Chapter 28. Supplemental Miscellaneous Notes by Chapter

Apparently there is no end to the new information and specimens I continue to acquire. It is a very good "problem" that every time I think I am about at the end a new source appears, often as a result of a visit to my web site, www.Gyrojet.net. One thing leads to another and I wind up driving to California to "take a look." The reason I drive is that in every group so far there are at least a few items that cannot be shipped because they are live and larger than .50 caliber or that I would not want to trust to shipping or checked airline baggage even if I could. My original idea was that I might receive a new rocket or two, or some new piece of literature, over a few months time and that I could add a brief supplemental chapter to the book several times a year — maybe even monthly — to share the new items. I was wrong. The quantity and quality of new information and specimens is almost overwhelming and if it continues as I hope it does, I will be lucky to get one supplemental chapter a year out as a free PDF download via the web site. The evidence of this is the size and quality of this supplemental chapter 28 (46 pages and 108 figures) and the previous chapter 27 (38 pages and 58 figures).

Now (June 2012), I finally have the new recently acquired material identified and organized enough to allow publication of this second supplemental chapter without omitting any of the important items. As before, the new information is presented in the order of its appropriate chapter in the book.

This new chapter is possible primarily because of the contributions of Pavl Zachary, Capitola, California; Paul Clark, Danville, California; and Dave Antonini, Cloverdale, California. Clark worked directly for Robert Mainhardt at MBA and was very involved with the MBA Javette program, including biodegradable nondiscernible versions of the little 0.030-inch Javettes. He provided our first-ever photographs showing how these little Javettes that dissolved in body fluids were manufactured. Antonini also worked directly for Mainhardt and headed up MBA's prototype and experimental shop in the 1960s. He carefully set aside specimens, often fired during testing, of MBA experimental and prototype Gyrojets and other ordnance — in addition to original MBA technical manuals and reports — in hopes that in due course "the right guy" would come along who would document and publish this part of MBA's history. I am very fortunate that I was that right guy. In addition, because of the increased interest in MBA Gyrojets and other ordnance generated by the book, collectors worldwide searched their collections and files for additional material. Without their help and generosity, this supplement would not have been possible.

Chapter 2. Company History

As mentioned on page 11, shortly after MBA was founded in 1960, Mainhardt and Biehl set up an internal corporation they named OrdTech to market their new miniature rockets, the 3mm Finjets which were designated the Model 020 Microjet at the time. When MBA was incorporated in April 1961, it acquired all of the OrdTech stock. On December 31, 1961, OrdTech was deactivated, and in December 1963 it was dissolved. In reality, OrdTech existed in name only just as an MBA marketing tool.

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MBA was assigned a manufacturer identification code number of 27934, sometimes listed as Code Ident 27934. This number serves to positively identify an MBA product when there is no "MBA" lot number prefix or other MBA marking. One example of this is shown on page 328, Figure 24–3, which is an MBA MJU-10/B infrared flare case with the first five digits of the part number shown as "27934." In addition, Model 207 13mm flare launchers are often seen with the "Code Ident 27934" marking.

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Mainhardt was always anxious to exploit every opportunity for free advertising courtesy of the print and television media, and MBA provided a steady stream of news releases and special announcements of the introduction of new products, expanded plant facilities, major government contracts, and key personnel additions to MBA's management team. The photo shown next depicts one such example, where a local television news crew is shown together with an unknown MBA employee and Robert Mawhinney (far right), the inventor of the Stun-Bag. Mawhinney was also instrumental in the development of many MBA products, including the 0.030-inch Javettes, but photographs of him are rare. He is shown casually holding an M79 40mm grenade launcher in front of an MBA explosives bunker with a "Dangerous Explosives" sign, an odd site for a press demonstration, presumedly of the "new" 40mm Stun-Bag ammunition. The MBA circa 1970 photo was provided recently by Paul Clark, who is shown with Mainhardt in Figure 18–9 on page 257, also with an M79 launcher.

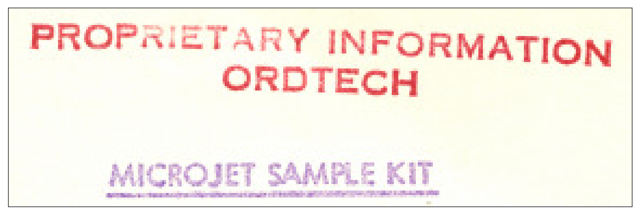
Fig. 28–1. *Robert Mawhinney TV news demonstration. MBA photo.*

Clark also provided the following photograph he took in the mid-1960s while on a local pleasure flight. It shows the MBA San Ramon Bollinger Canyon site with the engineering building (left) and the countermeasures lab and production building (top) under construction.

Fig. 28–2. *MBA plant, Bollinger Canyon. Paul Clark photo.*

Chapter 3. Finjets

On page 42, a description is given of the impromptu demonstrations of soda-straw-launched 3mm Finjets by Mainhardt and Biehl, often in the Pentagon offices of senior military officers. Apparently, other OrdTech personnel also conducted Finjet demonstrations because we now have, thanks to Dave Antonini, a circa 1961 3-page mimeographed copy of instructions covering how firing demonstrations of the "Model 301B Microjet rocket" were to be conducted using a "polyfoam firing block," instead of a Sweetheart Giant size straw, and a model 301F slow-burning fuse. The instructions and illustrations are shown next.



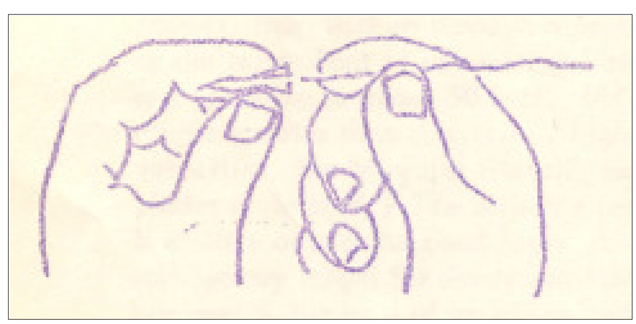
Contents:

Microjet sample kit contains all the necessary materials for demonstrating the action and effects of the Model 106[sic] Microjet rocket. Included are,

1 Model 301B Microjet rocket
1 Model 301F Microjet fuse (slow burning)
1 Polyfoam firing block
1 Match

Firing Instructions:

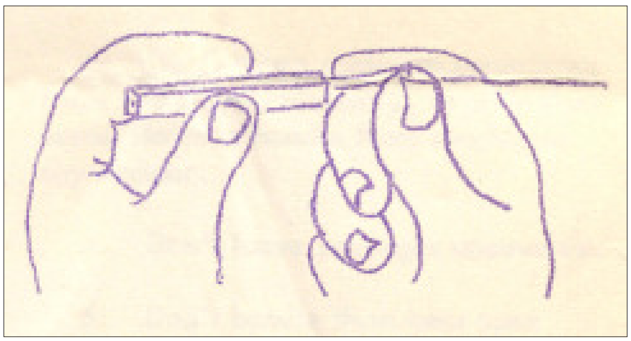
Step 1
Carefully insert the fuse wire through the nozzle of the Microjet, taking special care to insure that the fuse is completely bottomed.



Carefully place the small square of onion skin paper [?] onto the Microjet; press the paper toward the tail so that the fins are halfway inserted. This acts as a hold down, allowing the rocket to build up to full thrust before leaving tube.

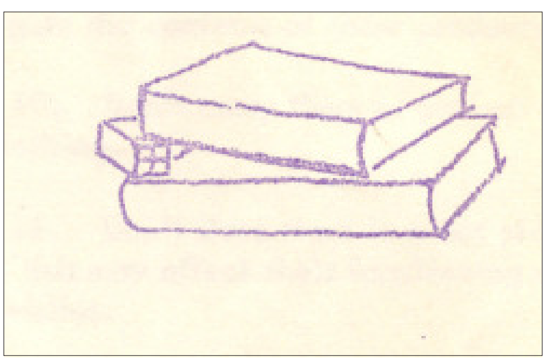
Step 2

Carefully insert the assembled Microjet into the firing block, making sure the Microjet is aligned with the axis of the block.



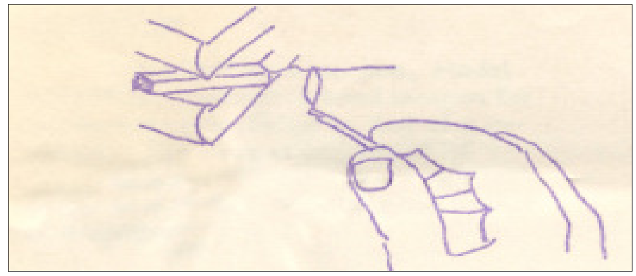
Step 3

Place the assembled firing block on a square of wood, or book, pointing it in such a direction that the Microjet when fired will strike any suitable target. It is generally preferable to place another piece of wood or book on top of the block to prevent its moving off the surface of a desk or table.



Step 4

(Caution: Before firing make sure target is satisfactory to shoot at). Light match and hold flame to end of fuse. When fuse ignites, withdraw hand to a safe distance. About two seconds after ignition of fuse, Microjet will fire. Do not stand in front of or directly behind firing block.



Target Suggestions:

Microjets require almost 100 feet to reach their maximum velocity (well over 3,000 feet/second), and therefore a long range is necessary to see the effects of such high velocity impact. However, at distances as close as 25 feet, they have been shot through a normal plasterboard wall. Since their thrust is over 1½ pounds, they will go through a person or similar amount of soft material at any range up to about 50 feet. (At ranges greater than this, i.e., high velocities, the Microjet literally explodes on impact.) The ultimate range is a little over a thousand feet. A satisfactory target for demonstration purposes is the wall of an office, garage or a piece of wallboard, with a range of 10 to 20 feet (providing the marring by a hole is not objectionable).

DON'TS:

1. Don't store Microjets in a residence, or any other human habitation, or leave them lying around where inexperienced persons or children can get them.

2. Don't leave them in a wet or damp place. They should be kept where it is clean, cool and dry.

3. Don't leave them near heat sources or electric and electronic equipment.

4. Don't throw packages containing these items down violently, or slide them across floors or handle them roughly in any manner.

5. Don't leave packages uncovered.

6. Don't handle them near open lights, fire, flame, or sparks.

7. Don't have matches near when you are handling these items.

8. Don't smoke while handling or using them.

9. Don't attempt to remove or investigate the contents of these products.

10. Don't carry them in pockets of clothing.

11. Don't store them in a hot place as this may affect their functioning characteristics.

WARNING

Many serious accidents have occurred as a result of careless or inadvertent handling of explosive devices, especially by children. To avoid such accidents, Microjets should always be stored under lock and key in a place where inexperienced persons cannot possibly get to them.


PROPRIETARY INFORMATION
ORDTECH
ORDTECH Corporation
1279 Boulevard Way
Walnut Creek (near San Francisco),
California

A loaded specimen of the Finjet Polyfoam firing block discussed and shown in the instructions is shown below in side and end views in Figure 28–3.

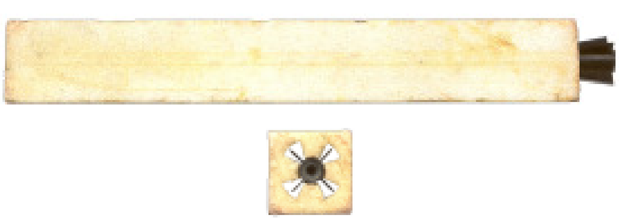


Fig. 28–3. *3mm Finjet Polyfoam firing block. Actual size.*

The instructions also included information about the cardboard tube launchers shown and discussed on page 44. The instructions launcher is identified as the "Microjet hand weapon, Model 2401" and a simplified drawing of it was included.

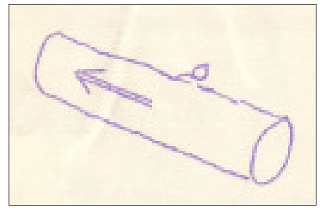


Fig. 28–4. *3mm Finjet Model 2401 launcher.*

The instructions state that the launcher is "for use in a manner similar to a revolver" and that on firing it will "spray the target in a manner not dissimilar to that of a shotgun." The instructions go on to state that, *"Although the Model 2401 was designed primarily to be useful for self-defense purposes, other uses include duck hunting - as well as deer hunting; they can also be used underwater where their range is about 20 feet. No skill or aiming ability is required, as all one has to do is point in the general direction and pull the trigger. A hit is a kill."* Exactly how the 2401 would be used for duck or deer hunting with no skill or aiming ability required is not clear. The specifications of the Model 2401 launcher were given as follows:

— 24 Microjets per round. (One 24-Finjet launcher is one "round.")

— 16 rounds (384 Finjets) per pound.

— 350-yard range.

— 12 Finjets in a 6-foot circle at 100 yards.

— 22 Finjets in a 22-foot circle at 100 yards.

— The Model 2401 launcher is 1¾ inches in diameter by 6 inches long.

Finally, the instructions mention the availability of a 10-pound "unit" containing 10,000 Finjets for special purposes with a firing rate of 100 Finjets per second for 100 seconds. The Finjet shown in the instructions has a plain one-piece case with no separate steel point.

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In March 1967, MBA published a classified progress report of a project to demonstrate the potential of fin-stabilized, metal-body, 3mm/0.125-inch Finjets for use as an air-delivered, antipersonnel weapon. The 33-page report, document number MB-67/65, was declassified in 1973. I consider it significant because it documents at least one reason the 3mm metal Finjets were developed.

The project's initial metal Finjets were made with aluminum cases based on a design developed under U.S. Air Force contract AF 08(635)-2211. When the aluminum cases failed, a change was made to stainless steel. The switch to stainless steel required a few changes in manufacturing techniques, but the changes were not considered significant.

MBA stated that it believed that the "practicality and utility of the Microjet Bomblet System" had been successfully demonstrated. The company based this belief on the items listed next:

— The stainless steel Finjet met the contract requirements for a kinetic energy kill mechanism. Based on single-round firings, reliability was better than 90 percent. Its burnout mass of 7 grains at a velocity of 2,500 fps allowed the rocket to penetrate up to 9 inches of Celotex board.

— The aircraft-launched, external-load bomblet which carried the Finjets was tested under varying conditions simulating ejection from an aircraft and opening of its drag-producing parachute. Satisfactory performance was achieved during these tests.

— Production of 60,000 Finjets using series production techniques indicated the feasibility of fully automatic production.

Drawings of the stainless 3mm Finjet and its operational deployment, both from MB-67/65, are shown below in Figure 28–5. Note the similarity of launch sequence to the delay-fuze Gyrojets on page 97.

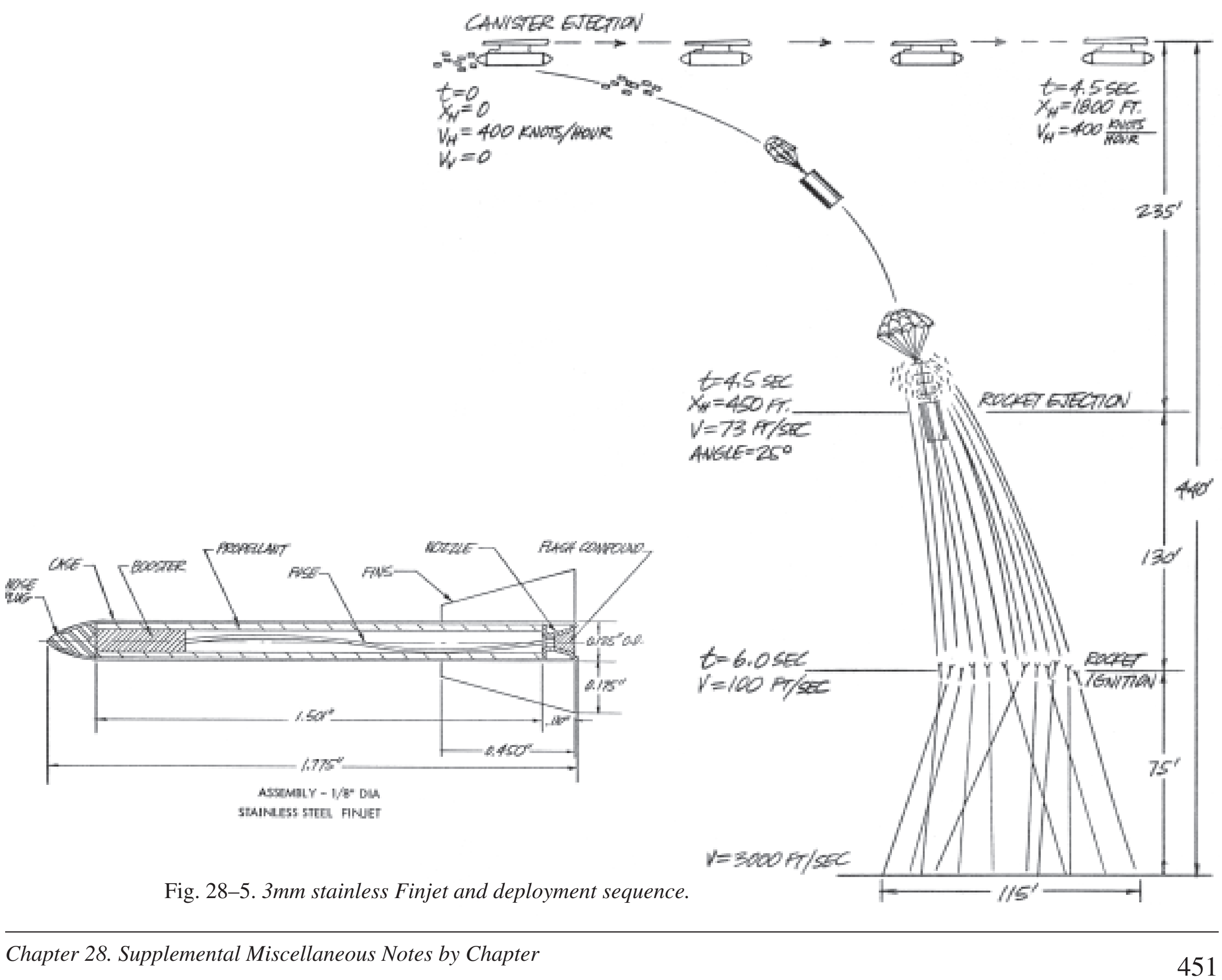

Fig. 28–5. *3mm stainless Finjet and deployment sequence.*

Some of the stainless Finjet characteristics are:

— Loaded weight: 0.742 grams
— Fired weight: 0.460 grams
— Propellant weight: 0.285 grams
— Case material: 304 Stainless Steel
— Case bursting pressure: 10,000-12,000 psi
— Nozzle material: Ledloy® (steel with a small amount of lead added to enhance machining) 300
— Static burn time: 32 milliseconds
— Burnout velocity: 2,500 fps
— Burnout distance: 60 feet

The bomblets containing the Finjets had the following characteristics:

— Finjets per bomblet: 650
— Number of bomblets per aircraft launch tube: 7
— Number of bomblets per SUU-7A/A (external aircraft dispenser containing bomblets): 133
— Total Finjets per SUU-7A/A: 86,450
— Bomblet diameter: 2.75 inches
— Bomblet length: 9.75 inches

The bomblets were just one of many identical bomblets loaded into SSU-7A/A aircraft dispensers. They were ejected from the dispenser by ram air pressure created by the aircraft's 400 knot (460 MPH) airspeed. On ejection, the bomblet's drag parachute opened and reduced the speed of the bomblet.

