle to handle the cal. .30-'06 cartridge. After considerable difficulty in standardizing the modified rifle, designated U. S. Rifle, Cal. .30, Model of 1917, initial deliveries were made by Winchester on Aug. 18, 1917, followed by Eddystone Arsenal on Sept. 10 and Remington about Oct. 28. Upon final termination of these contracts on Nov. 9, 1918, a total of 2,193,429 Model 1917 Enfield rifles had been produced. These figures reflect finished rifles only, and do not include spare parts.

After World War I, Model 1917 Enfield rifles were stored in war reserve and large numbers were subsequently sold to NRA members through the Director of Civilian Marksmanship. During the early part of World War II large quantities of these rifles were first sold and then lend-leased to our Allies.

Receivers and bolts of the Model 1917 Enfield rifle were made of 3½% nickel steel by all 3 manufacturers. In modifying the cal. .303 Pattern 1914 rifle for the .30-'06 cartridge it was necessary to change the rifling specifications. The 5-groove, left twist, Enfield

Second Printing

rifling was retained, but bore diameter was reduced to .300" with groove depth of .005". Magazine capacity is 6 cartridges and the receiver has clip slots for reloading with a 5-round Model 1903 Springfield clip.

The aperture-type folding leaf rear sight is adjustable for elevation only, and is a superior battle sight to that of the Model 1903 Springfield. Windage adjustments in the Model 1917 are made by tapping the front sight to left or right in its dovetail. The cock-on-closing action of the Model 1917 rifle has been the subject of some criticism by Americans accustomed to the cock-on-opening Model 1903 Springfield and Mauser 98 rifles. Actually this feature is a very sound one for a military rifle, in which the chamber may become so hot that extraction becomes difficult due to sticking cases, and thus adds to the effort required to lift the bolt handle. Those who become proficient with cock-on-closing rifles are not aware of any handicap by virtue of this mode of bolt operation.

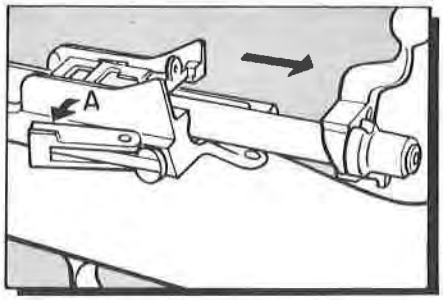
During World War II it was found necessary to produce additional barrels for the Model 1917 rifle and these were made by private firms. The High Standard Manufacturing Corp. produced 4-groove barrels and Johnson Automatics produced 2-groove barrels, both with right twist and to Model 1903 Springfield rifling specifications. After World War II a few NRA members who had purchased rifles through the DCM complained that the receiver rings of their rifles were cracked. The majority of these rifles were of Eddystone manufacture and had been rebarreled during the World War II period. In some instances the cracks were not clearly evident until the receiver had been polished and blued.

Faulty receivers were at one time exchanged gratis by the DCM but supply of this part is exhausted.

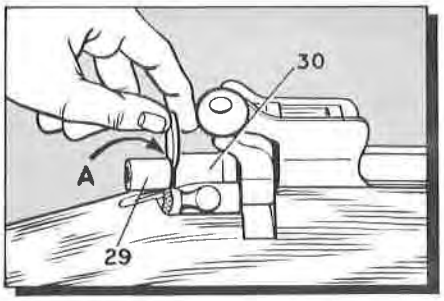
Disassembly Procedure

Remove bolt and field strip as shown in accompanying illustrations. Magazine assembly is stripped by pressing bullet end of cartridge or similar implement into hole at bottom rear of floorplate (47), at same time drawing floorplate to rear and removing along with magazine spring (49) and follower (50).

Barrel and receiver are removed from buttstock after sliding barrel bands (7 & 10) forward off stock and removing front and rear handguards and unscrewing front and rear guard screws (45 & 46). Pull trigger guard (41) and magazine (48) out from bottom of buttstock. Remaining parts (bolt stop assembly, safety-lock assembly, sear, trigger, floorplate catch assembly, sights, etc.) are all easily removed if necessary for replacement or repair. Reassembly is accomplished in reverse order.



1 To remove bolt, hold bolt stop (19) out as shown at "A" and pull bolt straight out to the rear

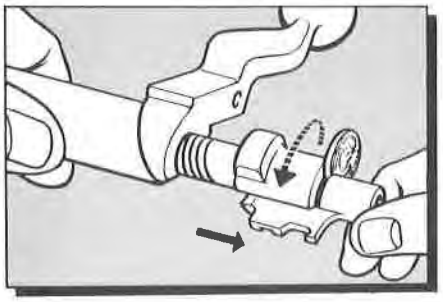


2 To disassemble bolt, open rifle bolt and engage safety. Close bolt, then elevate bolt as shown while at the same time inserting nickel or other coin between end of cocking piece and bolt sleeve so that coin is trapped between these parts as shown

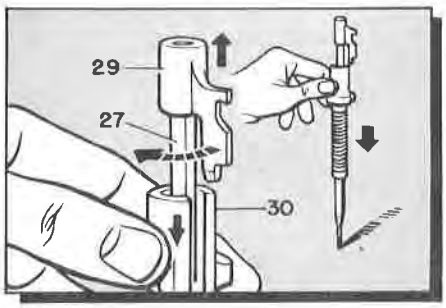
Parts Legend

1. Receiver
2. Barrel
3. Front sight blade
4. Front sight carrier
5. Front sight spline
6. Front sight pin
7. Upper band
7A. Upper band screw
8. Stacking swivel
9. Stacking swivel screw
10. Lower band
11. Lower band swivel
12. Lower band swivel screw
13. Handguard ring
14. Rear sight assembly
15. Rear sight base spring
16. Rear sight base spring screw
17. Rear sight joint bolt
18. Rear sight joint bolt nut
19. Bolt stop
20. Ejector
21. Bolt stop screw
22. Bolt stop spring
23. Bolt stop spring rest
24. Bolt
25. Extractor collar
26. Extractor
27. Striker
28. Mainspring
29. Cocking piece
30. Sleeve
31. Safety-lock
32. Safety-lock holder
33. Safety-lock holder screw
34. Safety-lock plunger
35. Safety-lock plunger spring
36. Sear spring
37. Sear
38. Sear pin (Enters receiver from left side—shown on right here for clarity)
39. Trigger pin
40. Trigger
41. Trigger guard
42. Floorplate catch
43. Floorplate catch spring
44. Floorplate catch pin
45. Front guard screw
46. Rear guard screw
47. Floorplate
48. Magazine
49. Magazine spring
50. Follower

