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Early English Firearms: A Re-examination of the Evidence

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EARLY ENGLISH FIREARMS:
A RE-EXAMINATION OF THE EVIDENCE

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APPROVAL SHEET

This thesis is submitted in partial fulfillment of

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DEDICATION

To my British parents Edwyn and Ruth Hardy who are amused and pleased that their American-born daughter should be digging up and studying the material remains of her English forebears.

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PREFACE

This study is the outgrowth of a project which I began in 1987 for Colonial National Historical Park to catalog the artifactual material excavated on Jamestown Island between the early 1930's and late 1950's. Established in 1607, Jamestown is the site of the earliest permanent English settlement in North America, and the objects recovered from these grounds reflect the range of materials produced and traded throughout Europe in the seventeenth century.

A substantial number of early gunlock parts are contained in the Jamestown Collection, including all of the major ignition systems in use in the seventeenth century: wheel-locks, miquelet locks, snaphaunces, matchlocks, English-locks, and flintlocks. Once I started cataloging the firearms assemblage I noticed that many parts previously had been misinterpreted providing a false picture of the type of weaponry in use. This is especially true of snaphaunces, most of which are represented by nothing more than lockplates which had formerly been recorded as wheel-locks. The classification errors of the Jamestown locks led Harold Peterson to state in his much read and cited Arms and Armor of Colonial America " . . . there are (at Jamestown) fewer remnants of snaphaunces than any other firearm used in colonial America" (Peterson 1965:27).

To the contrary, my cataloging project revealed that there are more fragments of snaphaunce firearms at Jamestown than any other type. (These artifacts are enumerated in Appendix A.) The role of the snaphaunce in the seventeenth century has been understated and misrepresented as a result of this type of misinformation finding its way into the literature. These inaccurate data are used repeatedly by scholars in the field of English firearms as evidence to build the history and development of ignition systems during the seventeenth century. Not only are these researchers working on assumptions about the archaeological record that are incorrect, but they often substantiate their evidence using extant museum examples which, in many cases have lost historical context. This has resulted in as many typologies as there are researchers and a confusing dating sequence for the appearance of these early arms.

My insights during this study of firearms have been aided by the fact that I started by analyzing archaeological examples which, by their nature, are unconsciously-preserved links to the past. While they may reflect the "repairs,

renewals, or conversions naturally found on weapons that have been in continual service over a long period during which various systems of lock have been introduced" (Jackson and Whitelaw:77), the archaeologically-retrieved gun parts have not been deliberately altered to deceive the collector or to enhance their worth.

Firearms that have survived in museum collections usually owe that survival to the fact that they are atypical in some way. Uncommon arms can be exquisite works of art constructed for a king or "state of the art" fowling pieces designed for wealthy recreational huntsmen. Or they can be just the opposite -- groups of weapons stored away on dusty shelves, considered unworthy of refurbishing or modernization and enduring from their perceived insignificance; but, usually, these "worn-out and obsolete guns were like old shoes thrown away" (Mayer: 5).

The value of archaeology as a source to an unbiased view to the past has been largely overlooked by firearms historians and collectors. It is hoped that this study may reawaken an appreciation of the untapped information residing in the rows of shelves and cabinets full of artifacts which are being maintained by federal and state agencies, historical societies, and preservation groups. Use of these resources helps justify the costs of their storage and curation and thereby guarantees their survival. A result all who are interested in material culture of the past should applaud.

ACKNOWLEDGMENTS

I am grateful to the following persons who assisted me in my research and helped make this thesis possible:

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to Eastern National Parks and Recreation and the American Society of Arms Collectors for research grants that enabled the necessary travel to New England and England;

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> "The archaeologist and connoisseur is born, not made. The most competent judge of the antique is he who, born with the gift of discrimination, has cultivated it, not only by the study of books and photographs, but, most necessary of all, by the careful study of the actual objects" (Jackson and Whitelaw:77).

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ABSTRACT

Four major ignition systems are found on firearms in the beginning of the seventeenth century: the matchlock, the miquelet lock, the wheel-lock, and the snaphaunce. This study focusses on the snaphaunce and the subsequent type of flint-and-steel gunlock believed to be inherently English and thereby known as the English-lock.

There are very few extant snaphaunces in museum and private collections; therefore, the study of these arms has not received the attention of the more common English-lock. Researchers acknowledge the constructional similarities between these two types of gunlocks; accordingly, a clearer understanding of the snaphaunce should provide insights regarding the flint-ignition firearms that supplanted it.

To this end, an intact unmodified snaphaunce with verifiable date and provenance is disassembled and thoroughly analyzed. The findings are then used as the standard by which to observe similarities and differences in both archaeological gunlocks with historical contexts and some of the museum-owned firearms studied in the literature.

The results suggest that many of the English-locks dated to the first quarter of the seventeenth century are, in reality, converted snaphaunces. These unrecognized conversions have distorted the dating sequence of these early arms. None of the evidence examined, including seventeenth-century English military manuals, provides a pre-1650 date for the first appearance of the English-lock. These findings mandate a re-evaluation of the current typologies of early English firearms and a reassessment of the chronological development of these types.

EARLY ENGLISH FIREARMS:

A RE-EXAMINATION OF THE EVIDENCE

INTRODUCTION

Sometimes in the course of material culture research an unsubstantiated "fact" or misinterpretation is recorded which becomes accepted as the truth. It fossilizes as subsequent researchers use it to interpret their data and as it becomes part of the foundation of knowledge used to build the history of the subject under study. This "house of cards" appears stable to the builders since their preconceptions color their interpretations of the documentary sources and any aberrations are rationalized. For these researchers, it no longer seems necessary to re-examine the primary evidence for flaws because everything seems to fit.

Such is the case in the history and development of early English firearms. The few extant examples attributed to pre-1650 are used repeatedly in the literature as typological benchmarks against which newly-discovered weapons or excavated gunlock parts are measured. In many instances, the contextual data of the latter do not agree with the established chronology, but explanations, historically, have not been sought within the typology.

Albeit, there are problems with studying firearms. These mechanisms are constructed of multiple components which can be

disassembled, reassembled, replaced, and reproduced. Parts, such as barrels, are transferrable from one gun to another, and if the firearms are not taken apart by the researcher these modifications may be undetected. Alterations or conversions may be executed purposefully in modern times to enhance the value of the firearm, or they may reflect the natural result of many years of service and value to the user. Either way, these changes, if undiscovered, may contaminate evidence upon which the typological sequence is built.

This study is a re-examination of the primary data used to construct the development of the gunlock type popular in seventeenth-century England known as the English-lock. In the first chapter, I will define the nomenclature that is used throughout the thesis. This section is necessitated by the unstandardized terminology currently employed by firearms researchers which often makes comparison of data difficult.

Next, to provide the necessary background information for understanding the analysis to follow, I will discuss the flintlock, English-lock, and snaphaunce as constructionally-related flint-and-steel ignition systems. These gunlock types are defined as evolutionary developments out of the wheel-lock tradition, and the earliest of these types, the snaphaunce, is studied in detail for a clearer understanding of the mechanisms that follow. An intact, unmodified snaphaunce with verifiable provenance is disassembled and thoroughly analyzed. The findings from this analysis are applied as the standard by

which to judge the accuracy of current chronologies and typologies of related firearms.

Finally, I will re-evaluate the evidence which has been extended to establish the English-lock as a product of the first half of the seventeenth century. Contemporary military manuals are examined as well as English-lock guns and gun parts in museum and archaeological collections in both England and America. The results indicate that, contrary to current opinion, there is no undeniable proof that the English-lock was manufactured prior to 1650. My findings suggest that the early seventeenth-century date for this lock type has been based on questionable historical data and unrecognized lock conversions.

Chapter 1

NOMENCLATURE OF GUNLOCK ELEMENTS

Ideally, firearms and the elements that comprise them should be described in emic terminology, i.e., the expressions that would make the most sense to those who originally used and made the guns. Emic terms, if discernable, have an advantage over terminology which has been imposed upon the objects from a modern perspective. Even though the meaning of the latter may be quite clear to the researcher, modern terminology does not necessarily reflect the subtle distinctions that may have been historically significant and that could be conveyed in the documentary sources. "The use of the most archaic terms available has the theoretical advantage of leading to a better understanding of original terminology found in archival material" (Puype:7).

The problem with using emic terminology to describe early seventeenth-century English firearms is that many of the same labels were applied without discrimination to different types of mechanisms. The opposite was also true whereby the same element was referred to by a number of different names. The term *firelock*, for instance, is found in the records referring to wheel-locks as well as to flintlocks (Blair 1983:64;

Tarrasuk and Blair: 183; Blackmore 1961: 22), and the part known by modern terminology as a *frizzen* has historical reference as a hammer, steel, or battery (Howard:96). To add further confusion, the words *snaphaunce* and *flintlock* are used synonymously in historical documents "for any type of lock that operated by striking a flint against a steel, whatever the precise details of its mechanism" (Blair 1983:67).

Even when the historical terminology can be determined, problems may arise with its application in current firearm studies. Often the historical terms have come to assume meanings differing from their original usage. This inconsistency causes confusion and necessitates either a lengthy description of terms preceding every study or the creation of a new nomenclature. For instance, the term *hammer* is not commonly used today to refer to the steel despite the fact that seventeenth-century sources consistently name the two main working parts of the firearm as the *cock* and the *hammer* (Blackmore 1980a:47-56). *Hammer* has been dropped from the lexicon in modern studies of flint firearms because, with the introduction of the percussion system in the early 19th century, the cock began to be referred to as the hammer. By extension, this term was applied to the cock of the flintlock as well (Mayer 1943; Glendenning 1951). To avoid confusion, firearms historians in America accepted a new term *frizzen* for this part, and it began appearing in colloquial literature on both sides of the Atlantic (Blackmore 1980a:52).

Modern terminology has not solved the problem either, however, and firearms researchers are still not in agreement on what term to use for this element of the "improved lock." *Hammer*, *steel*, *battery*, *frizzen*, *frizzle*, and *hen* have all appeared in the literature with no established terminological distinction made between this part on the snaphaunce and the functionally similar, but differently shaped, L-shaped component of the English-lock and flintlock.

Another modern term, 'dog-lock,' has been especially confusing in its application to technologically distinct mechanisms. The dog-lock has been described as every lock with a back-catch (Gooding: 117), an English-lock with a back-catch (Faulkner:65), and a specific type of lock characterized by an internal horizontal sear and no buffer for the cock (Eaves 1970:296). "It is ultimately up to the arms historian . . . to provide a reliable and comprehensive thesaurus of gun terms from which everyone who has to deal with gun parts may benefit. . ." (Puype: 7). Until this is accomplished, it will be necessary for each researcher to provide a glossary clearly defining not only the elements comprising the gunlocks but what he means by the types of gun discusses.

For the purposes of this study the following terms for the gunlock will be used: cock, jaws, jaw screw, pan, pancover, buffer, lock plate, steel (for the snaphaunce), and steel-with-pancover (for the L-shaped piece of the English-lock and flintlock), fence (for the closure on the end of the

snaphaunce pan), back-catch (for what is often called the dog), mainspring, steel spring, sear, and tumbler (Appendix B defines these terms).

Chapter 2 will define the types of flint and steel ignition systems in use in the seventeenth century and the relationships between them.

CHAPTER 2

DEFINITION OF GUNLOCK TYPES

As addressed in Chapter 1, nomenclature is problematic not only because of the confusion it engenders in the interpretation of archival sources but also because there is no standardized modern terminology in use by those studying early seventeenth-century firearms. This has precluded the development of a typology of flint ignition firearms and has clouded the identification of dateable characteristics.

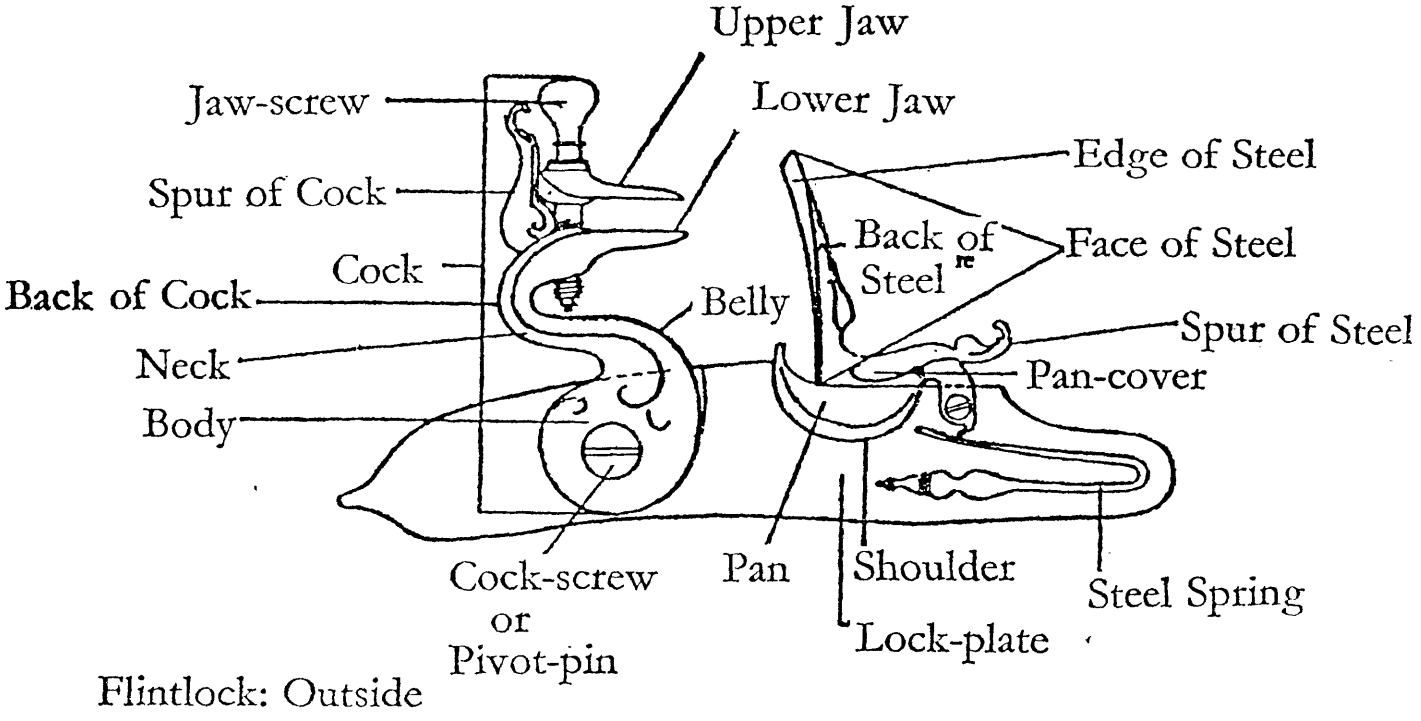
The ignition systems known as the flintlock, the English-lock, and the snaphaunce will be examined as an related ignition types of seventeenth-century firearms. The discussion will begin with the flintlock, "the major technical invention of the seventeenth century" (Blair:62), then move to the English-lock and finally to the snaphaunce. The order is not based on the chronological appearance of these gun types. The flintlock is discussed first because there is the most agreement among researchers about what comprises this type of gun. The English-lock is treated next as a development in response to the appearance of the French flintlock rather than, as many have suggested (Howard 1984:93), an evolutionary form of snaphaunce. Lastly, the snaphaunce will be examined as

a product of the wheel-lock tradition. Although "rarer today than any other type of weapon" (Jackson: 11), comprehension of the snaphaunce's mechanics ultimately holds the key to understanding the development of all seventeenth-century English flint-and-steel firearms.

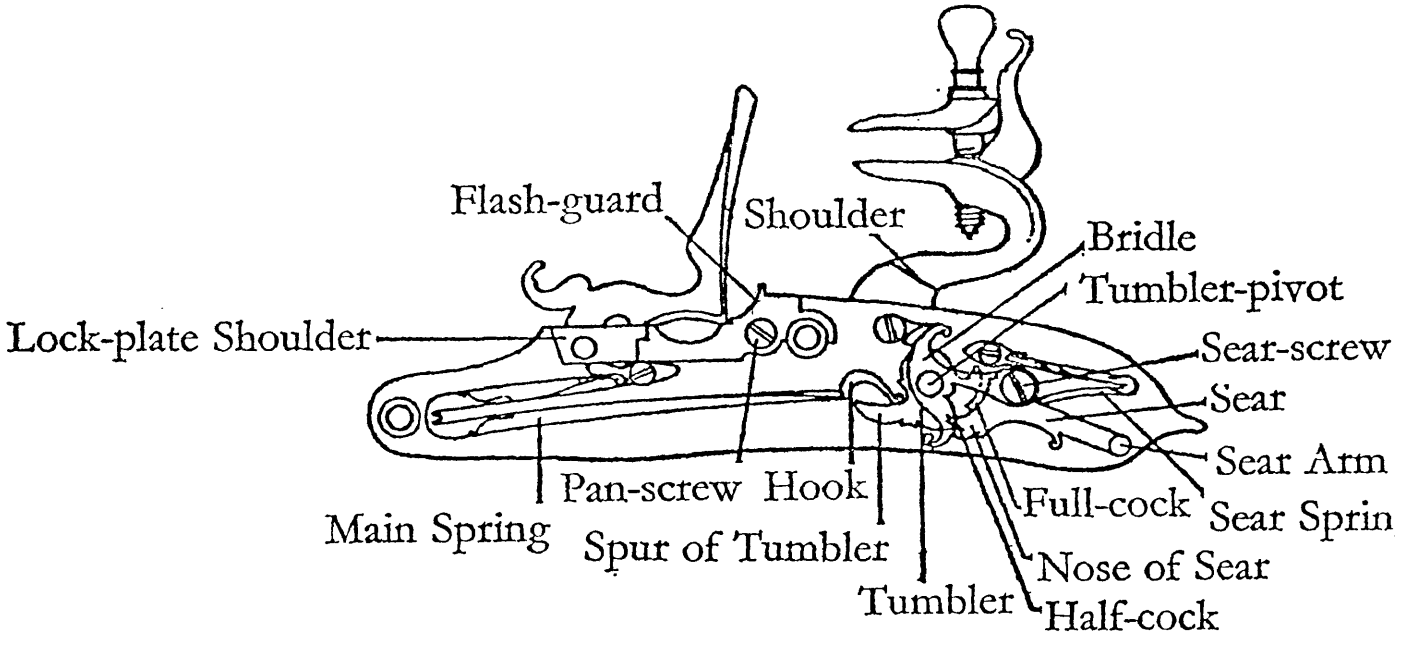
THE FLINTLOCK

Researchers today generally accept Torsten Lenk's definition of the true flintlock as put forth in his 1939 work The Flintlock: its origin and development. Lenk described the flintlock as "a mechanism for igniting firearms by striking a steel or battery (frizzen) with a flint. The steel and pan-cover are made in one piece, with a sear moving vertically" (Lenk: 1). In addition, the sear does not project through the lock plate as on the snaphaunce, but engages a tumbler notched for half-cock and full-cock. Figure 1 illustrates the interior and exterior of a flintlock with labeled parts as defined by Lenk.

According to Lenk, the "most radical simplification" over other ignition systems in existence at the time was the combination of the steel and pancover into one L-shaped unit (Lenk: 27). This elementary change allowed the single part of the steel-and-pancover to replace the pancover pivot of the snaphaunce and its spring as well as the pancover pushrod projecting from the tumbler. The combined steel and pancover of the flintlock did require some additions to the lockplate



Flintlock: Outside



Flintlock: inside

Figure 1. Interior and exterior views of flintlock lockplate. (From Lenk:9,Fig.2)

not necessary on its immediate predecessor, the snaphaunce. A snaphaunce lock can be primed and loaded and yet carried safely in two ways. The first method is by pushing the steel forward and out of reach of the cock, should it fall. The second way is to place the lock "at rest" by lowering the cock onto the pan. The cock on the flintlock, however, cannot be lowered to an "at rest" position with the pan closed because it hits the upright steel which is one unit with the pan. In addition, the flintlock steel cannot be rendered ineffective by pushing it forward, as with the snaphaunce, without risking the loss of priming powder. As a result, the half-cock position on the sear, which secures the cock out of the full-cock position, was developed on the flintlock. Activating the trigger will not move the sear out of the half-cock position and the gun is thereby secured from accidental discharge.

The innovation of the flintlock for firearms technology "lay in the construction of the sear" (Blair 1983:73); as the vertically-operating sear of the flintlock was a radical departure from the convention created by the laterally-acting sear of the wheel-lock. Although newly applied to firearms, "the vertically moving sear which engages in a notch in a tumbler can hardly be regarded as a new invention but is merely derived from the crossbow lock" (Lenk:27). The suggested contribution of the crossbow to this aspect of the development of the flintlock is interesting considering that, as described below, a mark in the shape of a crossbow is

stamped on what is believed to be one of the earliest flintlocks. It is very likely that the first flintlock was produced by a crossbow maker.

At the present time, there is some debate among firearms researchers concerning who should be credited with inventing the flintlock (Hayward 1979; Gusler and Lavin 1977). There is, however, general consensus that it first appeared in France; thus, this ignition system is often referred to as the "French flintlock" to distinguish it from other flint mechanisms.

Lenk credits the first true flintlock to Marin le Bourgeoys of Lisieux in Normandy (Lenk:29-37). le Bourgeoys was from "a family of locksmiths, watchmakers, cross-bow makers and gunsmiths" and he is documented as being "painter to the King" in 1633 (Lenk:30).

The firearm that Lenk regarded as the earliest extant example of flintlock construction is in the Hermitage Museum, Leningrad, and bears the signature M. LE BOVRGEOIS A LISIEVL on a strap around the stock. Another flintlock, in the Metropolitan Museum of Art, New York, closely resembles the Marin le Bourgeoys gun and is believed by Lenk to be contemporaneous. The Metropolitan firearm is attributed by Lenk to Marin's brother based on a barrel stamp consisting of a crossbow flanked by initials which Lenk understood to be "IB" or Jean le Bourgeoys who died in 1615. This terminous ante quem, and another mark on the gun suggesting that it was made for Louis XIII who ascended the throne in 1610,

established for Lenk the construction of the first flintlock as c.1610-1615 (Lenk:31).

Subsequent research has revealed that the mark upon which Lenk's hypothesis was based had been misread and that the "IB" is really a "PB," possibly attributable to another le Bourgeoys brother Pierre who died in 1627 (Gusler and Lavin:3). Further, re-examination of design and constructional elements of the two guns has led Wallace Gusler and James Lavin to believe that "the Metropolitan gun is the earliest of the Lisieux flintlocks" (Gusler and Lavin: 4). This prompted Claude Blair, editor of Pollard's History of Firearms, to state "since this is the earliest flintlock to which any kind of firm date can be attached, the date before which we know the true fintlock had been invented must be brought forward to 1627" (Blair: 73). Even this 1627 date is dubious, however, for there is no direct evidence that the "PB" mark really belongs to Pierre le Bourgeoys. Johan F. Stockel first associated the mark with Pierre in his 1938 book of marks Haandskydevaabens bedommelse I through circumstantial evidence (Lenk:30) and it has been widely accepted as fact ever since. If the le Bourgeoys attribution is suspect then the basis for establishing the Hermitage and Metropolitan guns as the earliest flintlocks is tenuous. Other extant flintlocks manifesting the same early attributes as the Lisieux arms, but dismissed under the "le Bourgeoys bias" as contenders for the distinction as the first flintlock, should be reconsidered.

Constructionally, the flintlock developed out of the wheellock-snaphaunce tradition. "The French flint-lock was developed from the snaphaunce, and it seems reasonable to expect, therefore, that the earliest flint-locks will show considerable similarity to the contemporary snaphaunce" (Hayward:145). Gusler and Lavin's research has confirmed this observation and has described the earliest known flintlocks as sharing the external buffer and straight-necked cock of the snaphaunce. In addition these locks have "a lockplate with a pronounced bulge in its lower profile that obviously derives from the wheel-lock" (Gusler and Lavin:5). There is no explanation other than an aesthetic hold-over for maintaining this wheel-lock shape for, with removal of the sliding pancover and the mechanics required for its operation, the flintlock plate could be made quite narrow.

A gun illustrated by Lenk (Plate 14 No. 4) which is in Windsor Castle (No.316) has features more analogous with the wheel-lock than either of the so-called le Bourgeoys arms (Gusler and Lavin:5) and it is dated "1630" on the lock plate. It is entirely possible that this firearm may indeed be the earliest surviving flintlock, but it will require considerable research beyond the present scope of this thesis to re-examine all the evidence necessary to build an argument to that effect.

In any case, this re-evaluation of the first appearance of the flintlock will have significance for understanding the

English-lock. As will be discussed later, the English-lock is a lock-type, based in the snaphaunce tradition, that developed in response to the innovation of the French flintlock. Knowledge of the latter was disseminated largely through pattern books of gunsmiths designs which ensured that "French dominance in firearms design was well established by the mid-seventeenth century" (Gusler and Lavin: 1). If the English-lock is understood as following the precedents set by the flintlock then it could not have appeared any earlier than the late 1620's or early 1630's and not c.1620 as is presently believed.

THE ENGLISH-LOCK/DOG-LOCK

The most confusion concerning flintlock typology has been in the definition of the lock known as the English-lock. Its appellation deriving from its assumed country of origin or, at least, the country of its greatest popularity, the ignition system known as the English-lock includes "several technologically distinct versions" (Puype:8). All forms of the English-lock have a variant of the horizontally acting sear of the snaphaunce and the L-shaped steel-and-pancover of the flintlock.

As with all the flint-and-steel mechanisms, the English-lock required a safety feature that would permit the pan to remain primed and covered and yet would ensure that the cock did not strike the steel prematurely. But, unlike the

snaphaunce which could be rendered safe by pushing the steel forward, the integral steel and pancover of the English-lock required a mechanism to hold the cock safely up and away from the steel. On some examples this is achieved by a half-cock capability on the tumbler, as on the flintlock. On others it is accomplished by a hook mounted behind the cock, which engages the tail of the cock and holds it safely in position. This hook is often called a dog catch and hence the name "dog-lock" for gunlocks manifesting this feature.

Unfortunately, as mentioned in Chapter 1, the term "dog-lock" has been applied to any lock having a back-catch, whether the lock embodies the distinct mechanism of the snaphaunce, English-lock, flintlock, or percussion system and therefore spanning the seventeenth, eighteenth, and nineteenth centuries (Peterson 1964:117-119). It is also used by English firearms researchers to refer to a specific type of English-lock in which the sear does not penetrate the lock plate, some of which have even been identified that do not include a "dog" (Darling:20). The blanket use of this term has added confusion to the study of early firearms and has disguised important differences on the interiors of lockplates which could elucidate the development of the flint ignition system.

The least complex manifestation of the English-lock has been described as a "true" dog lock for the back-catch provides the only safety (Peterson 1964:118). There is no provision for half-cock on the tumbler as the sear and tumbler

are of snaphaunce construction, but the steel has been replaced by a combined steel-and-pancover (Figure 2). Firearms scholars have placed the appearance of this "improved version of the Netherlands snaphaunce" (Blair 1983:68) as occurring sometime between 1610 and 1620 (Eaves 1970:294; Blair 1983:68; Howard: 93; Peterson 1956:28). As will be shown in the next chapter, however, this early date results from the fact that all known examples of the "true" dog lock are, in reality, converted snaphaunces.

The English-lock was manufactured in England probably until c.1680 (Howard:97) and its development reflects a technical evolution of form (although not necessarily a chronological one) which begins with the snaphaunce tumbler, to which a half-cock position is added (Figure 3), and finally both half-cock and full-cock positions as on the flintlock. Unlike the French or "true" flintlock, however, this "late" English-lock still maintains the horizontally-acting sear of the snaphaunce even though it no longer penetrates the lockplate (Figure 4). For gunmakers to commit to the vertical sear of the flintlock would require major alterations to the snaphaunce/English-lock tradition, including the use of a different type of trigger.

> "(The English-lock) must have been a happy compromise to the English gunsmiths, who saw in it the advantages of the true flintlock and yet enabled them to continue making locks with the horizontal "snaphaunce" sear with which they were most familiar" (Eaves 1970:296).