After a 4.5 second delay, the mass ignition system was activated, and this opened the bomblet and ignited the Finjets' delay fuses as they dispersed. The Finjets then tumbled in free fall for about 1.5 seconds, during which time they oriented themselves within a 30-degree angle of vertical. The Finjets' rocket motors then ignited, accelerating them down toward the ground.

MBA estimated that in mass production, the stainless Finjets would cost less than one cent each. Time delay fuses for the bomblets would cost about $1.00 each, and the bomblets themselves would cost about $2.50 each.

After the feasibility of the antipersonnel 3mm stainless Finjet/bomblet system had been established, MBA had completed its contractual requirements. No further information about follow-on work is at hand.

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To close out the Finjet section of this supplemental chapter, here are five new specimens received after Chapter 27 was published.

The first is an unknown mystery rocket, consisting of an aluminum 3mm Finjet imbedded in a gray 12.4mm case made of a soft metal in two pieces (the seams connecting the two pieces are clearly visible). The case is filled with a hard gray material that resembles epoxy. The rocket's roll-crimped nozzle has been filled with an off-white material which might be an igniter. Two of the rocket's four fins have small holes drilled in them, purpose unknown. Four identical specimens were recently acquired from Dave Antonini, the MBA experimental and prototype shop manager in the 1960s. One of them is currently awaiting sectioning by Paul Smith in hopes that we might be able to determine just what these are all about. But for now, their purpose is unknown because Antonini has no records of these bizarre little rockets. However, it is certain that they were made by MBA.

Fig. 28–6. *3mm aluminum Finjet, embedded. Actual size.*

A dark blue Woodin Laboratory 3mm Finjet with a shiny appearance is shown in Figure 3–47(N), page 48, without its mold sprue. The specimen shown below in Figure 28–7 is similar, but has a light blue "Robin's egg" matte color. It is interesting that both known blue rockets have mold sprue attached.

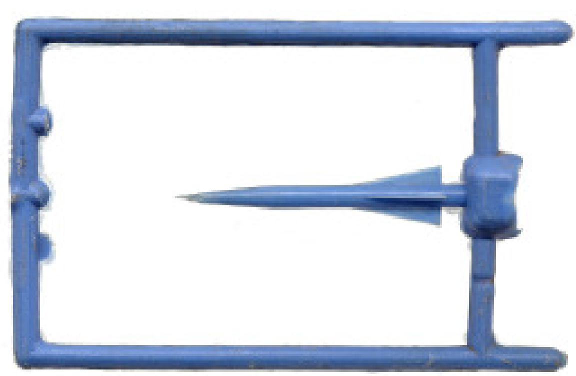

Fig. 28–7. *Light blue 3mm Finjet. Actual size.*

A very unusual experimental 3mm Finjet with a clear plastic (Nylon) cone in place of its normal fins is shown in Figures 26–2 (left row, fourth from the top) on page 368 and Figure 26–4 (bottom row, second from the left) on page 369. A metal specimen is also shown in Figure 26–4 (bottom row, fourth from the right).

This Finjet is drag-stabilized by the cone, which did a good job of keeping the rocket aligned with the air flowing over it. The cone was also easier to produce than fins. However, it produced much more drag than fins did, so much so that the rocket's velocity was significantly reduced. In addition, the cone design reduced packing density. The design was not adopted and the specimen shown below, complete with propellant, nozzle, and steel point is the only known example.

Fig. 28–8. *Drag-stabilized 3mm Finjet. Actual size.*

The translucent orange Finjet in Figure 28–9 is the first one seen with wide delta-shaped forward fins, aka canards. As is the case with most Finjets, the forward fins were made separately, probably cut from the back of another rocket and trimmed to the delta shape, then glued onto the case. The rocket is loaded with propellant and nozzle, and has a plastic point.

Fig. 28–9. *3mm Finjet with with delta canards. Actual size.*

The final specimen to be shown in this section is simply a color variation from those shown before on page 48 in Figure 3–47. It has a very dark amber color and is loaded with propellant, nozzle, and steel point. Its front fins are typical of those usually seen, but its steel point is longer than normal. However, slight variations in the lengths of steel points are not unusual.

Fig. 28–10. *Dark amber, loaded 3mm Finjet. Actual size.*

Chapter 4. Lancejets

The actual final MBA 1.5mm (0.0625 inch) Lancejet produced is shown in Figure 4–19 on page 59. This little rocket was mounted on a display with the annotation that it was produced for Honeywell Ordnance, Minneapolis, Minnesota, under a Honeywell subcontract, number 128200.

I recently discovered that the subcontract was for "Optimization of Antipersonnel Microrockets" and that MBA received $118,996 ($838,099 in 2010 dollars) for its work. Honeywell's prime contract, AF 08(635)-3774, was with Eglin Air Force Base, Florida. MBA's subcontract was completed on April 30, 1964 with the production of its final Lancejet. It is unusual to be able to pin down the final production date of one of MBA's ordnance products, and I'm grateful that Mainhardt kept the last one made as a souvenir.

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Underwater Lancejets are discussed beginning on page 53, and Mainhardt is shown testing an underwater Lancejet in his backyard pool in Figure 4–6 on the following page. Another Lancejet pistol is shown in Figure 26–6 on page 370, and more information about that gun has recently come to light via an MBA information sheet which depicts the pistol and provides some information about it. In addition, several photographs were recently discovered as I was going through boxes of old MBA photos. These show the pistol being tested in Mainhardt's backyard swimming pool test range, complete with plywood targets for penetration tests and an underwater test bench. If nothing else, the photos prove that the gun was in fact made and tested.

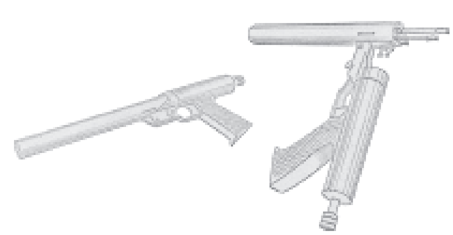

Fig. 28–11. *Underwater pistol. MBA drawing.*

The pistol, shown above and in the following photos, was a .25-caliber, 6-round repeater. Each shot fired one .25-caliber Lancejet, and the knob on the back of the gun cocked it for each shot. The knob was large in size so it could be easily manipulated by a diver wearing gloves. The pistol operated to depths of 50 feet, and could be submerged to depths of 200 feet. It could be reloaded underwater and was lightweight, weighing just 1.5 pounds loaded with six rounds. It had neutral buoyancy and its Lancejets could perforate two sheets of 0.75-inch plywood underwater at a range of 30 feet.

Fig. 28–12. *Diver loading underwater pistol. MBA photo.*

Fig. 28–13. *Mainhardt's "underwater test range." MBA photo.*

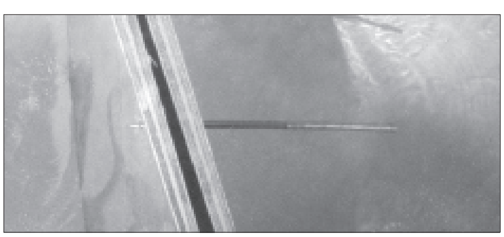

Fig. 28–14. *Lancejet perforation of 0.75-inch plywood. MBA photo.*

The photo shown in Figure 28–14 is dated July 22, 1962, and states that the two plywood targets were placed 15 feet from the shooter.

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The Lancejets shown in the figures that follow are recent acquisitions. The first of these creates serious doubt about Mainhardt's statement to me that "MBA never put a hypodermic needle in the nose of a Finjet or any other Microjet." Because he was so emphatic on this point at the time I accepted what he said, in part because I had never actually seen an original MBA Microjet (Finjet, Lancejet, or Gyrojet) with a hypodermic needle installed. Now I have, and its provenance is certain. To give him the benefit of any doubt, Mainhardt was probably just protecting what he considered to be sensitive information, as he did when discussing the TANG Javette project with me. The aluminum-case 1.5mm Lancejet is shown below. Note the peculiar curve to its hypodermic point, a characteristic of each of the three identical specimens in the group. The rocket is loaded with propellant and nozzle, but the needle is empty and clean.

Fig. 28–15. *1.5mm BW/CW Lancejet, actual (top) and 2x size.*

The next figure shows three very unusual 1.5mm Lancejets with color-coded aluminum cases; red, green, and brown. These have pieces of insulated copper wire instead of propellant, perhaps to simulate the propellant's weight. The purpose of the colors is not clear, but they might be for target marking during multiple externally-powered firing tests.

Fig. 28–16. *1.5mm color-coded Lancejets, actual and 2x size.*

Lancejets typically do not have anything other than their nozzles to prevent their propellant grains from rotating or moving back during firing, although most have a case cannelure to secure the propellant grain in the front. The two loaded Lancejets shown next have unusual squeeze crimps in their cases to secure their propellant grains, as if an electrician's connector-crimping tool was used. The effectiveness of this procedure is not known, but these are the only 1.5mm specimens seen so far. The top rocket has a steel point and the other has a brass one.

Fig. 28–17. *1.5mm Lancejets with propellant squeeze crimps, actual and 2x size.*

The brass points rarely seen in 1.5mm Lancejets come in at least two lengths. The normal length is shown above in Figure 28–17 and a longer variation is shown below in Figure 28–18. Its rocket case has no propellant squeeze crimp, and it is not loaded.

Fig. 28–18. *1.5mm Lancejet, long brass point, actual and 2x size.*

The 1.5mm Lancejet shown next is the only one I've seen with a catastrophic case failure that was so severe it pushed the steel point out of the aluminum case. The steel nozzle is still in place, held securely by its cannelure. About half of the propellant grain remains unburned, and the nozzle port is open.

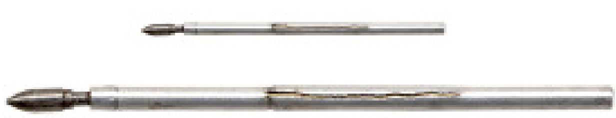


Fig. 28–19. *1.5mm Lancejet, case failure, actual and 2x size.*

The following three experimental steel 1.5mm Lancejet launching rounds are based on .30-06 cartridge cases. The top unfired round has an extended neck and fires one 1.5mm rocket, which would normally be hidden inside the cartridge. It has a brass screw-off head and nickel primer. The bottom two rounds each launch salvos of 7 Lancejets. They both have screw-off heads, presumedly for propellant loading. The bottom of the two has small holes drilled at the base of each internal 1.5mm launch tube, and each tube is numbered by engraving. The reason for the sawtooth case mouths is not known.

Fig. 28–20. *1.5mm Lancejet cartridges. Actual size.*

To close out the 1.5mm section, here is an encapsulated 1.5mm Lancejet which has been factory sectioned using the encapsulating material to hold it in place while it was being cut. The Lancejet itself appears to be of typical construction with aluminum case, steel point, steel nozzle, and inhibited propellant grain.

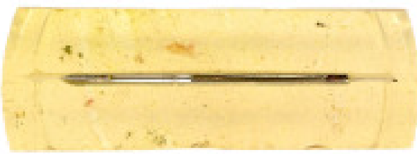


Fig. 28–21. *Encapsulated 1.5mm Lancejet, sectioned. Actual size.*

The next two Lancejets are 3mm hemispherical brass-nose variations with unusual squeeze-crimped nozzles similar to, but much more pronounced than the 1.5mm propellant squeeze crimps. Both of these rockets have steel cases, the top being stainless and the bottom carbon. The top rocket has a short 3-point squeeze crimp that is 3.5mm long to hold its 1-port steel nozzle in place, and there is a shallow cannelure just forward of the crimp.

The bottom rocket has a longer 3-point squeeze crimp that is 9mm long to hold its 4-port brass nozzle in place. Neither rocket has been fired, and it appears that there is no propellant in either.

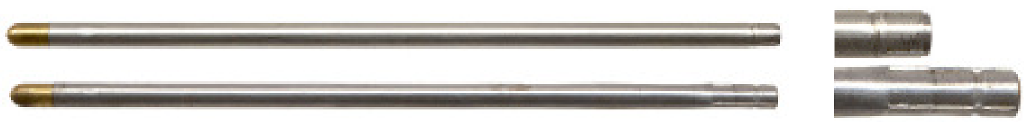


Fig. 28–22. *3mm steel Lancejets with squeeze-crimped nozzles. Actual size, with nozzles 2x.*

Figure 28–23 below shows six recently acquired .25-caliber aluminum anti-mine Lancejets. (A) and (B) have no nozzles and the other four have typical 4-port steel nozzles with roll crimps. All have steel points. The problem MBA was having with these rockets failing and how MBA's engineer Mathew Hengel (the inventor of the Gyrojet pistol's fixed firing pin and forward hammer design) solved the problem of the rockets prematurely detonating in 1962 is discussed on pages 131 and 132.

A.

B.

C.

D.

E.

F.

Fig. 28–23. *.25-caliber experimental anti-mine Lancejets, actual size. (A) Premature PETN detonation at delay train. Propellant grain mostly intact. (B) Case failure at motor section. (C) Case failure at delay train position. (D) Point with stab crimps. (E) Point with heavy cannelure. (F) Blunt nose point with no crimp.*

Three very unusual Lancejets are shown to the right. The left cartridge is based on a .30-06 extended neck case similar to the Project Salvo duplex and triplex rounds with extended necks to hold multiple bullets. It is brass and has a screw-off base, presumedly for loading propellant. When recently acquired, the case had no projectile loaded. Because of its brass construction and possible underwater use, I loaded a .25-caliber underwater Lancejet for perspective. MBA's extensive experimentation with underwater Lancejets is discussed beginning on page 53. The case has a normal primer pocket that is empty.

The other two Lancejets have also not been seen before, and I have no information about them except that they are MBA experiments, possibly for underwater use because of their long, slender designs.

The middle rocket is .25 inch (6.4mm) in diameter and is 11.4 inches (290mm) long. Its aluminum motor section is 4 inches (102mm) long and is secured to the upper steel body with a transverse steel pin. The Lancejet uses a .25 ACP primed cartridge case with a WESTERN 25 AUTO headstamp for ignition. The nickel primer has been snapped. Because the .25 ACP case is still attached to the rocket, the Lancejet is probably a dummy because after it ignited the rocket's propellant, the case would have been blown off. The red painted nose section (possibly to indicate an explosive) apparently screws into the steel body below it.

The right rocket measures .37 inch (9.4mm) in diameter and it is 18.6 inches (472mm) in length, easily the longest MBA rocket seen so far. Its motor section is 6.75 inches (171mm) long. The rocket is made entirely of aluminum, although the motor section has a different appearance from the upper body. This might be due to the motor section case being heat treated. It has a light green ink stamp that reads ★★★★★ HEAT NO. 890610. The truncated conical tip is machined from the upper body, which is solid. Like the smaller specimen, the motor section is secured to the upper body with a transverse pin, which is missing. The rocket has a rare pinched nozzle design in three segments, which appears to be annealed to allow the nozzle to be formed. The source of ignition is unknown, but one of the nozzle segments has a small hole. This might have been caused by a burnthrough if the rocket has been fired, or it might indicate a side ignition source.

Fig. 28–24. *MBA Experimental Lancejets.*

Chapter 5. Javettes

Two interesting applications for MBA Javettes which were included in a brochure folder labeled "*MBA Special Devices*" are shown and described below. The first is a .30-06 cartridge case loaded with 19 Javettes having tungsten points and aluminum bodies. Because it had a normal case length, the cartridge was "*usable in any .30-06 rifle with smooth-bored barrel*."

During this period (ca. 1963) the Army's project SPIW was underway, using various smoothbore rifles to salvo-launch multiple flechette payloads. Therefore, MBA's concept of a smoothbore .30-06 is not surprising and in fact is consistent with the company's policy of using existing equipment such as the .30-06 M1 Garand, modified in this case by removing the barrel's rifling, instead of developing an entirely new weapons system. The fact that project SPIW ultimately failed to produce anything usable (except for the M203 grenade launcher) might tend to support MBA's idea of using the 5 million plus Garands already manufactured rather than an entirely new rifle.