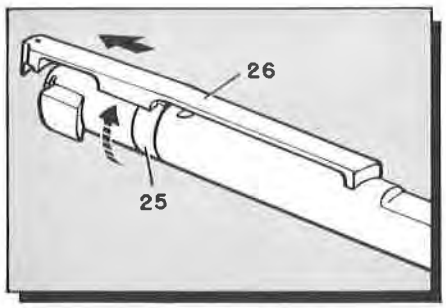
Note: The following parts are omitted in the drawing: Buttstock, buttplate, buttplate screws (2), butt swivel, swivel screws (2), rear band pin, front and rear handguards, stock bolt and nut, front and rear guard screw bushings



3 Remove bolt and unscrew percussion assembly as shown



4 With striker point resting on wood surface, force sleeve (30) down. Remove coin which has been trapped between end of cocking piece and sleeve. Continue forcing sleeve down, compressing mainspring (28) until cocking piece lug clears lug slot in sleeve. Turn cocking piece ¼ turn right or left, disengaging it from striker, and draw cocking piece off to rear. Relieve mainspring pressure gradually and draw off sleeve



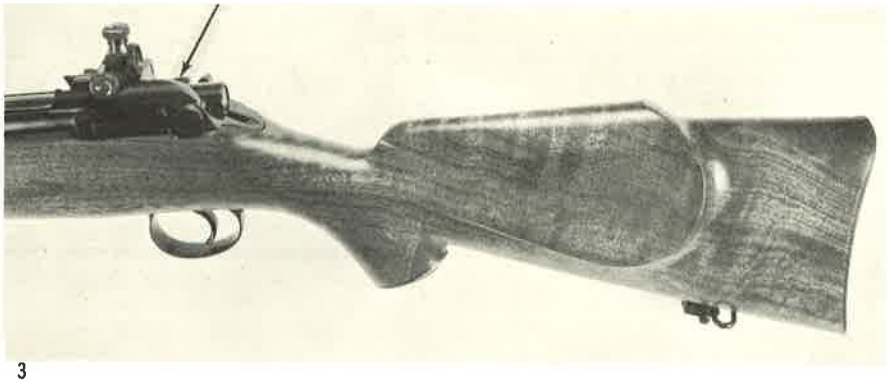
5 Turn extractor (26) to cover gas escape holes in bolt and push forward on extractor until it is free of extractor collar (25). Reassemble bolt in reverse order ■

1

1 Raw materials for a fine sporting rifle. All parts of the original rifle are discarded except barrel and action

2

2 Completed rifle weighs 9 lbs. plus, but is well balanced and pleasant to shoot. It is not practicable to make featherweight sporters of M1917 or P14 Service rifles due to their heavy barrels and long, heavy actions. Reduction of barrel weight by turning is not recommended



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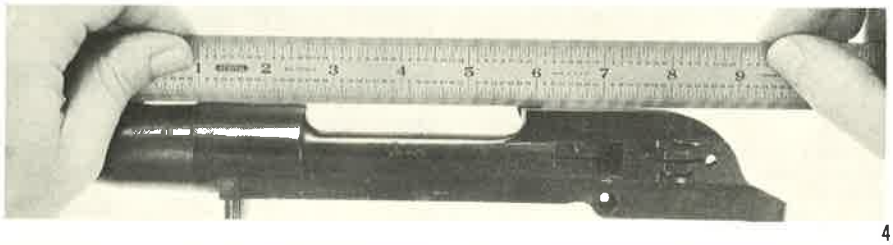
3 Left side view showing relatively small but adequate cheekpiece. Left rear of receiver bridge (arrow) has been reshaped to pleasing profile



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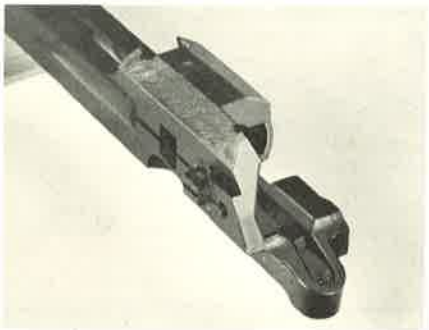
4 After hacksawing ears from receiver bridge, bridge is filed level with top of receiver ring. Work should be checked frequently with straightedge and care taken to preserve flatness of upper surface. Left rear side of receiver bridge has been streamlined by filing away upper corner

5 Initial rounding of receiver bridge is best done by filing off corners, taking care that resultant flats are parallel with long axis of receiver. Continue filing successively narrower flats until template can be used

REMODELING THE

Instructions on making



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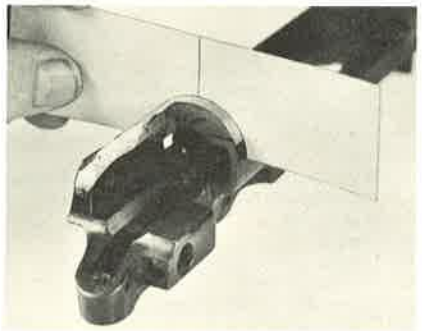

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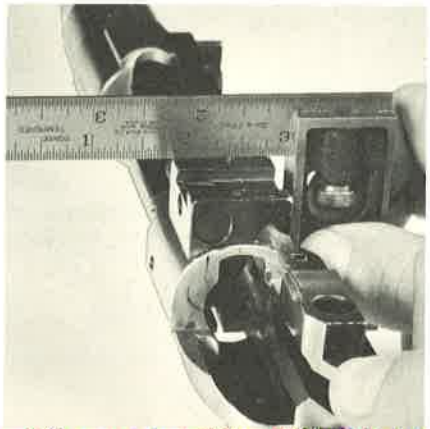

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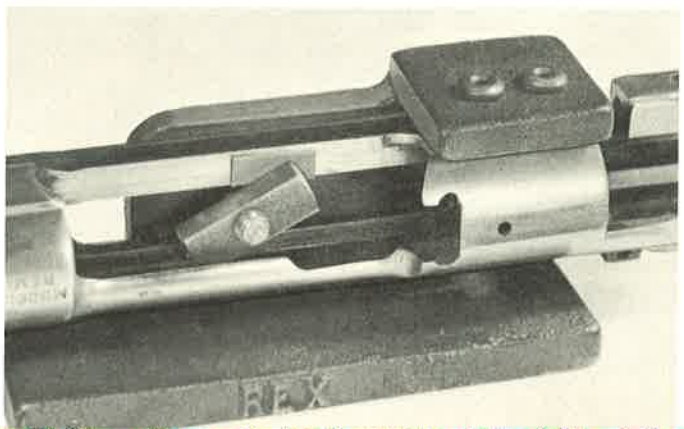