The English-lock has been viewed by some researchers as

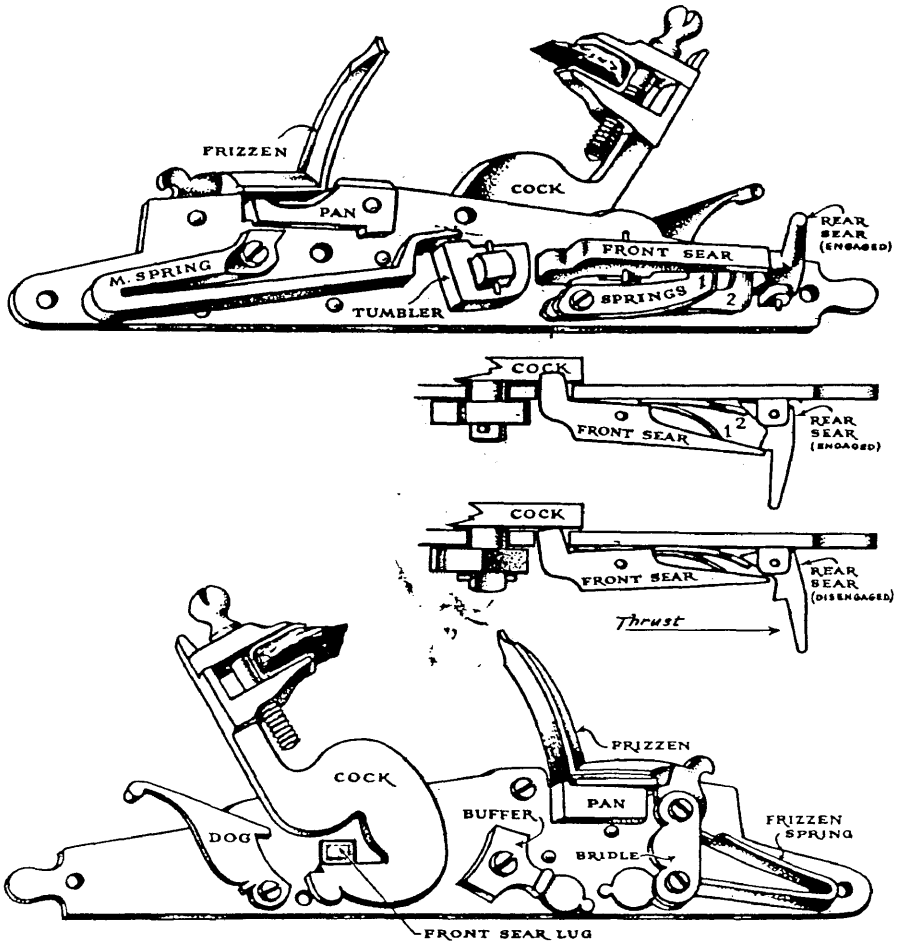


Figure 2. Type of English-lock with no half-cock position on tumbler. (From Peterson 1956:22, Plate 24)

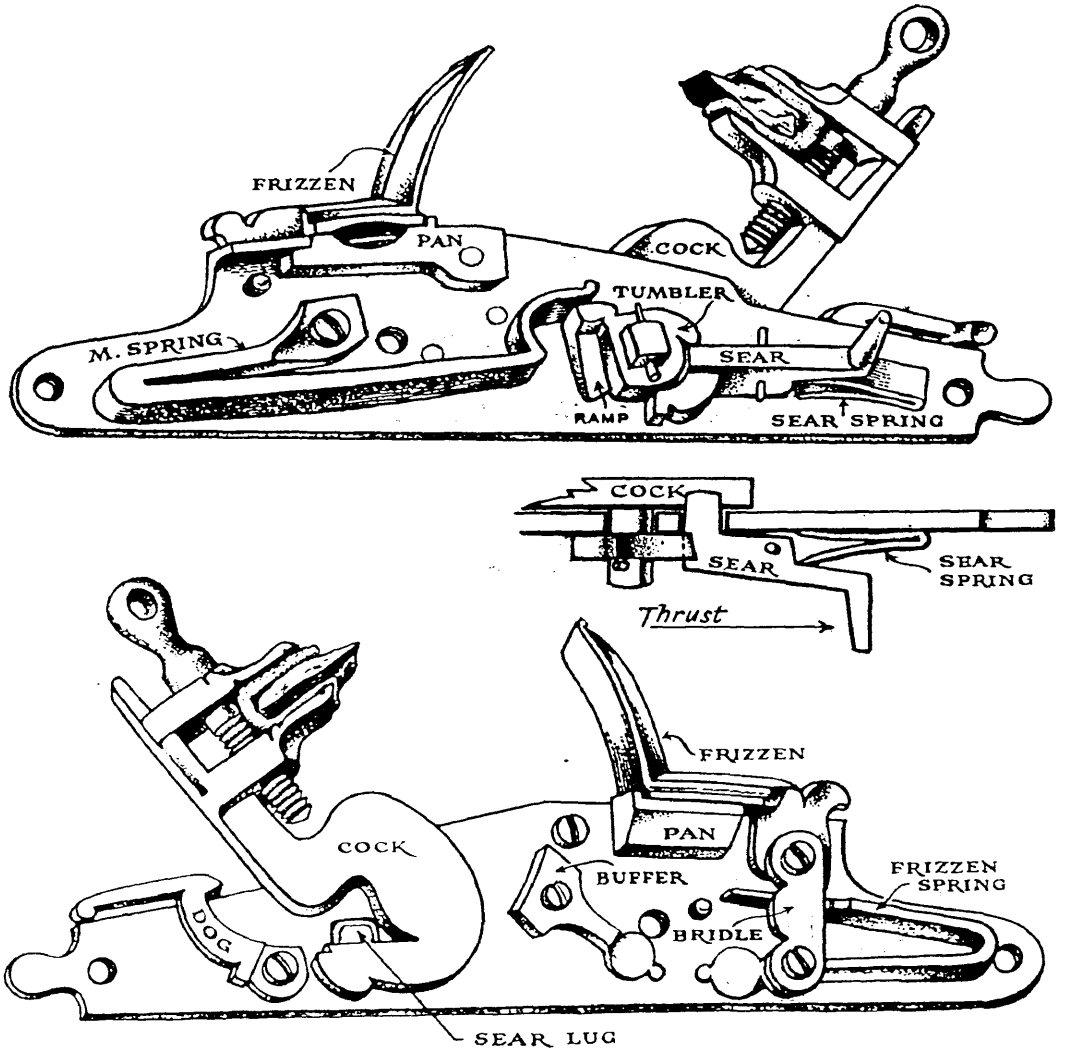


Figure 3. Type of English-lock with half-cock position on the tumbler. (From Peterson 1956:23, Plate 25)

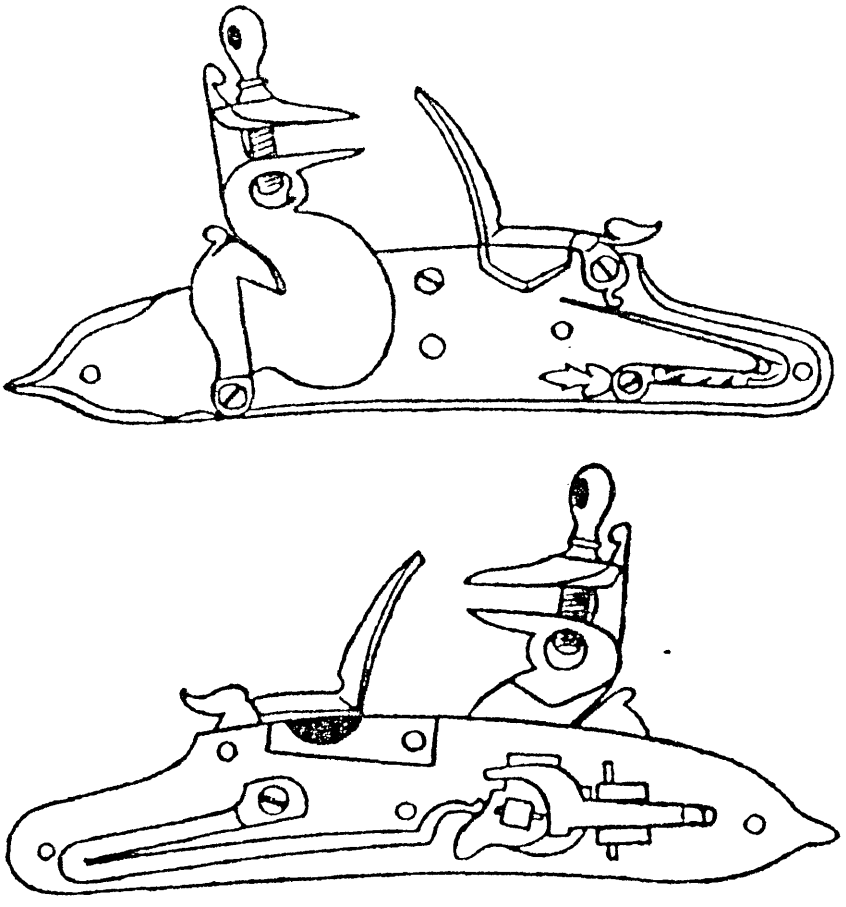


Figure 4. Type of English-lock with half-cock and full-cock positions on the tumbler. (From Peterson 1964:119)

developmentally falling between the snaphaunce and the flintlock (Held, 1957:42) or as a "separate and contemporary development" (Eaves 1970:294) of the flintlock. It is this author's thesis that the English-lock developed in response to the mid-seventeenth century appearance of the French flintlock in England, and used the snaphaunce lock or lock parts in its simplest form. Thus, the sequence is from snaphaunce to flintlock to English-lock.

The types of English-lock that have been described by researchers (see Appendix B for one typology) are primarily differentiated by changes in the sear and/or tumbler, as mentioned above. The most rudimentary form is, in effect, a snaphaunce with the steel replaced by a steel-and-pancover, and a back-catch instead of the sliding or pivoting snaphaunce safety. The more complex emulations of the flintlock require modifications to the tumbler and sear to incorporate the innovation of a half-cock. Stylistically, the simple forms of English-lock maintain the lockplate configuration of the snaphaunce and reflect the shape of the snaphaunce cock, steel, and terminals on the buffer and steel spring. The snaphaunce shapes on these English-lock elements appear to become debased with time and, with further study, may prove to be sensitive indicators of manufacture date.

The more complex English-lock assumed the appearance of the flintlock in all of its external elements; but, internally kept the horizontally-operating sear of the snaphaunce. This

may be a result of the French pattern books, widely disseminated through Europe by mid-seventeenth century (Gusler and Lavin: 1), which only illustrated the exterior configuration of the lock. The English gunmaker continued constructing the interior mechanism of the lock in the snaphaunce tradition with which he was familiar.

The review of the evidence in Chapter 3, will show that these "simple" and "complex" English-locks all appear within a thirty-year period between 1650 and 1680, with minor stylistic changes to the gunlock elements indicative of chronology. Basically, the design of the English-lock remained stable through the years; changes that were made can be seen as reactive to stylistic developments occurring in French flintlock design. Ian Eaves agrees with this assessment when he states:

> "It is interesting to note that the only part that the English gunsmiths played in the evolution of the 'English-lock', was to assimilate the Continental prototypes to a form that was compatible with their experience in the manufacture of snaphaunces" (Eaves 1970:296).

However, because Eaves believes that the first English-lock is contemporary with the first flintlock, he does not recognize the French flintlock as the prototype for the English-lock.

As will be shown in Chapter 3, the English-locks examined which have been ascribed to the first half of the seventeenth century appear to be either converted snaphaunce locks or newly constructed of snaphaunce elements. The early dates given to them by researchers are based on the archaic

appearance of the snaphaunce elements which have been retained and not upon the date when the lock was assembled. The inclusion of these previously unrecognized conversions and modifications as primary examples in the typology of English-locks has distorted the dating sequence of flint-and-steel firearms. It has also led to the erroneous assumption that "the English lock so quickly superseded the snaphaunce in England and in America that relatively few of the earlier arms were ever made" (Peterson 1956:28). In reality, as will be shown in the following discussion, the snaphaunce was made and used in England for approximately 100 years (c. 1580-1670), before being replaced by the "French" flintlock in the mid-seventeenth century (Blair 1983:74); whereas the English-lock was popular for only a quarter of that time (c. 1650-1680).

THE SNAPHAUNCE

The origin and development of the snaphaunce lock remains an enigma to firearms historians largely through the ambiguous terms used through the years to define it. " . . . references in Italian and German documents from 1507 until the 1540s to guns that 'ignite with a stone' or 'that ignite themselves' and to 'stone' and 'dead-fire' guns are appropriate to both snaphances and wheel-locks" (Blair 1990:1).

Definite evidence of the snaphaunce's existence is documented as early as 1547 (Tarassuk and Blair:280) and the "earliest reference to the use of the snaphaunce in England

dates from 1580" (Hayward 1962:114). Although historical sources continually refer to the snaphaunce through the 3rd quarter of the seventeenth century, it has been commonly accepted by firearms researchers that this ignition system was not made in England "in any quantity after the first quarter of the seventeenth century" (Hayward 1962:206). This assumption is based on the fact that there are so few extant examples of the snaphaunce, coupled with the pervasive belief, as shown above, that the English-lock was developed by 1620. Historical accounts of the second quarter of the seventeenth century in which "snaphaunce" is the only term applied to flint-and-steel firearms are interpreted by researchers to mean there was no perceived distinction in contemporary terminology between the snaphaunce and the English-lock. If the interpretation of historical accounts has been biased by the generally accepted date for the first appearance of the English-lock, which is premature by thirty years, then a re-reading of the primary sources is necessary.

The term snaphaunce derives from the "abrupt snapping down of the cock, which in Dutch, German and the Scandinavian languages is called haan, hahn, or hane" (Hoff:64) or from the German "Schappehahn" meaning "pecking fowl" and, again, referring to the action of the cock (Jackson and Whitelaw:11). There are three recognized types of snaphaunce, relating to geographical variations in the lock's development -- the Scandinavian-Russian, the Mediterranean or Miquelet, and the

Netherlands (Blair 1983:67). It is the latter type that is found in England and that will be discussed in this study. Despite its name, there is no proof that this lock originated in the Low Countries. "Practically nothing is known about this lock-type in Netherland before 1600" (Hoff:63), while literary and material evidence indicate that it was widely produced and used in Britain in the 16th century (Blair 1985:21).

Claude Blair describes the features of the "Netherlands" snaphaunce lock as including:

> . . . a cock with a spur at the rear that engages under a laterally-moving sear working through the plate; a separate hinged steel held firm by a small V-shaped feather-spring attached to the exterior of the plate; a sliding pan-cover that opens automatically as the cock falls; an internal mainspring working on a tumbler attached to the cock-screw; a buffer attached to the plate in front of the breast of the cock; and a circular or polygonal fence at the side of the pan (Blair 1983:68).

The snaphaunce lock can be seen as a direct development of the wheel-lock. On the exterior of the lock, aesthetic response to the wheel-lock is easily discernible : the rondel or fence at the end of the snaphaunce pan is reflecting the wheel shape, the turnings on the cock and steel copy those of the wheel-lock dog, and the finials on the buffer, safety, and battery spring mimic the wheel-lock finials. A small group of snaphaunce pistols even reproduce the semi-circular bulge to the lower profile of the lockplate and stock which was required on the wheel-lock to incorporate the wheel (Hoff:70).

On the interior of the snaphaunce lock there are also many parallels with the wheel-lock, beginning with the tumbler

which has been viewed as "a wheel in miniature"(Lenk:4). The sliding pan-cover is borrowed directly from the wheel-lock as is the mechanism for making it operate, and "some of the existing guns also have the ordinary wheel-lock safety which stops the sear-arm with a hook" (Lenk:27).

Snaphaunces are listed among the first weapons brought to Virginia in 1607 (Gill:3) and, based on the archaeological record (see Appendix A), were the most commonly used firearm at Jamestown. A complete snaphaunce lock (Figure 5), exhibiting features which identify it with the earliest known Netherlands-type snaphaunces, was excavated from a site just to the north of Jamestown. The lock (44KM394A) is similar in many respects to an example in the Pitt Rivers Museum, Oxford, which Claude Blair has identified as the product of gunmakers Simon and/or Jacques Robert of Lorraine in the last quarter of the sixteenth century. On both locks, the cock and steel are weedy in appearance and the buffer is a long thin rectangularelement. "The lockplate is drawn back at the rear to form an elongated, slightly-downcurved triangle with its tip truncated" (Blair 1990:6) and the steel spring extends beyond the front of the squared-off plate as on the wheel-lock. The long jaws are operated by a screw that enters from below and is secured by a nut above the top jaw, a feature of late 16th/early 17th-century locks attributed to Scottish manufacture (Blair 1990:16).

Lenk illustrates a snaphaunce pistol, with similarities

Figure 5. Exterior of snaphaunce lockplate (44KM394A) excavated from Kingsmill Tenement, James City County, Virginia. (From collections of Department of Historic Resources, Richmond, Virginia.)

to the excavated lock, which has also been ascribed to Scotland (Lenk, Plate 3:1,2) Besides the same external lock features as described above, the interiors of both locks have the guide for the pancover pushrod on the end of the mainspring rather than the ends of the pan as on later English examples (Figure 6).

Arne Hoff has re-examined the snaphaunce illustrated by Lenk and believes, based on the shape of the lockplate and the stock (which is a replacement based on the form of the original), that the pistol has a more Continental appearance. Rather than Scottish, Arne Hoff believes the snaphaunce is, like the Robert lock, a product of "the borderland between France and Germany", i.e. Lorraine (Hoff to Lavin, Personal communication:July 28, 1975).

The origin of the snaphaunce lock is uncertain but examination of these early examples suggests that the influence came from France rather than the Low Countries, ascommonly believed. ". . . it is possible that . . . the Low Countries were passing on features which they themselves had derived from Nothern France. This makes it difficult to determine how far England was directly influenced by the French fashions, which were then beginning to dominate Western European gunmaking" (Eaves 1970:333).

Since the snaphaunce was "the first form of flint lock to appear on the European scene" (Peterson 1956:26) and was, as shown earlier, the source for the invention of the flintlock,

Figure 6. Interior of snaphaunce lockplate (44KM394A).

it is important that it be examined more thoroughly.

In an attempt to understand the mechanics of the snaphaunce, an intact unmodified example with historical provenance was selected for study (Figure 7). One of "foure fowlling pieces" given in 1604 by James I to Philip III of Spain was chosen for its English attribution as well as for the fact that it has been stored, untouched and almost forgotten, in the Real Armeria in Madrid where it was received almost 400 years ago.

This fowler (K.124), along with another (K.125), has been overlooked through the years because of its "plain" appearance, "so divergent in form from Spanish taste" (Lavin 1989:12). Two ornate fowlers also comprising part of the extensive gift of arms from King James have not experienced the similar fortune of anonymity and have been "broken up or despoiled because of the richness of their decoration" (Lavin 1989:8).

The historical context of the fowler under study has been obscured until recently because it was not recognized as English let alone one of the surviving items comprising the royal gift. It was not part of the Tower of London exhibit of weaponry from Madrid's Real Armeria in 1960 which contained four crossbows and some gun parts (including components of the ornate fowlers) identified as gift items. As English pieces, the latter were recognized to be "of utmost significance in the study of British sporting arms of the early seventeenth

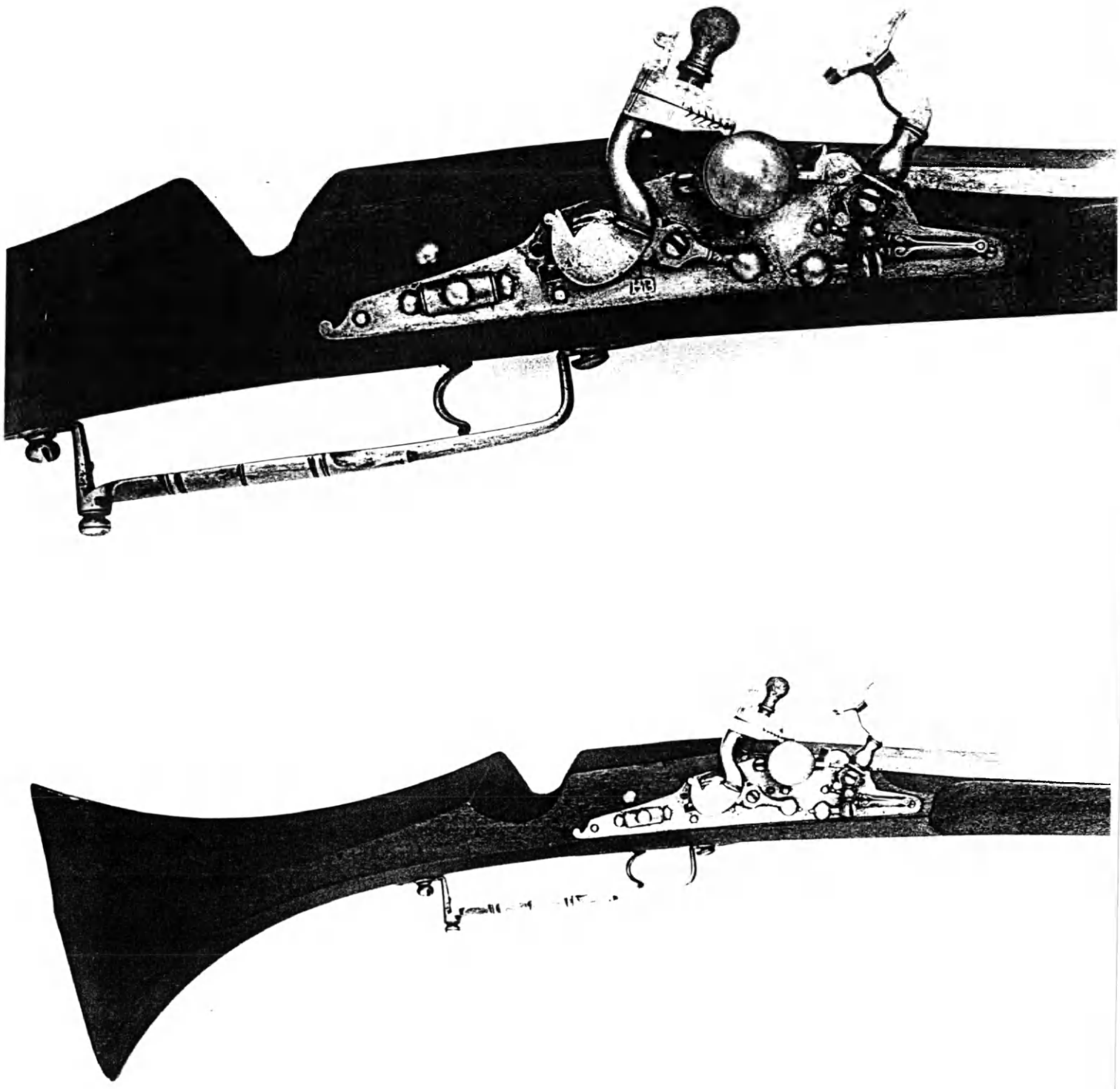


Figure 7. English snaphaunce fowler given to Philip III of Spain by James I in 1604. Top view shows close-up of lockplate; bottom view shows the fowler's fishtail butt. (K.124, Royal Armoury, Madrid)

century" (Reid:21).

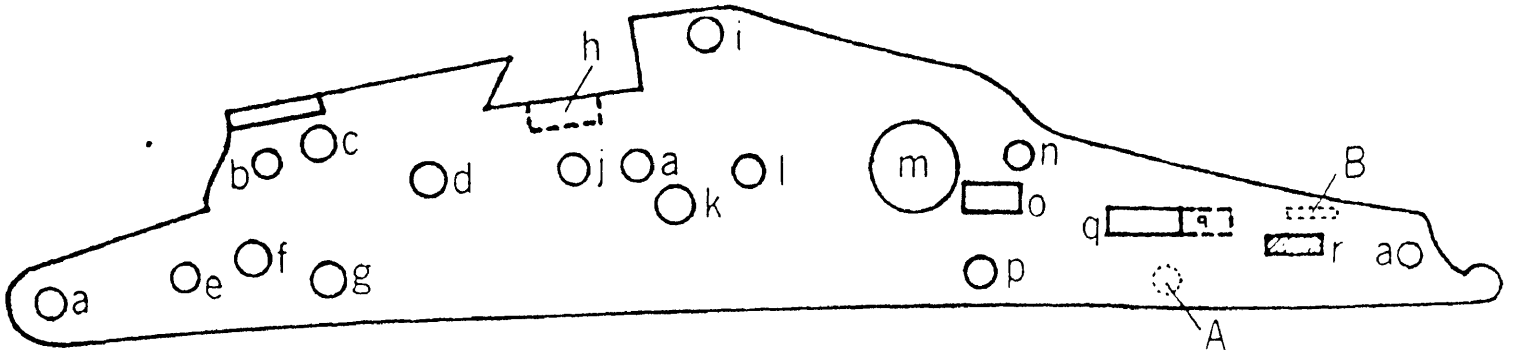
In conjunction with the exhibit, William Reid wrote an article for Connoisseur magazine in which he documents two gifts of reconciliation from England to Spain: one in 1604 which went to the armory at the royal palace in Madrid and one in 1614 which was presented at the Escorial, the royal residence located thirty miles northeast of Madrid (Reid:26). The only English firearms Reid notes are the gold-encrusted parts from the two despoiled fowlers which he believes formed part of the second gift. Other researchers such as Hayward (1962:117) and Eaves (1970:289) have mirrored this belief, failing to consider that the more complete plain fowlers may be English firearms dating to this time period.

James Lavin's research has restored these two plain fowlers to their rightful place as part of the 1604 gift (Lavin 1989). "In spite of their less-than imposing appearance next to the treasures of the Real Armeria, they survive as the only complete examples of the finest quality English snaphaunce guns from the first years of the seventeenth century" (Lavin 1989:15).

In the course of this study, the fowler (K.124) was disassembled and the pattern of lockplate holes was plotted and their functions identified (Figure 8). Once the plate was stripped, several interesting features were revealed that are intrinsic to the snaphaunce plate and that will serve to identify it even if it has been subjected to later

Figure 8. Template of 1604 snaphaunce fowler. (Drawing by James Lavin.)

LOCKPLATE OF ONE OF THE "FOURE FOWLLING PIECES" GIVEN IN 1604 BY JAMES I OF ENGLAND TO FELIPE I OF SPAIN. ROYAL ARMOURY, MADRID. K.124



a) Lock mounting screws (3)
b) Pancover spring retaining screw
c) Steel pivot and bridle screw
d) Pancover pivot screw
e) Steel spring support
f) Mainspring support
g) Steel spring and bridle screw
h) Recess for head of pancover pushrod
i) Pan retaining screw
j) Mainspring retaining screw
k) Buffer support
l) Buffer screw
m) Cock arbor hole
n) Screw retaining safety spring
o) Sear aperture
p) Screw retaining the two sear springs
q) Slot for manual safety
   (small q) Recess for base of pivoting sear
r) Pivot mount for sear

<u>Not on this lock</u> (found on locks with pivoting safety mounted externally on lockplate)

A) Pivoting safety pivot screw
B) Mounting slot for pivoting safety leaf spring

modifications.

A shallow recess ("h") beneath the pan on the inside of the plate accommodates a projection on the pancover pushrod. The pushrod's purpose is to push the sliding pancover off of the pan, so this provision is not seen on English-locks and flintlocks which have the combined steel and pancover. The pushrod, which is attached on one end to the tumbler and is operated by its movement, rides in this recess which keeps it close to the interior of the plate. With the cock in the forward position, it is not possible to pull the pancover back over the pan because the pancover pivot is stopped by the pushrod which is linked to the rotation of the tumbler. When the cock is pulled back to full-cock, however, the pushrod projection pops out of the recess thereby driving the pushrod away from the plate and allowing the pancover to be pulled over the pan.

Another characteristic of the snaphaunce is the hole for the pancover pivot screw ("d"). This hole is often plugged in conversions for aesthetic reasons since it is no longer needed. At the rear of the plate, "A" and "B" replace "q" when the snaphaunce has an externally-mounted pivoting safety rather than the sliding safety of the Madrid fowler.

Most snaphaunces have one of three types of safeties. On the muskets, either the pivoting or sliding safety, and on pistols, the safety mounted on the belt hook. Authors continually refer to the safety on the snaphaunce as a

redundant feature for "when the weapon is loaded it can be rendered safe in a similar way to the wheel-lock by moving the steel forward" (Lenk:27). This is correct; however, the snaphaunce safety is not a safety in the sense of the English-lock back-catch or the half-cock on the flintlock, which is to guard against premature firing. Rather, because of the way it functions, by locking the nose of the sear as it projects through the lockplate, the snaphaunce safety works only at full cock and it is required to keep the cock from accidentally falling which would send the pancover forward and the priming powder flying.