Each cartridge had a 19-Javette payload and each Javette weighed 6.5 grains, for a 123.5-grain "projectile," not counting the plastic sabot or retainer. The Javettes had a muzzle velocity of 3,000 fps and retained a velocity of 1,500 fps at 500 yards. The 19-Javette pattern at 300 yards was 10 feet, with a 65 percent probability of hitting a man-sized target with a single round.

I have not seen another reference to this round, which is one of a group of experimentals based on the .30-06, or a specimen of it.

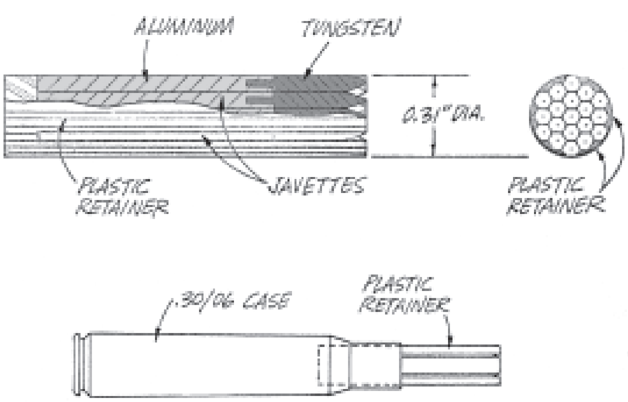


Fig. 28–25. *Experimental .30-06 Javette-launching cartridge.*

The second application was a "3-Javette Salvo Projector," shown below in Figure 28–26. Like the .30-06 Javette-launching cartridge, there is little information about the pistol and its ammunition other than the information sheet the drawing was taken from. Each shot fired three Javettes at a muzzle velocity of 3,500 fps, and at 750 yards downrange, the velocity was still 1,750 fps. With a pattern diameter of 3.5 feet at 100 yards, the probability of hitting a man-size target at 100 yards was 65 percent. The .25-caliber cartridges were 2.5 inches long, which seems too long for a clip-fed semiauto pistol with the design shown. Perhaps the long-barrel gun was single-shot; but then why would the cartridge case be rimless? I believe that this was just an interesting concept, not actually produced.

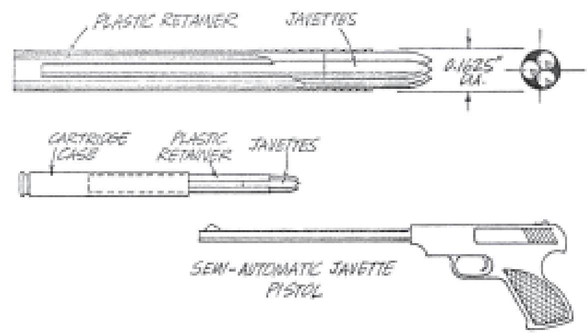


Fig. 28–26. *Experimental .25-caliber Javette-launching cartridge.*

Ammunition Concealment Round

I discovered an interesting thing while examining one of the fired .223 Ammunition Concealment Rounds (discussed beginning on page 66) recently acquired: It was impossible to remove the fired .25 ACP case and stainless adapter barrel from the .223 cartridge case, no matter how hard I pulled, even after soaking in penetrating oil and using tools. This particular round had been badly scratched and was darkly stained almost all over, so it had little collector value. However, it did give me the opportunity to see what was inside.

One of Mainhardt's design goals was that the round could be reloaded simply by pushing the barrel adapter and fired .25 ACP case out the back of the case where a fresh .25 ACP case and propellant could be attached to the barrel adapter and then inserted back into the case. The reloading could be done in the field if required, but it was much more likely that the fired rounds would be recovered — they were fired single-shot only so would not have been ejected very far away from the rifle — and returned to Fort Detrick for reloading. Reloading these expensive cartridges had the potential for saving a considerable amount of money, even if all of them might not be recovered. After learning of this practical concept, I did not give it much thought until I tried without success to get the stubborn fired .25 ACP case and barrel adapter out of their .223 case. Finally, I used a hacksaw to cut the case open. When I did, I instantly understood what had happened, and what might have happened to other Ammunition Concealment Rounds on firing.

If I had more carefully studied Paul Smith's sectioned round, it should have been obvious. Referring to the enlarged scan of the sectioned round below, note that at (A), the bases of the .223 and .25 ACP cases would be fully supported by the firearm's bolt face and would not be able to move or to swell under pressure, assuming the headspace was correct. At (B), both cases are fully supported by the firearm's chamber and both cases have their maximum web thickness. They cannot swell. But at (C), the straight-wall .25 ACP case is not supported by anything, because of the .223 case's internal taper, and it can swell due to internal pressure from burning propellant. In fact, it did swell out against the inside of the .223 case, jamming it very firmly in place and making it impossible to remove using normal force. When the .25 ACP case swelled out, it must have released gas pressure forward into the .223 case, reducing the Javette's velocity. However, the gas would have been retained in the .223 and .25 ACP cases until the Javette and Teflon plug had left the barrel by the seal at (D), supported by the firearm's chamber and the stepped barrel adapter.

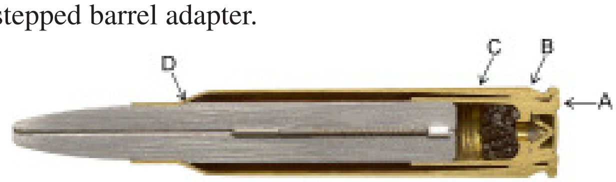


Fig. 28–27. .223 Ammunition Concealment Round, enlarged.

One solution to the problem was to use a modified stainless steel .223 case that was machined internally to fully support the brass .25 ACP case and prevent it from swelling. In fact, Mainhardt purchased unfinished .223 stainless steel cases from the Harry Owens company of Hacienda Heights, California, to use with Javette cartridges. One is shown at the top of page 72 in Figure 5–21. Another is shown below in Figure 28–28. It has a 0.185-inch bore drilled straight through so all MBA had to do was complete the internal machining. By purchasing unfinished cases from Owens, who offered a large variety of adapter cartridges and conversion units for sale, MBA saved time and money, and Owens had no need to know how the unfinished cases were to be finished and used, thereby protecting the project's security. Unfortunately, I have not seen a specimen or photograph of a completed stainless Ammunition Concealment Round.

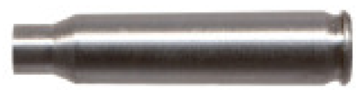


Fig. 28–28. Unfinished Owens stainless .223 case. Actual size.

In reality, I doubt that the military's special forces or CIA agents would have cared much about saving spent rounds for reloading. Considering the environment they were to be used in, more often than not at night, it is probably nonsensical to imagine a covert shooter looking around on the ground for a manually-ejected fired round from an M16.

It is also possible that my stuck case might have been from a pressure test or proof firing where elevated pressure caused the .25 ACP case to swell. I have no information about the strength of a .25 ACP case *if fired unsupported* or how much pressure 0.108 grain of Bullseye propellant (the round's stated normal load) might produce. In addition, the amount of gas that may have leaked into the .223 case, and its effect on Javette velocity, is unknown. It may not have been a problem. To add to the mystery, when I also disassembled another, unfired, round with a badly dented and stained case, I was surprised to find the little 0.5 x 1-inch piece of magician's flash paper shown below loaded into the .25 ACP case.

Fig. 28–29. .223 Ammunition Concealment Round flash paper propellant. Actual size.

We knew that MBA used flash paper as propellant in the M1 quiet round Javette cartridge — more on that on the following pages — but before now, I had not known that it was also sometimes used in the .223 rounds as well. The paper was wadded up to fit inside the .25 ACP case.

Another interesting fact recently uncovered is that in some cases, the Ammunition Concealment Rounds were not loaded with their Teflon-plug gas check and Javette from the back of the barrel adapter before assembly with the .25 ACP case. There were several different types of Javettes which could be used in the rounds and with different agents applied to them. To pre-load a round would pre-designate its ultimate use and reduce operational flexibility. To solve this issue, some adapter barrels had small dimples created with a punch at the bottom of the bore to create a slight restriction. Then, when the use of a round for a specific mission had been determined, the Teflon plug and appropriate Javette were loaded *from the front*, pushed in until the dimple's resistance was felt. Javettes were typically held in place by a small dab of grease.

Fig. 28–30. .223 dimpled barrel adapter base. 2x actual size.

Another fired Ammunition Concealment Round variation with a short, truncated conical nose was recently acquired. The purpose of this unusual nose design is not known.

Fig. 28–31. Ammunition Concealment Round, truncated nose. Actual size.

The final Ammunition Concealment Round shown in this section is a "kit" assembled by MBA, possibly to demonstrate the various components that made up the complete round, less the Javette and gas check. It consists of a bored-out .223 case, stainless barrel adapter, and a new-primed-empty .25 ACP pistol case with a nickel primer, all held together by a piece of cellophane tape.

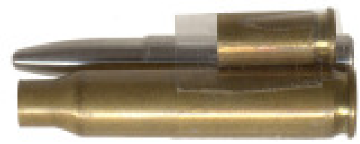


Fig. 28–32. Ammunition Concealment Round "kit." Actual size.

As of now (June 2012), MBA .223 Ammunition Concealment Rounds have been seen in three different configurations:

— Purpose-made dummy, with empty primer pocket and no Javette.

— Fired round with snapped primer. Could have been used as a dummy.

— Unfired, "loaded" rounds. One such unfired cartridge was acquired with a Mainhardt handwritten note that stated that it was "loaded." It did in fact have a threaded Javette loaded inside, confirmed when I gently used an inertia bullet puller tool to nudge the Javette forward out of the barrel adapter.

— · —

The Javette shown next is the only one of its particular design seen so far. It was loaded inside an Ammunition Concealment Round. I check all such rounds with a thin, stiff wire to try to determine whether a Javette cartridge has anything loaded inside, a policy I strongly recommend.

You never know what you might find; in this case a very scarce Javette variation, shown below in Figure 28–33. When my test wire stopped about halfway down, I again gently used an inertia bullet puller to nudge the Javette out of the barrel adapter. I was very surprised at its configuration and gold point.

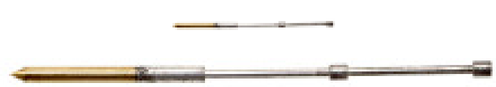


Fig. 28–33. 18-carat gold nose, 2-groove body 0.030 Javette. Actual size (top) and 3x actual size.

I should not have been too surprised, however, because a very similar but not identical design is included in an unsigned and undated sketch depicting various Javette designs. The fifth Javette down from the top is a “multiple groove” design and the one below it is a “Tri Groove” variation of the specimen shown in Figure 28–33. The wide grooves provided an enlarged space for the Javettes BW/CW agent. The threaded design most often seen has a 0.015-inch solid core, as this specimen does, and with the threads removed there is more space available for the BW/CW agent.

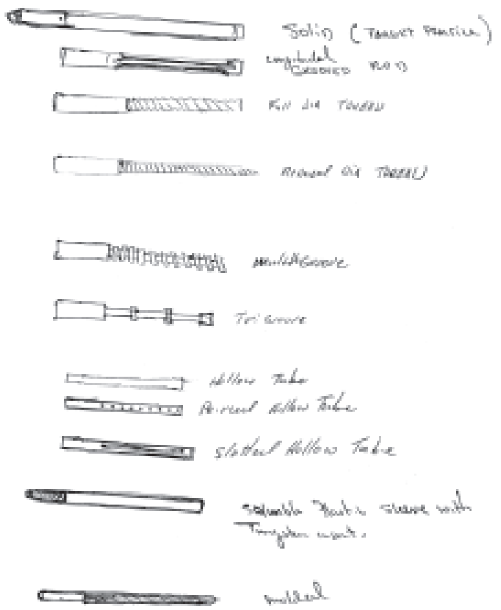


Fig. 28–34. MBA Javette designs sketch, reduced.

Biodegradable Methocel™ Javettes

In MBA’s unclassified Javelin Stabilized Quiet Round Patent, number 3,344,711, filed February 23, 1965, and granted October 3, 1976, water-soluble Javettes are discussed as a means to disguise the fact that a target had been shot. The Javette entered the target’s body where its agent payload entered the bloodstream. The Javette then dissolved in body fluids, leaving no trace behind and almost nothing that would appear on an X-ray. If a nonlethal agent were used, there would be no need to remove the Javette to allow for the target’s complete recovery.

Until now, authoritative information about these Javettes has not been available and photographs of them have not surfaced. Now, thanks entirely to Paul Clark, that situation has changed.

The water-soluble Javettes were made of Methocel™ which is a product of the Dow Chemical Company consisting mainly of methyl cellulose derived from pine pulp. If you have an interest in chemistry, just Google “Methocel” and you will see several links to informative sites, including those of Dow Chemical. You can even buy an 8-ounce bag of Methocel powder for $16 and conduct your own experiments.

Methocel Javettes were javelin stabilized for accurate flight, so their noses had to be heavier than their tails, with their centers of gravity as far forward as possible. MBA accomplished this in the Methocel Javettes by using a nose made of a mixture of powdered tungsten and Methocel. Because the noses were made separately, later to be bonded in molding to their tails, they were called “preforms” and were made in the special mold shown below.

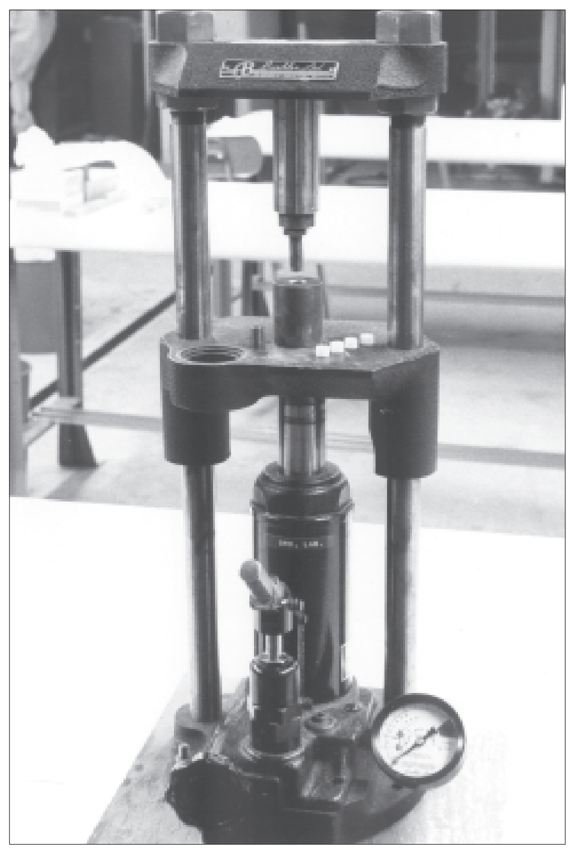


Fig. 28–35. MBA Methocel/tungsten Javette nose preform mold. MBA photo.

The tungsten and Methocel mix was injected into the mold under pressure until the mix bonded in the approximate shape required, seen next in Figure 28–36.

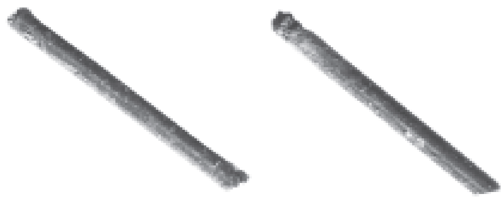


Fig. 28–36. MBA Methocel/tungsten mix Javette nose preforms, enlarged from actual size. MBA photo.

The preforms were later placed in another mold designed to make 12 Methocel Javettes simultaneously. Methocel powder was added from the top under considerable pressure and heat was applied to bond the Methocel tails into the threaded shape required and bond the tails to the preformed noses.

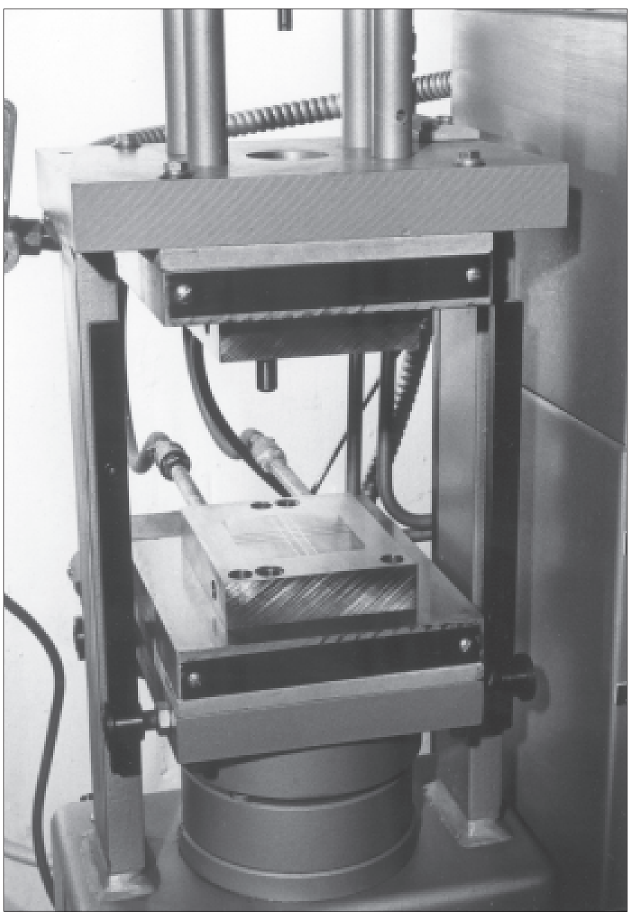


Fig. 28–37. MBA Methocel Javette heat mold, open. MBA photo.