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9

6 Half-moon template of sheet metal or card stock is used as guide in rounding receiver bridge. Walls of altered bridge should be parallel with walls of receiver ring. This demands frequent use of straightedge between receiver ring and bridge. Fine-cut mill file is next used and work is then stoned to remove file marks. Final polishing is done with abrasive papers backed by mill file

7 Small square can be used to square up rear sight base with receiver. Beam of square rests against flats on bottom of receiver with arm opposed to side of sight base. Square is used to orient base prior to drilling mounting holes in receiver and to check on accuracy after mounting. Misalignment is corrected by filing sight base or by using shims between base and receiver wall

8 Fixture with hardened steel bushings to guide drill simplifies mounting micrometer rear sights, but purchase is not justified unless considerable sight mounting is to be done. Amateur gunsmith can do satisfactory job using base of sight as guide for drill. Small square is used to orient sight base in relation to flats on bottom of receiver. Base is then clamped in place after which mounting holes are drilled and tapped in the receiver

9 Seating and aligning band-type front sight base is best done before shortening barrel. Muzzle area covered by band should be polished beforehand as it is difficult to polish around band after it is in place. Base (a) is driven on using hardwood block or brass drift. Base must fit snugly, but avoid heavy blows when seating it as band may split. Band can be aligned quite accurately on spline cut of Service sight. Band-type sights are offered with different inside diameters according to barrel length desired. This dimension affects height of front sight needed and must therefore be specified when ordering front sight assembly

10 Brass bore crowning balls in graduated sizes with shanks for mounting in drill chucks are offered by gunsmith supply houses, but satisfactory job can be done using roundhead brass or iron screws chucked in a hand drill. Coarse automobile valve-grinding compound is used as grinding agent. Drill should be oscillated slightly around long axis of barrel

11 Bore should be crowned deeply enough to remove the wire edge from both lands and grooves, but nothing is gained by excessively deep crowning. Wire edge on muzzle rim is broken with stone or needle file

ENFIELD RIFLE

sporters of U.S. model 1917 and British P14 rifles

By M. D. WAITE
NRA STAFF

10

11

SPORTERIZING the cal. .30-'06 U. S. Model 1917 (Enfield) rifle or the similar British cal. .303 Pattern 1914 (P14) (Rifle No. 3) rifle offers a real challenge to the amateur gunsmith. Considerable metal work is involved in reshaping receiver and trigger guard. Shortening the barrel is advisable to improve handling qualities and appearance. A sporting-type front sight and fully adjustable aperture rear sight are recommended. (A variety of such sights is available in a wide price range.)

Sporting stocks for the Enfield are offered by several makers in various styles, degrees of completion, and grades of wood. These range from the completely finished stock requiring very little inletting to install the barreled action, to the roughly turned blank with only token action inletting. Study of manufacturers' circulars and catalogs is advisable before ordering the stock.

The Bishop stock used for the rifle shown required only minor inletting in fitting the receiver and trigger guard, and inletting the barrel channel was not difficult. The type of stock chosen is necessarily related to the variety of inletting and shaping tools required.

A set of stockmaker's hand screws with T-handles will prove helpful in inletting the barreled action into the stock. Their use saves much time.

A shallower and more attractive action profile is obtained by straightening the front tang of the trigger guard and by reducing the depth of the magazine box about ¼". Removing the step from the front trigger guard tang requires that it be cut off and then welded back to the body of the guard. A fixture is needed to hold the parts in place and it is recommended that this job be given to an experienced gunsmith.

Many professional gunsmiths have altered quantities of these rifles and have the necessary fixtures and knowledge.

The same holds true for alteration of the receiver bridge, which involves removing the protective wings and contouring of the bridge to the same height and radius as the receiver ring. Professional gunsmiths usually do this by milling or grinding. The amateur gunsmith can do a creditable job using files alone. First step is removal of the military rear sight assembly. The ears are then cut off with a hacksaw, after which the top of the receiver bridge is filed flat and level with receiver ring. Flat surface of receiver bridge tilts down slightly towards the rear so that use of a straightedge to span receiver bridge and ring is required to effect precise leveling. After filing the receiver bridge flat, file excess material from the corners, taking care that surfaces are made parallel with the long axis of the receiver. A power grinder will prove extremely helpful in removing excess metal. A cardboard or metal template cut to the same diameter as receiver ring (1.37") serves as a guide in filing and in final shaping of receiver bridge. This is used in conjunction with the straightedge so that surfaces of receiver ring and bridge are made parallel. Some metal can also be filed off the left rear side of the receiver bridge to give a more pleasing profile. →

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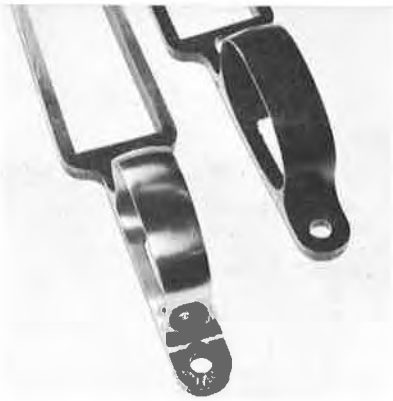

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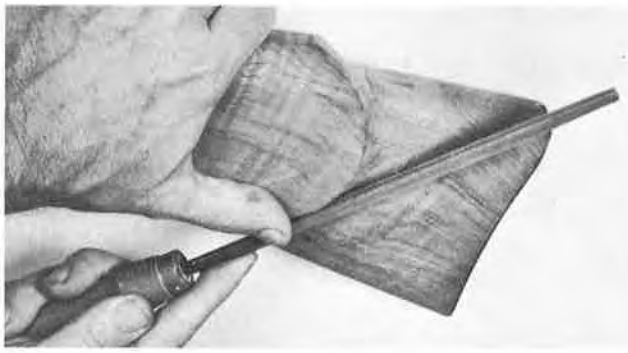

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Receivers of Winchester and Eddystone manufacture usually have a deep elliptical mortise in the receiver bridge. This can be covered with a thin metal plate formed to the contour of the bridge, or a fillet of steel can be welded in to fill it. Such welding is best done by an experienced gunsmith as it is necessary to shield the forepart of the receiver from high temperature.

Receivers and bolts of these rifles are of nickel steel, and the receivers in particular are always tough and sometimes quite hard. *High-speed hacksaw blades and good quality files are therefore necessary.*

The barrel is shortened by cutting off the excess with a hacksaw. If a sleeve-type ramp sight assembly is to be used, it is best to remove the military front sight assembly and polish the last 6″ or so of the barrel before installing the sight and shortening the barrel.