CHAPTER 3

THE EVIDENCE: ENGLISH

"The paucity of English firearms surviving from before the Civil War" (Eaves 1977:277) has resulted in the same few weapons repeatedly being studied and used in the literature to build the history and development of early seventeenth-century flint ignition systems. These examples often carry with them as baggage a body of assumptions which have been widely accepted but which, when closely scrutinized, are questionable. Many researchers such as Lenk and Eaves were not able to examine personally all the specimens that they were citing as evidence and often had to rely on the observations of others who were not as diligent or cautious in their assessments. The outcome has been some misinterpretation which, with time, has become reified as the truth. This is particularly true with the English-lock about which Eaves acknowledges "the unsubstantiated conclusions arrived at by some earlier writers have often been too readily accepted and repeated" (Eaves 197:293).

In an attempt to address some of these historical errors regarding the English-lock, this chapter will review the evidence which has been commonly extended by researchers to

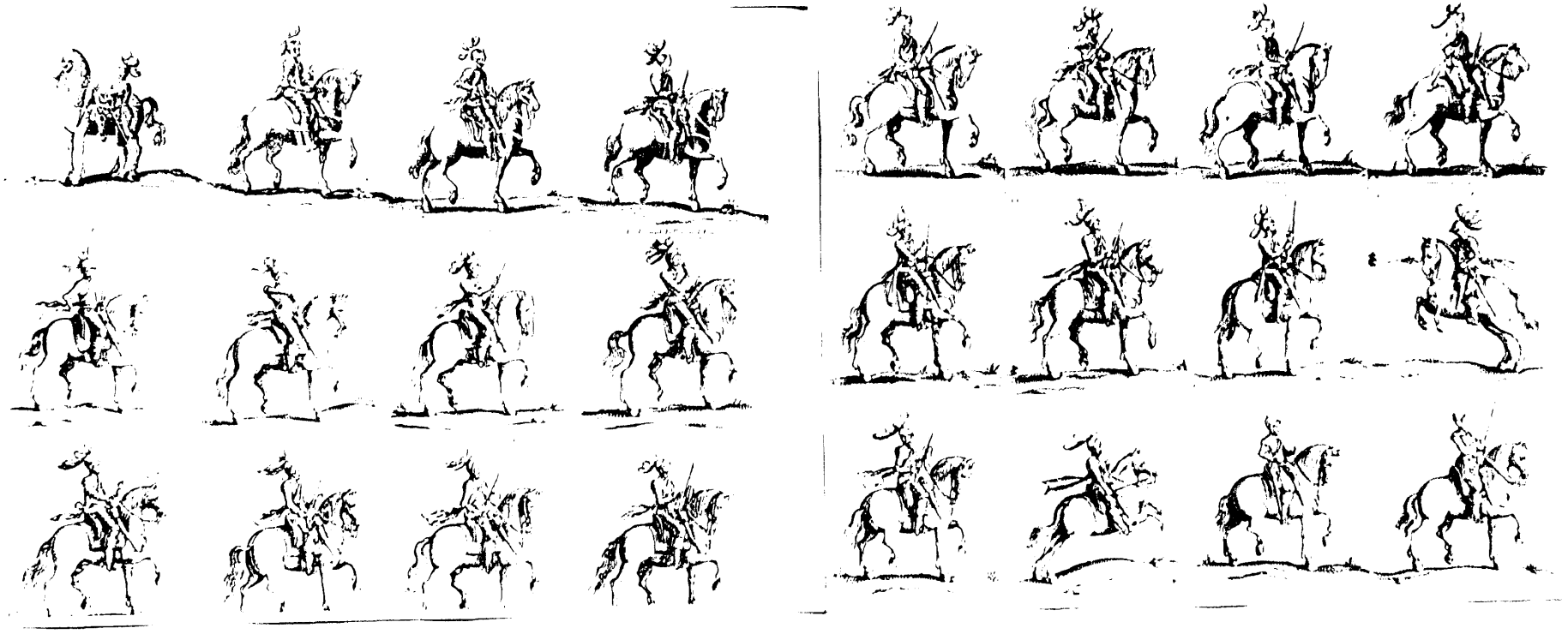
establish the chronology of this gunlock type.

Some authors have used seventeenth-century English military manuals to prove that the English-lock had supplanted the snaphaunce in common usage by the second quarter of the seventeenth century (Eaves 1970:293; Hayward: 206). Re-examination of the manuals suggests, however, that the arms under discussion are indeed snaphaunces until the 1670's when a discrete change in wording reflects that an alternate ignition system may by then be in use.

In 1632, Captain John Crusoe outlined the firearms drill for "firelocks" and "snap-hanes" in his Militarie Instructions for the Cavallrie. These instructions are accompanied by engravings (Figure 9) which depict a wheel-lock in Figures 1 - 17, and what Ian Eaves has described as "the earliest illustrations of the English-lock so far recorded" (Eaves 1970:293) in Figures 18 - 21. Photographic enlargement of the these last four figures clearly shows, however, that the "snap-hanes" Crusoe is describing are snaphaunces and not English-locks (Figures 10 and 11). The rondel or circular fence can be seen at the end of the pan and a pivoting safety, not a back-catch, is apparent behind the cock. Moreover, the separate steel is quite obvious.

The text accompanying figures 18 - 21 states

Figure 9. Engravings accompanying John Crusoe's Militarie Instructions for the Cavallrie (Crusoe 1632, Figure 3).



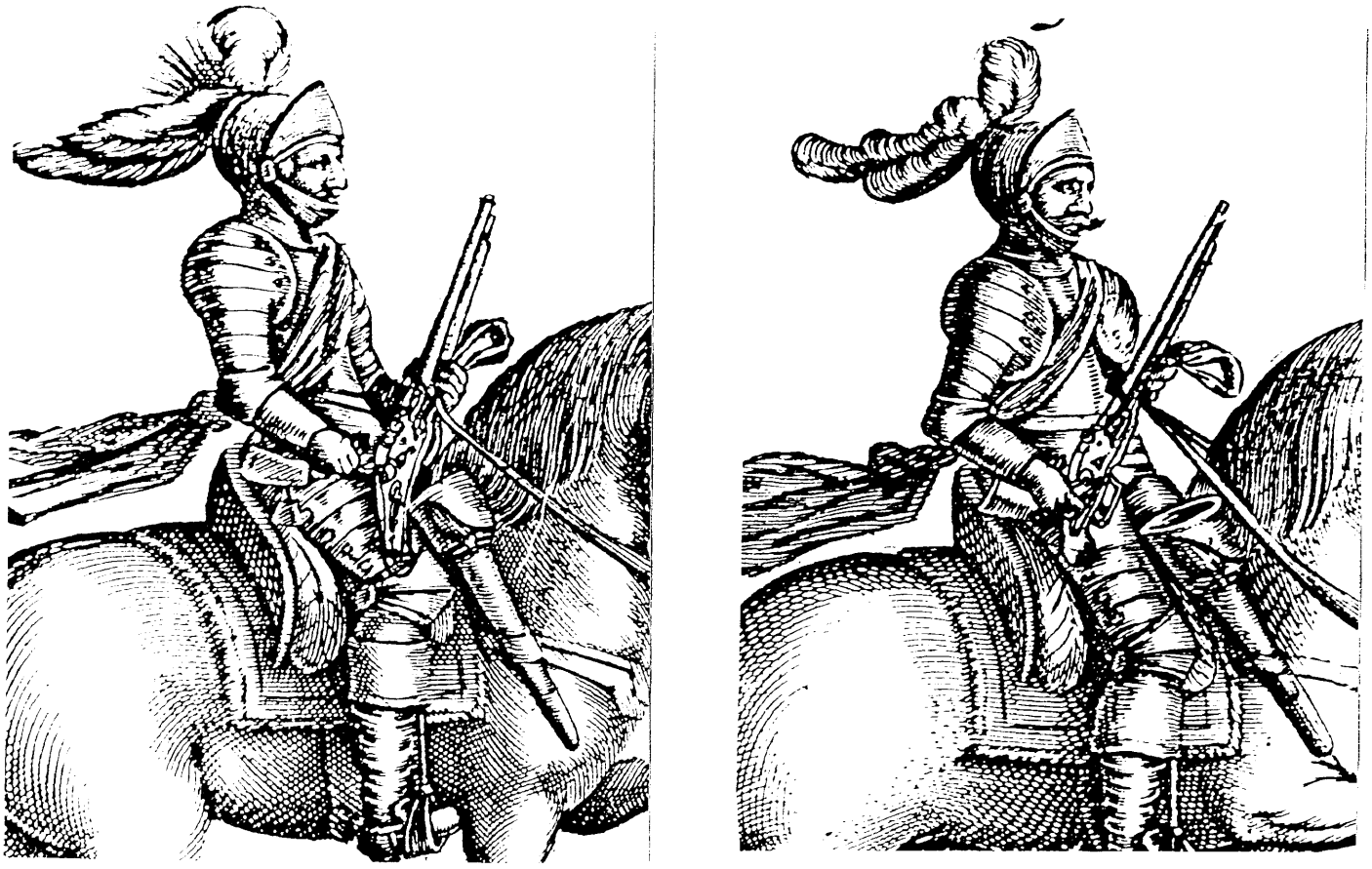


Figure 10. Crusoe's postures 18 (left) "Bend your cock;" and, 19 (right) "Guard your cock." (Crusoe, Figure 3).

Figure 11. Crusoe's postures 20 (left) "Order your hammer;" and, 21 (right) "Free your cock." (Crusoe, Figure 3).

"Now concerning the snap-hane pistoll, those postures wherein it differeth from the fire-lock pistoll, are these as in figure.)

18. Bend your cock.

Holding the pistoll in the bridle-hand, (as before hath been shewed) with the right hand he is to bend the cock.

19. Guard your cock.

With the right hand he is to pull down the back-lock, so to secure the cock from going off.

20. Order your hammer.

With the right hand he is to draw down the hammer upon the pan.

21. Free your cock.

With the right thumbe he is to thrust back the back-lock, and so to give the cock libertie." (Cruso 1632: 40-41).

If the qualifying remarks "wherein it differeth from the fire-lock pistoll" are remembered, it can be seen that instructions 18 through 21 are replacing 14 through 16 for the wheel lock which state "Pull down your cock," "Recover your pistoll," and "Present and give Fire." Eaves argues that since there is no provision for closing the pancover "this drill could only apply to the English-lock" (Eaves 1970:293). The order to "Shut your pan" is #7 for the wheel lock and occurs after priming the firearm. The procedures for priming the snaphaunce are not discussed by Crusoe because they are considered the same between the two ignition systems, and he is only elucidating the differences. In other words, the pan is already shut in the drill when Crusoe moves on to procedures specifically for the "snap-hane pistoll."

Later in the manual, Crusoe gives instructions for handling "carabines" which "are for the most part snap-hanes" (Crusoe 1635:43). In them he enumerates shutting the pan and ordering the hammer as two distinct postures. If, as claimed

by Eaves, "Cruso should assume that his reader would know that the 'snap-hane' was the type of lock which is now known as the 'English-lock'" (Eaves 1970:293) then the instruction to shut the pan would automatically "order the hammer" and there would be no need to make this command. It appears very clear that Crusoe is discussing a snaphaunce and not an English-lock.

Subsequent military manuals -- Henry Hexam in 1637, Robert Ward in 1639, and Richard Elton in 1650 -- echo Crusoe's instructions, suggesting that the wheel-lock and snaphaunce are the common military weapons for the mounted soldier through the mid-seventeenth century. Thomas Venn's Military Observations for the Exercise of the Horse, written in 1672, reflects a subtle change in his commands for the "Pistol with a Snaphans, and the Carabine" (Venn 1672:13). Instruction #4 is still "Bend your cock" but to this is added "to half bent" (Venn 1672:13), describing a half-cock position which is not part of the snaphaunce lock. The most convincing evidence that Venn is describing an English-lock rather than a snaphaunce, however, is command #7 "Shut your pan, (or fix your hammer)" (Venn 1672:13). Since these two elements are combined on the English-lock, the action of one brings about the other. The snaphaunce would require the drill to state "shut your pan, *and* fix your hammer."

In conclusion, the military manuals suggest that the English cavalry was equipped with either wheel locks or snaphaunces until after mid-century. This does not prove,

however, that the English-lock was not extant at this time. Firearms innovation started with sporting and other personal arms which "were either made to order for affluent patrons or exhibited the inventiveness of the master gunsmiths" (Brown 1980: 141). It is therefore on the fowlers and other personal arms that the first English-locks are most likely to be found.

Innovations in firearms technology were slow to be adopted by the military and initially appear to have been "confined to special units" (Blair 1983: 94). "Before 1685, only the North British Fusiliers, raised in 1678, had been exclusively armed with flintlocks"(Chandler:78). The matchlock remained the weapon of choice for the infantry until the end of the seventeenth century because it was an uncomplicated mechanism that was inexpensive to manufacture and easy to maintain. In addition, "the infantry tactics of the time . . . would have gained little from firearms equipped with more complex systems of ignition" (Blair 1983:63).

British military firearms of the seventeenth century are characterized as being crudely made contract weapons. Their rough quality can be attributed not only to mass production for expeditiously meeting the needs of war but as the outcome of competition among the gunmakers to gain orders from the government by producing arms as cheaply as possible. Before the Gunmakers' Company was chartered in 1638 the gunmakers were not only competing with each other but they also had to contend with foreign-made arms, which were often so cheaplyg

upon the walls. A guidebook of a decade earlier also describes the room with "yellow leathern jerkins arranged around the walls . . . with these must be coupled the bandoliers, petronels, helmets & etc."(Guidebook:30). An illustration of the Great Hall published by Joseph Nash in the 1840's shows the same view as the 1909 photograph. Instead of the racks of muskets on the wall, however, there are hung buff coats and armor. Only three sets of two crossed muskets can be seen. While this is no proof that the collection of firearms currently displayed on the walls was not assembled by Alexander Popham following the English Civil Wars, it does suggest that objects have been rearranged through the centuries. It is known that "General Edward Leyborne-Popham who had married the heiress of the Pophams of Littlecote and taken the name" had done extensive alterations to the house in the early nineteenth century (Latham 1909:207-208). Perhaps the "restoration" of the armory was the work of this gentleman, who was so enamoured with the Popham legacy that he adopted the name for his own.

If Alexander Popham did amass the armory, it was probably years after the conclusion of the Civil Wars and with arms and equipment that never saw combat in those battles. This is suggested by marks of the Commonwealth (1649-60) struck in the harquebusier armors in the armory, "thereby dating the group of armours and, by implication, the buff coats, baldricks and carbine slings" (Richardson: 26). This armor could not have

been used in the Civil Wars which concluded in 1648. It is possible that only the firearms are Civil War pieces and that their display in the Great Hall was fleshed out by other equipment after the wars. Or, perhaps the bulk of the armory, including the firearms, was installed fifteen years later for the grand occasion of entertaining Charles II which Alexander Popham did on September 21, 1663 when, it is recorded, he 'gave the King a costly dinner at Littlecot'(Guidebook: 31). Finally, there is the possibility that the armory was installed in "modern" times using pieces considered appropriate to the Civil War period.

These questions cannot be addressed within the scope of this study, but should be pursued to establish the credibility of the Littlecote House collection. Popham family papers, if extant, may address some of these considerations. In any case, the weapons themselves should be closely scrutinized for integrity and not accepted as weapons dating to the Civil War period simply because they are currently part of the armory.

The author was able to disassemble approximately a dozen muskets and pistols from the Popham Armoury. Within this sample, there were many signs of re-stocking and replacement or modification of parts. Generally, the firearms fit John Hayward's description of Civil War period English-lock guns which makes one think that he was basing his observations on the Popham Collection. He states:

> Many of them were originally fitted with normal snaphaunce locks, which have been roughly converted to

> flint action by the removal of the separate steel and pan-cover and substitution of the combined type. All are of rough workmanship and more or less standard pattern. The shape of their stocks and their primitive locks would seem to date them from the 1620's or '30's, but the presence of the proof marks of the London Gunmakers' Company on the barrels shows that they cannot be earlier than 1638 (Hayward: 207-208).

The Royal Armouries study (Appendix C) revealed two examples that were obviously converted snaphaunce locks as Hayward describes (Rimer and Blackmore: 21). One of these (M50) is a musket lock (Figure 12). The snaphaunce fence is retained on the pan and slots for a pivoting safety can be seen on the rear end of the trapezoidal snaphaunce plate, although a back-catch now serves this purpose on the English-lock. On the interior of the plate, the hole for the pancover pushrod attachment is still visible at the top of the tumbler. The cock, which appears original, manifests a ringed jaw screw and a stop on the cock spur. Both of these features are indicative of a mid-century date (Colton personal communication: 1990) although it appears that the stop is not integral to the cock spur but a later addition. The jaw screw is also much shorter than usual on these locks and it is debatable if the lock would even work in its present form. The added elements on this lock suggest that the conversion was made post 1650, so if the musket was part of Popham's Civil War arsenal then it was most likely such as a snaphaunce.

None of the remaining locks that were disassembled by the author are obvious conversions but the internal parts are curious. The tumblers, pans, cocks, and even lockplates appear

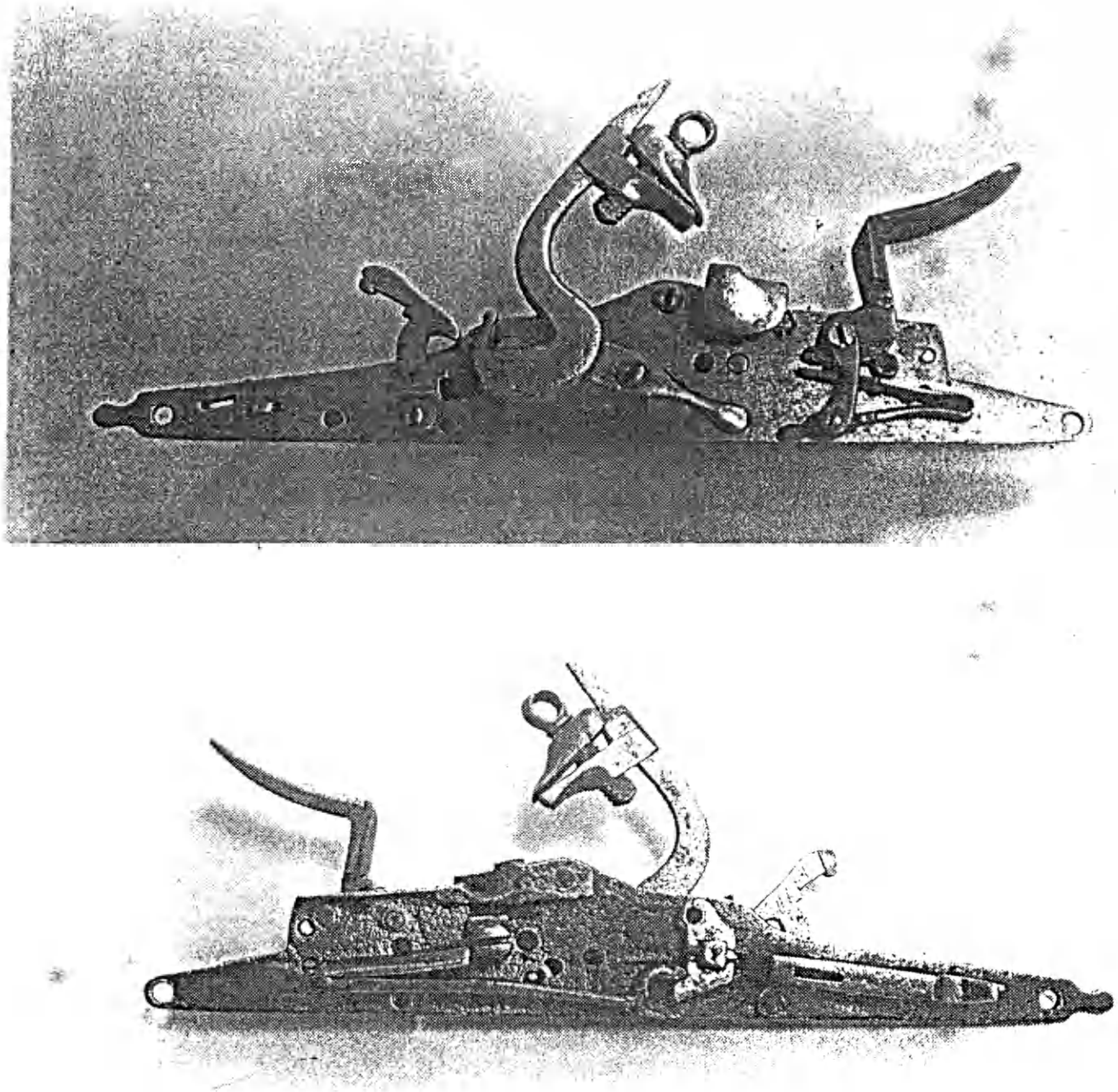


Figure 12. Exterior and interior views of English-lock (M50) converted from snaphaunce (Royal Armouries, Tower of London).

to have been either blanks for snaphaunces that were never assembled as such, or were parts made from dies originally created for manufacture of the snaphaunce lock. Indications of this "snaphaunce connection" are that many of the tumblers had residual arms for attachment of pancover pushrods, lockplates appeared to have been cut down, and many pans were badly seated on the lockplates. Figure 13 shows the interior of the lockplate from musket M67 which is representative of these locks. Although the tumbler has a half-cock ramp for the English-lock, it also has a projection at the top which corresponds to the area of attachment for the pancover pushrod on the snaphaunce. It appears as though the attachment hole has been filed off. In addition, the bottom of the pan retains a guide finger for the pancover pushrod which is not a feature of the English-lock.

The Royal Armouries study of the Littlecote collection of arms defined five variations of the English-lock (Rimer and Blackmore: 21) as cited in Appendix C. Three of the five types are very similar, reflecting the influence of the snaphaunce lock. Type 3 is, in fact, described as being "generally converted snaphaunce locks" in which "half cock is only possible by using the dog safety catch" (Rimer: 122). Types 1 and 2 have the snaphaunce-shaped lockplate and full cock is achieved in the same manner as the snaphaunce. The difference lies in the half-cock position which has been added both to the tumbler and to a nose on the sear. Both of these types

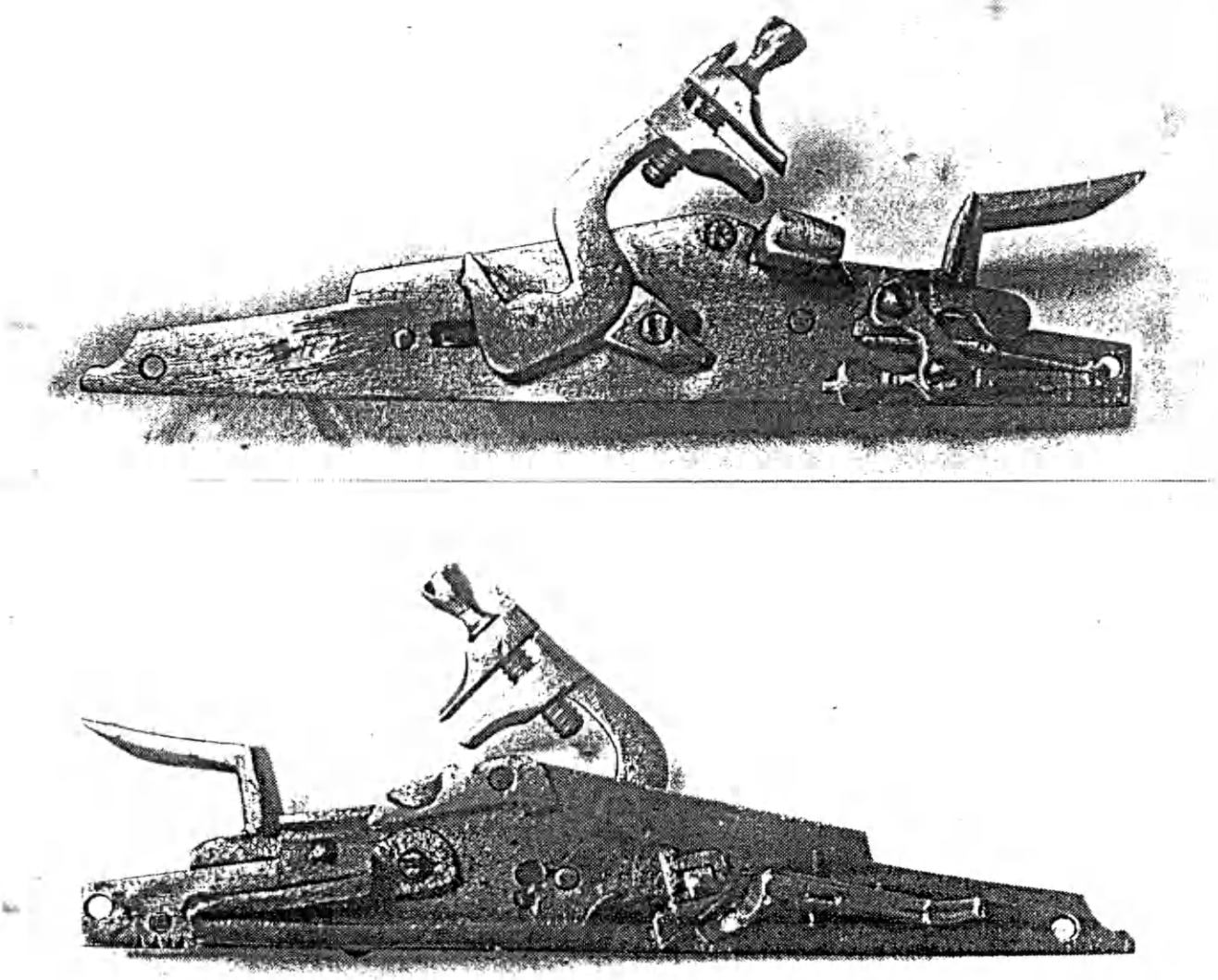


Figure 13. Exterior and interior views of English-lock (M67) from Popham Armoury (Royal Armouries, Tower of London).

patron's name:Frey, Christina A
patron's name:Hicks, Steven A

title:Yorktown shipwreck 44YO88
author:Broadwater, John David, 1
item id:1000504632
due:12/3/2004,23:59

title:Early english firearms :
author:Straube, Beverly Ann, 194
item id:1000505001
due:12/3/2004,23:59

are recorded with and without the back-catch.

Type 4 is described as a lockplate "of later or 'French' form" (Rimer: 122) but still maintains the horizontally-acting sear of the snaphaunce although the sear does not protrude through the lockplate for full-cock. There is no provision for half-cock on the tumbler so this must be achieved by using the back-catch which appears to dove-tail into the back of the cock. These locks have no buffer; instead, a shoulder on the inside neck of the cock stops the forward movement of the cock against the top of the lockplate. Claude Blair has dated the emergence of this feature on flintlocks as sometime in the 1630's (Blair 1983: 74). It seems likely that removal of the buffer first occurred on English-locks at the same time it became fashionable on flintlocks to place the steel spring inside the lock, thereby creating a clean and "uncluttered" plate. This style can be seen "on a small number of flintlocks of the middle of the century" (Blair 1983:74).

An aesthetic response to the French flintlock can also be seen in the cocks of the Type 4 locks. They are short and rounded and "the weakest point of the cock, the neck, was often strengthened with a little scroll across the angle below the bottom jaw" (Blair 1983:74). This form is said to be common from c.1640 to c.1690 and was the precurser of the "throat-hole cock" on military weapons of the eighteenth and early nineteenth centuries (Blair 1983:74).

Twenty-five of the Littlecote Collection pistols were

classified as having a Type 5 lockplate. This group differs from Type 4 only in that there is provision for half-cock on the tumbler. Five of this type of lock (Figure 14) are stamped "R MVRDEN" and are believed to be the product of Robert Murden "who is recorded as producing military pistols during the Civil War" (Rimer and Blackmore: 22). This is no proof, however, that the weapons in the Popham Armory are the products of this gunmaker during this time period. Considered a "specialist in pistols", Murden is described by Cromwell in 1658 as "our Gunsmith" (Stern:88) which clearly shows that he was active during the Commonwealth period as well. Discounting the circumstantial dating of the Murden locks -- that these firearms are supposedly part of a Civil War armory and Murden was known to have been producing guns at the time -- it is necessary to examine other locks of this type with dated elements for more firm temporal evidence.