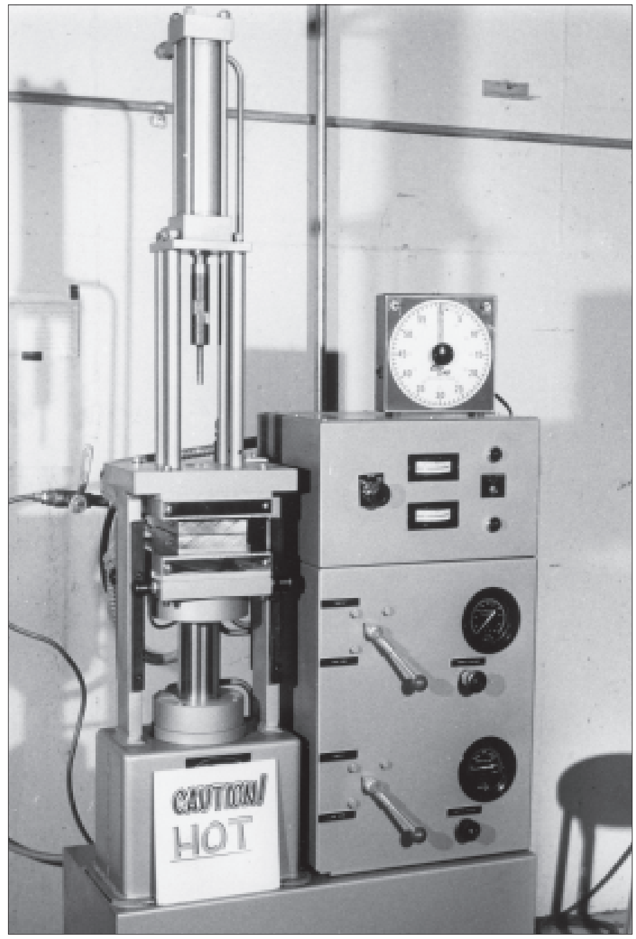


Fig. 28–38. MBA Methocel Javette heat mold, closed, heat applied. MBA photo.

When sufficient pressure, heat, and time had been applied, the mold was allowed to cool and the Javettes and their sprue (the waste material cast in a mold opening) were removed as one piece.

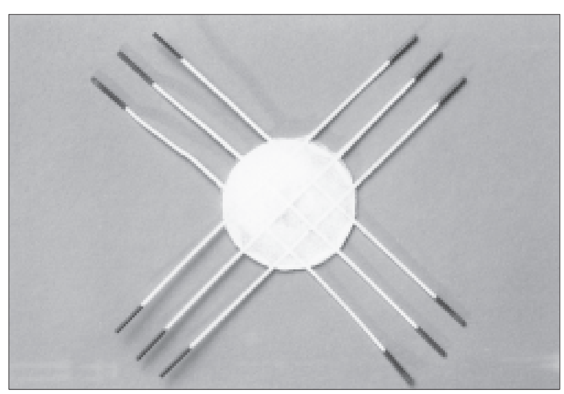


Fig. 28–39. 12 MBA Methocel Javettes, joined. MBA photo.

The Javettes were then separated and trimmed to their final shape and size. The photo below shows a Javette nose being shaped in a chuck by fine sandpaper.

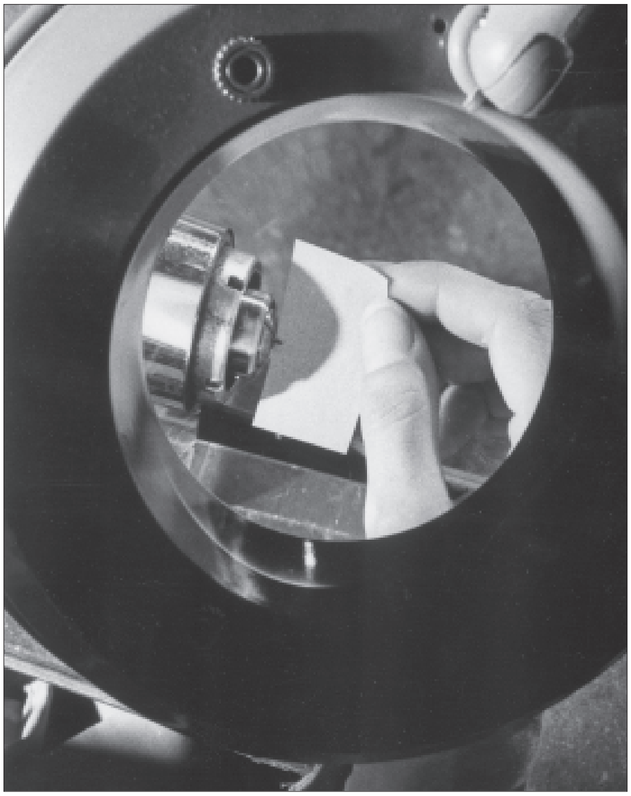


Fig. 28–40. Methocel Javette nose being shaped. MBA photo.

The final result was a threaded Javette that could be loaded with any of the available agents, and that would dissolve in its target's body, leaving no trace behind.

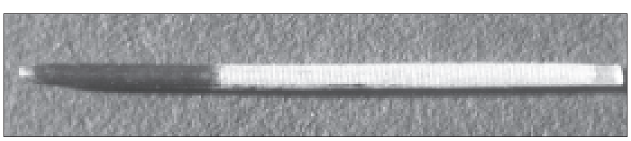


Fig. 28–41. 0.030-inch Methocel Javette, enlarged. MBA photo.

It is doubtful that any specimen of the Methocel Javette survives after 47 years. If a specimen had been carefully stored in an airtight container of inert gas and zero humidity, it might have been possible. Otherwise, specimens would long ago have absorbed moisture from the air and dissolved.

M1 Electric-Primed Javette Cartridges

M1 electric-primed Javette-launching cartridges for the CIA "Dart Gun" are discussed on pages 63, 64, 371, and 429. In discussing the brass variation shown on page 371 in Figure 26–8, I mentioned that I was unable to find any joint in the cartridge where two parts were screwed together and that I thought the Javette, gas check, propellant, and BWP electric primer might have been loaded from the rear.

In fact, that is exactly the case. Two new rough MBA factory sections of fired rounds show that the case is one piece with the back end rolled over to form a primer crimp after the round was loaded. This early design meant that the brass case cartridges could not be reloaded, as the later 2-piece steel rounds could.

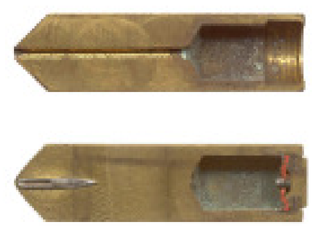


Fig. 28–42. M1 electric Javette cartridge sections. Actual size.

The sections also show that MBA did not always place a steel insert in the cartridge. The top section above clearly shows that the round is solid brass except for a small bore for a length of stainless hypodermic tubing to act as the Javette's barrel. The stainless tube is missing from the top specimen, but the front of one can be seen in the bottom round. Other variations recently acquired with stainless hypodermic tubes, but without carbon steel inserts, are shown below at actual size. The top specimen is a turned dummy and the bottom example has been fired, suffering a partially blown primer and case failure at its base around the primer.

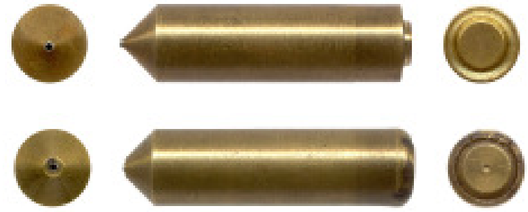
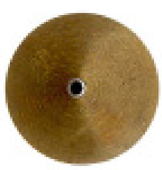


Fig. 28–43. M1 electric Javette cartridges without steel inserts.

Two more new brass M1 cartridge variations are shown below. The top unfired specimen was loaded with a Javette on December 20, 1967, according to a Mainhardt handwritten note on a polyethylene bag with five separate heat-sealed compartments; one for each of the five cartridges it contained. The bottom cartridge has been fired, and it has a large-diameter steel insert. The Olin BWP bridgewire electric primer has a distinct "dent" caused by the M1 electric pistol's contact point being firmly screwed into place. On firing, there might have been a slight setback under recoil.

Fig. 28–44. M1 electric Javette cartridge variations. Actual size.

Brass M1 cartridges have at least four different nose configurations, as shown below at 2x actual size in Figure 28–45. Each of the configurations has a bore that fits the 0.030-inch Javettes.



A. No steel insert. Stainless hypodermic tube with 0.033-inch inside diameter for 0.030-inch Javette. No flat step at nose point. Dummy cartridge.

B. No steel insert. Stainless hypodermic tube with 0.033-inch inside diameter for 0.030-inch Javette. Flat step at nose point. Fired round with case failure at base.

C. Carbon steel barrel insert 0.18 inch in diameter with 0.033-inch inside diameter for 0.030-inch Javette.

D. Carbon steel barrel insert 0.26 inch in diameter with 0.033-inch inside diameter for 0.030-inch Javette..

Fig. 28–45. M1 electric Javette cartridge inserts.2x Actual size.

The box that contained the M1 cartridges shown above also held the Olin BWP 8-4 electric primers shown below in Figure 28–46. The small discs of magicians' flash paper were inserted into the primer cups to act as propellant, a detail not previously known. The primer had its explosive compound washed out, as normal for these cartridges, and held three discs of flash paper. The propellant load could easily be varied by the number of discs used. One of the primers was factory sectioned.

Fig. 28–46. Olin BWP electric primer with flash paper propellant. Actual size.

The final new item in this section is an M1 electric brass round with a distinctive red primer waterproofing seal not seen before. This seal is on an unfired round with a steel insert as shown in Figure 28-45 (C).

Fig. 28–47. M1 cartridge base with red seal. Actual size.

.22 Rimfire Javette Cartridges

The MBA patent covering .22 rimfire Javette cartridges includes the drawing shown in Figure 5–1 on page 62. This cartridge has an extended barrel adapter with a length of hypodermic tube inside instead of the normal lead bullet. The drawing shows a cannelure to secure the adapter barrel, but the patent explains that the cannelure is not necessary and that the round will function well without it. Omission of the cannelure made it easy to remove the very precisely made, and expensive, barrel adapter after firing and use it again with a fresh .22 case, especially during factory test firing in a controlled laboratory environment.

On the other hand, the cannelure made the complete round more secure and less likely to come apart during rough handling on a covert operation. In addition, it is doubtful that a special forces soldier or CIA agent would spend much time looking for a small fired .22 cartridge to return for reloading.

Until now, no specimen of the cartridge with an extended barrel adapter had been seen by us, although two fired examples of the round with *short* steel adapter barrels were known. One of these from the Will Adye-White, Brampton, Canada collection is shown in Figure 27–35 on page 429. It has a SUPER-X headstamp. Other rounds made by Mainhardt at Trebor, Inc. are discussed and shown on pages 68-76.

These .22 cartridges are seen with three different headstamps. Thanks again to George Kass, Forensic Ammunition Service, Inc., Okemos, Michigan, we have the following information about the headstamps and their graphic depictions:

—  CCi. Cascade Cartridge, Inc., Lewiston, Idaho. Used from circa 1963 to 1965, the exact period the MBA Javette project began. One reader believes that this headstamp was short-lived because American shooters disapproved of its resemblance to the Soviet hammer and sickle design.

—  SUPER-X. Western Cartridge Company, East Alton, Illinois and other Winchester-Western divisions. Used from the mid 1930s until the present.

—  *Rem*. Remington Arms Company, Inc., Bridgeport, Connecticut. Used from circa 1983 until the present. Mainhardt began his .22 Javette project Meson/Tiger's Claw at Trebor, Inc. in 1983 and all of the cartridges from this project and the later TANG work used this headstamp.

Mainhardt had excellent contacts in these companies, so obtaining relatively small quantities of .22 NPEs (new primed empty cartridge cases) would not have been a problem. Most of the cartridge cases used were .22 Long Rifle because the first firearm used was a silenced .22 Long Rifle High Standard model HDM pistol developed for the OSS during WWII and produced in 1944. After the war, the pistol was used by CIA and military special forces personnel in Korea and Vietnam. I have been told by several persons who should know that the pistol provided to MBA for use in developing the system was the one issued to CIA pilot Francis Gary Powers, whose U2 spy plane was shot down over the Soviet Union in 1960. Instead of his pistol, Powers carried a suicide device consisting of a saxitoxin-coated needle hidden in a coin. The gun would have been available for MBA in 1963 since Powers had no further need of it.

Fig. 28–48. High Standard Model HDM silenced .22 pistol.

MBA also experimented with other .22 weapons during the period, but their reports, while silenced to some extent, were still too loud and the sound of their actions being manually operated — the Javette cartridges did not produce enough recoil to operate the semiautomatic actions — was also too loud. As a result the M1 system, which was totally silent, was developed.

Five examples of the extended barrel adapter round, all with brass adapters and CCi headstamps, are shown below at actual size.

Fig. 28–49. Extended-Adapter .22 Javette rounds. (A) Snapped primer, Javette point at muzzle. Possible dummy for demonstration. (B) Factory section of adapter with no internal stainless hypodermic tube barrel. (C) Snapped primer, hypodermic tube. (D) Unsnapped primer, no cannelure, hypodermic tube. (E) Solid adapter (no bore) dummy in .22 Short case.

Two additional long-adapter cartridges have no stainless hypodermic tubes in their adapter barrels even though they are both complete rounds with case cannelures, one with a snapped primer and one unfired. The reason for this and several other of the new .22 rounds is unknown. Perhaps if one of the technicians working on the project needed a round to function-check a firearm, he might have just assembled one or more with adapters without bore liners. Or he may have grabbed a handy .22 Short case, or used an adapter barrel that was not even finished to make his dummy, as in Figure 28–49 (E). It was assumed, I suppose, that these nonstandard loadings would not have left MBA. The only thing I know for certain is that they are all original MBA experimental cartridges, strange loadings notwithstanding.

Two .22 brass adapter barrel noses from complete rounds are shown below at 3x actual size. The specimen on the left, with the bore liner, is the round shown in Figure 28–49 (C) on the previous page.

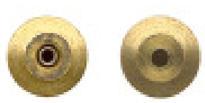


Fig. 28–50. Lined and unlined .22 adapter barrels.

Other .22 Javette rounds have normal length barrel adapters which could feed from standard magazines. Most of the adapter barrels in these cartridges were made from carbon steel, but a few used brass construction with a stainless bore liner. Three of these are shown below, actual size. The top specimen has a .22 Short case and a struck primer. The middle example in a .22 LR case has a rounded truncated nose and snapped primer, and the bottom example, unfired, has a case cannelure. All have stainless bore liners.

Fig. 28–51. .22 LR Javette cartridges with brass barrel adapters.

The next group of .22 rimfire Javette cartridges have carbon steel barrel adapters like the one shown below in Figure 28–52.

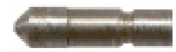


Fig. 28–52. .22 Javette carbon steel barrel adapter. Actual size.

Because of the similarity of appearance of carbon and stainless steel, it is difficult to determine whether the carbon steel adapter barrels have stainless liners; however, the 0.030-inch Javettes fit perfectly in them. In addition, the carbon steel adapter barrels have varying degrees of smoothing or rounding over of the steel noses. Some are sharply truncated while others have a smooth, rounded look. One of these rounds has seven distinct firing pin strikes from a High Standard pistol. Some other primers are snapped once or twice, and other cartridges are unfired. Most of the new (to us) cartridges have case cannelures, but a few do not. The top two cartridges have case cannelures to secure the adapter barrels, but the bottom two do not. The top round is shown with a Javette for perspective.

Fig. 28–53. MBA .22 Long Rifle Javette cartridges. Actual size.

A "standard" 0.030-inch Javette, shown in Figure 5–5 on page 64, is 0.822 inches (21mm) long. It and its Teflon gas check can easily be loaded into an M1 electric cartridge, a .223 Ammunition Concealment Round, or a .22 cartridge with an extended barrel adapter, with the entire Javette contained inside the cartridge, as shown in Figure 5–1 on page 62. However, a .22 cartridge of normal long rifle length with a shorter adapter barrel will not completely contain the long Javette. In some cases this might not matter because the Javettes were not completely inserted into their barrel adapters, as shown in Figure 5–15 on page 69. In these cases, the cartridges with their Javette noses protruding were carefully loaded into their firearm so that when fired, the Javette's nose would already be inside the firearm's bore and would not have to jump across any gap between the cartridge nose and gun bore, thereby eliminating wiggle or binding when the round was fired.

As discussed and shown on page 70 in Figure 5–18, Javettes were also made in medium and short lengths, and either of these could be completely contained in a long-rifle-length cartridge when required. These shorter lengths were made both at MBA and at Trebor.

Project Meson/Tiger's Claw/Tang .22 Javette cartridges are discussed and shown beginning on page 68. Three new specimens in this later series of cartridges are shown below in Figure 28-54. The top round has a distinct mouth crimp not seen before, the middle cartridge has a very heavy case cannelure to secure its barrel adapter, and the bottom specimen has a modified nose profile.

Fig. 28–54. Trebor .22 Long Rifle Javette cartridges. Actual size.

Chapter 6. Introduction to Gyrojets

Two MBA drawings of Gyrojet cases which have dimensions included have recently come to hand; one .30 caliber and the other .50 caliber. The copper-plated steel .30-caliber case drawing is dated February 22, 1963, and is shown below in Figure 28–55. It could withstand an internal pressure of 6,000 psi.

Fig. 28–55. .30-caliber rocket case, 1963. Actual size.