The ramp sight is then driven on the polished barrel and aligned on the spline cut of the Service sight. This can be done quite accurately by eye, using 2 short straightedges placed alongside the sight ramp. Gentle taps with a plastic- or brass-faced hammer will rotate the ramp into precise position. After the ramp sight is in position, a detent for its locking screw is drilled through the hole in the ramp into the barrel using a No. 31 drill. Depth of hole in barrel should be at least 1/16″, so that the sight locking screw has a firm purchase.

The barrel can now be cut off so that not more than ¼″ extends beyond the ramp band. A fine mill file is used to true the end of the barrel, after which the cut surface can be stoned and then polished with fine abrasive paper. Sharp outside edge of the muzzle is broken with the stone or a needle file.

Crowning the bore to remove burrs and sharp edges is done with a round-head brass or iron screw and coarse automobile valve-grinding compound. The screw can be chucked in a hand or electric drill.

It will be noted that the barrel was not shortened to desired length before fitting the ramp, and that a section of the barrel near the muzzle was polished beforehand. This procedure is advisable because one cannot estimate precisely where the ramp will lodge when driven to a firm fit on the barrel. The ramp must fit very tightly or it may shift from the shock of recoil—even when secured with a locking screw. Pre-polishing the barrel in the vicinity of the ramp is advisable since it is difficult to polish the barrel with ramp in place.

The above procedure is unnecessary if a bandless sweat-on or screw-on ramp is used.

Mounting receiver sight

The receiver sight can be mounted using its base as a drill fixture and a small machinist's or carpenter's square to orient the base in relation to flats on the bottom of the receiver. The base should be clamped in place on the receiver and its alignment re-checked before drilling the first hole. The initial hole drilled with a No. 31 drill is then tapped with 6-48 tap lubricated with turpentine or tapping lubricant. The sight base is then unclamped from the receiver and the burrs removed from the edge of the hole with a fine stone. The sight base is then secured to the receiver with mounting screw and alignment re-checked with a square before drilling and tapping the other hole.

Minor misalignment of rear sight can be corrected by filing the base, or through use of thin metal shims between the base and the receiver bridge. Drilling and tapping sight mounting holes is best accomplished using a drill press. More precise sight mounting can be done using a surface plate, V-blocks, machinist's squares, or a fixture as shown. Purchase of such items is not necessary unless one intends to do considerable sight mounting.

A very creditable polishing job on barrel and action can be done with abrasive cloths and papers plus some stoning and filing to remove light stamp marks, nicks, and dents. Initial polishing on the barrel is done with strips of 2/0 emery cloth about 1¼″ wide, torn full length of the sheet. These are used to rough polish the barrel using a motion akin to shining shoes.

After the barrel is rough polished with emery cloth, it should be polished lengthwise using emery cloth and then soft-back silicon carbide papers of successively finer grits (400 and 600) to remove scratches left by the coarser abrasives. Final polish is imparted with

(Text continued on page 8)

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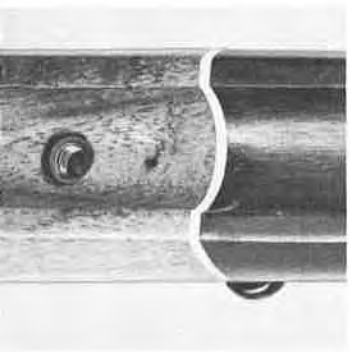

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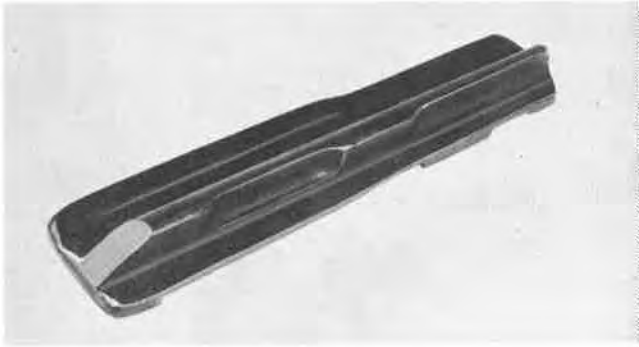

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12 Lower line of finished rifle will be neater if front trigger guard tang is straightened to remove step. A fixture is required to hold sections in position during welding. Original spacing between centers of front and rear guard screw holes must be maintained in straightened guard, and lug seat for floorplate preserved. New guard screws for straightened and unstraightened guards are available

13 Appearance of guard loop is enhanced by narrowing it about ⅛" and tapering it slightly from front to rear. Bulk of metal is removed with round file, after which fine-cut half-round Swiss file is used to refine outline. All filed surfaces are then stoned and polished with abrasive papers. Avoid thinning loop excessively as this will make it liable to buckling if struck hard

14 Trigger guard should be inletted prior to inletting the barreled action. Spotting color is applied to bottom and sides of guard, after which guard is pressed into its mortise. Inlet front tang first, which requires that guard be tipped forward as shown. Light taps with rubber or fiber mallet serve to drive guard forward so spotting color is transferred to tight spots in mortise. Care must be taken in paring wood from sides of mortise so unsightly gaps do not result. Many impressions are required to fully inlet guard, which is knocked out each time by punch through magazine mortise

15 Trigger guard has been fully inletted and some of the excess wood filed away from sides of its mortise. It is best to remove the guard when doing this as file marks are difficult to remove from metal parts

16 Inletting barreled action is done after inletting trigger guard. Barrel channel may have to be roughed in with gouge so stockmakers screws can be used. This is done by placing barreled action on top of stock, taking care to seat it in approximately correct location. Outline of barrel is then scribed or penciled on stock. Pencil or scribe should be toed in slightly to avoid possibly overcutting channel. Being longer, rear handscrew can be used in front guard screw of receiver during initial phase of inletting. Spotting color is applied to both barrel and receiver, and coating must be replaced before making each impression. Blows with rubber mallet on receiver and barrel will give better color impressions. Barreled action must be inletted evenly and square with stock. Heavy tension on handscrews may wedge stock apart and result in splits through action mortise. Clamps across receiver bridge and receiver ring areas will prevent this

17 Forged steel buttplate is fitted using spotting color to insure close contact between face of plate and stock. Excess wood is pared and rasped off using flat chisel and half-round file. Original screw holes in stock are plugged with walnut pegs driven in tightly and secured with glue. Screws furnished with buttplate can be used to draw plate tight after fitting is almost completed. Fitting of steel pistol grip cap offers no problem as its undersurface is flat

