

**“Rifling Machines and Methods”  
By Clifford F. LaBounty**

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“Rifling Machines and Methods”  
by Clifford F. LaBounty  
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The importance of understanding the processes of making a firearm should not be lost on any forensic firearm examiner. The operations used to make a rifled barrel are particularly critical because of the scientific and legal significance of a conclusion that a bullet, which caused injury or the death of an individual, was “matched” to a firearm that is linked to a suspect. When making this comparison, the examiner must find sufficient corresponding, unique or “individual” characteristics to justify a conclusion of identification. The selection of characteristics used, and the determination that these corresponding characteristics observed on an evidence bullet and on test fired bullets are unique, is directly related to the processes that shaped and finished the bore, the rifling, and other surfaces that mark fired bullets. Thus we study the processes, we find and examine gun barrels and investigate barrel manufacture and then carefully evaluate those critical surfaces during comparison. To develop expertise, we scrutinize technical forensic literature, historical accounts, and study firearm manufacture. We make pests of ourselves visiting firearm manufacturing facilities and spend time studying collections of barrels rifled by a variety of methods. We end up learning a lot about barrel manufacture.

Or so I thought until I began reading “Rifling Machines and Methods” by Clifford F. LaBounty. Though this book is not written for the firearm examiner, and is it not a casual read, it is loaded with valuable information that will be helpful to any firearm examiner striving to fully understand rifling. This book is written for the barrel maker or for someone wanting to build a rifler. LaBounty is the retired owner of LaBounty Precision Reboring, Inc. After selling the business to Jim Dubell of Clearwater Reboring in 2005, he decided to “take a few weeks to write a book about rifling.” The result is “Rifling Machines and Methods.” After the few weeks turned into six

years of false starts and research, it is now available. Prior to spending nearly 30 years in the reboring and re-rifling business, he taught Industrial Arts in Seattle, and Mukilteo, Washington. He also spent a number of years as a machinist and millwright. The information in his book reflects the knowledge and experience of having built six rifling machines over that 30 year period, - one manually-operated hand powered, two hydraulic and three CNC (computer numerical control) rifling machines. He currently works as a consultant to start-up rifling companies.

This 168-page, well-illustrated book has chapters on gun drilling, reaming and lapping. Its main focus, however, is on barrel rifling. Not a book for the neophyte, the book begins with a very brief review of cut rifling techniques, including hook cutters, scrape cutters, and broaches. The author also describes button swaging, ECM (electrochemical “milling”) or ECR (electrochemical rifling), and hammer and rotary forging. To these methods, he adds “saw cutters” (you heard me right – saw cutters) and describes “the draw bench” method of rifling that resulted in 22-foot long, 32 caliber rifled tubes. Since this 22 foot tube was intended to be cut into short pistol or revolver barrels, it would have presented interesting forensic concerns if the tubes had been used.

There is also a brief, but very intriguing, discussion of rifling variations such as: gain twist, paradox rifling, reverse paradox rifling, Lancaster oval bore rifling, parabolic rifling, as well as rifling with decreasing groove depth, changing groove width, and tapered bores.

In addition to presenting a good survey of barrel rifling techniques, the book is engaging and significant in several other ways. The book made me aware of the sizable cottage industry of custom barrel making, barrels being made by hobbyists, and barrel reboring. I had been unaware of the number of people who wanted to build a gun, including rifling their own barrel. The book also points out how common reboring is. Reboring refers to the process of rehabilitating a firearm with a damaged, worn, or shot-out barrel by reaming or drilling the barrel to a new caliber, rifling and re-chambering, thus salvaging and restoring an otherwise unusable firearm.

The book is informative in another way. Having been written by a longtime and very experienced barrel maker, it provides great insight into the thought processes, considerations, and problems with which a barrel maker must deal. A reader of this book visiting a firearm factory will have a far better understanding of the thought, the trial and error, the clever engineering, and metal forming involved. Many of us have watched equipment with a carriage or broach reciprocating, with parts rotating, the various actions being coordinated by cams, toggles, and gears, and have struggled to understand

exactly what was happening. I am certain that a tour of the firearm factory, preceded by a careful reading of this book, would be far more valuable.

A significant part of the book is devoted to hook cutter rifling machines, of which there are several types. From hand-pulled riflers to hydraulically driven machines, there is excellent detail on a number of sine bar rifling machines and leader bar rifling machines with numerous photographs. Chapter 9, "Rifling Heads," provides details for making and sharpening various rifling heads including the scrape, the hook, and the saw cutters. The geometry of the cutters, which is not as simple as one might expect, is presented in detail with interesting historical references as well.

Chapter 10, "Button Rifling," includes an account of the development of button rifling and as well as detailed information on advantages and disadvantages of lubricants used with this process. The author provides information to explain how the force developed by a hydraulic press varies as a function of a

hydraulic cylinder pressure and diameter (area) of the piston. The final chapter, "The Pope Addendum," was written by Dave Arawinko, a machinist and a tool and die maker, who works and teaches in the Engineering Department of the University of Wisconsin. He provides an in-depth, somewhat mathematical look at the rifling and rifler used by the famous barrel maker, Harry Pope.

While this book was not intended for the forensic firearm examiner, it contains a great deal of information that is significant to the examiner. It sheds light on some of the issues and concerns with subclass and may provide possible explanations when we encounter general rifling characteristics (GRC) not found in the usual GRC databases. This book will be an excellent addition to the libraries of forensic firearm examination laboratories. It will be useful to trainees and should be particularly interesting to firearm examiners who are researching potential barrel subclass. More information and the book are available directly from the LaBounty Precision Reboring, Inc. website at <http://riflingmachinemethods.com/>.