It had an outside diameter of 0.308 inch, a nozzle section inside diameter of 0.280 inch, and a case inside diameter just ahead of the nozzle of 0.270 inch.

The .50-caliber case drawing is dated February 21, 1963, and is shown below.

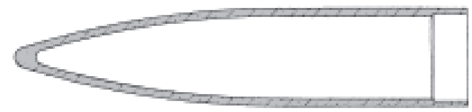


Fig. 28–56. .50-caliber rocket case, 1963. Actual size.

Like the .30-caliber case, the .50-caliber version is also copper-plated steel and was designed to withstand an internal pressure of 6,000 psi. It has an outside diameter of 0.511 inch and is 2.295 inches long.

Four new MBA nozzles are shown in Figure 28–57 below at actual size. They are each shown with the front (inside the case) sides on the left and the back (exposed) sides on the right. The top nozzle is an aluminum 13mm specimen with no primer pocket. The other three 20mm nozzles are steel, with the bottom two having Olin BWP electric primers and steep 30-degree port angles.

Fig. 28–57. MBA 13mm and 20mm rocket nozzles. Actual size.

Three 30mm nozzles are shown below at actual size, again with the front sides on the left. Note that the top nozzle has a donut-shaped aluminum foil moisture seal covering its ports. The middle experimental nozzle has *eight* ports and the remnants of an aluminum foil moisture seal. It also has a very small percussion primer. The bottom nozzle is a blank.

Fig. 28–58. MBA 30mm steel rocket nozzles. Actual size.

Chapter 8. .25-Caliber Gyrojets

This supplemental chapter includes two new .25-caliber Gyrojets, about which little is known. The top specimen is shown on page 94 in Figure 8–8(B) as a loaded round. The rocket shown here is unloaded, included primarily to document the existence of at least two of these rare experimentals. Another picture of it is in the group in Figure 26–11 on page 373 in the middle of the MBA photograph.

The bottom rocket is a very rare steel "pinched base" example which is complete. It has an aluminum plug in its base, apparently to divert exhaust gas to the formed nozzles. Another specimen is shown on page 94 in Figure 8–9(B), but that rocket, from the Woodin Laboratory collection, has a large hole in its nose and split ports.

Fig. 28–59. .25-caliber Gyrojets. Actual size.

Chapter 9. .30-Caliber Gyrojets

Three new .30-caliber Gyrojets have been recently acquired and are shown below. The top Gyrojet has a copper-plated steel case and a very unusual nozzle design similar but not identical to the one in Figure 6–6 on page 82. The bottom two rockets have nonmagnetic brass or GM (gilding metal) cases with pinched nozzles, one shorter than the other. See Figure 9–6 (C) on page 97 for another example.

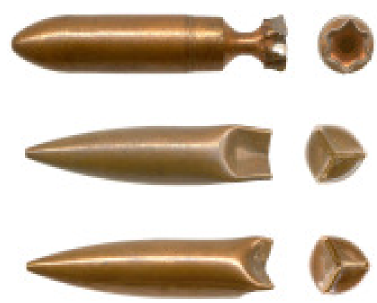


Fig. 28–60. .30-caliber Gyrojets. Actual size.

Chapter 10. .45- and .48-Caliber Gyrojets

.45-caliber Gyrojets are shown and discussed beginning on page 109, where a modified M1911A1 .45 ACP pistol and .45-caliber Gyrojet rocket are shown in Figure 10–2.

Because we now have three new .45-caliber Gyrojets to study, it is easy to see that the only modifications to the M1911A1 pistol would have been to its barrel, with a chamber insert similar to those used in the .30-06

M1 Garand rifle's chamber to convert it to the 7.62x51 NATO (.308). The rockets fit perfectly in an unmodified magazine, as shown below, and if loaded in a modified barrel chamber with a hold down, perhaps a simple O-ring, would function perfectly, although in a single shot mode only. The slide would have to be cycled for each shot, so the potential advantages of the Gyrojet cartridge over the .45 ACP ball round are not clear.

The top rocket, 11.2 x 32.4mm, in Figure 28–61 has a steel nozzle with large ports. It is unfired. The center rocket, 11.2 x 33.0mm, also has a steel nozzle, but with small ports and a snapped primer. The bottom specimen, 11.2 x 31.2mm, has a steel nozzle and snapped nickel primer.

Fig. 28–61 .45-caliber Gyrojets, with two loaded into a M1911A1 magazine. Actual size.

It is possible that the roundnose .45-caliber Gyrojet shown in Figure 10–3 on page 110 might have been a part of this project, but that has not been confirmed or even hinted at in MBA literature. Its round nose would have made feeding easier compared to the sharp truncated noses of the brass variations, and its very thick steel case would have made the cartridge much stronger and heavier. However, its 37.8mm length would not allow it to feed from a M1911A1 magazine.

Three new .48-caliber brass Gyrojets are shown below in Figure 28–62 to supplement the ones on page 111. The top Gyrojet has a very sharp needle point and a phenolic nozzle with two ports. The nozzle is secured in part by a transverse steel pin running completely through it and the case.

The middle rocket has a more rounded conical nose and a steel 4-port nozzle with snapped brass primer.

The bottom specimen is a factory 45-degree section with a phenolic nozzle having two ports and an empty primer pocket. Unfortunately, we still have almost no information about these .48-caliber Gyrojets and their potential use.

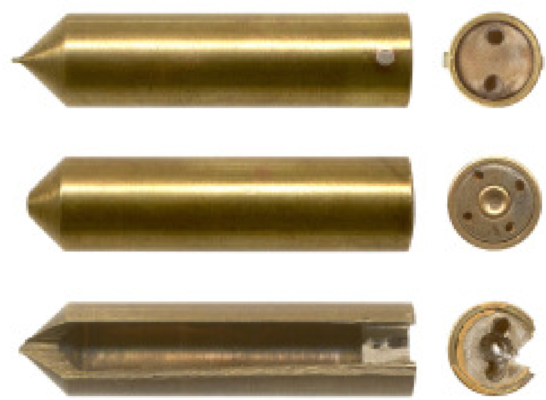


Fig. 28–62. .48-caliber Gyrojets. Actual size.

Chapter 11. .50-Caliber Gyrojets

The three new .50-caliber Gyrojets for this supplement include a rare pinched base specimen nearly, but not quite identical to the one shown on page 113 in Figure 11–2 (A) from the Woodin Laboratory collection. This Gyrojet has shorter ports. There are only two of these so-called pinched base specimens known; this one and the Woodin Laboratory rocket. It was considered to be so important, it was featured on the cover of MB-82, a 1962 two-year summary of all of MBA's work to date.

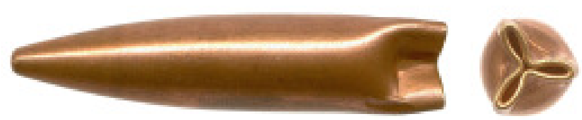


Fig. 28–63. .50-caliber pinched base rocket. Actual size.

The second round is a dummy with a brass nozzle, similar to the one shown on page 115 in Figure 11–9 engraved to President Lyndon B. Johnson. This specimen is engraved to David Antonini, past supervisor of the MBA experimental and prototype shop, who was the source of most of the new Gyrojets and other ordnance presented in this supplemental chapter. Gyrojet collectors everywhere owe him a debt of gratitude for having the foresight to carefully save so many rare experimental MBA rockets so they would be available to us now.

Fig. 28–64. .50-caliber Gyrojet dummy engraved to David Antonini. Actual size.

The third rocket is a new .50 K.E. (MBA's designation for this kinetic energy cartridge) shown next. It has an unusual "pagoda-style" steel point not seen on similar rounds, and the purpose of this unusual shape is unknown. The Gyrojet shown has an unsnapped nickel primer, and is assumed to be a dummy. However, there are no holes in its case, as most dummies have, so it is possibly a live round. It is certainly an interesting variation.

Fig. 28–65. .50-caliber K.E. Gyrojet, "pagoda" point. Actual size.

Chapter 12. .49-Caliber Gyrojets

A group of four bizarre .49-caliber dummies from the Woodin Laboratory is shown on page 128 in Figure 12–11. I commented that if it were not for the fact that Mainhardt placed these in Woodin's hand himself during an MBA factory visit, thereby firmly establishing their provenance, I would have discounted their authenticity and assumed they were fakes. At the time, they were thought to be unique. However, we now have another specimen, identical to Figure 12–11 (A), and it is shown next in Figure 28–66.

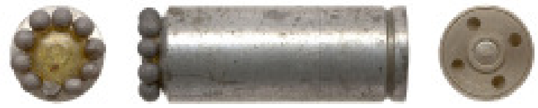
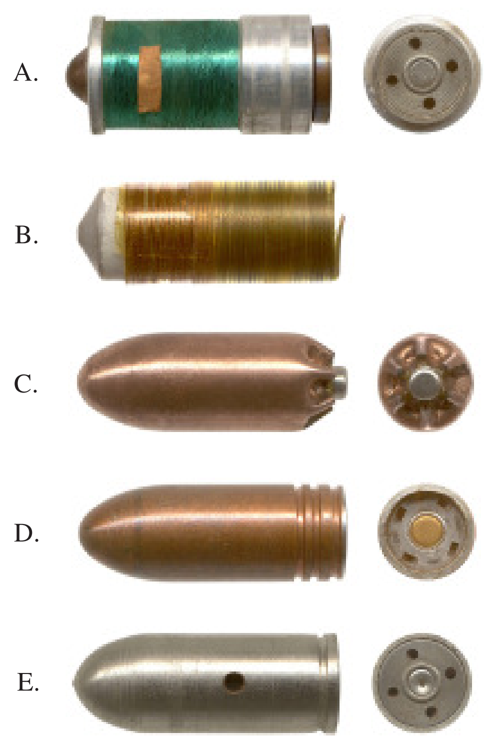


Fig. 28–66. .49-caliber dummy with #8 shot on nose. Actual size.

Chapter 13. 13mm Gyrojet Rockets

The 13mm rockets shown below are newly acquired experimentals with normal 1.4-inch (35.6mm) case lengths. (A) is a nickel-primer dummy with an aluminum spool of very thin green wire designed to unroll as the Gyrojet spun forward. The exact use of this rocket, and the .49-caliber wire-wrapped specimen (B) from the Woodin Laboratory is unknown. These two are the only wire-deploying Gyrojets seen. (C) has a 6-port, pinched-base nozzle and extended nickel primer. (D) has a 4-port nozzle with internal tangs punched (see page 146) and three cannelures. The rear and middle cannelures secure the nozzle and the front on secures the back of the propellant grain. (E) is a nickel-plated turned-steel dummy with one case hole and rubber "propellant." (F) is a Bundy tube round with an unusual flat powder-metal nozzle having four straight slots. Bundy tube rounds are described and pictured beginning on page 152.



F.

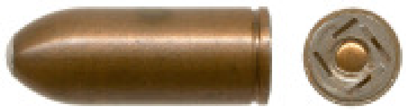


Fig. 28–67. Normal-length 13mm Gyrojet rockets. Actual size.

The next two 13mm rockets to the right are each 2 inches (50.8mm) long with plain steel cases and copper-plated 4-port steel nozzles. The bottom specimen is a factory section with propellant grain. One explanation for the development of the extended-length rockets, given by a reliable source, is that during tests on enemy corpses in Vietnam, penetration was not considered to be sufficient. Manihardt's answer was to increase velocity by increasing the amount of propellant in longer cases. This also increased the mass of the case, resulting in higher kinetic energy. However, these long rockets would not feed from the magazine of a Mark I Model B firearm.

Fig. 28–68. 2-inch long 13mm Gyrojet rockets. Actual size.

The following four Gyrojets show the range of different case lengths tried in otherwise identical roundnose 13mm Gyrojets with copper-plated steel cases and copper-plated steel 4-port nozzles with one case cannelure. The top specimen (A) is a standard 1.4-inch (35.6mm) rocket included here for comparison. (B) is a 2-inch (50.8mm) variation. (C) is 2.3 inches (58.4mm) long, and (D) is 3 inches (76.6mm) in length. All of the long rockets have snapped brass primers, but the standard round is unfired..

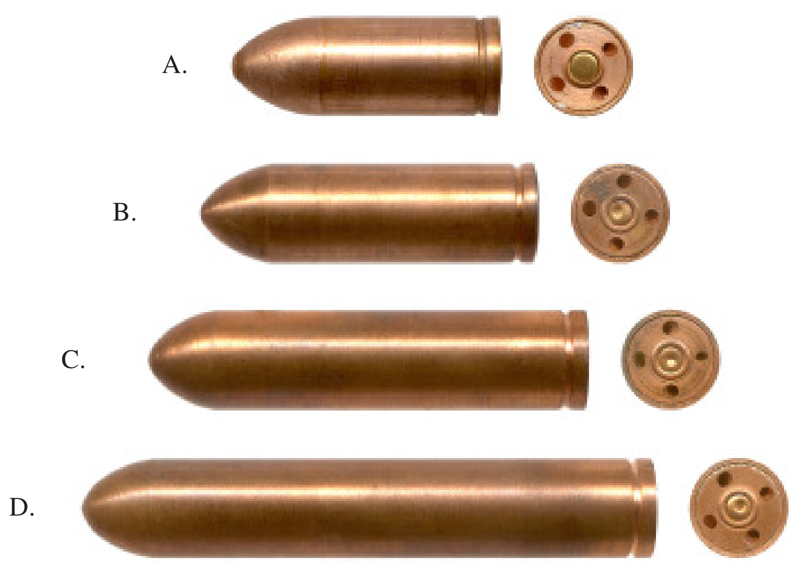


Fig. 28–69. Normal and extended-length 13mm Gyrojet rockets. Actual size.

Chapter 14. 13mm Gyrojet Firearms

Two pieces of fantasy artwork recently acquired depict future conceptual MBA 13mm carbines and pistols. The artwork is striking, and was apparently to be used in advertising or at trade shows. The Gyrojets do not appear anywhere else in MBA literature. The original posters are large, 30 by 18 inches, and it is not clear when they were made. They are shown on the next page in Figure 28–70.

Fig. 28–70. Fantasy Gyrojet advertising carbines and pistols of the future. Reduced.

Chapter 15. 13mm Gyrojet Flares and Launchers

We now know that the pyrotechnic flare mixture for 13mm Gyro-Signals was:

— strontium nitrate, 50 parts by weight.
— magnesium, 30 parts by weight.
— potassium perchlorate, 10 parts by weight.
— polyvinyl chloride, 10 parts by weight.

— · —

Four new 13mm "Gyro-Signal" flares have been acquired since the last supplemental chapter and they are shown next in Figure 28–71 to the right. The top three have flat-tip noses and resemble lipsticks in red, black, and blue. They are unfired and we have no information about them. The bottom flare has an unusual clear coat, perhaps lacquer, on its black-finished case.

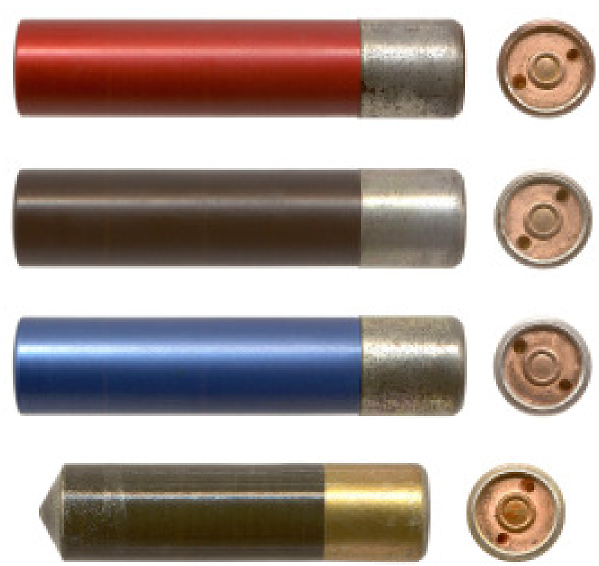


Fig. 28–71. 13mm Gyrojet flares. Actual size.

Four 13-20mm flares are discussed and shown on page 231; two Model 207 red smoke signals, one Model 207 red flare, and one display board dummy with an extended motor section. Because the official MBA designation for these was "13-20mm," I decided to place the four new flares of the type here. The top (A) specimen is gold anodized with no markings. It has not been fired. The second (B) rocket is plain aluminum and its motor section is slightly extended, with a cannelure. It is also unfired.

The third example (C) has a plain aluminum flare section with a roundnose design. It has been fired.

The bottom (D) flare is a mystery round. Unlike any other 13-20mm flare seen, it has a plastic flare section that appears to be red Nylon. There is no nose cap. Although it is empty except for a length of pyrotechnic fuse that smells like a firecracker fuse, it is unfired. The motor sections of all four flares are stainless steel and the nozzles are plain carbon steel.