18 Fitting buttplate has been completed. Tricky part of job is inletting curved upper tang into heel of buttstock. Buttplate and grip cap should be left in place during subsequent shaping of stock even though bluing may be marred. This insures a perfect edge fit. Buttplate and grip cap are reblued upon completion of stock shaping

19 Round and half-round bastard files are used to profile cheekpiece and pistol grip as well as to cut flutes in comb. Chisels are actually used very little in exterior shaping of stock, as bulk of work is done most effectively with coarse-cut files and rasps which remove wood surprisingly fast. Fine-cut files are employed to remove deep scratches left by coarse files. Abrasive paper, backed with block where possible, is then used to true up surfaces. All lines of stock should be either straight or segments of perfect circles

20 Installation of detachable sling swivels on buttstock and fore-end is not difficult. Screw hole for buttstock swivel is drilled at right angle to bottom line of stock. Hole for fore-end swivel bolt must be counterbored for escutcheon nut, which should be tight drive fit in counterbore. Top of escutcheon nut must lie well below barrel channel lest it touch barrel

21 Magazine box is reduced in depth by cutting off lower part so bottom edge lies flush with outer surface of trigger guard. Shoulders (arrows) must also be cut down to clear trigger guard frame when guard screws are tightened. Alteration of magazine box is done after completion of inletting

22 Rear of magazine follower is ground off as shown so that bolt will override follower when magazine is empty. Follower is then polished to reduce bolt friction

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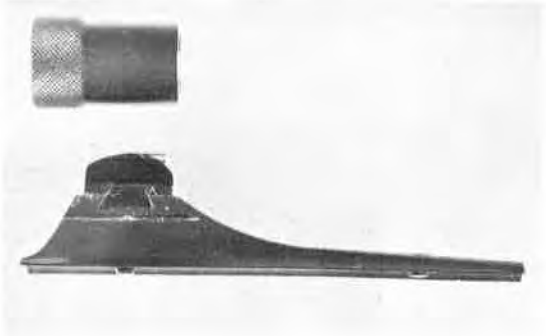

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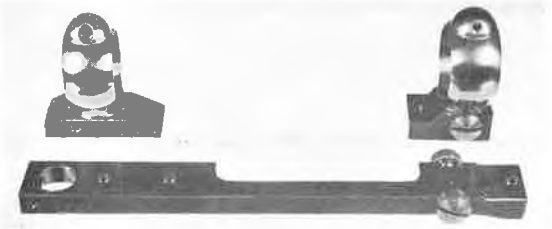

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crocus cloth. All polishing after the initial emery cloth treatment should be lengthwise and the barrel should be wiped clean when changing to a finer grit abrasive cloth or paper.

Polishing action

Polishing of the action assembly is accomplished in the same manner, but preliminary polishing is done using a medium grit triangular or half-round Carborundum or India stone. Such stones are extremely efficient when used with plenty of light oil to prevent glazing. A fine-cut half-round Swiss-pattern needle file is desirable for cleaning up areas inaccessible to the stones, and for final profiling of the trigger guard loop after it is roughed to shape with the round file. All filed surfaces should be stoned and then they can be polished with abrasive paper. On many surfaces a better polish can be achieved by backing the abrasive paper with a smooth-cut mill file.

No attempt should be made to remove deep inspector's or proof markings on the barrel or bolt as this will result in unsightly flats. Serial number markings should not be removed from the receiver ring as this is in violation of Federal law.

Rough polishing of the barreled action should be completed before inletting it into the stock. This insures a close fit between wood and metal which might not be obtainable if metal parts were cleaned up and polished after inletting. Friction between metal parts and the stock tends to abrade sides of the barrel and receiver, so final polishing should be done upon completion of inletting.

Some form of coloring agent must be used to transfer impression of the metal parts to the wood. This can be lampblack and oil, or oil-base tinting colors sold by paint stores. The coloring agent is best applied with cloth patches to secure a uniform, thin coating. Pressure of the metal parts against the wood transfers color to high points, which are then cut or chiseled away. The process is repeated again and again until parts have been inletted to full depth.

Inlet trigger guard first

The trigger guard should be inletted first, as it establishes relationship of the receiver with the stock recoil shoulder and allows use of the stockmaker's hand screws to pull the barreled action into the stock.

In most instances the original barrel channel in the stock will be too narrow and shallow to allow use of the stockmaker's screws. This channel must be enlarged with the gouge and deepened to the point where the rear, or long, stockmaker's screw will engage front guardscrew hole in the receiver. A headless guide screw is obtainable from gunsmiths supply houses for the purpose of aligning receiver with guard screw hole in the trigger guard tang. While not absolutely necessary, this guide screw is helpful when working with semi-inletted stocks as it assists in accurate positioning of the receiver recoil shoulder in the stock.

The receiver recoil shoulder must bear firmly against the stock and the bottom flat of the receiver must be in intimate contact with its bed in the receiver mortise. Lower surface of receiver tang must also have full bearing against the stock. Slight clearance should be provided between vertical surfaces of receiver tang and the stock to prevent splitting of the stock from recoil. Clearance of .005" is sufficient, and resultant gap is not unsightly.

Bedding barrel

The barrel can be full-floated throughout its entire length, or pressure-bedded near the muzzle to give an upward pressure against the barrel of from 7 to 10 lbs. Experience shows that the full-floated barrel is best as zero of the rifle will not be changed by forearm warpage. Clearance between barrel and barrel channel sufficient to admit a thick piece of paper is adequate and is not unsightly if gap is uniform.