Anthony Darling illustrates an English fowler with the same cock and back-catch shape as on the Type 4 and 5 Popham Armory English-lock guns except that his example is of the true flintlock ignition system (Darling: 1973). He has dated his firearm to 1647 which would lend credibility to a Civil War date for the Popham arms. Darling's ascription, however, is based on a date on the barrel, which has "two heavily chiseled panels" and does not appear to be original to the gun. Darling hints that the barrel may be older than the present stocking when he reveals that J.F. Hayward's opinion

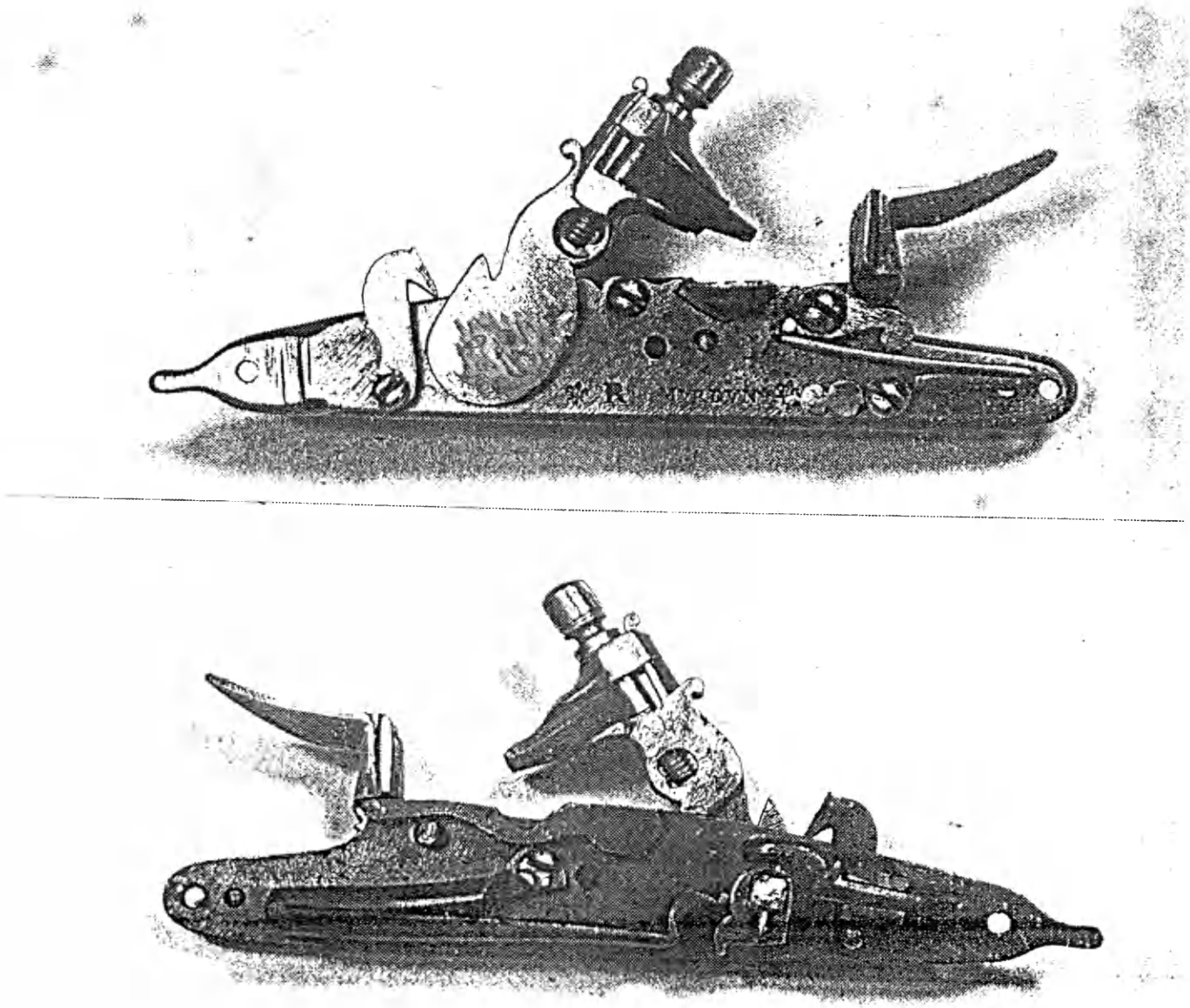


Figure 14. English-lock from Popham Armoury, signed "R. Murden" (Royal Armouries, Tower of London).

of the gun was that "the decorative panelwork on the barrel indicates this component was probably made early in the 17th Century" (Darling:21). The date of 1647 must then, in Darling's view, relate to the time of the restocking and the presently mounted lock.

It is also possible, however, that the ascribed early seventeenth-century date for the barrel is because it is originally from a snaphaunce gun -- not one from the beginning of the century, but one constructed, as its barrel reflects, in 1647. Firearms researchers would be unwilling to associate a 1647 date with this type of ignition system since the commonly accepted belief is that the snaphaunce was supplanted in England by the flintlock in the 1630's (Hayward 1962:207). As has been shown, however, the snaphaunce was used extensively, at least militarily, in England until the 1670's. So, if the barrel was originally part of a snaphaunce fowler assembled in 1647, the present stocking of the gun must date later.

An indication that the barrel has been restocked is that only two of the three attachment holes on the lockplate are used to mount the lock. Darling explains that the "third screw was not used presumably because it would have required grinding down of the barrel breech" (Darling:20). Obviously, the barrel has been mounted with a new lock at the time of its restocking although this was not evident during Darling's analysis since the barrel was not "separated from the stock"

(Darling:21).

The stock provides the final evidence that the fowler dates later than the 1647 date on the barrel. The stock is identified as walnut and "with profile similar to the Alton long gun in the Curtis Museum" (Daring:19). The author had an opportunity to examine this firearm (Figure 15), which is now in the Havant Museum, Hampshire, England. The Alton gun has definitely been restocked and judging by the stock shape this occurred c. 1660-90.

In conclusion, the 1647 date for this firearm, in its present incarnation as a flintlock, cannot be trusted and much more aptly applies to the time in which the barrel was originally mounted with a snaphaunce lock. Thus, it cannot be used as evidence for the pre-1650 appearance of this type of lock.

Another English firearm dated to 1647, and of the type found in the Popham Armory, is represented by a detached lock "formerly of the Jackson Collection" (Hayward 1962:208)(Figure 16). The lockplate is signed by Henry Crips, a London gunmaker who died in 1710 (Christies 1990:13), and the cock bears the date 1647 above armorial bearings (Jackson and Whitelaw:24). In John Hayward's opinion, this dated lock provides "evidence of the adoption of the French sear construction in England before the middle of the century" (Hayward 1962:208). This is a surprising observation since the lock is an English-lock and has the laterally-operating sear of the snaphaunce, not the

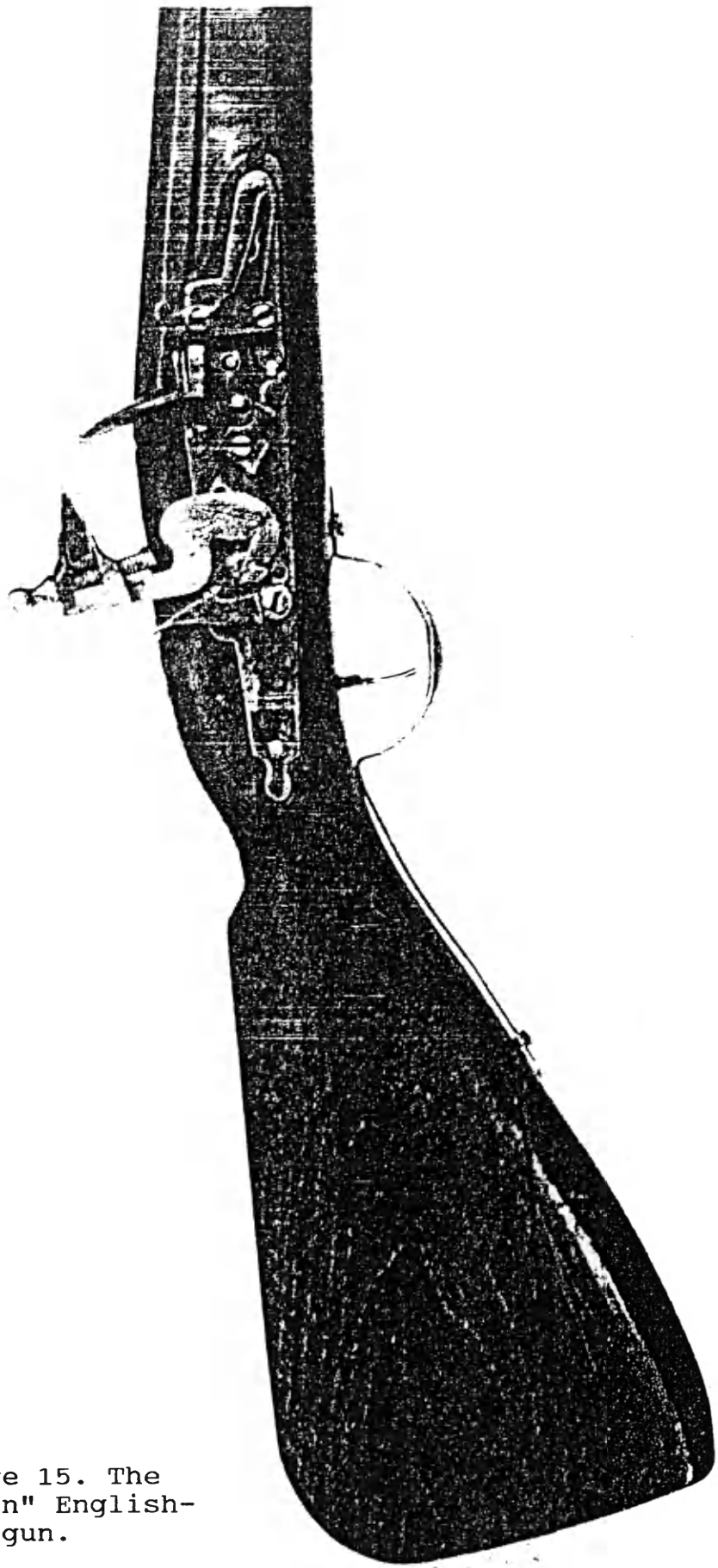


Figure 15. The "Alton" English-lock gun.

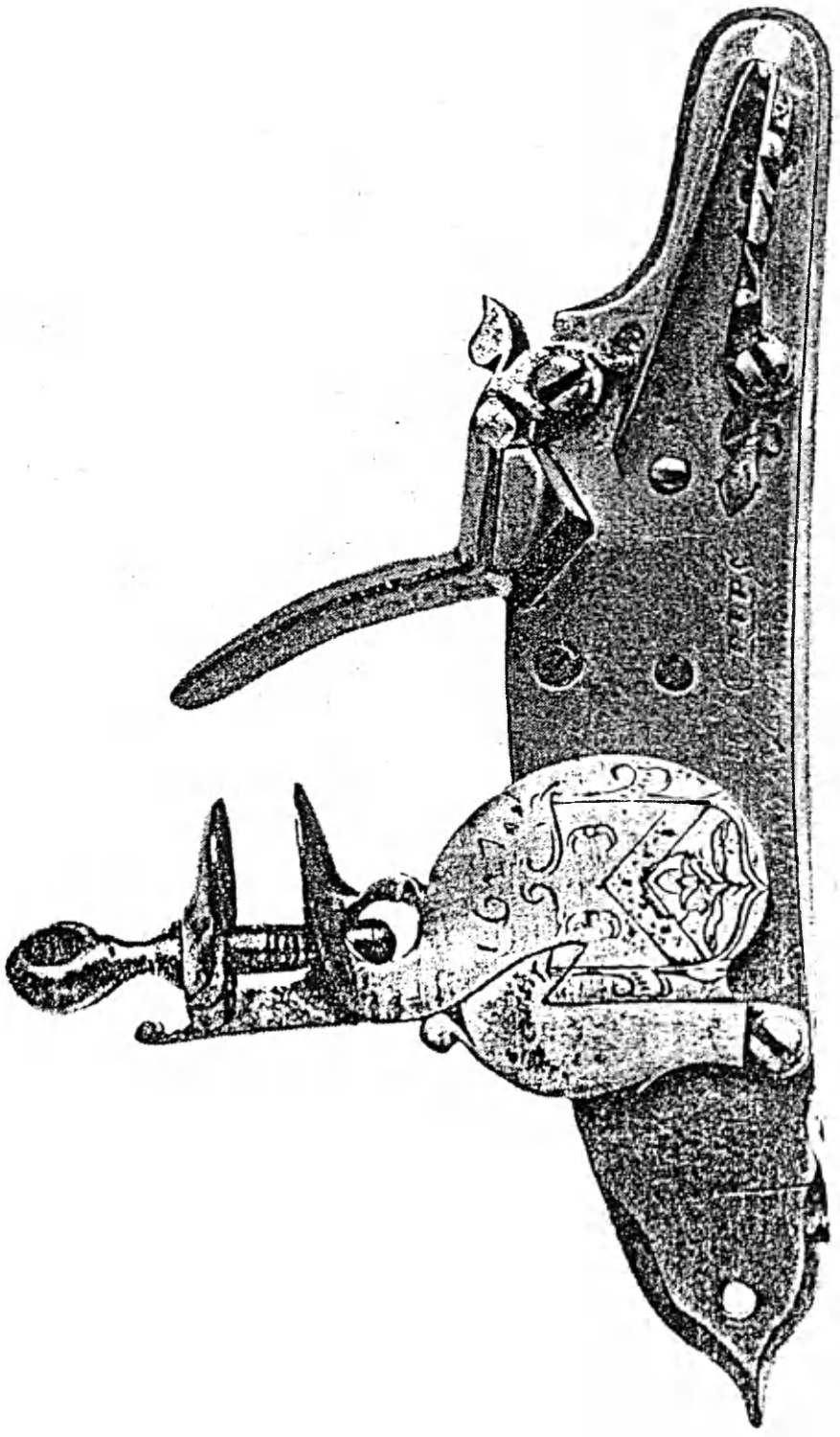


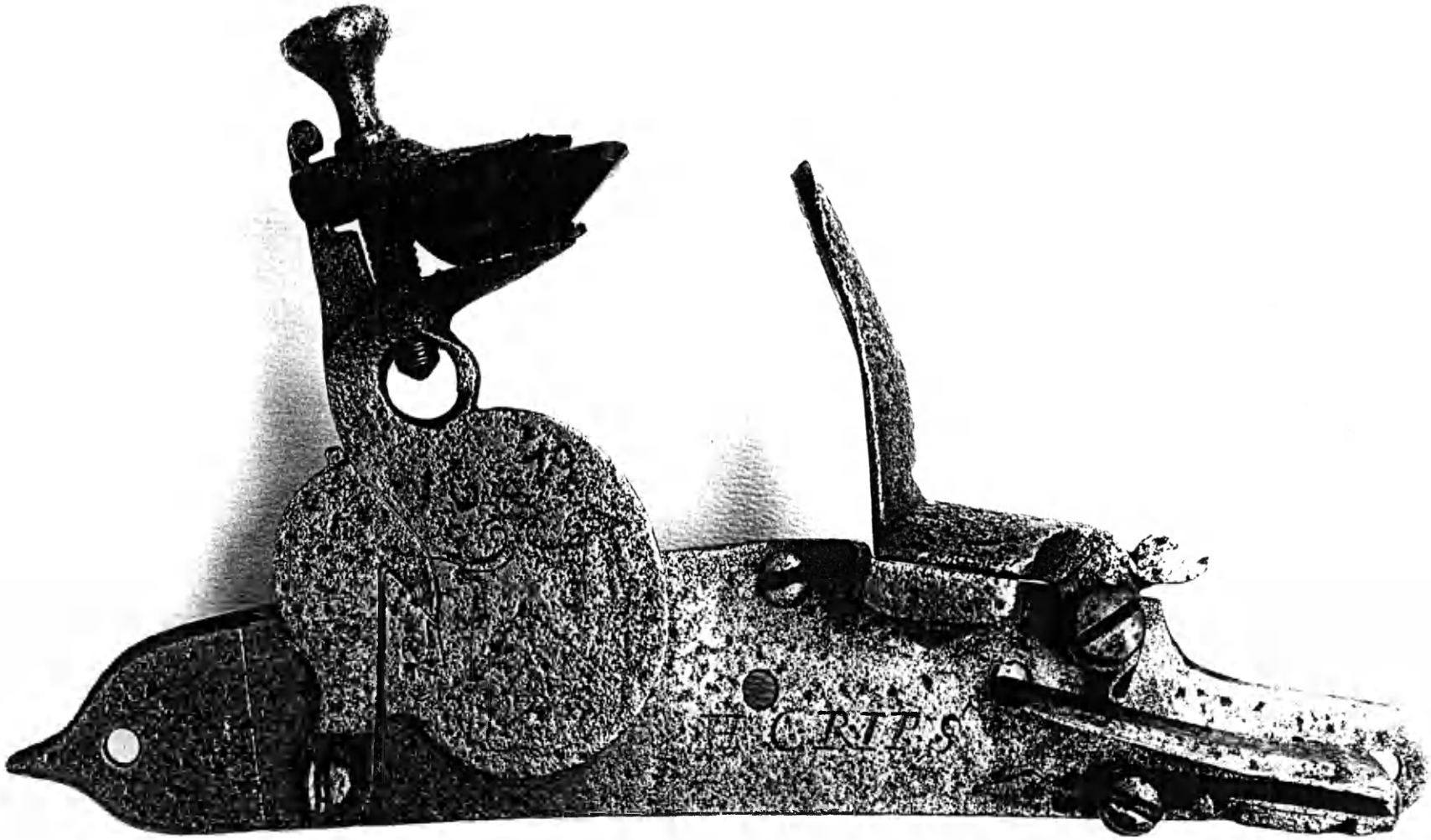
Figure 16. English-lock signed "Henry Crips" and dated 1647. (From Jackson and Whitelaw, Plate XXVIII, Figure 49.)

vertical sear of the French flintlock.

Nevertheless, this lock still would appear to lend credence to a pre-1650's date for the appearance of the English-lock except for the evidence supplied by another English-lock signed by Henry Crips. This lock is on a musket from the J.C.L. Knapton Collection which was recently acquired by The Jamestown-Yorktown Educational Fund (Figure 17). It is dated 1679 on the cock above the identical coat of arms as the 1647 lock. The author had the opportunity to disassemble this firearm and was able to determine that all elements are original to the gun.

Comparison of the two dated cocks provides an explanation for the seeming temporal disparity in stylistically similar elements by the same maker. On the Knapton Collection cock, the year is inscribed astride the central scroll above the armorial shield, whereas on the Jackson lock the date runs continually across the top of the shield. It appears that, at some recent date, the upper breast of the cock on the Jackson Collection lock was cut down in order to partially remove the final digit of the year. The remaining traces of the number were filed away and a partial number "4" was engraved in the space between the "6" and "7". The original engraved date was undoubtedly 1679, just as on the Knapton Collection lock, and the two were probably constructed as part of a series. The fourth quarter of the seventeenth-century date for these locks corresponds with the historical documentation which records

Figure 17. English-lock signed "Henry Crips" and dated 1679 (Jamestown-Yorktown Educational Fund).



Henry Crips as a gunmaker to the Board of Ordnance 1680-1707 (May:202). Most importantly, it removes the foundation for the claim of a pre-1650 appearance of the English-lock. This lock was intentionally modified, probably to give it a Civil War period association and thereby enhance its value.

Another example of the Popham Type 4 and 5 locks is on a pistol at the Tower of London (Figure 18). This English-lock gun bears the signature of William Watson who was Master of the Gunmakers Company from 1645-47. The barrel "bears proof-marks used under the Commonwealth and Protectorate (1649-59)" (Blair: 1983:88) and it is known that Watson died in 1652. This places a rather tight date of c.1650 on the gun which closely resembles the Murden pistols. The lockplates are virtually identical, including an ogee molding on the top of the plate in front of the cock. The only difference is that the Watson lock has "the additional refinement of enclosed steel springs" (Blackmore 1961:25), a feature, as described earlier, that appeared mid-century. So far, this pistol provides the earliest firm date for the appearance of the English-lock, which is after the Civil Wars.

The 1679 Crips locks are very much in the style of the earlier Watson and Murden English-locks and the internal sear operates in the same way. There are some very minor changes to some of the elements on the Crips locks which appear to be associated with the later date of manufacture. The jaw screws on both the Murden and Watson locks are slotted squat

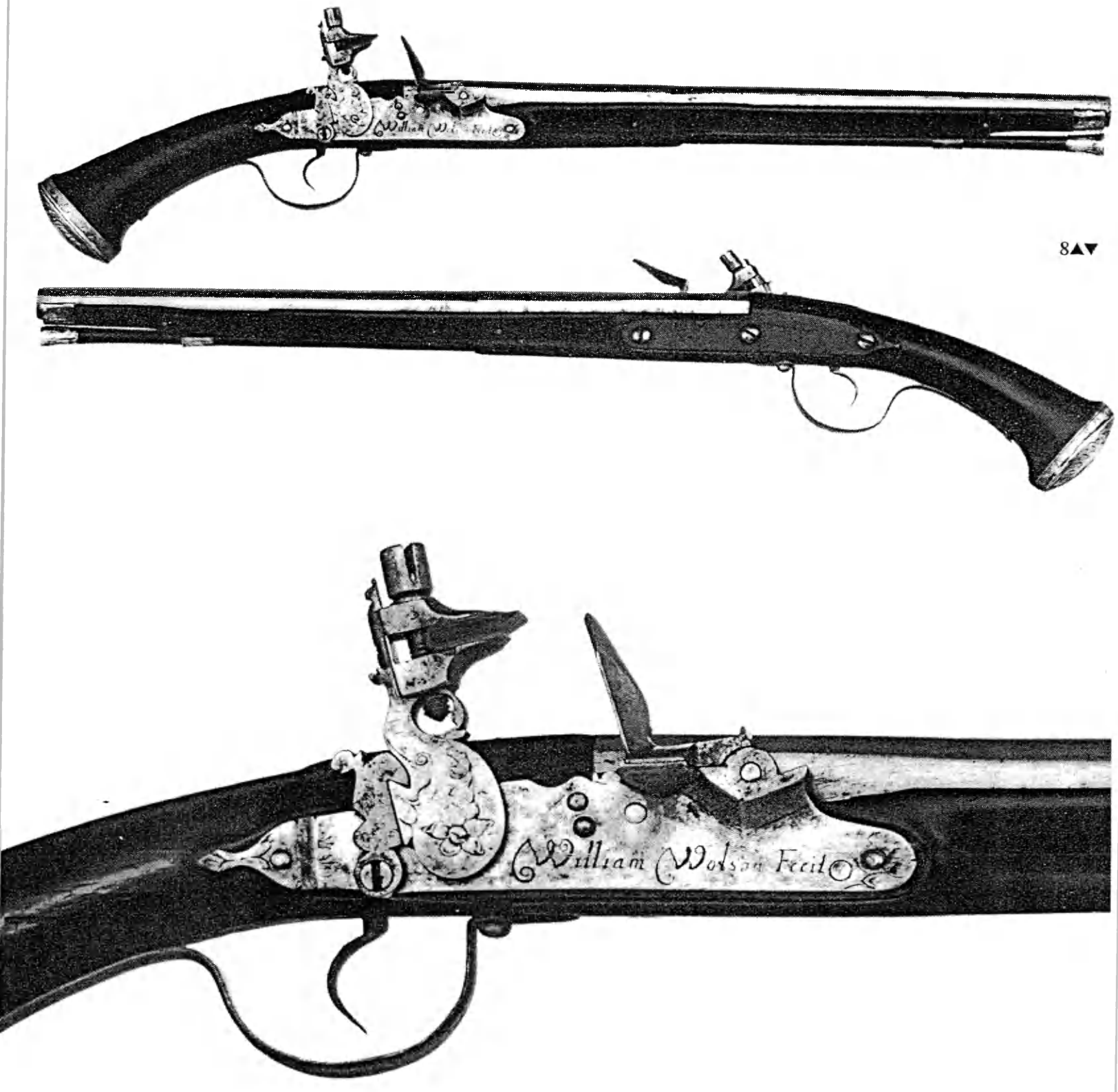


Figure 18. English-lock signed "William Watson". (From Blackmore 1985:9, Figures 8,9.)

cylindical pieces whereas one of the Crips locks has a ringed jaw screw, which has already been mentioned as a mid-century element, and the other has a slotted button terminal. The jaws of the two earlier locks are very squared, in the snaphaunce tradition, while those of the Crips locks are thinner, rounded, and more like a duckbill. Finally, the cock spur terminal curves towards the front of the lock on the locks of the 1670's and toward the back on the earlier locks.

Another English-lock pistol which manifests the later features of the Crips lock is signed by Joseph Stace who was on the Board of Ordnance from 1678-1691 (May:203). It has the button jaw screw, "duck-bill" jaws, dove-tailed back-catch, and forward curving cock spur of the Crips' locks. The Stace lock is unlike the Crips' locks in the method of attaching the cock to the lockplate in that the former has a separate cock screw with decorated head attached from the outside. It is considered by firearms researcher Gordon Howard to represent one of the last English-lock pistols made in England (Howard: 97).

Of the five examples of "late" English-locks or flintlocks just discussed, only one, the musket from the J. C.L. Knapton Collection, has been personally examined by the author. This raises the specter of past studies of seventeenth-century firearms with their unverified observations, so these assessments must at this point be considered just conjectural. It does appear that English-locks

and flintlocks of this type -- characterized by the rounded cock with throat-hole and interior stop at neck, stop on the cock-spur, dove-tailed back-catch, and no buffer -- all date c.1650-80 and reflect the influence of the French flintlock which, by this time, must have been quite familiar in England.

The French domination in firearm design through the seventeenth to mid-eighteenth century has been long acknowledged. "Before the 1640s France exerted little influence over the arms of neighboring countries, but by mid-century French designs had gained popularity abroad" (Gusler and Lavin: 1). As discussed in Chapter 2, the French are credited with the development of the flintlock which "was ultimately to revolutionize firearms design" (Blair 1983:62-63). The "immediate impact" of this improvement in the flint-and-steel ignition system, however, has been described by firearms scholars as "negligible" (Blair 1983:63). There is an explanation for this perception. The date for the invention of the flintlock has been set fifteen to twenty years too early, as previously discussed. If the flintlock is understood to emerge c.1630 then the English adaptation of it at mid-century is rather rapid, especially considering that the outbreak of civil war in 1642 inhibited firearms innovation.

The majority of the firearms pressed into service during the Civil Wars "were out-of-date weapons resurrected and renovated by the needs of war which had seriously disrupted the normal manufacture of guns and had, to some extent

arrested their development" (Blackmore 1961:17). Conversely, "the Restoration in 1660 heralded a refreshing change" in the design of firearms (Blackmore 1985:5). The government could afford to be more receptive to innovation and the gunmakers had the economic motivation to experiment using the "numerous series of published patterns" emanating from France which illustrated the flintlock's "mechanical and artistic development" (Gusler and Lavin:2).

An English pistol of the Popham Type 4 and 5 genre, and seen as a direct result of French design is depicted in Figure 19. From the Clay P. Bedford Collection, it has been placed c.1660 "based on the form of the lockplate, battery, and battery spring" which are illustrated in a French pattern book of that period (Gusler and Lavin: 86). Other features of the firearm are described as relating to the 1650's, which is possible considering the lock's similar appearance to the William Watson pistol.

In sum, there is no direct evidence that the English-lock guns in the Popham Armory date, in their present form, to the 1642-1648 period. Yet the collection has been used as evidence for the existence of English-locks in this time period. Rather, as the documentary record suggests, the matchlock was the predominant long arm of the Civil Wars, supplemented in special cases, by snaphaunces. Pistols were either wheellocks or snaphaunces, of which very few have survived.

Another collection of so-called Civil War period English-

Figure 19. English-lock pistol reflecting the influence of French design. (From Gusler and Lavin: 87.)

lock guns which the author had the opportunity to examine is in the Town Hall in the City of Oxford. Of the fourteen muskets, five are fitted with "the earlier type of 'English-lock'(Spencer:10) like those at Popham. One is a true flintlock from c. 1690, and the rest are English-locks which have been dated c. 1650-70. Examination of the "early" English-locks revealed similar alterations as those in the Popham Armory such as restocking and the use of snaphaunce parts or snaphaunce blanks. One was even equipped with a matchlock barrel as were many of the Popham muskets. Michael Spencer has speculated about how this collection of arms, spanning the second half of the seventeenth century, was assembled as the property of the City of Oxford. In his opinion, the Monmouth rebellion in 1685 is the most plausible explanation to account for the majority of the arms although he concedes that "some of the weapons under consideration, if dated correctly, would then have been rather old-fashioned" (Spencer:16). This observation, concerning the "early English-lock", is made time and time again. There is a consistent disparity between the date when this ignition system is believed to have first appeared and the dates when it is documented in use. Explanations are extended by researchers, as will be discussed later, that obsolete weapons were often provided for unsophisticated markets and that "even new trade weapons were frequently made to an archaic design" (Spencer:16). No one has considered that perhaps the date of

the mainstream manufacture and use of these weapons may be twenty years later than is currently believed.