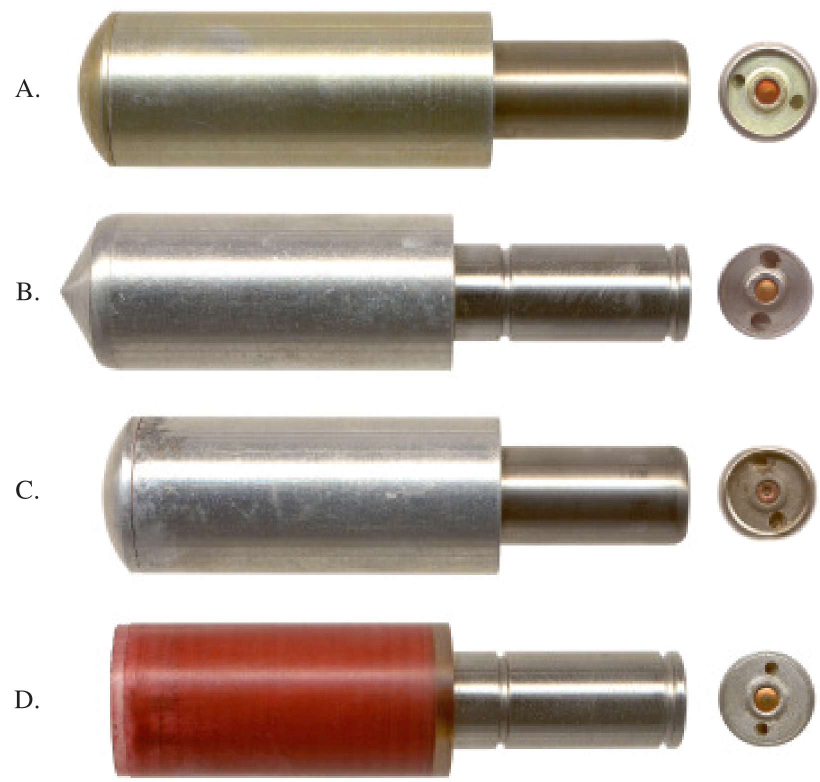
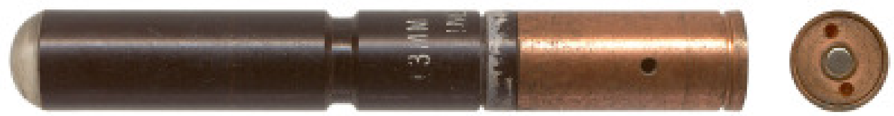


Fig. 28–72. 13-20mm Gyrojet flares. Actual size.

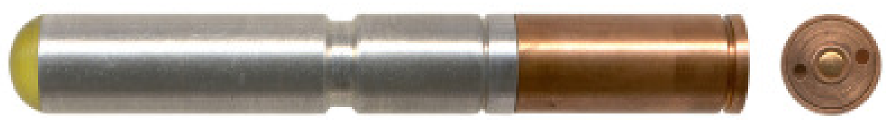
An experimental MBA 13mm flare launcher made of translucent plastic, possibly Nylon, is very light and simple. The rear end cap unscrews to allow placement of the spring, firing pin, and cocking knob. Flares are held down in the forward section by friction, and there is no safety notch for the cocking knob.

Fig. 28–73. Experimental MBA 13mm flare launcher. Actual size.

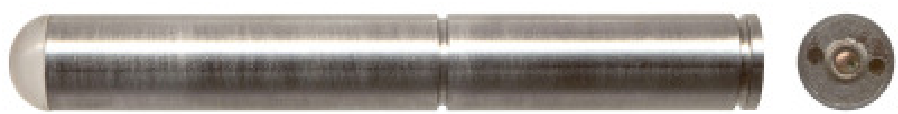
Radar chaff signals are rare now and it is amazing that any survived. They were made in small numbers and there is no record in available literature that they were adopted by any military service or sold in the civilian market. Only one type of 20mm chaff flare (the Model 301-2 shown on page 235), two types of 25mm chaff flares (including the Model 501-1 shown on page 237), and one type of 30mm chaff flare (the Model 7100-2 shown on page 245) are known. However, there are several variations of the Model 401 and Model 402 13mm chaff flares, and these, together with two unknown 13mm experimentals, are shown below. Four other variations are discussed and pictured on page 218 with a Model 401 package label.

A.


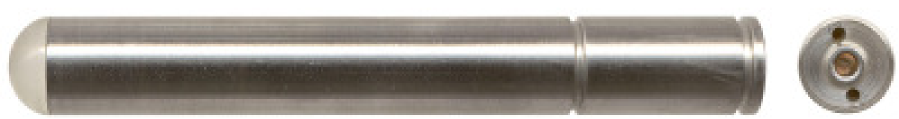
B.

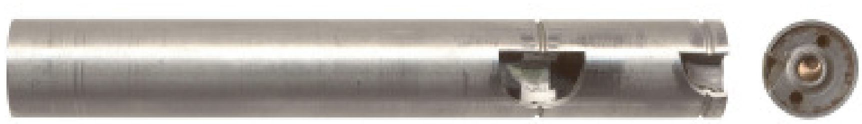

C.


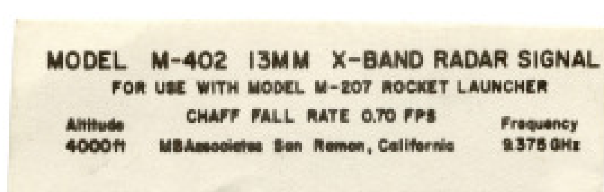
D.


E.


F.


G.


H.


I.


J.

K.

Fig. 28–74. MBA 13mm chaff flares, actual size. (A) Model 401 dummy, one case hole. (B) Model 401 factory section, Woodin Laboratory. (C) Model 401, plain aluminum with no markings; unfired. (D) Model 402, long motor, stainless, unfired. (E) Model 402, long motor, stainless, unmarked, fired. (F) Model 402, short motor, stainless, fired. (G) Model 402, short motor, stainless, unmarked, fired. (H) Model 402 partial factory section. (I) Model 402 label. (Note 4,000 foot altitude. Model 401 altitude was 2,250 feet.). (J) Unknown chaff rocket, plain steel motor, alminum payload section, unfired. (K) Unknown chaff rocket, no primer pocket; just a small hole (for fuze?).

Chapter 16. 12mm Gyrojets

This is the only new 12mm Gyrojet for this supplemental chapter and it is the only one known with a plain steel case and powder metal nozzle with four straight slots. It has been fired.

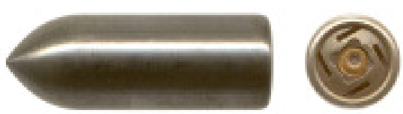


Fig. 28–75. MBA 12mm Gyrojet, plain steel case. Actual size.

Chapter 17. Large-Caliber Gyrojets

20mm Subcaliber Swarmjets

Shown on the next page in Figure 28–76 is an edited —the original is 36 inches wide—MBA drawing that recently surfaced which has important new information. The drawing, titled "Subcaliber Assy Swarmjet," is dated August 21, 1979, and it is one of a series of MBA drawings of this rocket's various components.

The MBA Swarmjet was a steel rocket to be used to destroy with kinetic energy incoming Soviet nuclear warheads targeted against U.S. Minuteman Intercontinental Ballistic Missile (ICBM) launch sites. Multiple salvos of radar-directed Swarmjets were to be fired at the warheads which had penetrated the first two antimissile satellite layers of the "High Frontier" defense system that later evolved into President Reagan's 1983 Strategic Defense Initiative (SDI), aka "Star Wars." Swarmjet specimens are seen in 30mm versions in both my collection and the Woodin Laboratory collection, and in both 40mm (November 1978) and 55mm (1979) MBA drawings. There are no known specimens of 40mm or 55mm Swarmjets.

Until recently, I had not considered that the small 20mm Swarmjet was a subcaliber round, and Mainhardt did not mention that when he identified the rocket as a Swarmjet. I also did not realize that one of the Woodin Laboratory specimens was significantly different from mine, meaning that there were at least two variations; one with eight aluminum-nose retaining pins around the forward bore rider band, as seen in the drawing and in the fired Woodin specimen (middle picture), which matches the drawing perfectly except for a slightly blunted nose caused by impact damage. My unloaded second variation, the bottom picture, and seen on page 234 in Figure 17–11(B), does not have the retaining pins. Instead, the aluminum nose is held in place with fine-pitch threads. Both variations have an outside diameter of 19.8mm and are 96.5mm long. The small hole in the center of the nozzle is for an "igniter header." As seen in the drawing, the igniter, or primer, is contained inside the rocket's base, which is machined as one piece with the rest of the case. I have assumed that the primer was electric, but I can't prove it. The igniter housing assembly drawing does not specify electric or percussion, and it is possible that the "header" was used to transmit a firing pin's blow through the case to a percussion primer inside the igniter housing. But it looks like an electric primer to me, and that would be expected in this application. The aluminum noses have long hollow cavities in both variations, but with different shapes.

How were *subcaliber* Swarmjet rockets to be used? Being smaller and perhaps less complicated to manufacture, and cheaper, they might have been used to test the rocket's design before committing to the larger-caliber design. One clue to the "launcher" used to test-fire them is the note on the drawing: "Unless otherwise specified, diameter [of the rocket] to be specified by the inside diameter of a 10 ga shotgun barrel." An MBA 10-gauge "20mm rifle," with percussion firing pin, is shown and described on page 377.

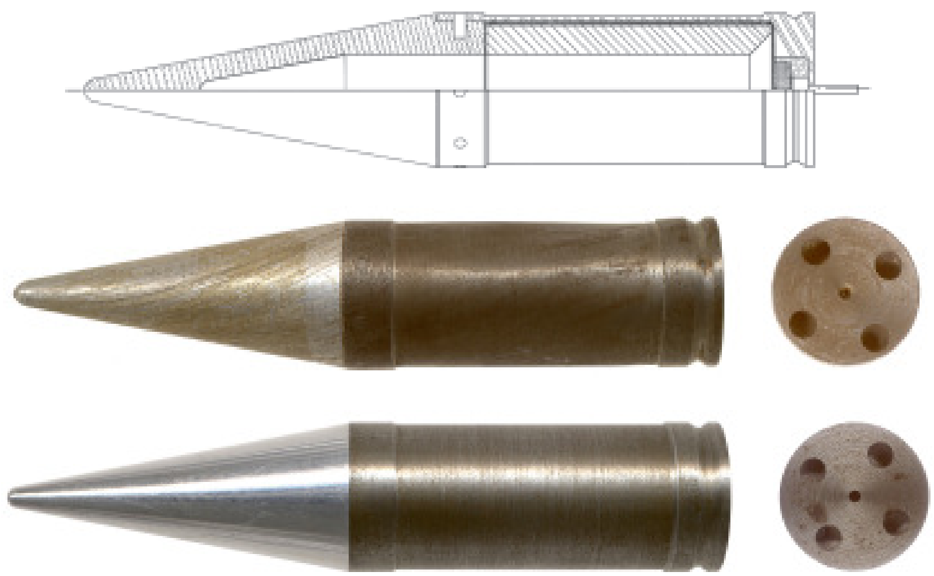


Fig. 28–76. MBA 20mm Subcaliber Swarmjets. Actual size.

Mainhardt sometimes had fired test rounds nickel plated to give to factory visitors as souvenirs, and most of these seen are 12 or 13mm. One 20mm variation, which struck its target almost straight on at a 90-degree angle is shown next.

A 20mm Model 302 chaff rocket with an unusual red nose cap is also shown. I have no information about the purpose of the red nose. It is possibly to identify the round as a dummy. Another fired chaff rocket with a red nose is shown in the 25mm section.

Fig. 28–77. MBA 20mm Gyrojets. Actual size.

25mm Gyrojets

Almost all of the 25mm Gyrojets we have seen are flares or signals; including chaff, pyrotechnic for night use, and smoke for day use. These rockets were generally designed for hand-held or rifle-mounted adapter launch. One hand-held launcher is being demonstrated by MBA engineer David Mays in the photograph below. The launcher has a mousetrap-type firing mechanism. When the lanyard was pulled, it released a spring-loaded firing pin which rotated up to ignite the flare's normal percussion primer. The flare was preloaded in the launcher, which had operating instructions printed on it and pull-off rubber waterproofing seals on each end.

Fig. 28–78. MBA 25mm Gyrojet flare launch. MBA photo.

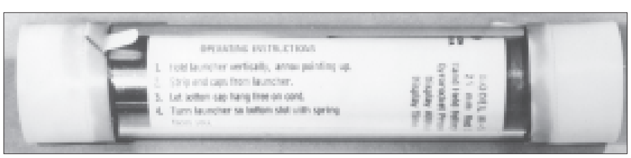


Fig. 28–79. MBA 25mm Model 510L red smoke signal preloaded in launcher. MBA photo.

A rifle adapter launch is shown on page 237 in Figure 17–16. Another combination hand-held, rifle adapter launcher with interchangeable square launch tubes for different flare sizes is shown next in Figure 28–80. It was approximately 18 inches long and had a pen-gun-type firing mechanism as seen on most of the MBA flare launchers. It also had a .30-caliber and .223-caliber rifle muzzle adapter. Perhaps its most interesting feature was the bubble level inside with a 45-degree mirror and viewing opening so the shooter could ensure that the launcher was perfectly vertical when its flare was fired. The launcher could fire 13mm, 20mm, 25mm, and 30mm flares.

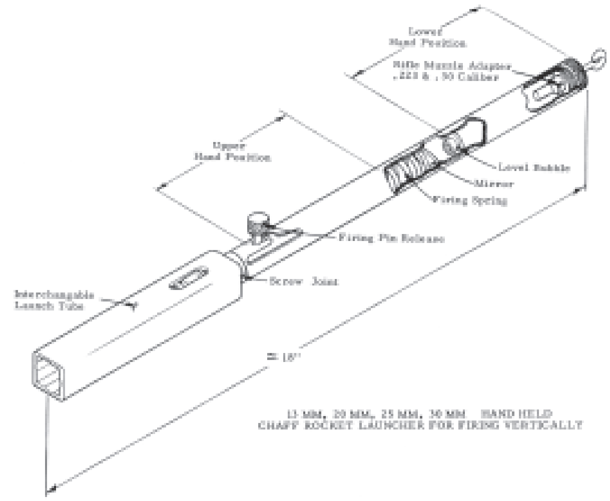


Fig. 28–80. Multi-caliber Gyrojet flare launcher. MBA drawing.

Two of three other hand-held preloaded flare launchers in MBA's "Family of Flares" (MBA designation) are shown below, reduced from actual size. The one not shown is marked FLARE and is otherwise identical to the other two. These also had a mousetrap firing mechanism with a very strong spring-loaded pivoting firing pin. The launchers were covered entirely by a silicone waterproofing seal. The lanyard was for carrying only. When the launcher's inner sleeve holding the flare was pushed up by the shooter's thumb, it allowed the firing pin to release and pivot up and fire the flare's normal percussion primer.

Fig. 28–81. MBA 25mm Gyrojet flare launchers. Reduced.

Five 25mm Gyrojet flares are shown below at actual size. (A) is a one-piece machined dummy that was loaded in the chaff launcher in Figure 28–81. (B) is a fired, unmarked SRU-29P chaff signal. (C) is either an unfired and unmarked SRU-27P smoke or a SRU-28P flare with very steep nozzle ports. (D) is a factory sectioned unfired case. It has a polyethylene plug as simulated propellant. The reason for a live (?) primer with dummy propellant is not clear. (E) is a fired unmarked Model 501 chaff rocket with an unusual red nose cap, possibly to indicate a dummy. (F) is an empty, unfired test case with a deep-seated nozzle.

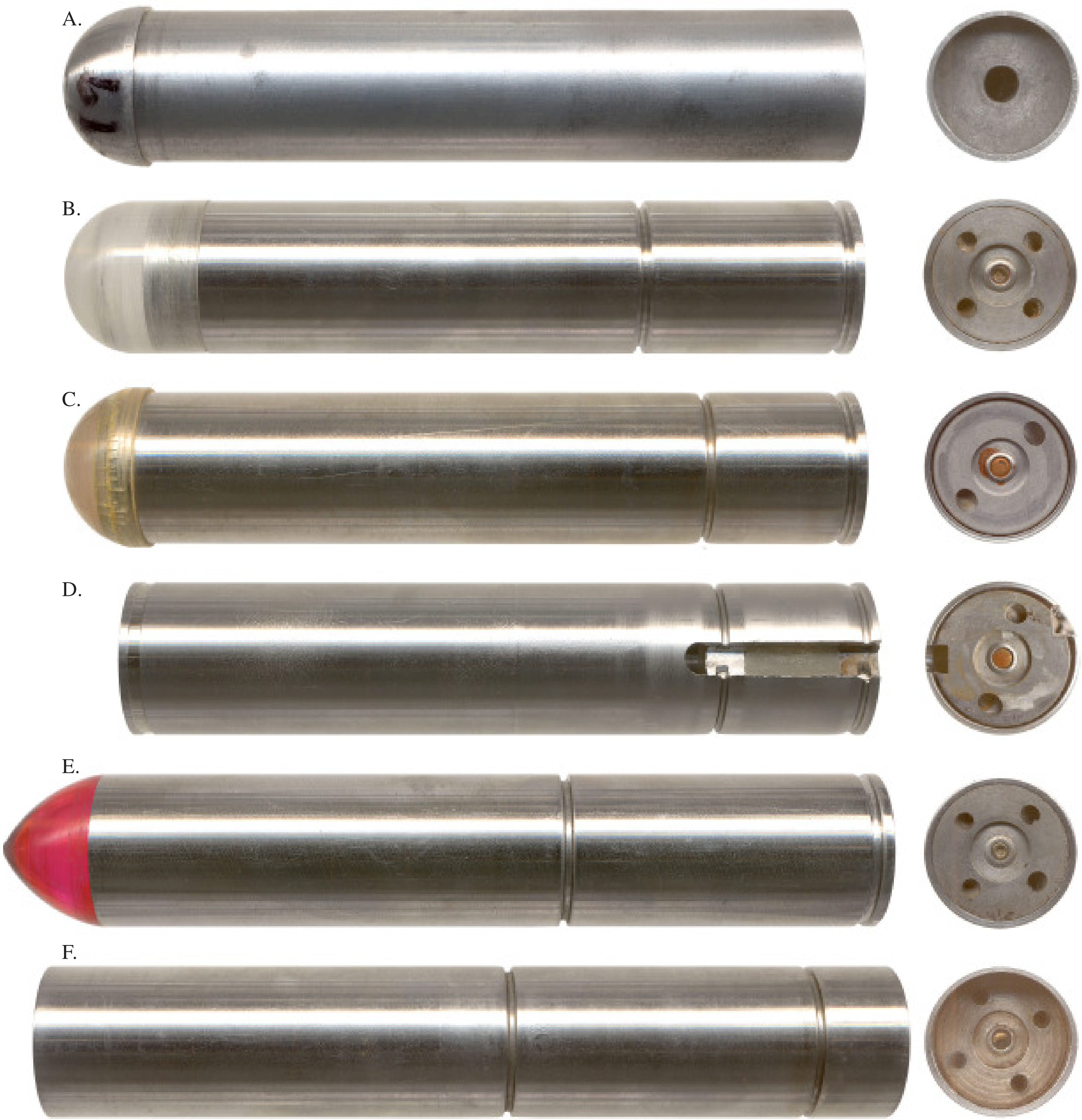


Fig. 28–82. MBA 25mm Gyrojets. Actual size.