32

33

23 Williams FP17 fully adjustable micrometer sight for M1917 rifle is of lightweight alloy. Adjustments are made with small screwdriver against positive click stops. Absence of knobs virtually eliminates possibility of tampering and provides minimum interference to shooter's vision

24 Redfield 70-R fully adjustable micrometer rear sight is of steel. Adjustments are made with coin or screwdriver against click stops. Rounded 'hunter-type' knobs discourage tampering and are less likely to snag

25 Lyman 48 ¼-minute micrometer rear sight is furnished with target-type adjustment knobs, but is also available with round coin-slotted knobs. The latter are preferred by many as they are less likely to be tampered with. Drilling and tapping 2 holes in receiver bridge is required for installation. A variety of excellent fully adjustable receiver sights for the Enfield rifle is offered by several firms

26 Williams streamlined ramp sight base is available in screw-on and sweat-on styles. Bead sight is driven into base dovetail after base is installed. Length of barrel should be specified when ordering so front sight of correct height can be furnished. Detachable hood is offered as accessory item

27 Hunting-type telescope mounts for attachment to side or top of the receiver are offered by several makers. Williams SM70 side mount shown for M1917 and P14 rifles is of lightweight alloy. Its base is secured to side of receiver with 3 large screws. Ring and scope assembly is readily detached from base by loosening 2 large milled nuts under rings. Rings are furnished to position scope over bore line, or off-set to left to permit clip loading and alternate use of scope or metallic sight. Hinged scope mounts are also available so scope can be swung aside quickly to use metallic sights

28 Buehler top mounts for M1917 and P14 rifles are made in one-piece and 2-piece base styles. Scope rings are interchangeable so that same scope and ring assembly can be used on other rifles fitted with Buehler mount bases. By removing one screw at rear of base, scope and ring assembly can be swung to side and detached. Auxiliary aperture sight is available for clamping to rear of base so rifle need not be fitted with additional metallic rear sight. Variety of top mounts is offered by other manufacturers. Type of receiver bridge alteration performed on particular rifle must be specified when ordering top mounts for M1917 and P14 rifles

29 Timney single-stage (single-pull) trigger is typical of commercial single-stage triggers available for M1917 rifle. Adjustable for sear engagement and over-travel, it is preferred by shooters who dislike double-pull military trigger. Such triggers are quite easily installed

30 Magazine feed system of M1917 rifle is designed for pointed bullets and will not function properly with cartridges having round-nose or soft-point bullets. Easiest solution is to install Dayton Traister Tru-Feed kit. Of stainless steel, this kit is fitted without tools and with no cutting or welding

31 Checkered steel pistol grip cap and buttplate by Paul Jaeger add quality touch. They are much more durable and attractive than plastic fittings

32 Completely finished sporting stock as furnished by Reinhart Fajen, Warsaw, Mo. Similar finished stocks are offered by other firms. Only minor inletting is required to install barreled action

33 Numrich Arms Corp. striker assembly converts M1917 and P14 actions to cock on bolt opening and gives faster lock time as striker fall is reduced. Assembly includes firing pin, mainspring, bolt sleeve, and cocking piece which works with regular safety. It can be installed without use of tools

Contact between sides of the receiver and stock mortise is not important from the standpoint of the rifle's potential accuracy, but a good fit is handsome and is indicative of careful workmanship.

Shaping stock

Exterior of the stock is shaped with files and rasps. A blockplane or spoke shave will prove handy in trimming off excess wood. Many semi-inletted stocks have an excess of wood in all areas, and especially in the butt. Since metal parts of the Enfield rifle are quite heavy, it is advisable to cut away as much wood as possible in the interest of reducing over-all weight of the finished rifle. Finished stock need not be spindly, but should not be clubby.

The plastic fore-end tip furnished on some stocks is relatively soft and will melt if buffed with power equipment. This part is best filed to shape and then sanded with abrasive papers to a smooth finish. Final polishing is done with fine steel wool followed by hand buffing with rough cloth.

Production-type aluminum oxide abrasive papers are recommended to smooth the surfaces of the stock prior to finishing. Ordinary flint sandpaper is not satisfactory for stock work.

Plane surfaces on the stock are preserved by use of a sanding block to back up the paper. Use of a block is especially advisable with figured wood as abrasive paper backed by the fingers alone will tend to cut away the softer wood leaving a rippled surface quite visible after finishing.

The stock can be finished with lacquer, spar varnish, plastic finish, or with one of the drying-oil preparations applied by hand rubbing. These vary in waterproofing capability, and the drying oils with linseed oil base are undoubtedly the poorest in this respect. However, oil finishes are easy to apply and are attractive. They have an added advantage in that minor abrasions suffered during use are readily eliminated by rubbing on a bit of the same oil. Regardless of the finish used, it is important to follow manufacturer's recommendations.

In humid climates, drying of stock finishes is accelerated by hanging the stock in a box heated with a 75-watt light bulb. Such a drying chamber can be made at small cost with a light socket and extension cord mounted near the bottom of a long paper box as used to package screen wire. A coil of corrugated paper assembled with adhesive tape will also suffice. Drive a tack into barrel channel near tip of fore-end and suspend stock in chamber with short length of string held on a crosspiece resting on top of the chamber. A few holes cut in bottom of the chamber below the light bulb will aid in circulating warm air around the stock.

Bluing of the barreled action in the home workshop is not suggested due to cost of equipment and materials necessary to do a good job. Such work is best entrusted to the professional gunsmith. Swab-on chemical blues do not give a durable and uniform finish, although they are adequate for touching up worn spots. ■

M. D. Waite of NRA Technical Staff takes reading on Potter chronograph at the H. P. White Laboratory during the test firing

Loads for the .30-'06

By
M. D. Waite,
NRA Technical Staff

Ballistic data supplied by H. P. White Laboratory

Of all the rifle cartridges available to the present-day handloader not one affords a greater degree of versatility than that of the half-century-old .30-'06. Admittedly a superior military cartridge, it has also established an enviable reputation on the target range and in the hunting of virtually every species of thin-skinned game animal found throughout the world.

The individual with an accurate .30-'06 rifle in his gun rack need but spend an hour or two at the loading bench to be ready for a big buck, a wily woodchuck, or the famed 1,000-yard Wimbledon match at Camp Perry.

That this is possible can only be explained by stating that the U. S. Ordnance technicians who designed the .30-'06 cartridge did a better job than might reasonably have been expected of them. This is borne out by a study of early Ordnance Department records which indicate that the research and development program ultimately responsible for the .30-'03 and subsequent .30-'06 cartridge was instituted before 1900, or before a suitable rifle for the cartridge had been designed!

Development of Model 1903

In 1900 the Ordnance Department undertook the development of what eventually became the Model 1903 Springfield rifle. Initially this was chambered for the newly adopted .30-'03 or U. S. Cartridge Caliber .30 Model of 1903, with a 220-grain full-jacketed blunt-nose bullet loaded to a muzzle velocity of 2,300 feet per second. This new rimless round was more powerful than the rimmed .30-40 Krag-Jorgensen cartridge which it replaced, but barrel accuracy life was quite short due to the highly erosive smokeless powders used at that time. In 1905, or shortly after the Model 1903 rifle and cartridge combination went into quantity production, German military ballisticians developed a 154-grain 8 mm. flat-base, sharp-pointed 'spitzer' bullet which proved eminently superior to the round-nosed bullet formerly used in loading German service ammunition. U. S. Ordnance almost immediately adopted a similar sharp-pointed flat-base bullet weighing 150 grains to replace the then outmoded 220-grain round-nose projectile. This change-over necessitated the recall and rechambering of all 1903 rifles then in the hands of troops.