An example of a firearm, dated because of its appearance twenty to thirty years earlier than historical evidence proves it to be, is illustrated in Figure 20. This musket's lock has been described as the same type as on the "Civil War period" firearms at Littlecote and Oxford (Blackmore 1980b: 63; Spencer: 16) and was first illustrated by Ian Glendenning in 1951 who dated it "circa 1640 or earlier" (Glendenning: 105). Howard L. Blackmore has subsequently re-examined the weapon and places it c.1660's (Blackmore 1980b).

Like the previously discussed examples, the musket is a plain military arm of average craftsmanship, distinguished only by an ivory inlay on the butt engraved "Sultan Bantam". The Sultan of Bantam governed "a powerful Mohammedan state" (Glendenning: 108) on the island of Java and the musket is believed to have been part of a gift from the East India Company to strengthen trade relations with the ruler. Two such gifts have been documented, one in 1639/40 and the other in 1662/3 (Blackmore 1980b:63).

Based on three pieces of evidence, Blackmore argues sucessfully that the gun must have formed part of the latter gift. The first indication is that the musket has a brass serpentine sideplate and, according to Blackmore, "English muskets of the 1640's are without exception not furnished with sideplates. It is a strengthening device which was not

Figure 20. Lockplate from "Sultan of Bantam" English-lock musket. (From Blackmore 1980b, Plate XV.)

introduced until the 1650's" (1980b:64). The second clue is the butt style of the walnut stock (Figure 21). The 100 muskets comprising the 1663 gift were described in the Minute Books of the Board of Ordnance as "well wrought with french stocks. . ." (Blackmore 1980b:63). Using Arne Hoff's description of this form of butt, which did not occur on muskets until the 1650's, Blackmore points out that this fits the "Bantam" gun (1980b:64). The last bit of evidence is the maker's mark, "RS" under a swan, which Blackmore suggests belongs to Robert Steadman, one of the gunmakers of the 1663 gift.

Blackmore admits that "if the lock of this gun is considered on its own, I think that most collectors would agree with Glendenning's dating of c.1640" and "it is a type of construction which has been dated by some writers to as early as 1630" (1980b: 63). Placing the manufacture of this English-lock in the 1660's has some implication for the so-called Civil War period firearms at Littlecote and Oxford with which it has been compared. Unwilling to accept that this style of lock belongs to this later date, Blackmore tries to explain the incongruity by giving examples of stylistically antiquated English and Dutch weapons which were supplied to "unsophisticated" markets such as the tribes of North Africa and the North American Indians. ". . . once a pattern of flintlock issued to natives had been established then that pattern continued to be preferred long after it had been

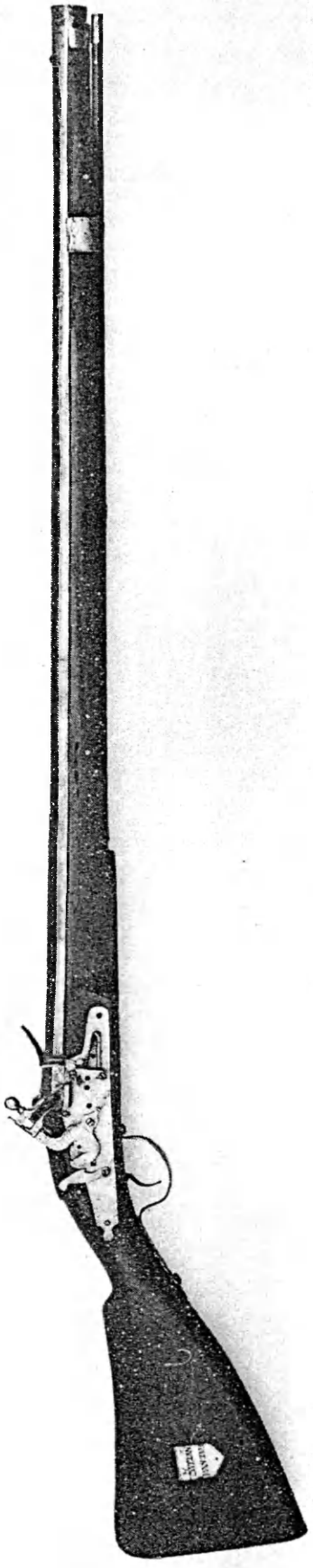


Figure 21. "Sultan of Bantam" musket showing butt style. (From Blackmore 1980b, Plate XIV)

superseded elsewhere" (Blackmore 1980b:64).

CHAPTER IV

THE EVIDENCE: AMERICAN

Thus far this thesis has examined English collections of the English-lock without uncovering any evidence, other than circumstantial, that this ignition system was manufactured any earlier than c.1650. Now, the focus will turn to examples of the English-lock which have been excavated on American archaeological sites or which reside in American museum collections for indications of date.

In 1956 Harold Peterson, in his oft-cited Arms and Armor in Colonial America, stated that the English-lock, which he called the dog lock, was the most common firearm used in colonial America between 1625 and 1675. He based his observation on the fact that this type of lock had "been found in quantity in the excavations of 17th-century sites, and several well-preserved and well-authenticated specimens exist in public and private collections throughout the country" (Peterson 1956:32). Cited by Peterson as some of these examples are "a beautifully preserved early dog lock . . . excavated at Yorktown," "a very early and most interesing dog lock . . . found at the site of the Jireh Bull garrison house in Rhode Island," "two of the remaining guns of the Plymouth

colonists," and "the lock of the 'old style musket' with which King Philip was killed in 1676" (Peterson 1956: 32). Each of these English-locks recovered in America will be re-examined, as well as some recently excavated examples, beginning with the "Yorktown dog lock".

Peterson encaptioned an illustration of the gunlock in Figure 22 with "early dog lock excavated at the site of a 17th-century outpost, Yorktown, Va."(Peterson 1956:25). While this lock is in the possession of Colonial National Historical Park and has been given a Yorktown catalog number (Y-206), there is a great deal of confusion surrounding its actual provenance. The catalog card assigns this object to Accession #15 which is not an archaeologically-derived collection but a donation to the National Park Service by the Gloucester Historical Society. The accession, dated April 1937, is described as the Stephen Campbell Wolcott Collection of Firearms including "101 shoulder arms of 18th, 19th and early 20th centuries; also bullet molds, powder flasks, powder horns, bayonets and gunsmiths tools."

As the only archaeological artifact in the Wolcott Collection, the gunlock in question is very much out of character with the rest of the collection; in addition, although it dates much earlier than the other objects, it receives no special mention in any of the associated documentation. Furthermore, the gunlock is not included in an itemized list of the Wolcott Collection dated April 28, 1937,

Figure 22. English-lock lockplate (Y-206). (Colonial National Historical Park

which was compiled by park superintendent B. Floyd Flickinger for legal purposes.

Park archives contain photographs of this object dated September 17, 1938 (Photo #'s 7132 and 7135) and describe it as "'Dog lock' c.1620-1640, English. Recovered in American Artillery Park Dump in 1936." Thus far no documentation has been found describing any archaeological excavations at this site (James Haskett 1989: Personal Communication) so it is not known how this very significant artifact is contextually related.

Constructionally, this lock embodies what has been defined by S.J. Gooding as the Type 2 or "true" dog lock in that it has a snaphaunce-type sear and the "dog" provides the only safety (Peterson 1964: 118). It is dated by Peterson to the "early years of the seventeenth century" and has been cited by other studies to establish the introduction of the "dog lock" by the English c.1620 (Eaves 1970:294; Mayer:19; Faulkner:66). Instead, close examination of this artifact reveals that it was originally made as a snaphaunce and that it was later converted to an English-lock with back-catch. Its archaic appearance is based primarily on the trapezoidal lockplate which is an original snaphaunce plate; but the alterations converting it to An English-lock occurred much later.

This alteration on the lock is immediately apparent with the poor fit of the pan. Comparing this lock with the template

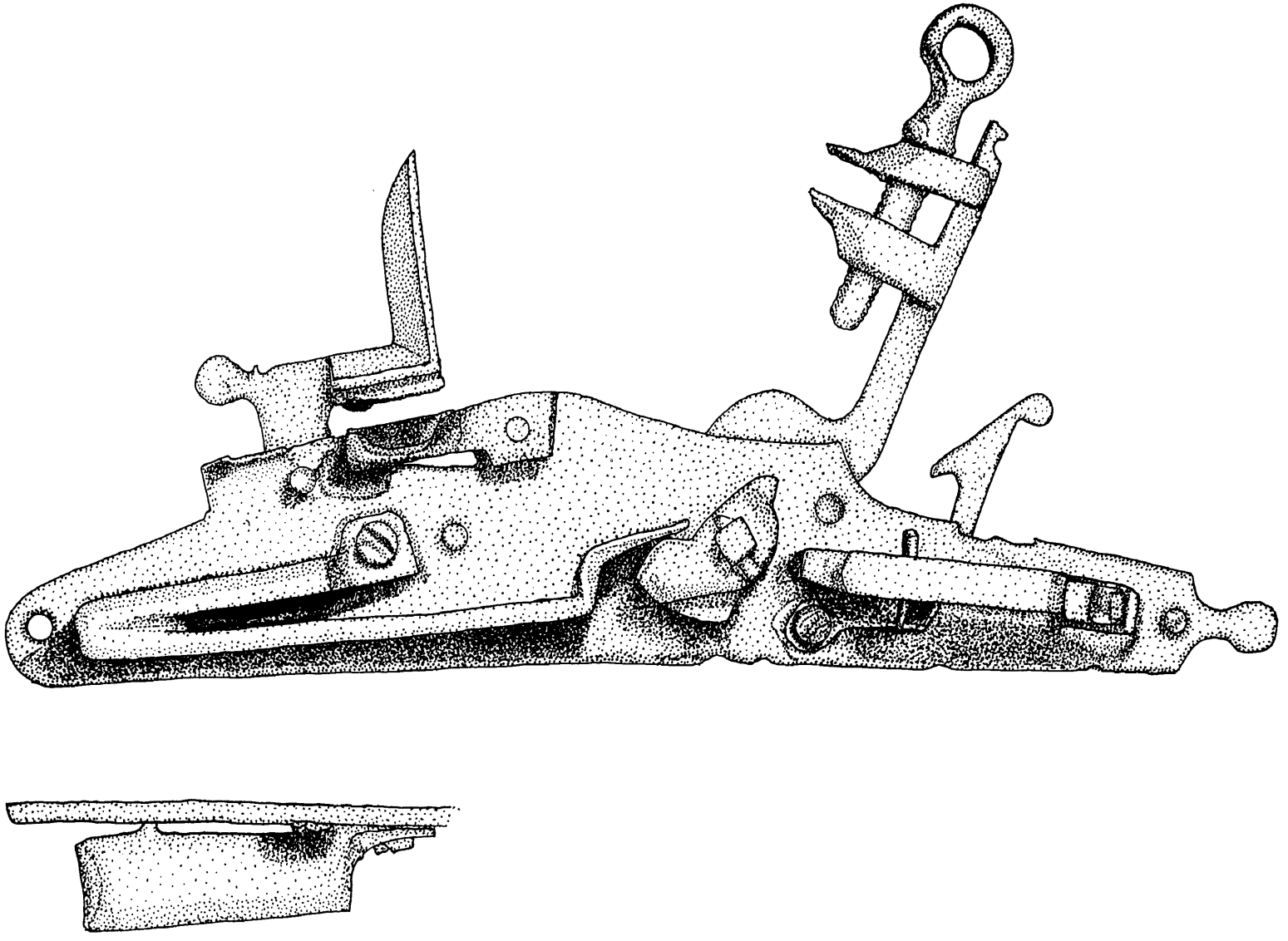
from the James I gift gun (Figure 8), it can be seen that the pan area has been modified to incorporate the new steel-and-pancover. Since the arc of the steel-and-pancover is much shorter than that of the snaphaunce steel, it was necessary to move the steel-and-pancover attachment closer to the cock. The inner plate, as illustrated in Figure 23, has the recessed area provided for the ramp of the pancover pushrod and yet it is not centered under the cutout for the pan as it would be for a snaphaunce. It appears that the slot on the plate for the pan has been enlarged toward the rear of the lock and filled to the front by lap welding a section to build up an area for the attachment of the new steel.

The lock retains its snaphaunce mainspring as evidenced by the inner notch required to accomodate the lever of the sliding pancover. This detail is also illustrated in Figure 23.

There is a partially plugged hole above the opening for the sear which corresponds to "n" on the diagram for the 1604 gift gun (Figure 8) and which indicates that the lock once had a sliding safety. The corresponding slot " q " for this safety is not visible, but there is considerable secondary hammering in the rear area of the plate which could have obliterated the evidence.

An X-ray of the lock plate shows no sign of the attachment for the original safety, but it does disclose the slight separation of a hammer weld between the forward and

Figure 23. Illustration of Y-206 inner lockplate. (Drawing by Jamie E. May.)



rear portions of the lock plate (Figure 24). This clearly shows the reshaping to the front of the lock, as described above, through the addition of a welded section of plate designed to accept the new steel-and-pancover and its spring. Significantly, the lock retains its original mainspring, which is notched for the pancover pivot arm; and its original snaphaunce sear, which protrudes through a slot behind the cock for the full cock stop, but which has no provision for half-cock. This is particularly interesting since the tumbler does have a ramp for the half-cock extension of an English-lock sear.

The steel is short and has a pronounced curve with a strongly ridged back, indicating a date approaching the middle of the century. Also suggestive of this mid-century date are the ringed jaw screw and the stop for the upper jaw on the cock spur (Richard Colton personal communication: 1990). The pancover continues the ridge of the steel, but extends on both sides in flanges to cover the pan in a manner reminiscent of early Scottish locks. The lock saw long use as shown by wear on the jaw screw whose threaded section has been hammered to broaden the screw and tighten its fit. This alteration is commonly found on well-used gunlocks with worn screw holes.The screw threads have been obliterated on the sides as a result of hammering to make a tighter fit in the worn screw holes.

In conclusion, Y-205 is very clearly a snaphaunce which has been converted at some point to an English-lock and used

Figure 24. X-ray of Y-206.

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extensively as such before it was lost or discarded. But when did the conversion occur? As discussed above, features on the lock suggest c. 1650 even though the overall appearance of the lock has led researchers to place it much earlier. A re-examination of some of the English-locks with American archaeological or historical provenance, which have been used to establish the chronology of lock types, may help clarify this problem.

In 1943, Joseph Mayer illustrated what he called an "early dog-lock" dating c. 1620 and paralleled by only two other such locks in America -- the one just discussed (Y-205) and the Jireh Bull lock presently held by the Rhode Island Historical Society (Mayer:19). Mayer's lock was excavated from a Seneca Indian village which was occupied c.1675-1687 (Puype:68), and judging from the characteristics of the lock, in light of the locks just examined, it was on a fairly modern firearm when it was in use.

The trapezoidal lock plate has the ringed jaw screw and the stop on the cock spur as on the Yorktown lock. The breasted cock, back-catch, and strongly curved steel-and-pancover also reflect those parts on the Yorktown lock. Unlike the latter, however, is the provision for half-cock on the sear (Mayer:20). There is nothing about this lock, except the archaic shape of the plate, that suggests a date any earlier than mid-17th century and yet this lock has been used to suggest "that designs already obsolete in Europe are

encountered only in comparatively late Indian sites"(Puype: 9). The implication is that the Indians were given second-hand goods (Faulkner:66) or, if newly manufactured, the design of the trade guns was affected by traditionalism, as discussed earlier with the "Sultan of Bantam" gun (Blackmore 1980:64). If, indeed, the dating of early English locks has been thrown off by including unrecognized conversions in chronologies, then this trading pattern would have to be reconsidered.

The Jireh Bull lock (Figure 25) cited by Mayer was excavated from an archaeological context of c.1675 (Richard Colton personal communication: 1990). Again, it has the archaic lock shape, the breasted cock, the stop on the cock spur, and the very curved steel-and-pancover as on the two previous examples. It does not have a back-catch or any apparent provision for one. On the interior of the lock (Figure 26), the sear has a half-cock arm with an angled nose which engages on the half-cock ramp on the bottom of the tumbler. The top of the tumbler has a small projection which corresponds to the location of the snaphaunce pancover pushrod, but which appears to have been filed down. This suggests that the lock is either a conversion or that it was constructed of blank parts originally made up for a snaphaunce lock.

An obvious example of a converted snaphaunce is the Alderman lock now in the collections of the Massachusetts Historical Society in Boston (Figure 27). This lock is

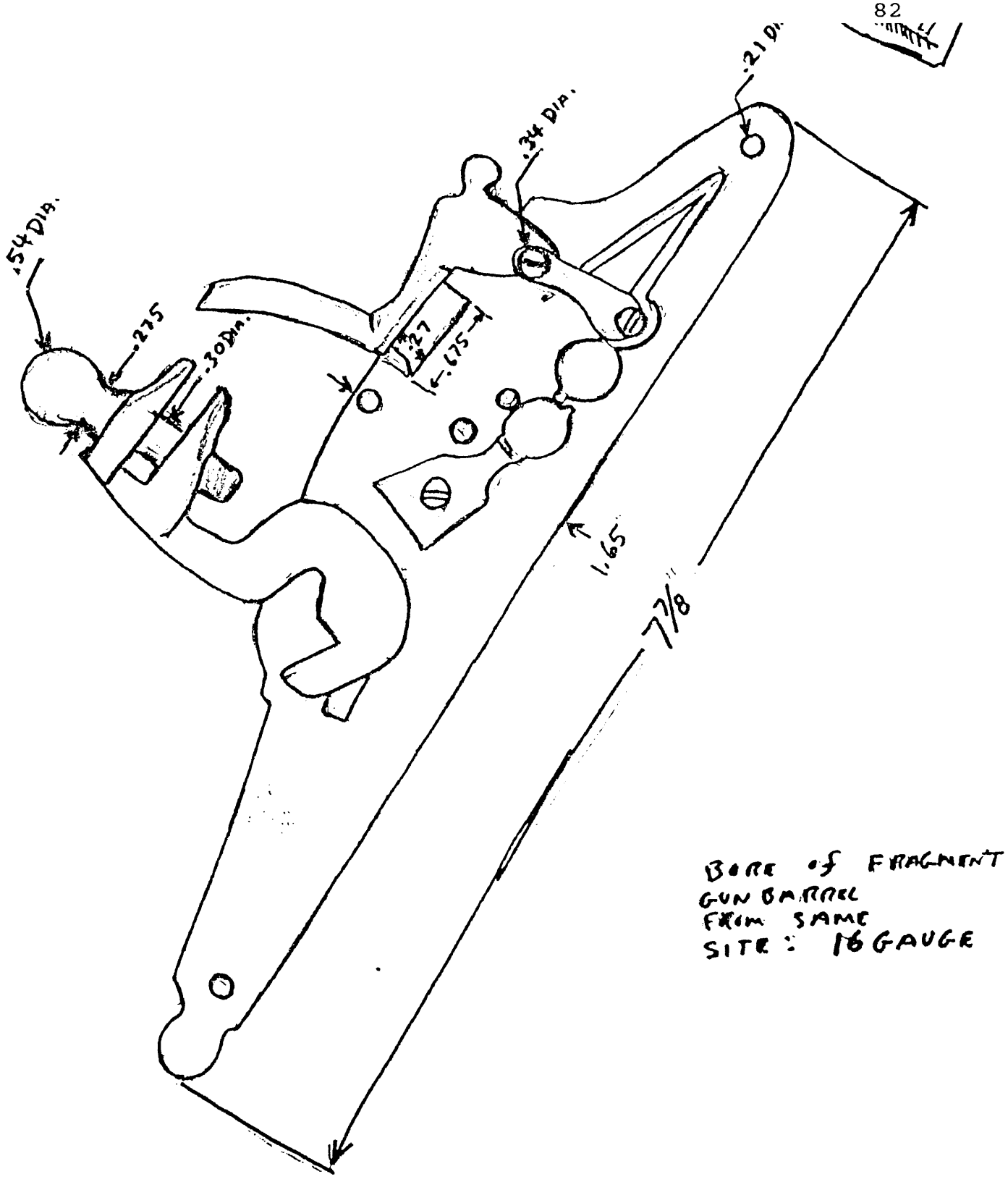


Figure 25. Drawing of exterior of Jireh Bull lock. (Drawing by Richard Colton.)

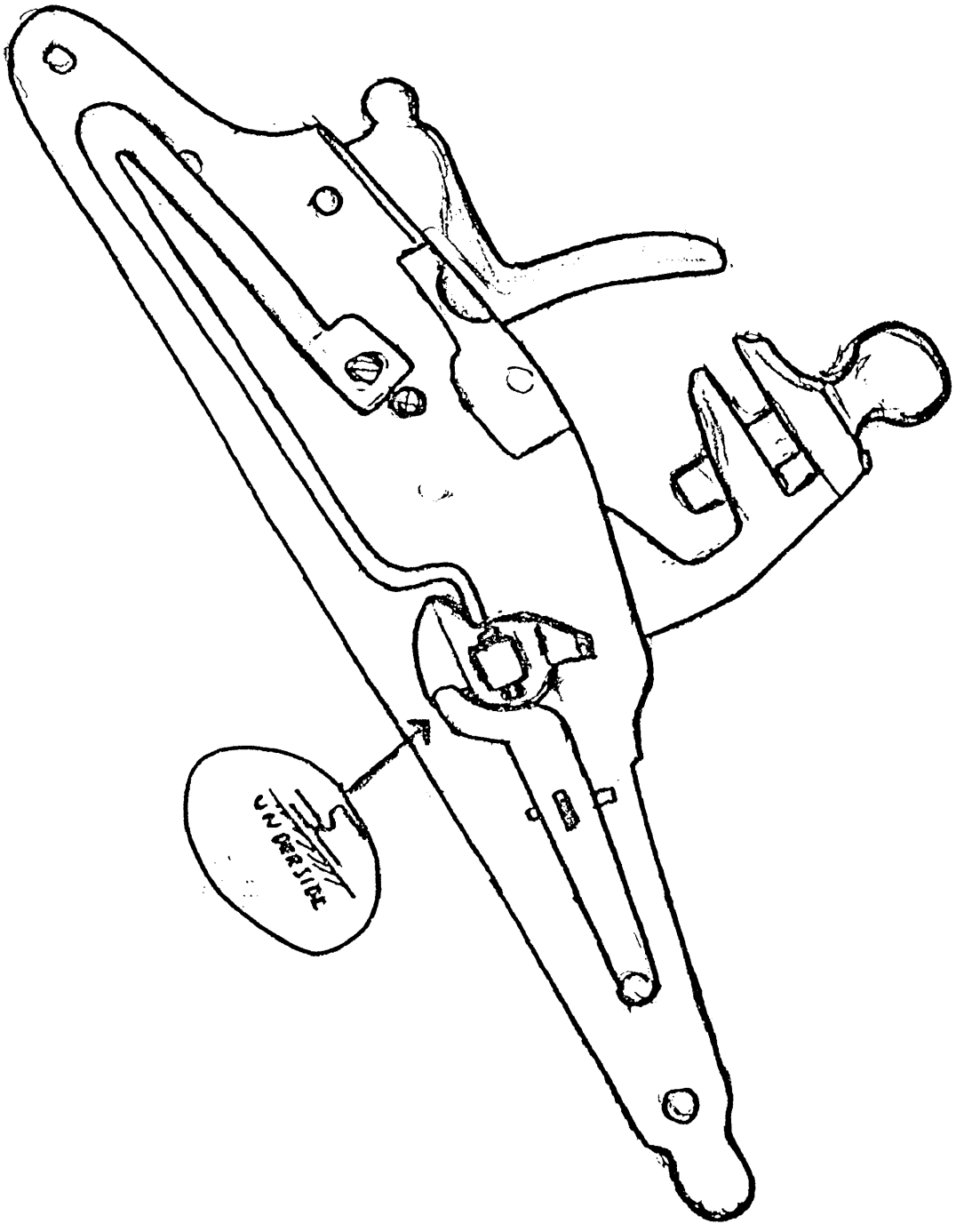


Figure 26. Drawing of interior of Jireh Bull lock. (Drawing by Richard Colton.)

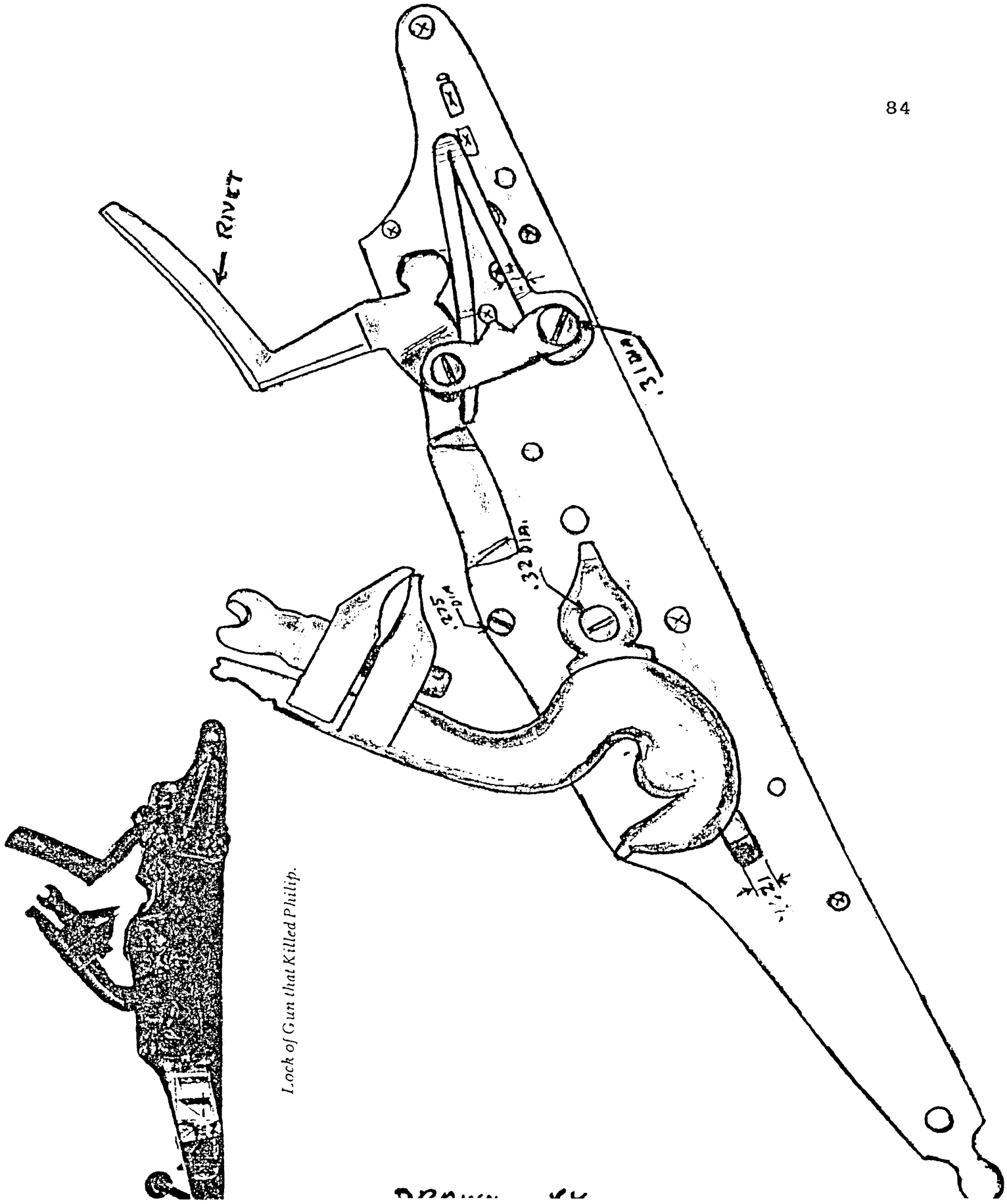


Figure 27. Drawing of exterior of Alderman lock. (Drawing by Richard Colton.)

purported to be from the firearm of a Christian Indian named Alderman who used it to kill King Philip, Indian chief of the Wampanoags in 1676 (Brown:131).