A second specimen of the SRU-27P smoke or SRU-28P flare was acquired with the example shown in Figure 28–82 (C) on page 478 to the left. It is identical to the specimen shown except for its nozzle, shown below in Figure 28–83.

Fig. 28–83. SRU-27P or SRU-28P nozzle variation. Actual size.

The final 25mm hand-held flare launcher variation of this section is shown below. It has tear-off rubber end caps and a thumb-activated trigger.

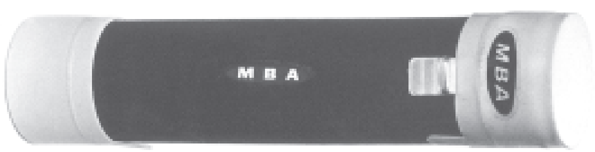


Fig. 28–84. 25mm hand-held launcher variation, reduced.

The two 25mm Gyrojets shown at actual size to the right are very unusual variations, to say the least, and the only thing about them known for certain is that they are original MBA experimentals.

The rocket on the left is clearly some sort of flashlight projectile with what appears to be a flashlight-type light bulb in its extended clear plastic nose. The only thing I have that comes close to this is a ship-to-ship linethrowing projectile with a similar “flashlight” at its nose. That linethrowing device is for use at night, so the receiving ship’s personnel can visually track the projectile inbound. I do not want to be too strong on the night linethrowing rocket theory because I see no way a line might be attached to the rocket.

The other bizarre rocket has a short, live 25mm motor section with a threaded hole in the tip of its nose to take a solid steel 6.35mm rod and 25mm truncated conical point, also solid steel. I cannot imagine how this would have been used. I also acquired a second motor section with this rocket, so it is probably not unique.

Fig. 28–85. Unusual MBA 25mm Gyrojets. Actual size.

The 25mm (23.8 x 133mm) MBA rocket shown below in Figure 28–86 is included here because its diameter is so close to other 25mm rockets, which typically measure 25.5mm. The Gyrojet has an aluminum body and aluminum 2-port nozzle which is quite thick. It is secured by a tapered boat-tail crimp. There is no primer pocket, just a slight depression, so the rocket must have been ignited by a pyrotechnic fuse. It has a weathered look and might be a dummy because the nozzle ports are both obstructed inside the case, which would not normally occur with a fired round. The Gyrojet resembles the .25-caliber rockets shown on page 93, some of which had aluminum cases and 2-port aluminum nozzles. These were also ignited by $BKNO_3$ pyrotechnic fuses. Because of their strong resemblance to the .25-caliber Gyrojets, and apparently identical construction, these Gyrojets are possibly early, circa 1962.

Fig. 28–86. Unknown MBA 25mm Gyrojet. Actual size.

30mm Gyrojets

MBA 30mm Gyrojets were used in a number of different applications including chaff signals, Swarmjets, over-the-shoulder-launched high-explosive anti-armor rockets (discussed and shown beginning on page 240), parachute flares, tear gas, etc. Because apparently only the Model 7100 chaff rocket was marked, identification of specific 30mm Gyrojets is difficult.

They have different types of fuzes, impact and centrifugal, and sometimes a combination of both. Detailed drawings of these fuzes and a discussion of their operation begins on page 436. 30mm Gyrojets are seen with percussion or electric bridgewire primers.

30mm rockets were also quite expensive, even the "simple" variations like Model 7100 chaff rounds, which had no complicated fuzes or high explosive payloads. On April 4, 1967, MBA's Mitchell Paige noted that Model 7100 30mm chaff rockets cost $265 ($1,712 in 2010 dollars) each for an order of 20. The MBA Model 7500 30mm chaff Gyrojet launchers cost $1,940 ($12,532 in 2010 dollars) each.

Because they were never offered for sale in the police or civilian markets, 30mm Gyrojets are quite rare today, and most of those found are fired examples.

One type of 30mm rocket that can be identified is the Model 7309 Gyrojet for the "MBA Model 7603 Over Shoulder Rocket Weapon System - 30mm." It has a 2-piece steel case topped by a 3-piece fuze, as shown below in an MBA drawing from MBA Technical Manual MB-TM-69/16 dated March 1969.

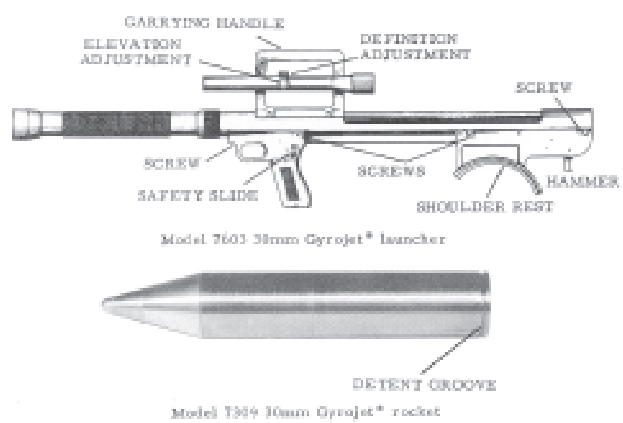


Fig. 28–87. MBA 30mm Model 7309 rocket and Model 7603 weapon system. MBA drawing and photo.

We are fortunate to have acquired the 10-page manual, which explains in some detail how the system worked. It had an open breech and smooth barrel, and was loaded from the rear, like the 30mm Gyrojet-Combo SAWS/OTSL shown on page 240 in Figure 17–22. The

Model 7603 looks identical to the 30mm ARROW (Advanced Recoilless Rocket Weapon) pictured in Figure 17–24 on page 241. It is possible that the Model 7603 was an early 1968 version that was further developed as the ARROW, pictured in the 1971 and 1975 MBA annual reports.

The Model 7603 weapon was equipped with a variable 3x-8x telescopic sight. The rocket's percussion primer was struck from the rear by the hammer, which cocked down and forward, simultaneously safing both the hammer and trigger. The rocket was held down by two spring detents in the breech which engaged the "detent groove," aka nozzle-crimping cannelure.

The telescopic sight could be adjusted for range by changing the elevation of the front of the scope. At an angle of zero degrees, the weapon was set for a range of 195 meters. As elevation increased, the range increased to a maximum, at 20-degrees, of 2,520 yards.

Fig. 28–88. MBA 30mm Model 7603 in firing position. MBA photo.

Two Model 7309 rockets are shown to the right at actual size. The left specimen is a dummy with a 2-piece steel case, 3-piece aluminum and steel fuze, and a nozzle with a percussion primer pocket but no ports. The various pieces are empty and unscrew easily. The bases of the payload sections of both rockets are solid.

The specimen on the right is a fired variation with a stainless steel motor section and carbon steel payload section. The aluminum fuze base has slight impact swirl marks

Fig. 28–89. MBA 30mm Model 7309 Gyrojets, dummy and fired.

The short unfired stainless 30mm rocket shown next has an aluminum retaining band around its base that is twice as high as the fired similar rocket shown on page 248. This thrust-test specimen also differs by having a steel nose. Like the other example, its ports are drilled straight with no angle. The aluminum foil waterproofing seal under the nozzle is visible through the ports.

Fig. 28–90. MBA 30mm test Gyrojet. Actual size.

The 30mm Gyrojets shown to the right at actual size in Figure 28–91 begin with (A), a rocket that is similar to the specimen from the Woodin Laboratory shown in Figure 17–36 (E) on page 249 but half an inch shorter at 5.75 inches. It may be the rocket shown and described and shown on page 437 in Figure 27–45; a test round simulating the smoke rocket. It has been fired and like most MBA expended ordnance, recovered for study and possible later use.

(B) is an unusual rocket that has been fired, with the copper primer receiving a very light hit. Light swirl impact marks are seen on the case and 2-piece aluminum fuze. The rocket has a cannelure separating the motor section from the payload, presumedly securing a bulkhead between the two sections. However, half of the payload section is stainless steel in one piece with the motor section, and the other half is carbon steel. The fuze is stab-crimped to the steel payload section and because the rocket's pieces are tightly stuck together, I cannot determine whether the fuze is also threaded.

(C) is a factory section of a rocket with a combination impact and centrifugal fuze, as described and shown on page 438 in Figure 27–46. It is similar but not identical to the factory section shown on page 243 in Figure 17–29(B). The combination fuze allowed the rocket to function on impact if the nose struck at a 90-degree angle, or close to it or, if the rocket landed parallel to the ground in a "non-trailing" orientation (described on page 436), as the rocket's spin and centrifugal force decreases after impact.

(D) is a very long 8.5-inch stainless case and aluminum fuze assembly. The steel nozzle has no ports, and the primer pocket has been drilled and threaded for pull-testing to determine how much force was required to cause the nozzle to fail and separate from its case. Similar pull-test cases are described and shown on page 236 in Figure 17–15(C), a 20mm, and on pages 154 and 155 in Figure 13–20, 13mm. In addition, this rocket has a sectioned centrifugal aluminum fuze body, sectioned cannelure showing bulkhead security between the motor and payload, and sectioned rear cannelure showing nozzle security in the stainless case and red rubber O-ring seal. Because of its mint, unused appearance, I do not believe that the nozzle pull test was done on this round.

Fig. 28–91. MBA 30mm Gyrojets. Actual size.

The final 30mm item for this supplement is an MBA photo of a 30mm launcher adapter for an XM148 grenade launcher mounted on an M16 rifle. The XM148 was the predecessor of the M203. The photo shows a 30mm rocket with an impact fuze and adapter tubes.

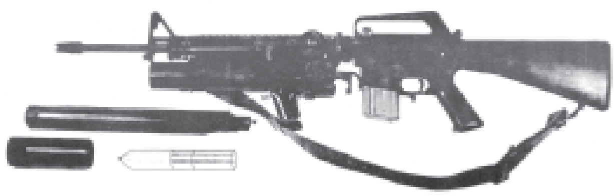


Fig. 28–92. MBA 30mm rocket adapter for M16 rifle and XM148 grenade launcher. MBA photo.

Another photo, shown below in Figure 28–93, of the launcher adapter is captioned: "Firing position for launching chaff rocket from the XM148 grenade launcher adapter."

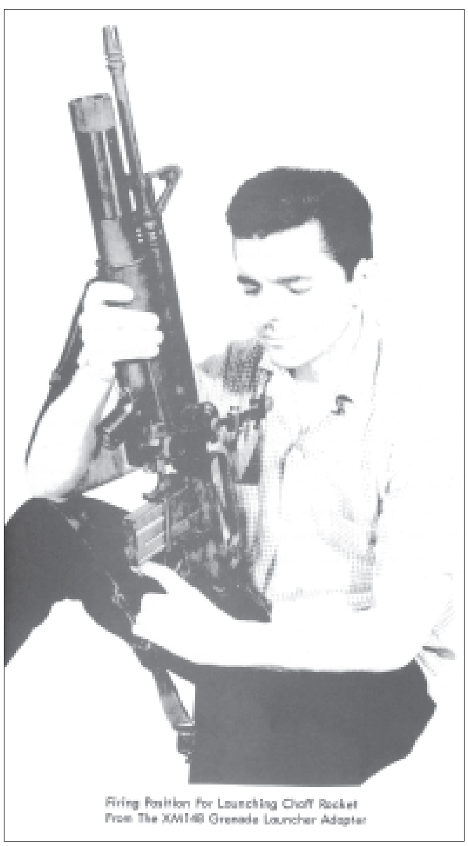


Fig. 28–93. 30mm launcher adapter in firing position for launching 30mm chaff rocket. MBA photo.

40mm Gyrojets

MBA Type III 40mm cloud seeding rockets are discussed on page 250 and shown in Figure 17–39. Another variation is discussed and shown on page 381 in Figure 26–23, and a Paul Smith sectioned Type III composite image is discussed and shown on page 441 in Figure 27–50.

Now an early Type I has been acquired, and it is shown at actual size on the next page with an MBA photo of a group of these black and white striped rockets. The Type I rockets, which were basically for test and evaluation, were painted with contrasting stripes to better visually track their flight. Our specimen, which is serial number 29 of a group of an unknown size, also has an orange band painted around its base to further enhance its visibility. The only other known specimen, serial number 6, is in the Pepper Burruss, Green Bay, Wisconsin, collection of special purpose ammunition.

The B&W photo is dated 1974 and during the summer of that year, cloud seeding rockets were used operationally for the first time, with 551 of them being expended during seeding operations. During this period, 29 "hail days" were declared by the NHRE (National Hail Research Experiment) with 13 of these days having cloud seeding operations.

A new undated NHRE cloud seeding rocket drawing shows the construction of the rocket but does specify its type (I, II, or III). It lists the rocket's altitude (above launch height) as 6,500 feet. Other project literature listed it as 8,000 feet

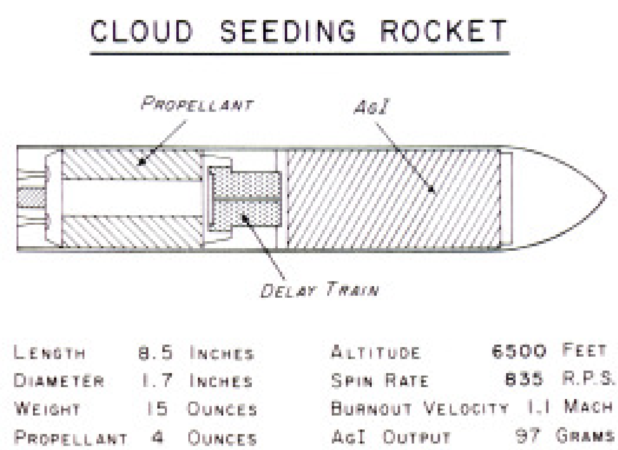


Fig. 28–94. MBA 40mm cloud seeding rocket. NHRE drawing.

A 40mm "Rocket Barrage System" is described and pictured in MB-TM-68/2, an MBA technical manual dated January 1968. The system was designed to protect a camp of soldiers from enemy attacks which could take place from different directions around the camp's perimeter. The system utilized a barrage (salvo) of 40mm rockets fired from a lightweight launcher.

The rocket's payload was the 40mm high explosive M406 warhead, which was readily adaptable and already in use with M79/M203 grenade launchers. Only minor modifications were required to attach the warhead to an MBA rocket motor. In addition, the point-detonating fuze's setback feature was eliminated because the MBA rocket's acceleration was only about 30 g's. Acceleration when fired from an M79/M203 was 800 g's. Because of the reduced acceleration and spin of the MBA rocket motor, the warhead was armed further out, at about 150 feet from the muzzle.

The system had a maximum range of 1,000 meters at 40 degrees elevation. The launcher could fire 144 rockets, which would blanket 90,000 square feet resulting in "optimum lethality." The rockets had a lethal burst radius of 5 meters, and could also carry other 40mm warheads such as illumination, white phosphorus, etc. The launcher held four modules of 36 rockets each, and it could be ripple or salvo fired. Unfortunately, no other information about this unique system is available, including testing or adoption by the military.

Fig. 28–95. 40mm Type I cloud seeding rocket and MBA photo.

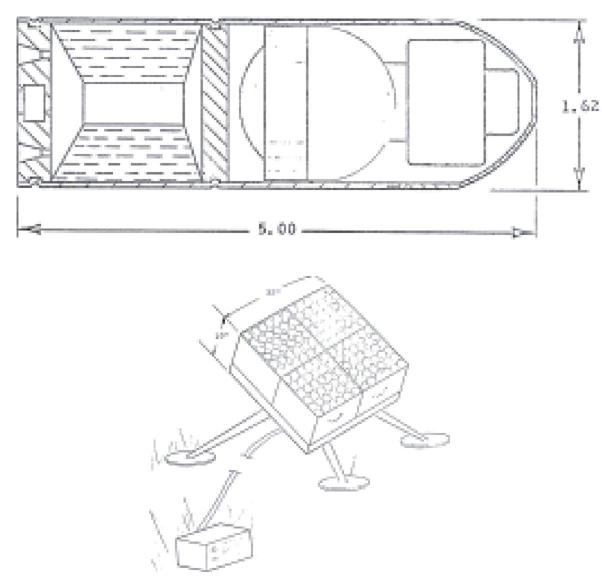


Fig. 28–96. 40mm Rocket Barrage System. MB-TM-68/2.

Chapter 18. 40mm Less-Lethal, Gunpowder Powered

Two MBA drawings have recently come to light. The first is drawing number 010060, by MBA draftsman G. Niskala titled "Threaded Launcher Assembly." It is dated February 18, 1971, and depicts a 2-piece 40mm Stun-Bag launcher not seen before. The second drawing, number 010827, also by Niskala, is titled "Multi-Bag Cartridge Assembly" and it depicts a 40mm triplex Stun-Bag cartridge. Both of these drawings are originals, not copies, and are very sharp. To save some space, I placed the triplex round in the launcher.