The rechambering of barrels throated for the original 220-grain bullet presented a real problem since it had been the intention to load the new 150-grain bullet in the original .30-'03 cartridge case. It was soon determined however that accuracy with the 150-grain bullets was very poor in barrels throated for the 220-grain bullet. Accuracy improved when the bullets were seated out farther, but the resultant bullet seating depth was only 1/16 inch, not to speak of the fact that this over-length round would not function through the magazine nor could it be ejected from the rifle by normal operation of the bolt. It was also determined that an alteration in the bullet seat alone would not correct the trouble since a rather pronounced gap existed between the bullet ogive and the case mouth when overall length of the cartridge was shortened to permit functioning through the box magazine.

The upshot of all this was the decision to shorten the cartridge case by .07 inch. The bullet was then seated as shallow as possible to give a comparatively 'long loaded' round which would still function through the magazine. This altered .30-'03 cartridge with 150-grain bullet was redesignated the U. S. Cartridge Caliber .30 Model of 1906, or .30-'06 as it is commonly known today.

With this redesigned cartridge it was a simple matter to salvage the original barrels by a cutting-off, rethreading, and rechambering operation.

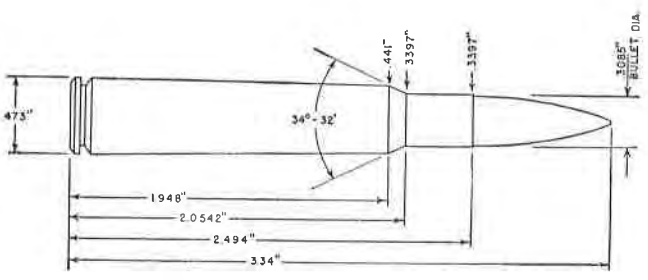
It is interesting to note that the shorter .30-'06 cartridge can be safely fired in rifles chambered for the longer .30-'03 cartridge, but not vice versa.

Heavy bullets can be used

Of particular significance to the handloader is the fact that the comparatively long neck of the .30-'06 case allows the use of bullets as heavy as 220 grains without encroachment of the bullet base into the powder space, yet the overall length of the loaded cartridge is such that it will function properly through box magazines of bolt-action military and sporting rifles. Even when long 172-, 180- and 220-grain boattail bullets are used only a negligible amount of the bullet base extends below the neck.

The case capacity of the .30-'06 is also adaptable to a wide variety of

(Text continued on page 12)



.30-'06 maximum cartridge dimensions

LOADS FOR THE .30-'06

LOAD					POWDER		RESULTS	
No	Bullet Weight (grains)	Bullet Type	Bullet Diameter (inches)	Overall Cartridge Length (inches)	Charge (grains)	Type	Velocity (f.p.s.) Avg. of 10	Pressure (lbs. per sq. inch) Avg. of 10
				TABLE A				
1.	110	Hornady Spire-Point	.308	3.12	48.0	HiVel #2	3166	43,430
2.	110	Norma Round-Nose Soft-Point	.3075	3.00	53.0	3031	3328	45,890
3.	110	Speer Soft-Point	.3085	3.14	57.0	4320	3237	41,690
4.*	125	Sierra Spitzer Soft-Point	.308	3.21	48.5	HiVel #2	3140	47,620
5.	125	Sierra Spitzer Soft-Point	.308	3.21	55.0	4320	3132	43,570
6.*	130	Norma Full-Metal-Jacket Boattail	.308	3.20	51.0	3031	3090	44,960
7.	130	Norma Soft-Point Boattail	.308	3.15	52.0	3031	3155	46,440
8.	150	Centrix Soft-Point	.3085	3.27	53.0	4320	2952	47,770
9.	150	Hornady Spire-Point	.308	3.15	53.0	4064	2932	46,450
10.	150	Hornady Round-Nose	.308	3.03	52.0	4320	2820	42,144
11.*	150	Norma Full-Metal-Jacket Boattail	.3085	3.22	46.0	HiVel #2	2874	46,230
12.	150	Norma Soft-Point Boattail	.308	3.32	53.0	4064	2962	47,850
13.	150	Nosler Soft-Point	.308	3.31	59.0	4350	2932	43,840
14.	150	Remington Core-Lokt	.308	3.27	53.0	4064	2958	44,360
15.	150	Remington Bronze-Point	.308	3.33	53.0	4064	2954	45,230
16.	150	Sierra Spitzer Soft-Point	.308	3.32	50.0	4064	2815	41,820
17.	150	Sierra Spitzer Soft-Point	.308	3.31	53.0	4320	2904	44,700
18.	150	Speer Spitzer Soft-Point	.3085	3.32	53.0	4064	2972	46,620
19.	150	Speer Round-Nose	.3085	3.25	47.0	HiVel #2	2917	47,980
20.	180	Centrix Soft-Point	.309	3.24	44.0	3031	2550	48,820
21.	180	Hornady Round-Nose	.308	3.12	56.0	4350	2714	47,070
22.	180	Hornady Spire-Point	.308	3.23	56.0	4350	2711	46,340
23.	180	Norma Hollow-Point Boattail	.3075	3.28	45.0	3031	2609	45,190
24.*	180	Norma Full-Metal-Jacket Boattail	.3085	3.34	48.0	4320	2632	45,970
25.*	180	Norma Full-Metal-Jacket Boattail	.3085	3.34	55.0	4350	2713	44,830
26.	180	Norma Soft-Point Boattail	.308	3.32	50.0	4064	2726	47,980
27.	180	Nosler Soft-Point	.308	3.32	50.0	4064	2716	49,920
28.	180	Remington Bronze-Point	.3085	3.35	49.0	4064	2690	47,930
29.	180	Remington Core-Lokt	.308	3.34	56.0	4350	2724	46,830
30.	180	Sierra Flat-Base Soft-Point	.3085	3.32	43.0	HiVel #2	2589	45,220
31.*	180	Sierra Match King Boattail	.3085	3.32	57.0	4350	2759	48,920
32.*	180	Sierra Match King Boattail	.3085	3.32	50.0	4064	2738	48,720
33.	180	Sierra Spitzer Boattail	.308	3.32	49.0	4064	2721	48,920
34.**	180	Sierra Flat-Base Soft-Point	.3085	3.32	37.0	HiVel #2	2297	34,150
35.	180	Speer Round-Nose Soft-Point	.3085	3.10	47.0	4064	2542	44,160
36.	180	Speer Spitzer Soft-Point	.3085	3.27	44.0	HiVel #2	2609	46,800
37.	180	Winchester Silvertip	.308	3.17	54.0	4350	2687	47,980
38.	180	Winchester Silvertip	.308	3.17	54.0	4350	2674	46,490
39.	200	Nosler Blunt-Nose	.308	3.29	54.0	4350	2597	47,590
40.	200	Speer Round-Nose Soft-Point	.3085	3.29	52.0	4350	2516	46,060
41.	200	Speer Spitzer Soft-Point	.308	3.34	52.0	4350	2508	45,320
42.	220	Hornady Round-Nose	.308	3.25	52.0	4350	2398	47,200
43.	220	Norma Round-Nose Soft-Point	.308	3.26	52.0	4350	2447	48,210
44.	220	Norma Full-Metal-Jacket Round-Nose Boattail	.308	3.26	50.0	4350	2386	47,270
45.	220	Winchester Soft-Point	.308	3.28	52.0	4350	2430	49,700
46.	220	Remington Core-Lokt	.308	3.26	41.0	HiVel #2	2357	48,100
	220	Factory Load					2353	47,410