A drawing of the interior of the lock (Figure 28) shows the hole in the tumbler for the snaphaunce pancover pushrod toe. The lockplate retains the holes for the pancover spring, steel pivot and pancover pivot. The pan is a replacement as is the steel-and-pancover and mainspring. There is a welded plate on the forend of the lock but it appears to have been present during the lock's life as a snaphaunce for it contains a lock mounting screw hole and slots for the steel spring and mainspring support that are not used on an English-lock. There is no provision for half-cock on the tumbler or the sear and the lock has no back-catch although there is a hole behind the cock visible on the exterior of the lock. It is possible that this hole could relate to "A" on the gift gun template, a pivoting safety pivot screw. The cock is round-sectioned and swan-shaped and appears to belong to the original snaphaunce. Additionally, it has no stop on the cock spur for the upper jaw which is usually seen on English-locks.

Another English-lock, which was excavated from Fort William Henry in Pemaquid, Maine (Figure 29), has been described as being "virtually identical" to the Alderman lock and "very similar" to the Yorktown example (Faulkner: 66). This lock was found in a c.1692-1696 context (Faulkner:63) and has many features in common with all of the locks described

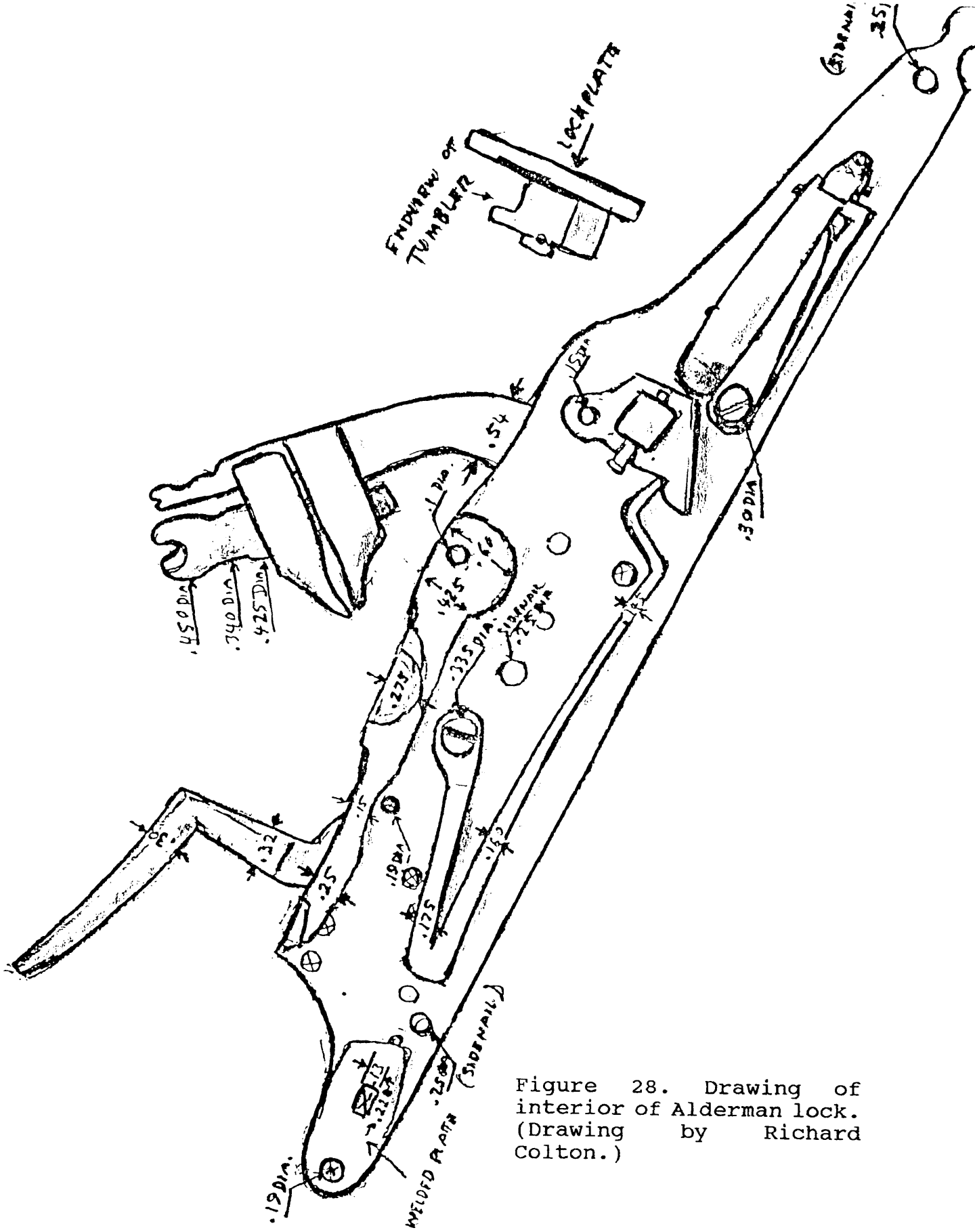


Figure 28. Drawing of interior of Alderman lock. (Drawing by Richard Colton.)

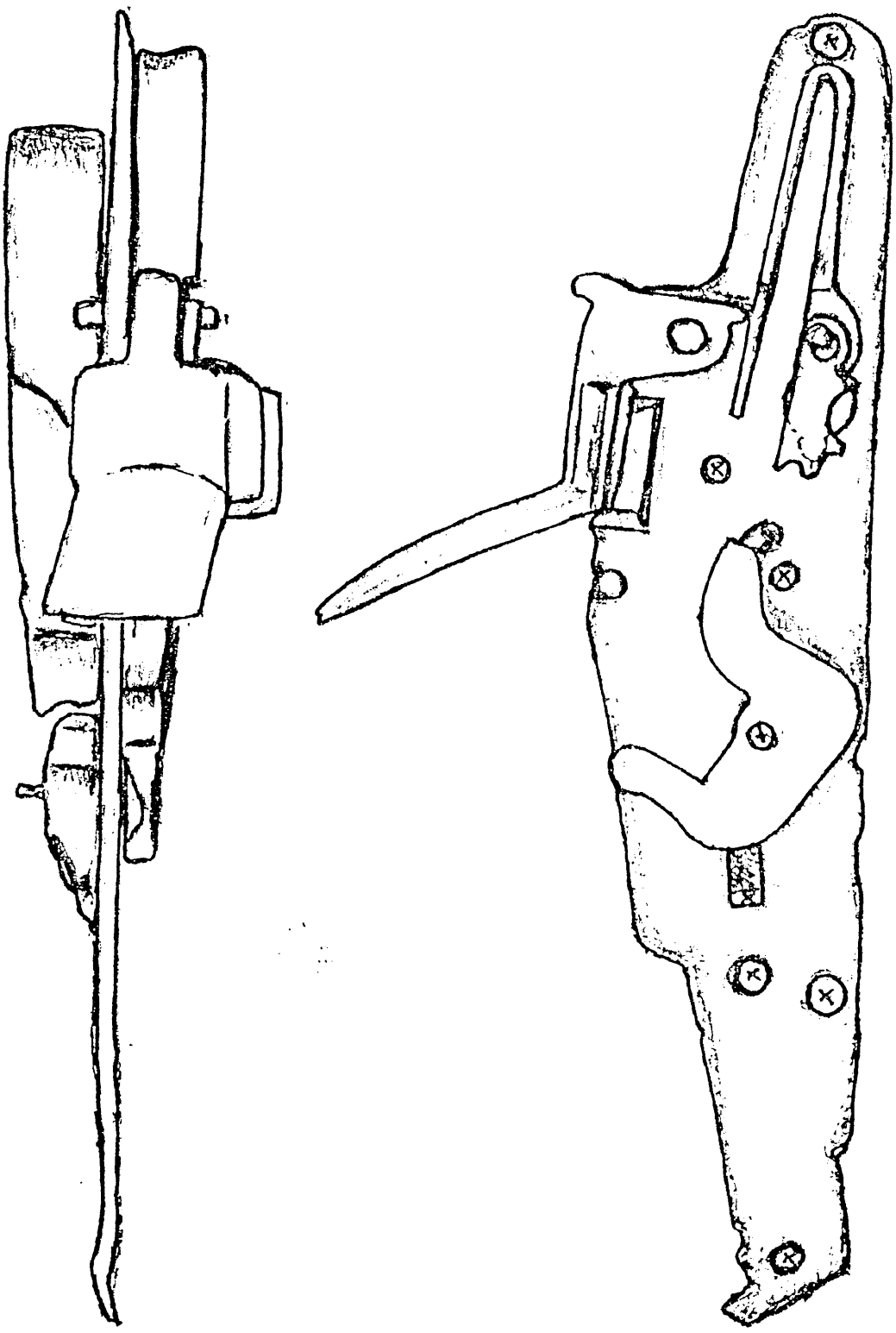


Figure 29. Drawing of exterior of Pemaquid lock. (Drawing by Richard Colton.

above. The lock plate is trapezoidal, the cock is flat sectioned and breasted, and the steel of the steel-and-pancover is curved. The sear is missing on the interior of the lock (Figure 30) but the tumbler is intact and has a half-cock ramp as on the Jireh Bull lock. Also, like the latter lock, the Pemaquid tumbler has a projection on the top which corresponds to the site of the pancover pushrod attachment in the snaphaunce. Again, it is possible that the tumbler was a snaphaunce forging adapted for use on an English-lock. The lock has no back-catch on its exterior but, as on the Alderman lock, there is a hole behind the cock which probably accomodated one. As suggested above, this hole may indicate a pivoting safety, especially since the Pemaquid lock has a hole roughly corresponding to "n" on the gift template which is the safety spring retaining screw.

Also from a c.1690's context is an English-lock excavated at Strawberry Banke, New Hampshire (Richard Colton, Personal Communication: 1990) (Figure 31). Although it is missing its steel-and-pancover, it has the flat-sectioned breasted cock of the Bull and Pemaquid locks and a stop on the cock spur as Y-205 and the Jireh Bull locks. Also like the Jireh Bull lock are the buffer and steel spring terminals which have been described by Ian Glendenning as the "blob and tit type" (Glendenning 1951:106). A drawing of the interior of the lock (Figure 32) shows a similar tumbler and sear arrangement as on the Bull lock, including the projection on the top of the

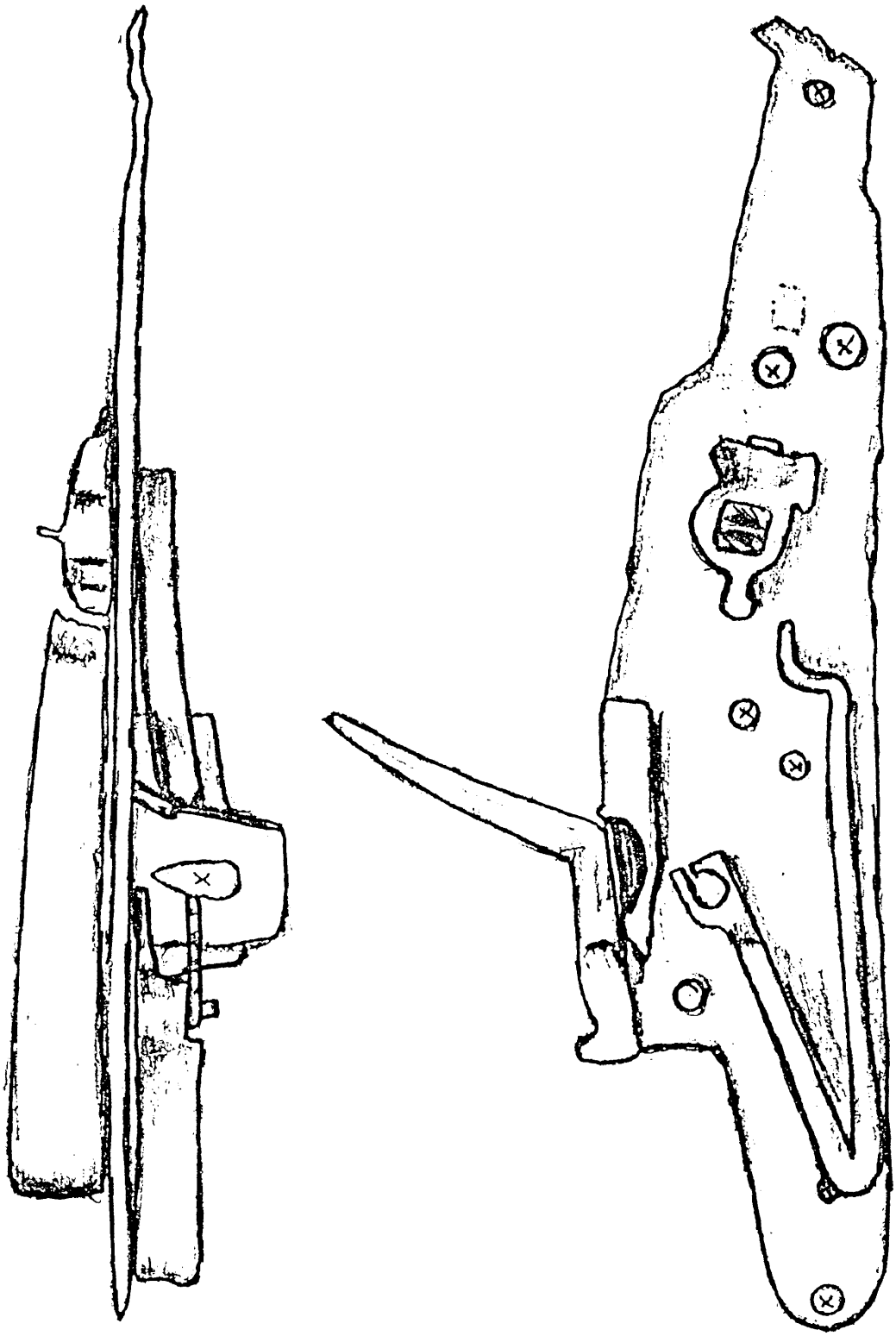


Figure 30. Drawing of interior of Pemaquid lock. (Drawing by Richard Colton.)

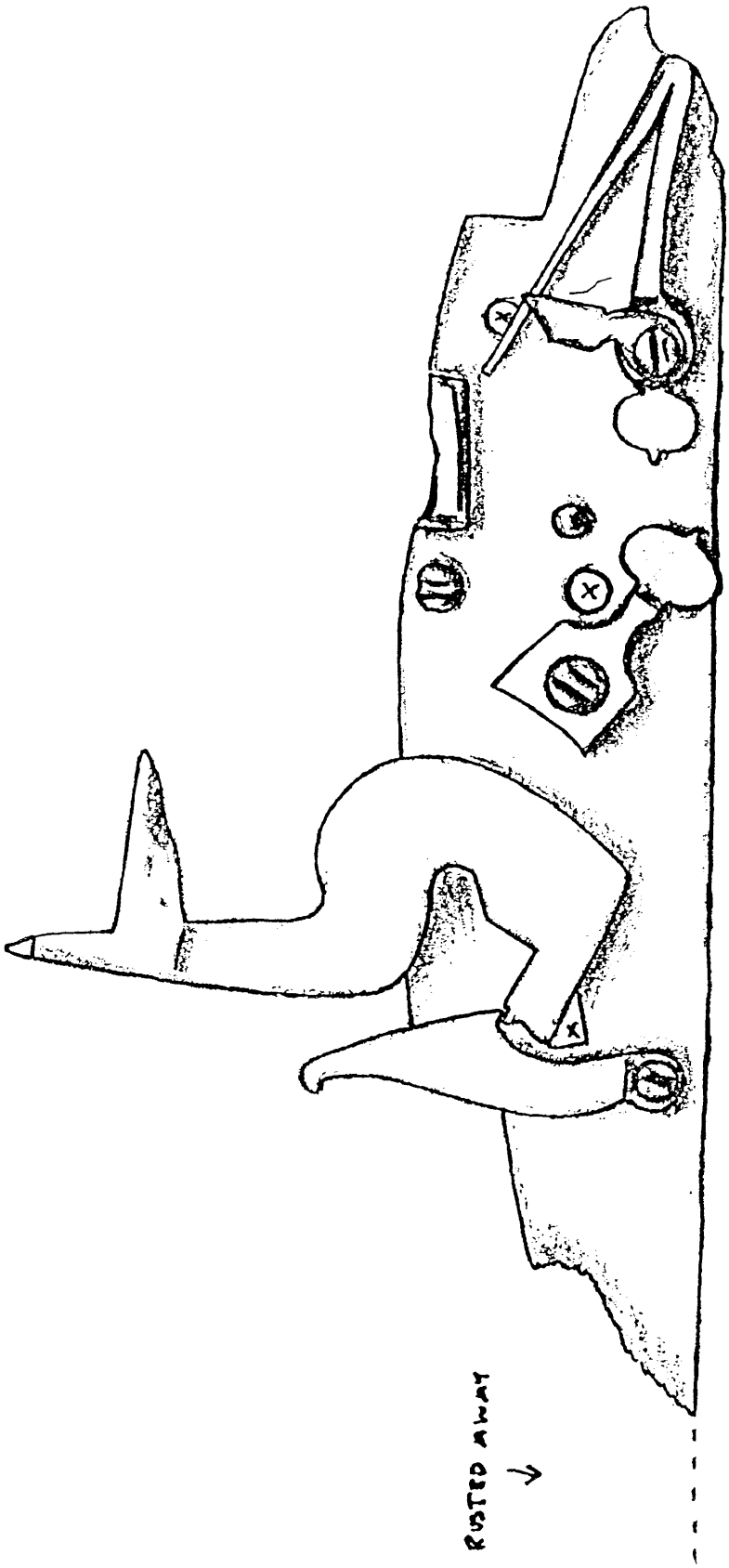


Figure 31. Drawing of exterior of Strawberry Banke lock. (Drawing by Richard Colton.)

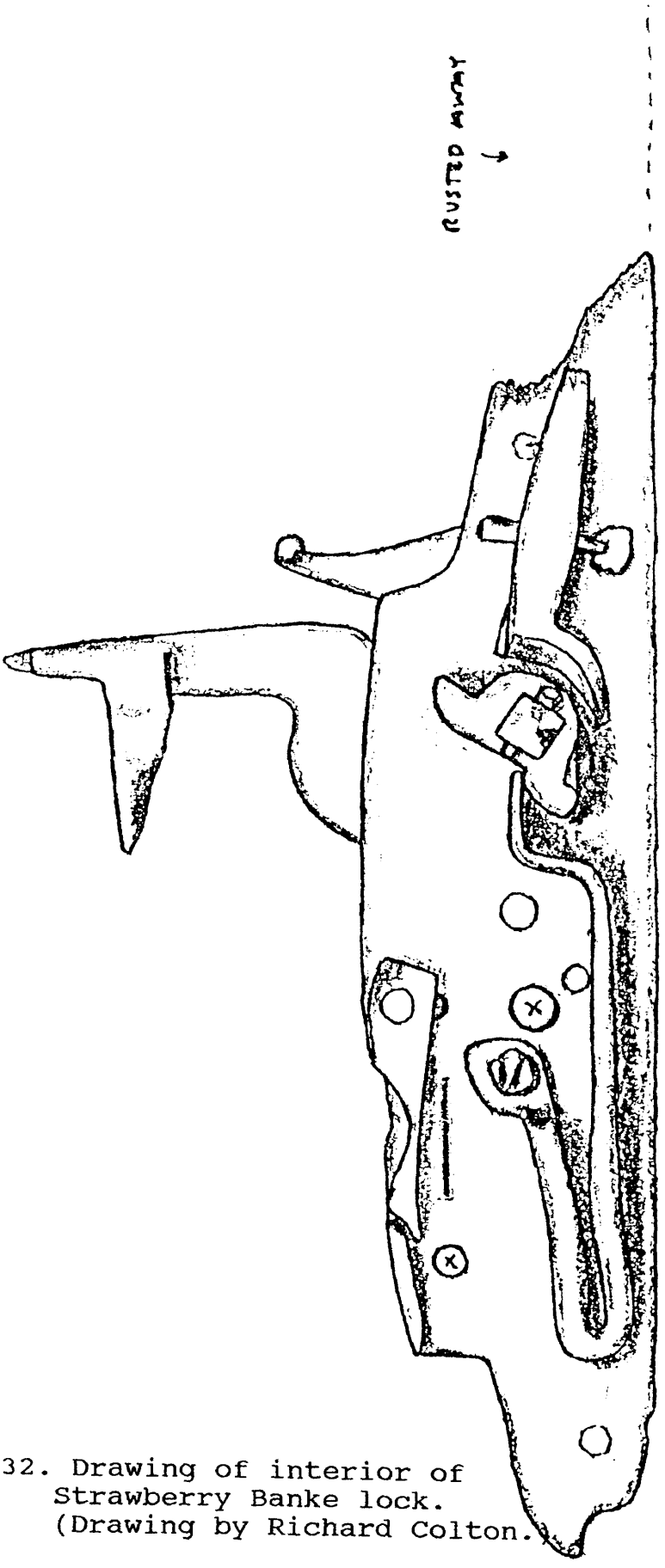


Figure 32. Drawing of interior of Strawberry Banke lock. (Drawing by Richard Colton.)

tumbler.

Thus far, five similarly constructed English-locks with American provenances dating to the fourth quarter of the 17th century have been discussed. One is clearly a conversion from an earlier snaphaunce lock, as is Y-205, and the others have features suggesting use of snaphaunce blanks. Despite their late historical or archaeological contexts, they are all considered to have been constructed during the first half of the century and to be examples of "obsolete firearms" which "remained in service for extraordinarily long periods" (Faulkner 1986:67). As previously discussed, the early 17th-century date for the appearance of the English-lock has been erroneously based on converted locks which maintain many of the early snaphaunce elements. The common appearance of the English-lock in late seventeenth-century contexts should be an indication that the date when it is first considered to appear is at least thirty years too early. There is no evidence thus far that places the English-lock any earlier than 1650.

The remainder of this chapter consists of a study of three Anglo-American English-lock guns which have been dated based upon their history of ownership. Unlike many of the previously discussed examples which were military weapons, the pistol and two fowlers examined are personal firearms. As stated earlier, it is in this realm of civilian arms that the earliest examples of the English-lock are expected to surface; in fact, two of these arms, the pistol and fowler attributed

to John Thompson, have been cited as "the earliest evidence of any sort for the manufacture" of the English-lock (Eaves 1970:292). Since these arms have been used as prototypes for stylistically dating English-lock elements, they require close examination.

The much published Thompson pistol (Figure 33) is presently in the possession of the Pilgrim Society at Pilgrim Hall in Plymouth, Massachusetts. Donated to the society by Ephraim B. Tompson in 1889, the pistol has a family tradition connecting it to John Thompson whom legend has arriving in Massachusetts in August 1623 on the Little James and Anne, ostensibly bringing the pistol with him (Thompson, 1928). There is no record of Thompson on the ship's passenger list (Pizer: personal communication, 1988) but he is known to be in Plymouth by 1643 and deceased after 1680 (Museum of Fine Arts, Boston: 56).

The pistol's original fruitwood stock, missing part of the forend, is mounted with a cast brass barrel chased with raised moldings and acanthus leaf ornament (Figure 34). The engraved cast brass lockplate has a separate iron pan. Many of the external lock parts are missing, but the unusual number of holes in the plate is solid evidence that the missing English-lock parts were not the first elements to be attached to it (Figure 35).

Using the plan provided by the James I gift gun, the lock was reconstructed to its original snaphaunce form. Figure 36

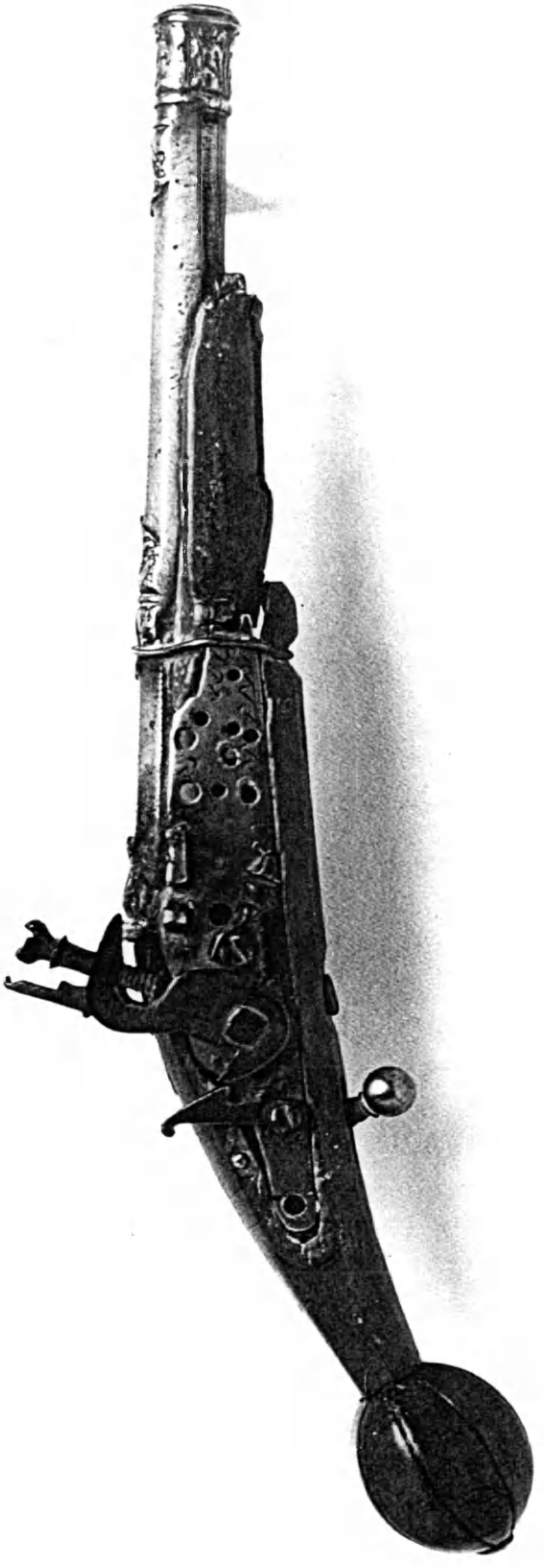
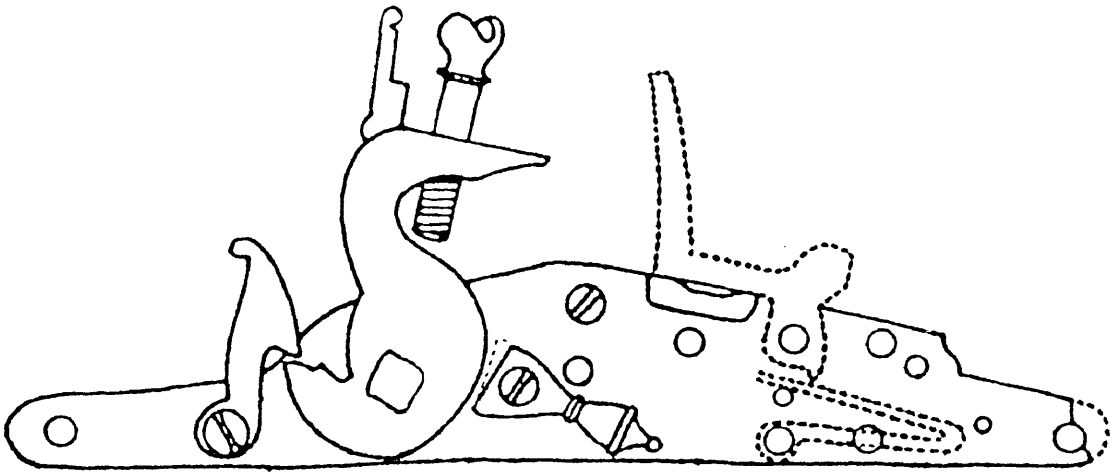


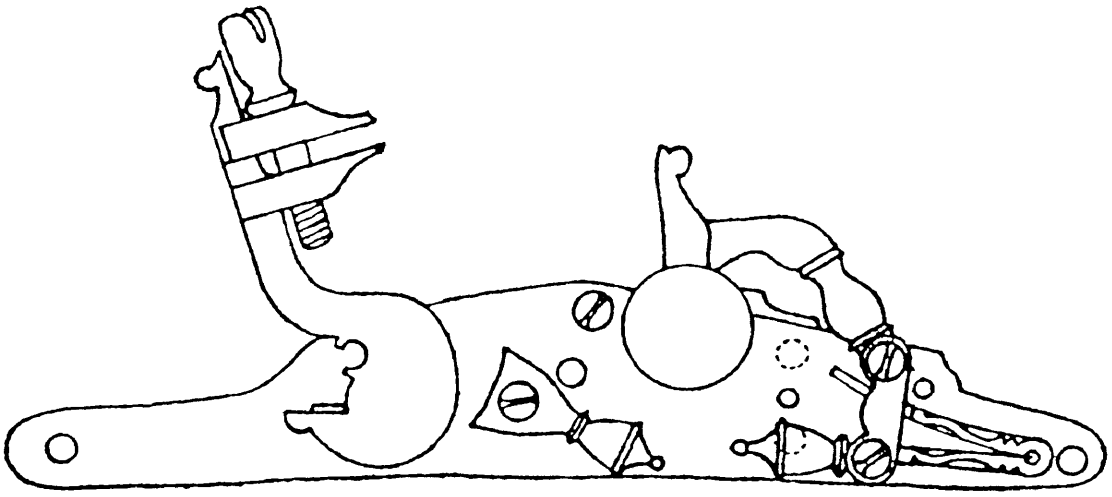
Figure 33. The Thompson pistol (Pilgrim Society, Pilgrim Hall, Plymouth, Massachusetts).