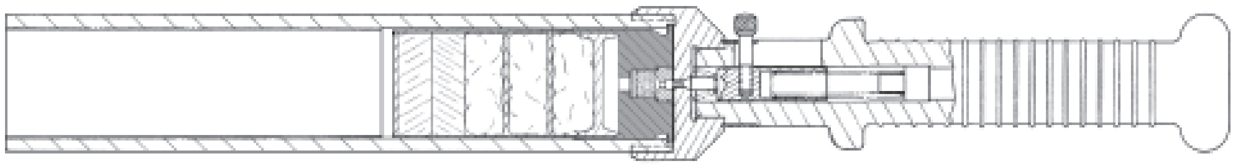


Fig. 28–97. 40mm threaded launcher loaded with triplex Stun-Bag cartridge. MBA drawings.

An early MBA Stun-Stik is described and pictured on page 268, and MBA engineer Paul Clark, a recent and major contributor to this supplement, is pictured with Mainhardt in Figure 18–9 on page 257 testing 40mm Stun-Bag cartridges in an M79 grenade launcher. Clark provided the photograph below of himself with an MBA 40mm Stun-Stik. He was very involved with MBA's less-lethal program.

Fig. 28–98. MBA engineer Paul Clark testing an early Stinger-Stik less-lethal launcher. MBA photo.

Clark confirmed my earlier suspicion that Mainhardt had the Stun-Stik's barrel covered with wood-grain plastic drawer-lining material to simulate a wood billy club, thereby making it more attractive to guards.

Clark also provided the photo below of a Berkeley, California, policeman who was slightly but painfully injured on his upper left arm during a demonstration by MBA personnel, including Mainhardt and Clark, of the Stun-Gun. Clark had fired the weapon many times and was quite proficient with it. He planned to fire a Stun-Bag at the torso of the volunteer officer who was wearing a protective vest and helmet with face shield. However, Mainhardt intervened out of concern of possible MBA liability if something went wrong during the firing demonstration with a live, human target. Clark was replaced as the shooter by an inexperienced policeman who had never fired the device. His first shot missed his fellow officer completely; but his second shot struck the volunteer on his arm, causing great pain but no permanent injury.

Fig. 28–99. Slightly injured Berkeley policeman. Paul Clark photo.

Chapter 21. .38 Special Short Stop Ammunition

An article titled "Short-Range Ammunition—A Possible Anti-Hijacking Device" by J.E. Smialek, M.D. and W.U. Spitz, M.D. was published in the October 1976 *Journal of Forensic Science*. The authors described and pictured MBA Short Stop ammunition and they reported the results of scientific testing of the cartridges against a donated cadaver, simulated airliner fuselage, and simulated windows.

The object of the testing was to determine whether the Short Stop was effective in achieving its stated purpose. Testing resulted in the following:

— During test firing on cadavers, the projectile [bean bag] never exited from the body, regardless of range of fire, supporting the manufacturer's claim of this safety factor.

— The ammunition [final production version with red roundnose sabot] was reasonably accurate at ranges of 50 feet. It was capable of hitting a 3-foot square target at this range.

— At ranges up to 15 feet with a clothed person, evidence of substantial injury was noted. However, at ranges of 25 feet, only superficial wounds were noted.

— At ranges up to 10 feet, the ammunition produced wounds likely to be fatal in real situations.

— At ranges up to and including 6 feet, the ammunition perforated the full thickness of a simulated wall of a large commercial airliner. At the same distance, the ammunition produced a 0.75-inch hole in a Plexiglas® window of the same thickness as that used in commercial airliners.

As a result of their testing, the authors concluded that "Short-range ammunition deserves serious consideration as an alternative to regular ammunition for use in specialized, close-quartered situations, such as hijacking."

They also noted that "Short-range ammunition was currently [1974] being used by certain units of the U.S. Air Force.

Chapter 22. Gas-Powered Less-Lethal

On page 316, I made the statement that even though an MBA less-lethal catalog pictured a Prowlette with a Lexan barrel, stock number 1200, I had never seen or heard of such a specimen. All known (by me) Prowlettes until now had aluminum barrels. However, a new-condition Prowlette with a Lexan barrel has since been acquired, so that little issue has been resolved. The barrel has several raised ridges molded in at its rear to assist in screwing it on and off of the breech and firing mechanism.

Fig. 28–100. MBA Prowlette with Lexan, not aluminum, barrel.

Chapter 23. MBA at the Movies

On December 20, 1966, Columbia Pictures released its latest James Bond 007 spoof spy movie, *Murderers' Row*, starring Dean Martin as Matt Helm, secret agent, out to save the world from the evil Karl Malden. From our perspective, the star of the movie is an MBA Mark I Model B 13mm survival pistol, serial number B5121S, although it is hard to overlook Martin's co-star, Ann-Margret, who, strapped to a wall, is the supposed target of Malden's shooting, as shown in Figure 28–101 below.

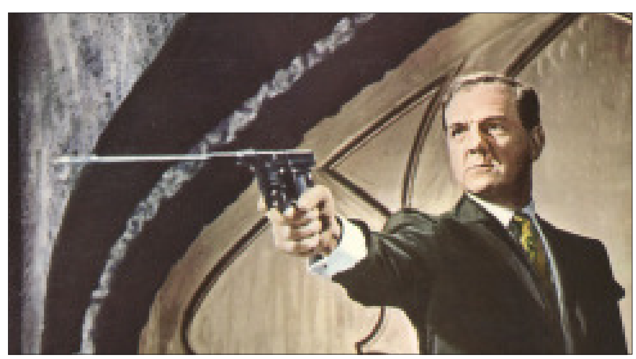


Fig. 28–101. Karl Malden with an MBA 13mm survival pistol.

This MBA survival pistol first came to my attention when it was pictured on page 41 of the June, 2010 issue of *The American Rifleman* magazine as one of a group of firearms that had been used in movies, which were on display in the NRA's National Firearms Museum. A call to Doug Wicklund, Senior Curator, got me the pistol's serial number and the fact that it was on loan to the museum from a California firm that provided firearms to movie producers.

The gray-finished movie pistol is just eight numbers from my B5113S, shown with its spear cartridge adapter in Figure 27-36 on page 430. The film's release date of December 20, 1966, works well with the Mark I Model B's release date earlier in 1966. MBA's survival pistol, with its dangerous-looking long spear, would be an obvious choice for the spy movie.

The movie also featured Matt Helm firing a 3mm Finjet from a cigarette into the neck of a secret facility guard in a scene very similar to the 007 movie "You Only Live Twice" scene where James Bond uses a similar tactic against an enemy soldier.

Chapter 24. Miscellaneous MBA Ordnance

36mm RR-129 Chaff Cartridge

One of MBA's most profitable types of ordnance was radar chaff, and it was primarily this product line that Tracor, Inc. wanted as it acquired MBA in 1980. MBA chaff rockets are shown and described in detail by caliber in prior chapters, and an example of a different type of cartridge used to deploy chaff from aircraft was recently discovered in a group of MBA material. It is an RR (Radar Reflective)-129 chaff round designed for use in the ALE-29A chaff dispenser. It contains three different lengths of dipoles (small hairlike fibers of material that reflects radar energy) for S, C, and X band radar. There are a total of 3,750,000 (± 10 percent) dipoles in the case. The cartridge has a diameter of 36mm (1.4 inches), a rim diameter of 37.8mm (1.5 inches), and a length of 148.6mm (5.8 inches). The case is made of transparent polyethylene. The blue topwad is made of hard plastic, as is the base with propellant charge cup.

The cartridge uses an electric CCU-41/B (or equivalent) impulse cartridge to push the chaff payload out into the airstream. It is shown at actual size to the right in Figure 28–102.

Fig. 28–102. MBA RR-129 chaff round with CCU-41B impulse cartridge. Actual size.

Another MBA cartridge with the same dimensions as the RR-129; 1.43-inch (36.3mm) body diameter, 1.48-inch (37.7) rim diameter, and 5.8-inch (147.5mm) length not including the two electrical contacts from the CCU-41 impulse cartridge) is shown next in Figure 28–103. It weighs 16 ounces (454 grams), while the RR-129 weighs just 7.5 ounces (213 grams). The cartridge has a stainless steel case. Its electric contacts are brass instead of the CCU-41's steel ones. Except for the roughly engraved number 11 on its base, it is unmarked. Its use and payload are unknown as it awaits X-ray, but it is not a chaff round.

Fig. 28–103. MBA unknown electric initiated round with RR-129 dimensions. Actual size.

Because of its weight, the cartridge might have a payload of steel flechettes, metal Finjets, or Lancejets for salvo-firing from any of a number of aircraft-mounted chaff/infrared flare dispensers such as the AN/ALE-24, which has a capacity of 30 RR-129 chaff rounds, the AN/ALE-44, or the AN/ALE-29, which also has a 30-round capacity.

MBA had a long history of aircraft salvo-fired devices for its Finjets and Lancejets and it does not seem unreasonable to consider that this unknown might be one of them.

MBA M42/M46 Grenades

In May 1977 MBA contracted with the U.S. Army to develop improved methods for the mass production of small M42/M46 grenade bodies. The contract, DAAK10-77-C-0051, was for $141,344 ($503,185 in 2010 dollars). A follow-on contract, DAAK10-77-C-0092, in September 1977 was for $516,000 ($1,836,960 in 2010 dollars).

The small antipersonnel/anti-light-material (M42) and anti-light-material only (M46) grenades had 1.5-inch diameters and overall lengths of 3.2 inches. With projected production rates of 20 million per month, potential savings realized from improved methods for their manufacture were significant. The grenades were delivered by 155mm and 8-inch guns. Introduced in 1961, they were successfully used by the U.S. in Vietnam and by the Israelis in the Sinai Peninsula against Egypt. They are loaded with shaped-charge explosives, as seen in Figure 28–104 below.

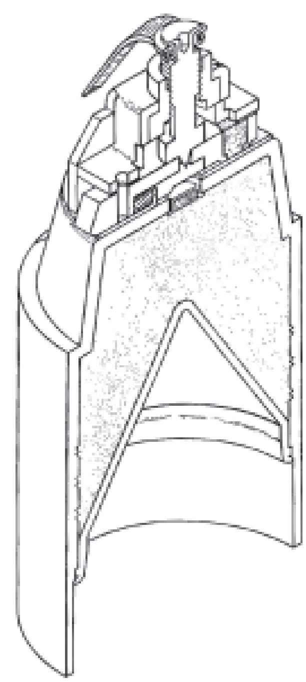


Fig. 28–104. M42/M46 grenade, approximate actual size.

The antipersonnel M42 body has a prefragmentation pattern engraved inside, while the M46 has a smooth inside wall for greater strength. My experimental/prototype specimen has prefragmented copper bands.

In 1977 the Army asked industry to propose completely new, highly-automated methods of manufacturing the grenades. Four contracts were awarded to MBAssociates, Gulf & Western (E.W. Bliss Division), Daron, and Avco. The Army selected four contractors because the program was so important. MBA's first contract was to identify the most cost-effective method of making samples of 100 each M42 and M46, and in April, 1978, MBA successfully produced 100 each of them.

Prior to 1978, the grenade had been made from flat sheet stock using special spheridized 4140 steel of deep-draw quality, and were costly to manufacture at $1.00 to $1.25 each. MBA used less-strategic 1040 steel and different forming methods to reduce the unit cost to 40 cents to 50 cents. Because the 155mm shell carried 88 grenades, and the 8-inch shell used 198 of them, MBA's improved methods resulted in significant savings. The Army could manufacture 2,000 shells per week.

Army Technical Report ARFSD-TR-86004 described the new MBA manufacturing process as follows: "*Tracor-MBA Associates. Two-piece design. A steel rod was to cut into slugs, then warm 'backward extruded' into cups. The open portion of the cup was to be flared into a cone shape. The pattern [prefragmentation] was then to be pressed into the cone portion and the cone returned to a cylindrical shape by pushing through a closing die. The closed end of the cup was to be punched out and warm forged into a cap configuration, then copper brazed to the cylinder.*"

The report added that: *"Tracor-MBA demonstrated that an extruded grenade body could be produced meeting all the dimensional and strength requirements."*

Because of MBA's success in the improved manufacture of the grenade bodies, the company received follow-on contracts, one of which was to develop a machine that prepared a small, parachute-like device to be hooked to the individual grenades to arm them after they were expelled from the artillery shell.

Another contract was for MBA to develop an automatic machine to pack the grenades in rings so they could be loaded into the 155mm shells. After Tracor, Inc. acquired MBA in 1980, the company continued work on the project through the 1980s.

Fig. 28–105. MBA M42 grenade partial draw set.

The large rocket shown to the far right is a Tractorjet with a payload consisting of what appears to be a large piece of orange plastic designed to be a marker of some sort. It is live and has a 4-port steel Tractorjet to pull its stainless steel payload section out of a launch tube. The inside of the payload section has a spool of very strong, thin wire, the end of which would be secured to a stationary object, perhaps the Tractorjet's firing mechanism. As the rocket flew out, the wire would pay out and when it was fully extended, it would abruptly yank out the payload, splitting apart the 2-piece payload container in the process. The device has a body diameter of 1.64 inches (42mm) and a length of 12.2 inches (310mm). The Tractorjet motor has a diameter of 1.5 inches (38mm) and has a small unfired primer in its nose. Similar devices are shown on pages 379 and 380 in Figures 26–20 and 26–21. A tag attached labeled it as a "*40mm Panel Rocket, motor deflector missing. MRS. J. Vindum.*"

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One of the reasons the MBA 40mm Stun-Bag system was not adopted by the military was the requirement to have up to 11 different cartridge loadings readily available in fast-changing tactical situations. These are shown in an MBA table in Figure 18–17 on page 262, and range from Close Range to Super Long Range to CN/CS Gas.

To overcome this problem, MBA developed a "Graded Lethality Weapon" as described in MB-P-71/84, dated September 10, 1971. The design was a modification to the M79 grenade launcher which allowed a single Stun-Bag round to be effective at different ranges by bleeding varying amounts of gas from the launcher's barrel. In use, the shooter would first estimate the range to the target and then turn a thumb wheel to align its mark with a fixed distance scale. This action adjusted the rear sight to the desired range and opened ports to bleed gas, thereby controlling velocity and range.

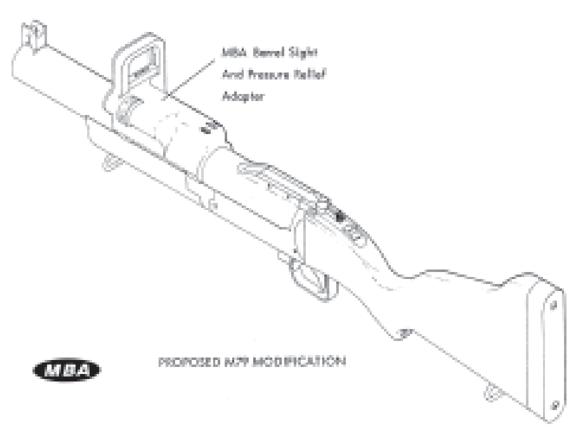

Fig. 28–106. 40mm Graded Lethality Weapon. MBA drawing.

Fig. 28–107. 38mm Tractorjet with 42mm payload. 70% .

I noted several times in earlier chapters that Mainhardt was very reluctant to ever throw anything away that could possibly be of later use. He also worked hard to devise different ways to use existing products, in this case, dummy Gyrojet rockets to be used as jewelry. I have not seen any actual examples of the jewelry, but I am not surprised that Mainhardt would have found one more use for his Gyrojets.

Fig. 28–108. Robert Mainhardt jewelry made with dummy Gyrojets. Mainhardt photos.

Chapter 25. Foreign "Gyrojets"

The provenance of rare and expensive collectibles is an extremely important thing, especially when dealing with items known to have been faked. I therefore spend a lot of time researching the specimens in my collection which I show and discuss in this book.

I explained on page 340 how I came to acquire an example of the WW II German S-Patrone 9mm rocket shown in Figure 25–4 and its provenance from Colonel George B. Jarrett to Valmore (Val) J. Forgett who later consigned it to a cartridge dealer, who in turn sold it to me. What I did not explain, because I did not know at the time, was how Forgett got the rocket from Jarrett. Now, thanks to an article in the January 2012 *Small Arms Review*, we know that Forgett worked at Jarrett's Aberdeen Ordnance Museum following WW II. Forgett is quoted, in part: *"Col. Jarrett...was not only my Commanding Officer, but a close, personal friend for many years..."* That explains the connection between Forgett and Jarrett, and it is not hard to understand how Jarrett would have shared things of interest with Forgett over their years of friendship.

On page 344, while discussing the U.S. Navy's experimentation with the German 9mm rocket (Figure 25–6), I mentioned that Naval Ordnance Test Station (NOTS) staff engineer Donald Stoehr, who confirmed during a phone interview that he initiated the experiments, had acquired one of the German rockets from Fred A. Datig, who he knew as a cartridge collector and writer. In September 2010 I wrote to Datig and in his reply, he informed me that he had given a rocket to Stoehr and that Stoehr in return had given him a couple of the Navy rockets in appreciation of his help.

Because Datig lived in Palm Springs, California, at the time, and because I acquired my Navy rocket from the estate of a major California collector, I asked Datig whether the collector acquired his rocket from him. Datig replied: "Probably. That was over 50 years ago!" But like Mainhardt so often did, Datig remembered. The *Small Arms Review* article also discussed Datig's employment at the Aberdeen Ordnance Museum in 1949 where he was in daily contact with Jarrett. Datig confirmed that he had received his rocket from Jarrett and that it was with Jarrett's encouragement that he launched his classic works on Russian arms.

— End of Chapter —