* Target load ** 300-meter target load

				TABLE B				
1.	150	Nosler Partition Jacket	.308	3.29	51.0	3031	3018	48,210
2.	150	Hornady Spire-Point	.308	3.17	51.0	3031	2999	48,200
3.	150	Hornady Round-Nose	.3085	3.06	51.0	3031	2972	47,430
4.	150	Speer Spitzer Soft-Point	.3085	3.25	51.0	3031	3000	46,490
5.	150	Barnes Soft-Point	.308	3.22	51.0	3031	2990	45,430
6.	150	U.S. M2 Full-Metal-Jacket	.308	3.28	51.0	3031	2956	44,510

TABLE A

REMARKS: Instrumental velocities taken at 20 ft. from the muzzle of the gun. Range temperature varied from 70° to 74° F; relative humidity, 43% to 64%. All loads tested in Douglas pressure barrel 24" long, groove diameter .308", land diameter .301"; 4 grooves, right-hand twist, 1 turn in 10". With exception of Load No. 38 all loads assembled in Winchester cases, primed with Winchester 120 primer. Load No. 38 assembled in Remington cases, primed with Remington 9½ primer.

TABLE B

REMARKS: Instrumental velocities taken at 20 ft. from the muzzle of the gun. Range temperature varied from 72° to 74° F; relative humidity, 43% to 58%. All loads tested in Winchester pressure barrel 24" long, groove diameter .308", land diameter .300"; 4 grooves, right-hand twist, 1 turn in 10". All loads assembled in Western cases, primed with Federal 210 primer.

canister smokeless powders currently available to the handloader. The .30-'06 is an extremely 'flexible' cartridge, since with the proper choice of powder creditable velocities can be safely obtained with any bullet not exceeding 220 grains weight.

The accepted mean working pressure for the .30-'06 cartridge is a respectable 50,000 pounds per square inch. Within this limitation it is quite possible to handload bullets of 150 grains weight to muzzle velocities above 3,000 feet per second. When it is considered that some of the hotshot .22's better this velocity level only slightly, it can be seen that the .30-'06 is truly a high intensity cartridge capable of holding its own in any company, the .270 Winchester not excepted.

As a hunting cartridge for medium game it is at its best with bullets in the 150- to 180-grain category.

The expert marksman can obtain quite satisfactory results on larger game animals with bullets heavier than 180 grains, but in this bullet weight range the .30-'06 is somewhat overshadowed by the more powerful .300 H&H Magnum cartridge.

For varmint hunting

For those who hunt varmints including the coyote, woodchuck, and crow, good accuracy with very high velocities and correspondingly flat medium-range trajectories can be obtained with all bullets within the 110- to 130-grain category. The 110-grain bullet will prove most satisfactory when used at ranges not exceeding 200 yards. Beyond that range it is almost always inaccurate and especially so if any appreciable wind is blowing. The 125- and 130-grain bullets will give excellent accuracy up to a full 300 yards under average wind conditions.

The target shooter is especially fortunate in that a variety of accurate bullets is available for short-, mid- and long-range shooting. It would appear that most of the present-day .30 caliber competitive shooters prefer the 125- to 150-grain bullets for 200- and 300-yard shooting, with the 170- to 180-grain types almost universally selected for the longer ranges. For both low and high velocity loadings the 180-grain bullet is preferred by most riflemen for the 300-meter International course fired at the difficult metric target.

When the decision was made to carry out a .30-'06 load development program in conjunction with the H. P. White Laboratory, the NRA asked a number of sportsmen and target riflemen throughout the country for data on their best loads. Their response was excellent, and the majority of the loading recommendations given in Table A should give satisfactory performance without major charge adjustment when used in rifles with standard ten-inch twist barrels.

With the exception of Load 38, all loads in Table A were assembled in Winchester cases with Winchester 120 primers. Load 38 uses the same powder charge and bullet as Load 37, but was assembled in Remington cases with the Remington 9½ primer. A comparison of the pressure and velocity data for Loads 37 and 38 shows only a negligible difference which for practical purposes can be ignored.

Loads given in Table B were derived from the article "Bullet Types and Pressure", which appears in the NRA Reloading Handbook.

Choice of powder

Choice of powder for use in a given .30-'06 load is largely dictated by the weight of bullet the handloader desires

Bill Senior and Burt Munhall of the H. P. White Laboratory discuss load prior to putting it in pressure gun

to use. With bullets weighing 170 grains or more, DuPont IMR 4350 powder provides highest possible velocities within acceptable pressure levels. Hercules HiVel #2 is also quite suitable for use with the heavier bullets and is particularly recommended if one desires precision target loads.

DuPont IMR 4064 and 4320 powders, while somewhat faster burning than IMR 4350, are very desirable for bullets within the 150- to 180-grain category. When used with bullets heavier than 180 grains, they will not provide the high velocity-pressure ratios afforded by the slower burning IMR 4350.

DuPont IMR 3031 as well as the very flexible Hercules HiVel #2 are recommended for use with bullets weighing 150 grains or less.

Many of the load recommendations in Table A were furnished through the courtesy of the following individuals: Peyton Autrey, Edwards Brown, Jr., Roy F. Dunlap, Donald S. Hopkins, Fred T. Huntington, Arthur C. Jackson, Elmer Keith, H. E. MacFarland, John A. Nosler, Clyde Ormond, Francis Sell, E. H. Sheldon, Col. Townsend Whelen.