Figure 34. Thompson pistol. View from top showing cast brass barrel chased with raised moldings and acanthus leaf ornament.

Figure 35. Thompson pistol lockplate, exterior.



Lock of the so-called John Thompson pistol after its conversion to English lock. Missing parts are shown in dotted outline. Pilgrim Hall, Plymouth Massachusetts.



Reconstruction of the John Thompson pistol lock showing its original snaphaunce form. The present holes for the English-lock steel and its spring are in dotted outline.

Figure 36. Drawings of Thompson pistol showing it (top) as an English-lock, and, (bottom) as it probably looked in its original snaphaunce form.

graphically depicts the Thompson lock as a snaphaunce and as it appeared after conversion. As can be seen, the original holes for mounting the snaphaunce steel, its spring, and the sliding pancover were not plugged during the lock's conversion. They, together with the missing English-lock parts, give the present "swiss-cheese" effect to the lock's forward section.

The flat-surfaced cock and back-catch, which bear no decorative elements like the lock plate, are the only remaining English-lock elements and are from much later than the 1623 date originally given to Thompson's arrival. Although crudely shaped and finished, the curve of the cock's short neck and the slope of its lower jaw suggest the decade 1650-1660 rather than the 1620's. Eaves acknowledges this incongruity when he observes that "the form of cock resembles most nearly the examples found on 'dog-locks' of the late Commonwealth or early Restoration period" (Eaves 1976:325). In addition, the interior of the cock has been manufactured with a cutaway below the shoulder to form a stop against the top surface of the lockplate. As previously mentioned, this is a feature found on the English-locks dating c. 1650-80 which renders the buffer superfluous. The Thompson pistol retains its original snaphaunce buffer but the face has been altered to adjust it to the breast of the present cock.

On the interior of the lock (Figure 37), the guide finger on the pan for the snaphaunce pancover pushrod remains and the

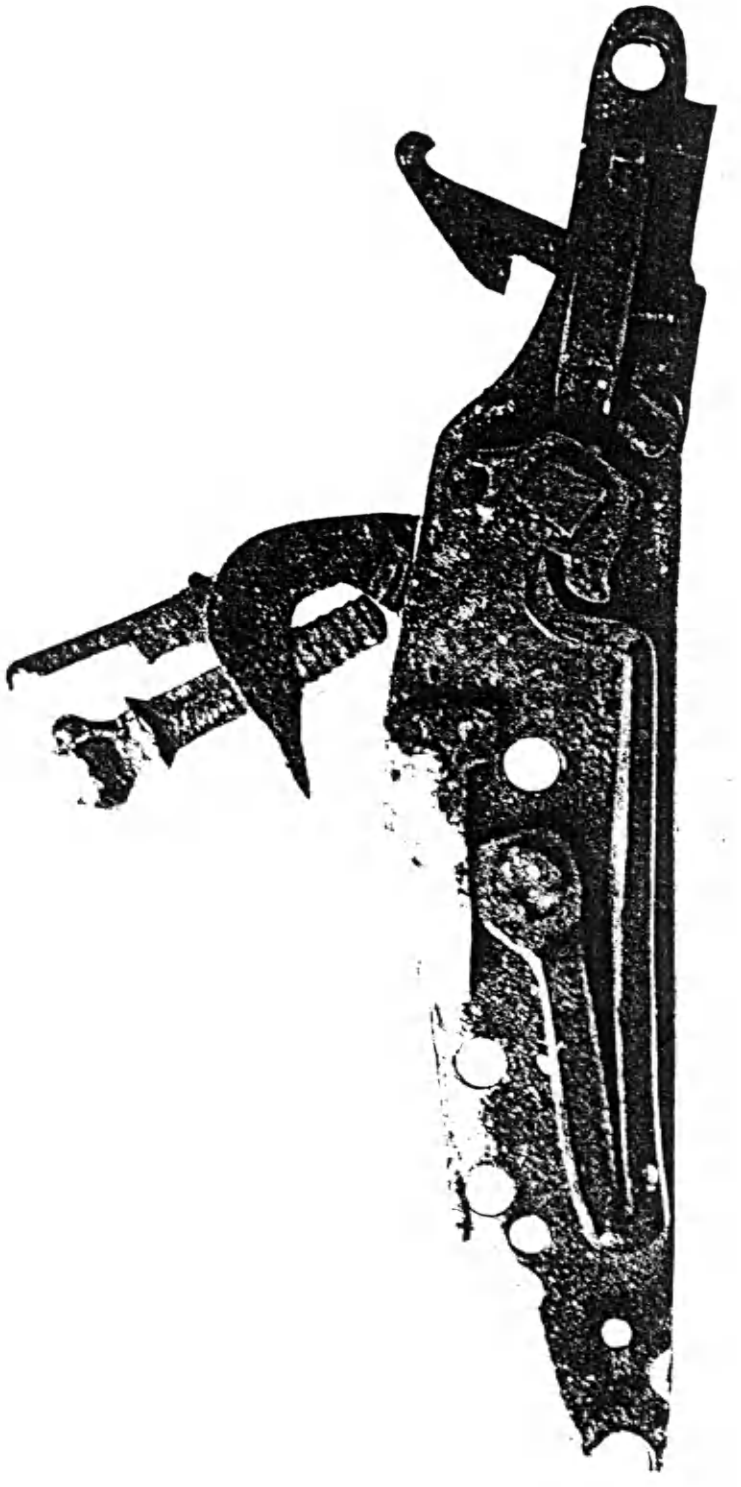


Figure 37. Thompson pistol, interior.

tumbler still bears the hole for the toe of the pancover pushrod, just as in the Alderman lock. The mainspring is a replacement as there is no inner groove for the pancover lever. The pan appears original although the fence has been removed. A gap remains between the lockplate and barrel to accommodate the snaphaunce sliding pancover (Figure 38).

Overall, the pistol's alteration appears to have been an inexpensive endeavor leading Ian Eaves to categorized the pistol as "an interesting example of a lower class civilian arm" (Eaves 1970:292) even though he did not realize at the time that he was looking at a conversion. The lock plate was not shortened nor the pistol restocked in order to modernize its appearance and to eliminate the empty mortise forward of the lock.

The stock, with its faceted pommel, shows that it was originally fitted with a sideplate with a manual safety and most probably a belt hook. This is not unusual for "every . . . English pistol so far recorded from a period earlier than 1620 has, or once had, a belt-hook" (Eaves 1976:279). Of the three holes seen in the slot for the sideplate in Figure 39, the large central one is to accommodate the extension of the sear arm that contacted the safety. The original safety was not used in the conversion but replaced by a back-catch. This is commonly seen on converted snaphaunces, either because the sear is altered and the safety would no longer operate properly or, in cases when the sear is untouched, to simplify

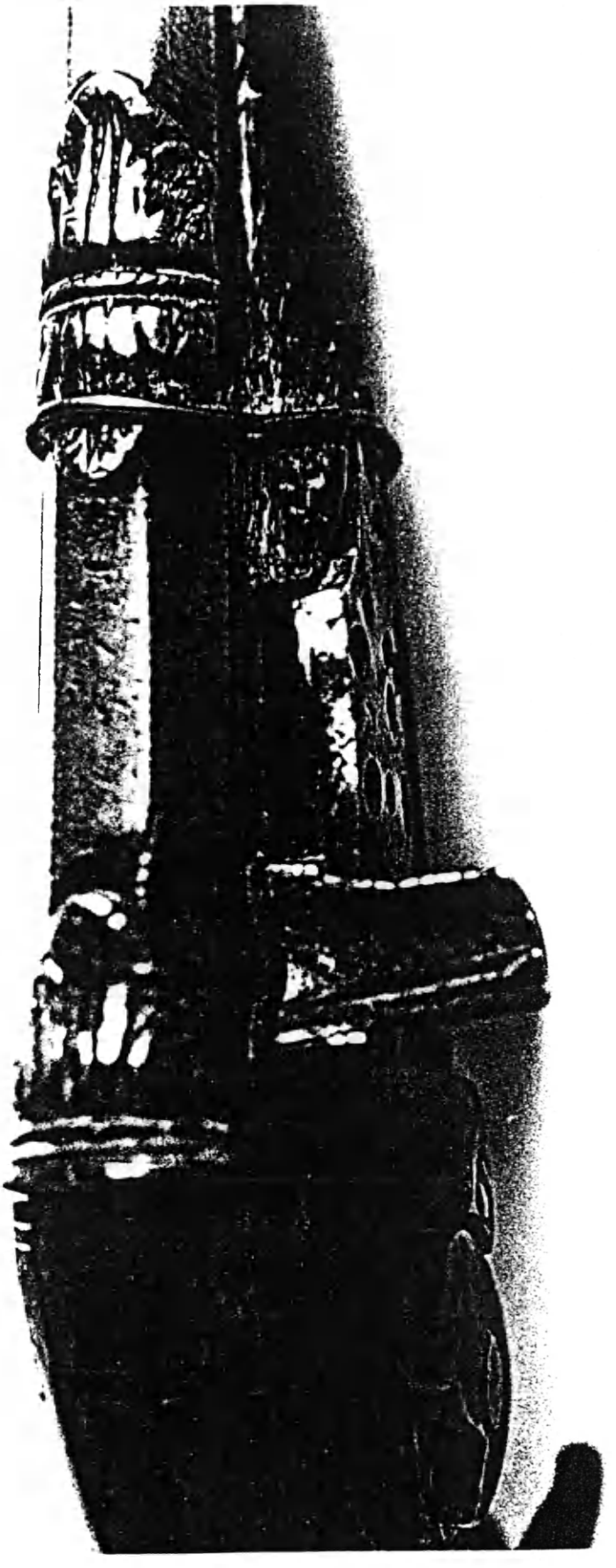


Figure 38. Gap to accommodate snaphaunce sliding pancover.

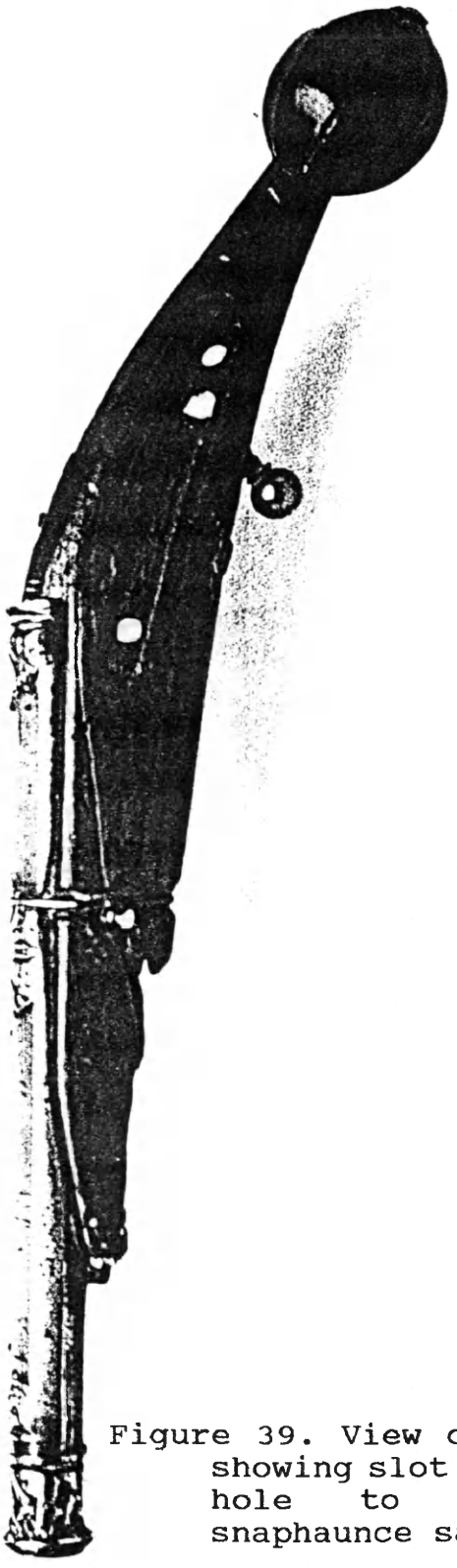


Figure 39. View of Thompson pistol showing slot for sideplate with hole to accommodate the snaphaunce safety.

the mechanism from the three moveable parts of the safety to the single part of the back-catch. This same trend toward simplification led "to the discarding of the safety catch on the majority of wheel-locks" (Blair 1983:63) in the beginning of the seventeenth century.

In conclusion, the evidence of the pistol itself, Thompson family tradition aside, disputes Ian Eaves' claim that "the Thomson pistol clearly shows that (the invention of the English-lock) can be placed some years before 1622; perhaps between 1610 and 1620" (Eaves 1970:292). Instead, it appears to be an English snaphaunce pistol of c.1620, its lock altered to English-lock with a back-catch around the middle of the seventeenth century.

An English-lock fowler (Figure 40), also associated with John Thompson, is on loan from his descendants to the Old Colony Historical Society in Taunton, Massachusetts. It is an unwieldy piece, almost seven and a half feet long, with a barrel that approaches two inches in breadth across its breech. Unlike the pistol, this arm shows high quality both in its manufacture and its remodeling.

This is a second-generation piece dating from the time of its present stocking which, judging from the butt shape, occurred in the middle years of the seventeenth century. Since the stock is beech and not oak as it has been incorrectly identified in the literature (Peterson 1956:42), it is not possible to prove by the wood whether it was restocked in

Figure 40. Thompson fowler (Old Colony Historical Society, Taunton, Massachusetts).

England or America. Beech is a typical stock wood for British firearms during this time period (Colton personal communication: 1988) but was also available in America. Thompson is recorded as being in New England by 1643. If this fowler truly belonged to him then, based on the later butt shape, it must have been restocked after Thompson's arrival in America. The barrel and parts of the lock come from an earlier snaphaunce long fowler of English manufacture.

The lock plate (Figure 41), at ten inches overall, is proportionate to the gun's great size. It seems to have lost very little, if any, of its length to conversion, although there is evidence of welding on the inside of the plate and of some reshaping of the forward end. Nevertheless, the upper edge of the lockplate forward of the pan retains the long slope necessary to support the original snaphaunce sliding pancover. Perhaps the length of the plate was maintained so as not to alter the lock mortise sufficiently to require restocking. Indeed, precisely this can be seen on a snaphaunce gun (#364) dated 1619 and now converted to English-lock, in the Windsor Castle collection; however, on the Thompson gun there is definite evidence of restocking in the mounting of the barrel.

It appears that the buffer and steel spring, with their matching shield-shaped terminals, are the only original snaphaunce parts on the exterior of the plate. The cock looks very much like a snaphaunce cock but, with its stop on the

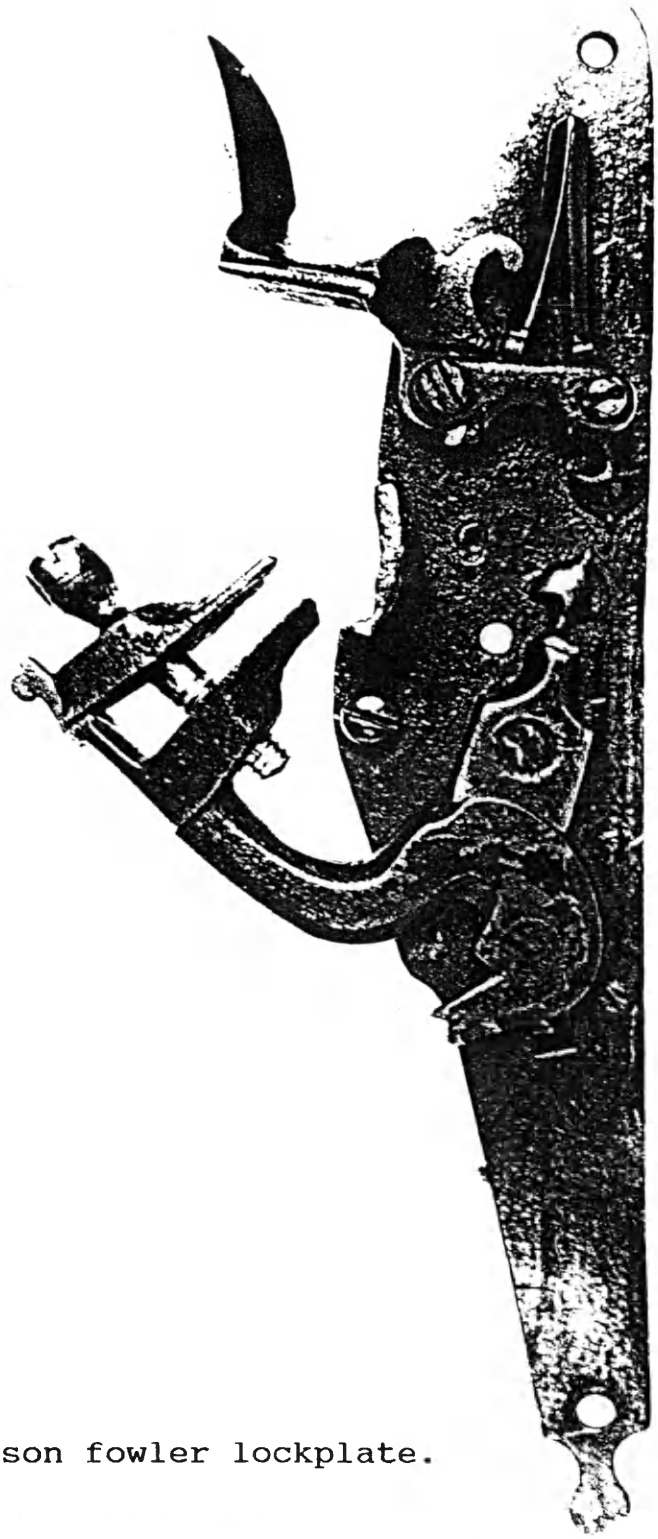


Figure 41. Thompson fowler lockplate.

spur and ringed jaw screw which indicate mid-century manufacture, it appears to date to the present stocking.

It is interesting to speculate that the Thompson fowler was composed of hand-forged snaphaunce parts of the mid-seventeenth century, using a barrel from a yet older piece, and converted to English-lock even later. A suggestion of this theory is provided by the location of the present steel-with-pancover and the original steel spring and bridle which have been moved rearward almost one inch, leaving an equal space of empty lockplate to the front. If this was done originally to avoid changing the relationship between the three lock mounting screws, then the implication is that the conversion was done while the lock was on its original stock.

The bevelled molding along the forward edge of the cock's base and neck do not correspond to the concave face of the buffer, indicating that the two parts were not originally made for each other. It should also be noted that this lock has not been fitted with a back-catch and there is no apparent provision for one although the plate has not been x-rayed for plugged holes.

On the interior of the plate (Figure 42), a new and shorter mainspring is attached just five-eighths of an inch forward of where a partially plugged screw hole indicates the mounting of the original snaphaunce spring. The hole for the attachment of the pancover pivot has also been partially plugged. The new pan is made in a piece with a long bar which

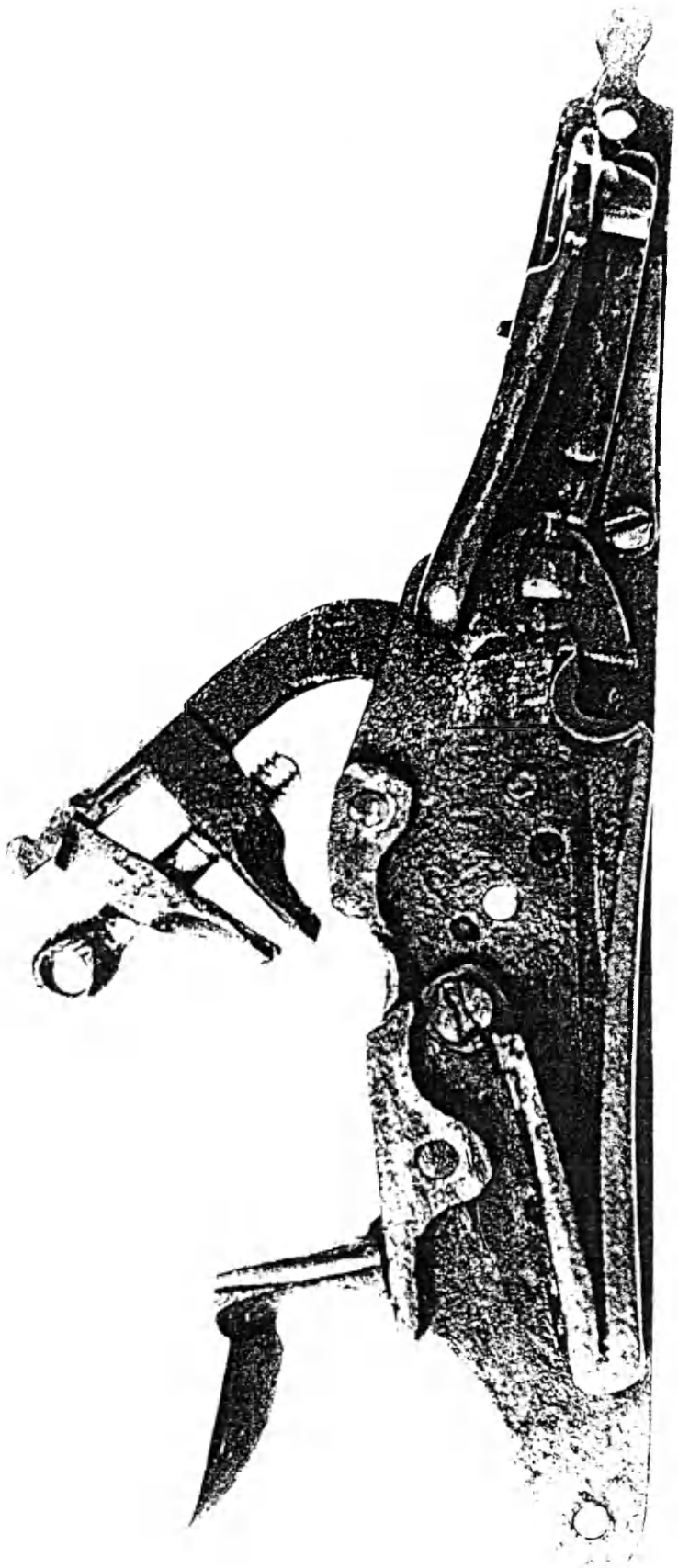


Figure 42. Interior of Thompson fowler lockplate.

fits flush along the inner face of the lockplate. This is retained by its own screw at the rear of the pan and by the screw from which the steel-with-pancover pivots, for which it also provides extra support. Long use has caused this second pan to burn through.

The most unusual part of the lock mechanism is the strange, and possibly unique, double sear. The lower portion is the standard snaphaunce full-cock sear; the upper, of almost identical construction, engages the tumbler's upper forward edge to provide a half cock. Another investigator, R.T. Colton, has suggested that the upper sear is a later addition (Colton personal communication: 1988); however, when the lock was disassembled, it was discovered that both sears are mounted on identical semi-circular supports. There is no evidence that the whole sear mechanism is not by the same hand nor original to this lock. Moreover, the standard snaphaunce sear is mounted along the centerline of the lockplate, while its counterpart on this lock is mounted well below that in order to allow the necessary space to mount the additional half-cock sear. With the incorporation of a half-cock, a back-catch safety becomes superfluous which is why this lock was never fitted with one. The original snaphaunce tumbler, which has been modified to accomodate the half-cock sear, shows evidence of the removal of its connection for the pancover pushrod.

The octagonal-to-round snaphaunce barrel has a short,

belled octagonal muzzle (Figure 43) and is fitted with an ironbead front sight and a slotted rear sight. Under the right breech there is a deeply struck but indecipherable maker's mark which appears to be a man's head in profile. The barrel originally had three lugs for pinning it to the forend; these were spaced precisely 34.8 centimeters from the breech and from each other. For this stocking the forward lug was moved forward of its original position another 10.5 centimeters. While these lugs were used for attachment to the present stock, they have been supplemented by four sheet-iron bands of indeterminate age. The bands may date to 1973 when museum records report the the gun was "restored" although there is no indication of what this work entailed.

The ash ramrod shows every indication of being early, and possibly original to this stocking. It is tipped with an iron worm and has one early repaired break. The iron trigger guard and trigger are the least well-made elements of the entire arm.

In sum, the Thompson English-lock fowler is an interesting and well-made Anglo-American firearm. If the conversions on this piece were made by American gunmakers then this is an indication of the quality of work available in the colonies. It is entirely possible that, rather than a total conversion, the fowler is an example of the "snaphaunce connection" as seen in the Popham Armory. The lock could be constructed of snaphaunce parts which have been adapted for

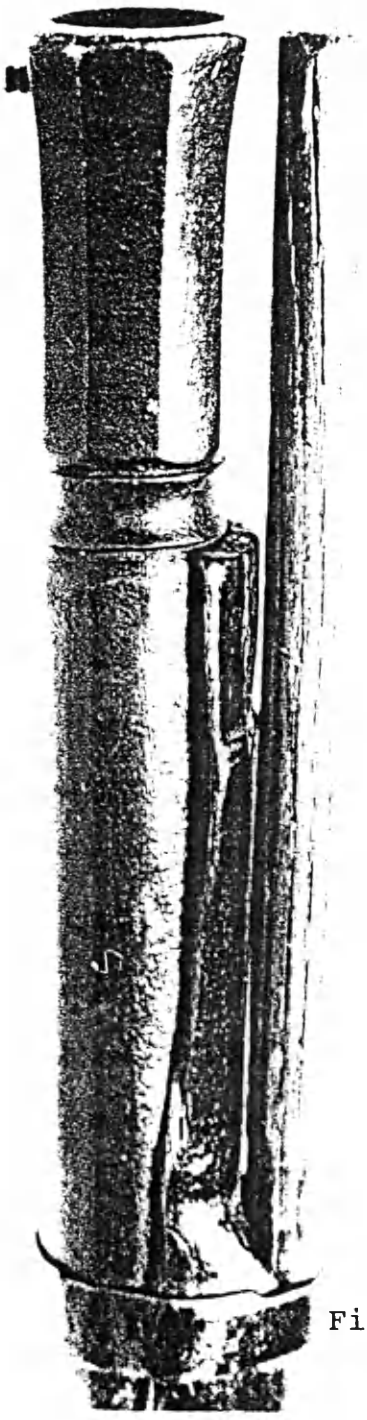


Figure 43. Belled muzzle of Thompson fowler snaphaunce barrel.

use with an English-lock. This may explain the double sear. When the lock was assembled, a snaphaunce sear was used for full-cock and a new sear was constructed to enable a half-cock position.

The last English-lock arm to be considered, also a fowler, has many features in common with the Thompson fowler. It will be interpreted here as a converted lock but it is possible that it too is composed of snaphaunce parts that have been altered to create an English-lock mechanism.

Now in the Smithsonian Institution's Museum of American History, the Forbes fowler was identified by Harold Peterson in 1956 as "the finest American colonial gun in private ownership." It had then only recently been purchased for the Benjamin Hubbel collection from a Forbes descendant. According to family tradition, its original owner, John Forbes, brought it to America when he emigrated from Scotland in 1654 after having been imprisoned in the Tower of London for his Civil War activities.

In published literature the Forbes fowler has been dated c.1620 (Brown: 85), but closer inspection reveals that both the lock and the barrel have been previously mounted, and neither would seem to predate the 1620's, even in their earlier unaltered state.

