BLACKSTAR BORE TREATMENT AND THE THREAT TO FIREARMS EXAMINERS

By: Sergeants Mark A. Keisler and James Fazio, Firearms Examiners, Indiana State Police

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ABSTRACT

A recent magazine article advised of a new procedure that removed most imperfections from the barrel of a firearm, therefore eliminating a large amount of identifying marks from the bullet. What was this procedure and was it possible?

INTRODUCTION

Sergeant Jim Fazio, a Firearms and Toolmark Examiner assigned to our Fort Wayne Laboratory recently telephoned me and brought to my attention, a recent article in the July 1996 issue of the *American Rifleman* titled "Blackstar Bore Treatments", by Finn Aagaard [1]. This article concerned an electropolishing technique that smoothes the bore of a firearm so much that "...the end result is a smooth, microscopically featureless surface". Of course as Firearms Examiners this concerned us greatly. Was it possible that this polished bore would render a bullet "featureless" when it left the muzzle of a firearm? Intellectually, we did not think so, but we definitely were up to some stimulating research.

We began by moving the mountain known as State government, convincing the powers-to-be to fund our project. Since the powers-to-be consisted of three firearms examiners (now supervisors) this task was not all that difficult. Choosing the firearms to send was another matter. We decided that we would send Blackstar two of our pistols from our reference collection; one brand new and one which had been around for awhile. They will be described in detail later.

THE ELECTROPOLISHING PROCESS

As is the experience of all firearms examiners, it is known that lapping the barrel of a firearm with a fine abrasive does not remove the microscopic marks used for comparison. Lapping may smooth the barrel, but microscopically, striated marks remain and may be sufficient for comparison. Electropolishing on the other hand, utilizes direct current and an electrolyte solution which removes metal from the barrel of a firearm ion by ion. Mike Montgomery of Blackstar advised us that this procedure is an art, demands a great amount of skill, and is somewhat of a trade secret.

FIREARMS TESTED

As previously stated, we selected two semi-automatic pistols from our firearms reference collection; one very old, and the other fired only once by me (this, of course, does not include any testing after production prior to sale).

Firearm 1-Ruger 9mm, model P89DC semi-automatic pistol (seized from a convicted drug dealer and submitted to the firearms reference collection wrapped in plastic, still in the box) See photograph 1.

Firearm 2-Colt .45 caliber, "Model of 1911 U.S. Army" semi-automatic pistol (in researching the serial number, Colt advised that the pistol was manufactured sometime in 1913) See photograph 2.

We selected these two particular firearms for two primary reasons: (1) We wanted to see if this electropolishing process affected the bores differently depending upon age and condition, and (2) Sergeant

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Fazio wanted an opportunity to fire the old 1911 (according to him the "finest pistol ever produced").

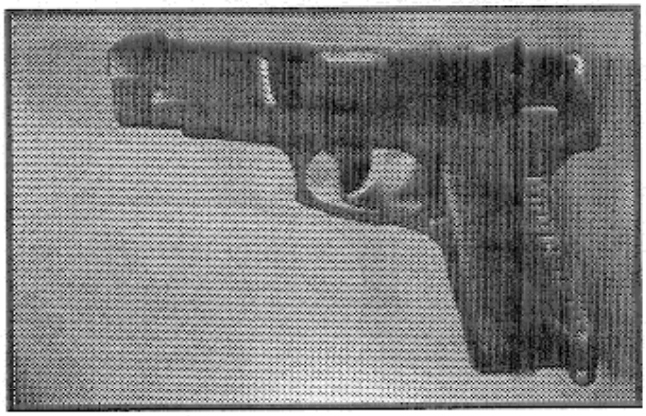

Photo 1

TESTING PRIOR TO TREATMENT

For comparison purposes we selected 9mm American Eagle (Federal) 124 grain round nose and .45 caliber Winchester 230 grain round nose ammunition. It was decided that each firearm would be fired 15 times, and we would attempt to compare test shot #1 to #15 for each firearm. Comparisons were accomplished with very little difficulty for both firearms (See Photograph 3 for Ruger results and Photograph 4 for Colt results).

BLACKSTAR MEASUREMENTS AND COMMENTS

Both barrels were removed from the firearms and sent to Blackstar for electropolishing (funding was available for processing the barrels but not for flying me to Houston for a couple of days). Officials at Blackstar reported that the Ruger bore was "...very nice, with some roughness at the throat. Its land diameter was .3464", +/-.0001" and the groove diameter was .3545", somewhat tight for a 9mm". After the electropolishing process, the land diameter was increased to .3472", tapering to .3468", and the groove diameter was increased to .3552", tapering to .3548". Officials at Blackstar were not all that happy to see the Colt barrel. They reported that, "...the .45 barrel was rather heavily pitted from the beginning; in fact, had this been sent in from a regular customer, we would not have polished it. Heavily cracked or pitted barrels tend to get worse during the polishing process, because these imperfections have a much larger surface area to be worked than a barrel whose bore surface is relatively smooth from the outset. In other words, the pits will become larger. They'll be smooth pits, but pits nonetheless". They reported the land diameter before polishing as .4431" and the groove diameter as .4513" (both +/- .0001"). After polishing, the land diameter was reported as .4439", tapering to .4434", and the groove diameter was .4521", tapering to .4516", again +/- .0001". Blackstar believes and provided literature which supports these beliefs that a tapered bore improves accuracy and velocity. Blackstar reported that "...a tapered bore improves accuracy primarily by transforming the bullet into a self-governing "check-valve", ensuring a positive gas seal with minimum distortion, and...it is a bonafide linear taper, not just a sudden choke at the muzzle end.".