The present English-lock, adapted from the original snaphaunce, is an alteration so complicated that one wonders about its economic feasibility, although its transformation

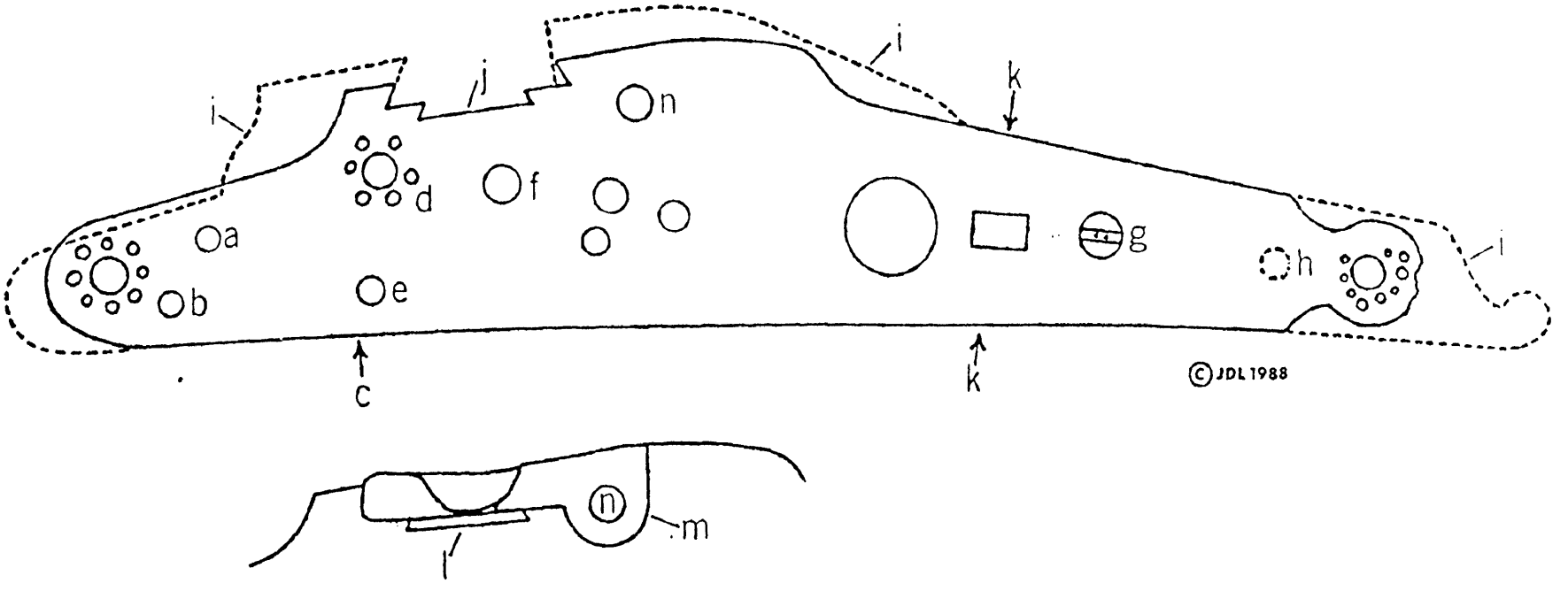
may have occurred in stages. Figure 44 shows the present lockplate of the Forbes fowler and the conjectured original form.

The steel-with-pancover, steel spring, and pan -- which are mainly hammer finished and show only minimum use of the file --- are markedly inferior in quality to the cock and buffer (Figure 45). The buffer is of Glendenning's "blob and tit type" (Glendenning 1951:106) and, just as in the case of the Thompson fowler, the decorative elements of the cock and buffer do not line up, suggesting that they were not originally paired. There is a stop on the cock spur indicative of a mid-seventeenth century date and the cock's upper jaw is a replacement of indeterminate date, coming possibly from the time the tip of the cock spur was broken.

The present sheet-metal bridle may have been added when the steel pivot screw began to wobble. An early attempt to overcome this problem can be seen in the punch marks surrounding the hole on the inner face of the lockplate (Figure 46).

Besides the replaced forward section of the lockplate, a change normally made for the conversion, a new mainspring is riveted to the lockplate which is also fitted with a new sear and tumbler. The sear is attached about one inch forward of the now plugged hole which anchored the original snaphaunce sear mount, and is adapted to the half-cock ramp of the present tumbler. The tail of the plate was subsequently

CONJECTURAL RECONSTRUCTION OF THE FORBES FOWLER LOCK



Detail of priming pan in place

a) Hole for mainspring support pin
b) Hole for steel spring support pin
c) Possible visual seam of lap weld on lockplate edge
d) Hole for new steel pivot screw
e) Hole for new steel spring mounting screw
f) Hole for new mainspring mounting screw
g) Mount for present English-lock sear
h) Plugged hole for original snaphaunce sear mount
i) Presumed snaphaunce lock contour
j) Small dovetail for shim-repairing priming pan
k) Vise jaw imprints
l) Shim repairing priming pan burn through
m) Removable priming pan
n) Priming pan retaining screw hole

Figure 44. Conjectural reconstruction of Forbes fowler lock.

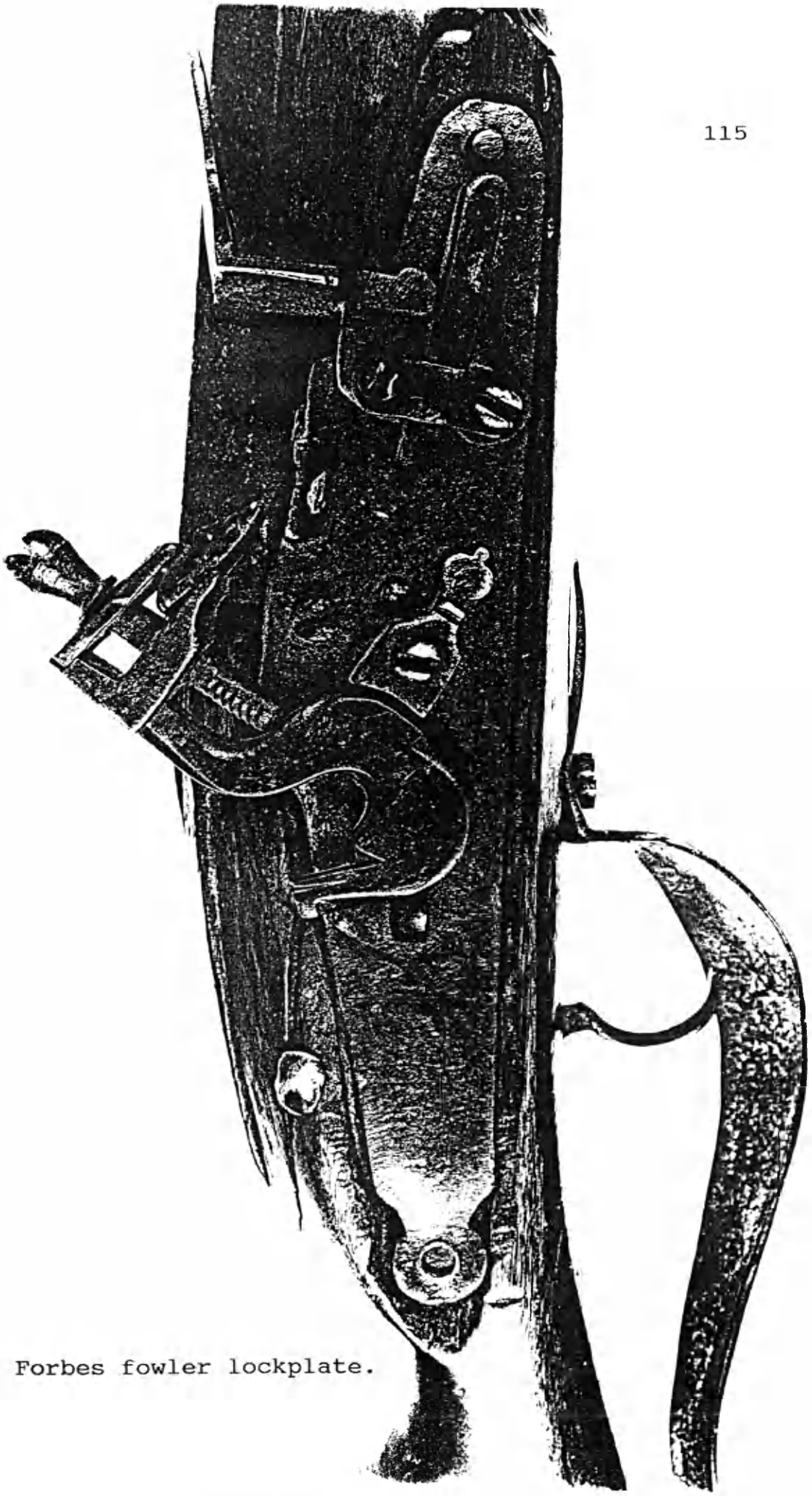


Figure 45. Forbes fowler lockplate.

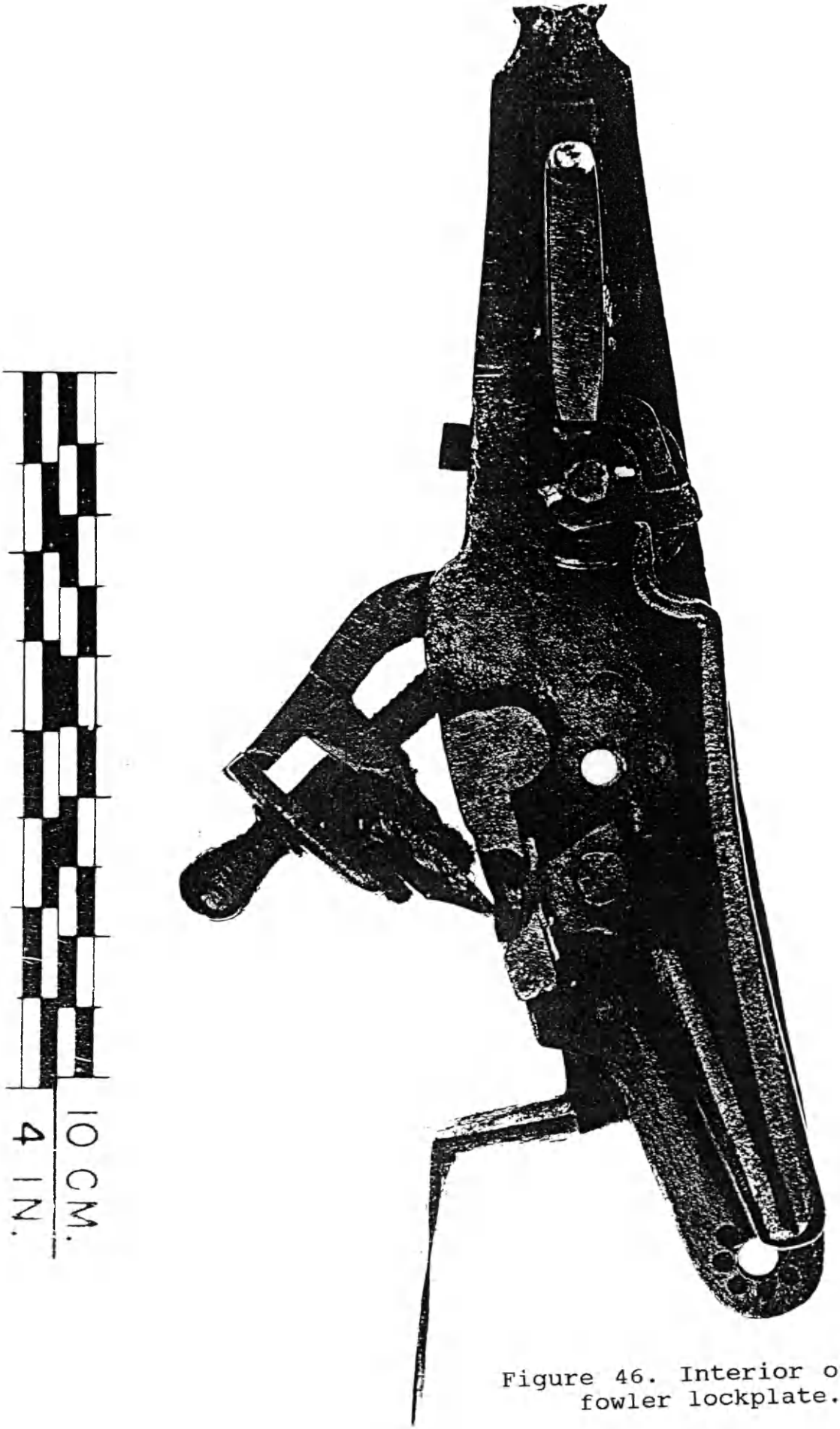


Figure 46. Interior of Forbes fowler lockplate.

shortened and reshaped.

The flat shallow pan burned through in use, and was repaired simply by dovetailing a shim directly under the perforated section.

The sixty-one inch octagonal-to-round English snaphaunce barrel is of average quality. It has a slightly belled octagonal muzzle with an iron bead front sight. There is no corresponding raised molding at the breech supporting a rear sight, but the breech has been shortened about a quarter inch and has been fitted with a new breechplug. The touchhole has been bushed with iron and redrilled. An unrecorded deep heart-shaped maker's mark containing what may be another heart, possibly pierced by an arrow, is struck into the lower right breech flat.

The barrel was originally secured by a tang screw from below and by four pins. Lugs for two of these are missing -- the forward one from prior to the present stocking. The second lug from the muzzle apparently never coincided with its pin which passes slightly forward of it. Now three, apparently early, brass bands secure the forend and hold the ash ramrod.

The birch stock has a fishtail butt common on English long-guns until c.1630 (Blair 1983:80). The stock does not appear original to this time period for it was obviously made for the lock and barrel as they are presently modified. The pan lines up with the present touchhole and the lock's mortise is unaltered. The trigger pivots on what appears to be its

original rose-headed carpenter's nail. Interestingly, most of the inletting, as well as the very cursory carving of the moldings along the butt, were done with the same gouge. This tool also was used to inlet three of the barrel lugs. It cut the ramrod groove along the forend, and, curiously, under the barrel breech where a one-inch deep groove continues the ramrod recess, thus indicating the lack of either the proper drill for the purpose or skill on the part of the maker.

The stock was shaped with a minimum of tools: a square chisel, a half-inch gouge, and possibly a half-round cabinet file or rasp. The blank was plain or slab sawn from a section far removed from the center of a large trunk as evidenced by the number of small knots included in its forend. The knots now stand in relief and the butt has warped and cracked because the wood was not fully seasoned before it was worked. In sum, the stock appears to have been fashioned by a competent carpenter who knew precisely how a stock of perhaps a quarter century earlier should look, but who was unfamiliar with the techniques of fitting and assembly.

It is possible that the naively-formed stock, which reflects a butt style that was popular twenty years before the date suggested by the gunlock elements, is of American manufacture. As has been shown, the stock was made for the gunlock and barrel in their present form, and both the lock and barrel have been previously mounted. The characteristics of the gunlock are consistent with the mid-century date for

John Forbes' arrival in America which suggests that Forbes brought the fowler with him in its previous stocking. The gunlock saw long use as evidenced by the repair on the burned out pan, and the conversion, which possibly occurred in stages, could have been made in America with the restocking occurring at that time. In any case, there is nothing about the Forbes fowler in its present form to suggest a date of manufacture in the 1620's.

CHAPTER 5

CONCLUSIONS

The primary data used to construct the development of the English-lock have been re-examined; and, none have been found to substantiate the commonly-held belief that this lock type was first manufactured c.1620. Instead, this research has demonstrated that the early seventeenth-century date for the appearance of the English-lock is based on questionable or misinterpreted historical documentation and unrecognized lock conversions.

The evidence studied to form the basis of this thesis includes seventeenth-century military manuals, English-lock guns in English and American museum collections, and gunlocks and gunlock parts in American archaeological collections. None of the data provides proof that the English-lock existed prior to 1650.

The different types of English-lock described by researchers are examined for evolution of form. The findings suggest that there are three major groupings of English-lock. Rather than a chronological development, all three types appear to be contemporary to c.1650 and are manifestations of the technical advances of the French flintlock within the

snaphaunce tradition. English gunmakers steadfastly retained the snaphaunce sear on the English-lock while accepting and applying other advantageous features of the flintlock.

In the first type of English-lock, flintlock elements are adapted to an existing snaphaunce lock. These are the examples that have been mistakenly dated by researchers to the 1620's based on the locks' archaic snaphaunce elements. These inaccurate attributions have caused past researchers to view the English-lock incorrectly as an evolving form, intermediary between the snaphaunce and the French flintlock, rather than an adaptation of the flintlock. The second type of English-locks were never snaphaunces but are composed of unfinished snaphaunce forgings that have been modified to incorporate the advantages of the flintlock. The third major variety of English-lock is constructed as such, and it is this type that emulates the outward appearance of the French flintlock and persists into the final quarter of the seventeenth century.

These findings explain the consistent disparity between the date when the English lock is believed to have first appeared and the dates when it is documented in use. Rather than socio-economic reasons that have been extended in past works, the explanation for these inconsistencies appears to be simply that the English-lock was first developed twenty to thirty years later than is currently believed. None appears to date much earlier than the mid-seventeenth century when it emerged in response to the invention of the French flintlock

in the third decade of the seventeenth century.

This study is particularistic in scope and does not address broader issues, such as trading patterns and diffusion of gunlock technology, only hinted at in this work. But it is hoped that this reassessment of the typological benchmarks of the English-lock provides the groundwork for further research in the development of early English firearms.

APPENDIX A

SNAPHAUNCE AND ENGLISH-LOCK PARTS RECOVERED AT JAMESTOWN

These gunlock parts have been cataloged by the author as part of the Colonial National Historical Park Study Collection and are housed together in the curatorial area of the Visitors' Center on Jamestown Island. It is very probable that there are more firearms elements which are presently stored with the individual site collections and, consequently, are not listed here.

Colonial National Historical Park is presently in the process of cataloging and computerizing all of its collections according to the Automated National Cataloging System. Once this has been completed, all the gunlock parts and provenience data will be very accessible. For the first time, the park will be capable of compiling a finds list for each feature which will enable contextual dating of the artifactual material. This will contribute greatly to the understanding of colonial material culture and thereby to the interpretation of life in seventeenth-century Jamestown.

The first gunsmith at Jamestown is documented as arriving in 1608, and was joined two years later by two gunmakers and two armorers (Gill:6). From this time on, there is an increasing number of gunsmiths in the colony, but "very little is known of their work" (Gill:6). Among the cataloged parts included here, there is evidence of gunmaking and gun repair as well as gunlock conversion. In addition, excavations in 1956 during the search for the first fort, Project 100, uncovered an armorer's forge with many gun parts amid the forge waste. Analysis of these data may elucidate the quality and quantity of arms repair and manufacture that occurred during the colony's early years as well as contribute information to the chronology of early English firearms.

Element	Catalog #	Provenience
Snaphaunce		
Lockplates, musket	J-7049	Pr100, TP18W
	J-8505	Pr100, TP12E
	J-8527	Pr100, TP18W
	J-16360	Lt B76, Floor inside foundation

	J-12	Lt B75, E-80,S-50
	J-13	Lt B86, E-60,S-20
	J-14	Lt B183
	J-16	Lt B48, 18-36"De
	J-446	Lt B74, 30-48"De
	J-448	Lt B86, elev.4.85
	J-4278	Lt B73
	J-5564	Lt B74
	J-9814	Pr103, Lt90:111, Sq55-95, Surf-Undist. 3'N-S test trench
	J-9825	Pr103, Lt92:107, Sq50-90, 1'-Undist., 3'N-S test trench
	J-9829	Pr104, Lt96:110, Sq50-90, Surf-Undist., 3'N-S test trench
	J-10378	Pr103, Lt91:111, Sq2&3, Surf-2', F103
	J-11781	Pr103, Fill of Well 20, F103
	J-16395	Lt B60, 18-36"De
	J-116	Lt B87, E-0, S-50, 3'3"-4'De
Lockplate, pistol	J-12728	Lt B102, 0-12"De, E of St 34-37, near D-5
Cocks	J-714	Lt B60, E-0, S90, 18-36"De
	J-9688	Back of Ambler House
	J-2362	Lt93:110-198, Hartwell
	J-9942	Pr103, Lt91:111, Sq2&3, 3-4'De,F103
	J-118	Lt B85
	J-444	Lt B59, elev. 4.70
	J-445	Lt B100, E-0, S-40, 18-24"De
	J-443	Lt B76, E-70, S-90, 1'6"-2'De
	J-8730	Pr194, Lt100:102, Sq97&98, Level B, F6
	J-36917	APVA
	J-36916	APVA
Cock Jaws	J-18368	Lt B192
	J-49437	Pr 100, TP12J
	J-16391	Lt B68, 0-12" De, Str44-53
Jaw Screws	J-16300	Lt B87, 12-24"De
	J-18702	Lt B75, 0-18"De

Butt Plate	J-11632	Lt95:107, Sq75
Steel Springs	J-12738	Lt B84, 0-12"De, near D15
	J-10536	Pr 103, Lt91:111, Sq 2&3
Barrel Band	J-9832	Pr 100, TP18W
Barrels	J-301	Lt93:110-158, Hartwell
	J-10071	Lt B69, E-20, S-70, 4-12"De, St31(steps)
	J-26	Lt B76, 0-18"De
	J-30	Lt B87, 24-36"De
	J-162	Lt B61, 0-18"De
	J-2562	Lt B101, E-90, S-40, 2'6"De, D5, Beneath drain
	J-2563	Lt 96:107, Wyatt
	J-3931	Lt B48, E-18, S-20
	J-9879	Pr 103, Lt90:111, Sq55-95, Surf-Undist., 3' N-S Trench
	J-12881	Lt B87, E15'6", S-94'30"De, circular fill D28
Triggers	J-12862	Lt B76, 18-36"De
	J-18766	Lt94:110-6, Str 79
	J-5506	Lt B184, 0-12"De
Trigger Guards	J-8102	Pr 114, NOL
	J-831	Unit A
	J-5283	Lt B184, 0-12"De
	J-9614	Pr 100, TP12J
	J-18627	Lt B97, F1
	J-6701	Lt B87, 0-12"De
Breech Plug	J-3852	Lt B86, near Str 21
Steels	J-164	Lt B184, 0-12"De
	J-5328	Lt B101, 0-12"De
	J-800	Lt B184, 0-12"De
	J-861	Lt B183
	J-862	Lt B69, 18-36"De
	J-863	Lt93:110-83, Hartwell
	J-9620	Pr 100, TP12J
	J-10732	Lt B101, 0-12"De
	J-18637	Lt B192
	J-9634	Pr 100, Tp 12J

Pan Cover	J-12732	Lt B102, E of str 34-37, near D5
Pans	J-9451	Pr 103, Lt93:06, Sq50-54, 3' E-W Trench
	J-12745	Lt B184, near D15, Str 87, 0-12"De
	J-1795	Lt B102, 0-12"De
	J-16214	Lt B184, near D15, Str 87, 0-12"De
	J-16056	Lt B184, 0-12"De
Mainsprings	J-16127	Lt B68
	J-4276	Lt B73
	J-16106	Lt B68
	J-3381	Lt B96
	J-3466	Lt B76, 0-24"De
	J-449	Lt B113, 0-18"De
	J-9585	Pr100, TP 12J
	J-4781	Lt B86, 0-12"De
	J-8752	Pr 194, Lt100-102, Sq29,39,49, Top of F-8
	J-3	Lt B87, 24-36"De
	J-9644	Pr100, TP 12J
	J-12728	Lt B102, 0-12"De, E of Str 34-37, near D-5
	J-10333	Pr 100, TP 22
	J-4006	Lt B76, 0-24"De

English-locks

Lockplates, muskets	J-10364	Pr 103, Lt93:109, Sq 81,82,91,92, Surf-Undist, F105, Ditch
	J-448	Lt B86, Elev 4.85
	J-15	Lt B82, 0-18"De
	J-298	Lt B88
	Y-206	American Artillery Park Dump, Yorktown
Lockplate, pistol	J-303	Lt B101, 12-24"De
Cocks	J-23	Lt B59, 24-42"De
	J-220	Lt100:98-13
	J-25	Lt B82, 0-18"De
	J-120	Lt B97, F2
	J-24	Lt B101, 12-24"De
	J-2222	Lt100:98-20
Mainsprings	J-6827	Lt B86, 0-12"De
	J-803	Lt B183
	J-121	Lt B74, E-50, S-60

	J-18678	Lt B96
	J-6671	Lt B87
	J-4879	Lt B192
Mainspring, pistol	J-163	Lt B61, 0-18"De
Steel Springs	J-195	Lt B184, E-40, S-90, 1-4"De
	J-2296	Lt95:108-1
Steel-and-Pancover	J-4632	Lt B47, 18-36"De
	J-5519	Lt B101, 0-12"De

APPENDIX B

Glossary of Gunlock Terms

Back-catch: Also referred to as a dog, it is a hook-shaped element mounted behind the cock and is manually operated to engage the tail of the cock and prevent it from falling forward.

Buffer: The component riveted to the lockplate in front of the breast of the cock to arrest the cock's fall.

Cock: The pivoting lock component, usually spring activated, that holds the flint and strikes the steel.

Fence: Also known as a rondel, it is the vertical closure on the end of the snaphaunce pan that serves as a flashguard. It is usually round, but sometimes shell-shaped.

Jaws: The two parts of the flint-and-steel mechanism on the cock that hold the flint. The lower jaw is an integral part of the cock, the upper jaw is adjustable by a screw known as the jaw screw. Jaw shape is indicative of date of manufacture.

Jaw screw: The screw that fits through the upper and lower jaws and tightens the hold on the flint. The shape of the jaw screw appears to be an indication of manufacture date.

Lock plate: The flat metal plate attached to one side of the stock on which the components that provide ignition are mounted. The contours and surface treatments of seventeenth-century lock plates are indicators of date of manufacture.

Mainspring: The spring that works on the tumbler.

Pan: The container for the priming powder, fitted to the lock, on flint ignition systems, next to the touch-hole.

Pancover: The cover for the pan to keep the priming powder from getting wet and to allow the firearm to be carried primed and loaded without loss of the priming powder.

Sear: The part of the lock that engages with the tumbler which is linked to the cock and provides half-cock and/or full-cock position; or interacts only with the cock, as in the snaphaunce, and provides only a full-cock capability. In both cases, it is released by the trigger.

Steel: A pivoting steel plate from which sparks are struck by contact with the flint held in the jaw screws of the cock, thereby igniting the charge in the pan. It has also been known as a battery, frizzle, frizzen, hen, and hammer.

Steel spring: The spring that holds the steel in position.

Steel-with-pancover: The L-shaped component that combined the separate snaphaunce elements of the steel and the pancover into one.

Tumbler: A block on the interior of the lockplate attached to the cock pivot and interacting with the mainspring. It can incorporate the capabilities for half-cock and/or full-cock through interaction with the sear.

APPENDIX C

*TYPOLOGY OF ENGLISH-LOCKS IN THE POPHAM ARMOURY

Type 1: This type of lock is held at full cock by a lug on the laterally operating sear which projects throgh the lockplate and engages on the tail of the cock, and at half-cock by the angled nose of the sear, which lodges on the rear of a wedge-shaped lug on the underside of the tumbler. This type of lock was found with and without an additional dog catch.

Type 2: This is similar to Type 1, but has a sear with the nose cut with a vertical V-shaped notch in order that it should lodge over the angled rear edge of the lug beneath the tumbler. This type of lock was also found with and without a dog catch.

Type 3: This has a two-piece laterally operating sear which resembles that of a wheellock, and which is fitted wih a dog catch for the half-cock position. Interestingly two examples of this type were found which were clearly converted snaphance locks.

Type 4: This has a lockplate of more fully developed later or "French" form, but still with a laterally operating one-piece sear. The lock is held at half-cock by means of a dog catch, and at full-cock by the nose of the sear engaging over the rear surface of a wedge-shaped lug on the rear of the tumbler.

Type 5: This has a lockplate of "English-lock" form, but with a cock of dog-lock type, and with a laterally operating two-function sear which does not protrude through the plate. The lock is held at half-cock by a long limb on the sear which curves around the upper part of the tumbler and hooks over a wedge-shaped lug, and at full-cock by a small angled face at the root of the half-cock limb which engages over a second smaller wedge-shaped projection on the rear of the tumbler. This type of lock is described by Peterson, coincidentally, as his Type 5 dog-lock, but interestingly in some of the Littlecote examples additional safety is achieved not by a dog catch but by a small pivoting lever lying beneath the cock which

can engage a notch on its lower edge. This rather feeble device was automatically cammed out of engagement by a carefully arranged curve to the rear of this notch, which allowed the cock to fall unhindered after being raised to the fully-cocked position. The dog-lock version of this lock is illustrated by Blackmore.

* From Graeme Rimer and David Blackmore. "Firearms in the Popham Armoury at Littlecote House," Third Park Lane Arms Fair, produced by David Oliver, Esq., and Apollo

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