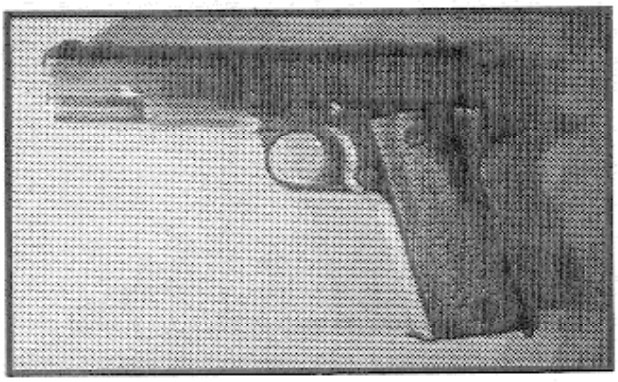

Photo 2

TESTING AFTER TREATMENT

We hoped that once the barrels were polished the examination process would be quick and easy and we would be able to have some definitive answers for the membership. Of course, that was not the case. Blackstar will be happy to know that their procedure does appear to smooth the barrel considerably, but still leaves a substantial amount of imperfections which makes the identification of bullets possible.

As far as the Ruger was concerned, we had absolutely no problem matching shot #1 to shot #15 once the barrel was polished (photograph #5). There

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was a substantial amount of striae visible and identification was readily apparent. We then attempted to match test fires from before and after the polishing procedure

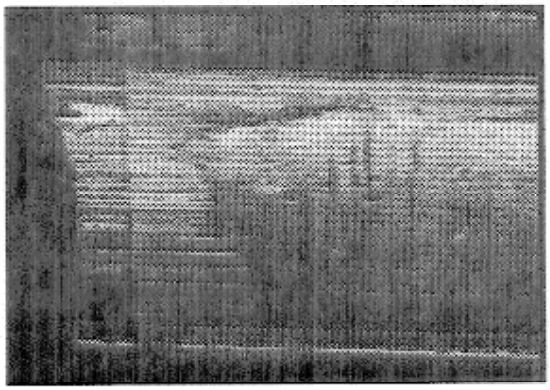

Photo 3

and found this to be very difficult. In fact it was not possible. Class characteristics were similar, however, individual characteristics were just not reproducing. There were some gross striae matches, but they were inconsistent and far from any type of positive ID, even with the knowledge that we ***knew*** the bullets came from the same firearm.

The Colt was the harder of the two, and we contributed this to the bore being slightly oversized. We had great difficulty matching shot #1 to shot #15 after polishing. In fact, several of the comparisons that we

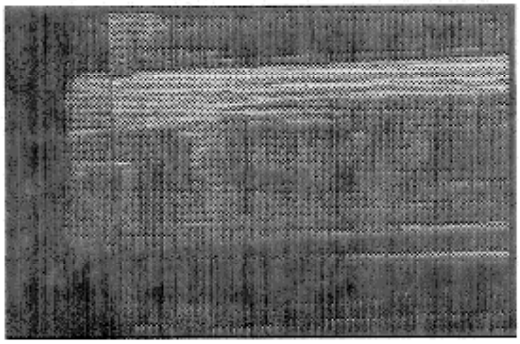

Photo 4

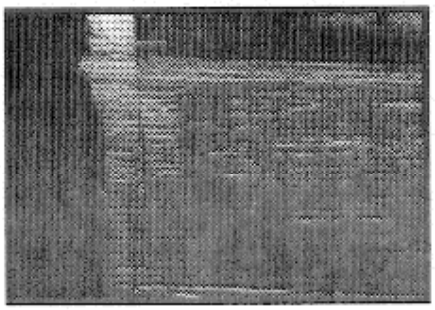

Photo 5

attempted were very difficult and had us pulling out what little hair remains. We were only able to identify about half of the "after polished" test fires to each other with relative ease (photograph #6). The others had a very smooth appearance and were unidentifiable to the others. When comparisons were made of test fires before and after polishing we found no matchable striae. Similar class characteristics were visible, and that was it! No individual striated marks were matched and if we didn't know better we would have thought they came from different firearms.

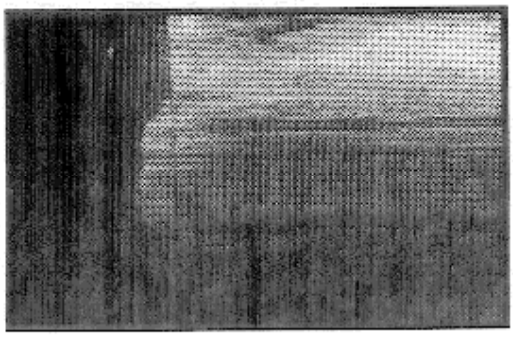

Photo 6

CONCLUSION

The Blackstar Bore treatment is a very good procedure and does exactly what it is marketed to do; it polishes a barrel. Polishing a barrel to remove some of the imperfections helps with accuracy and increases velocity. Does it hinder identification for a firearms examiner? We do not believe so. Though it definitely smoothes a barrel, microscopic imperfections are still visible which makes identification possible.

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The problem a firearms examiner would encounter is if the perpetrator had an opportunity to have the barrel polished between the time he/she shot someone until the time it was seized and later examined. It would be very difficult to make an identification if this occurred, however, we see this as not a likely option for most individuals.

ACKNOWLEDGMENTS

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FOOTNOTE

(1) Aagaard, Finn, "Blackstar Bore Treatments", American Rifleman, July 1996, pp.28-29.