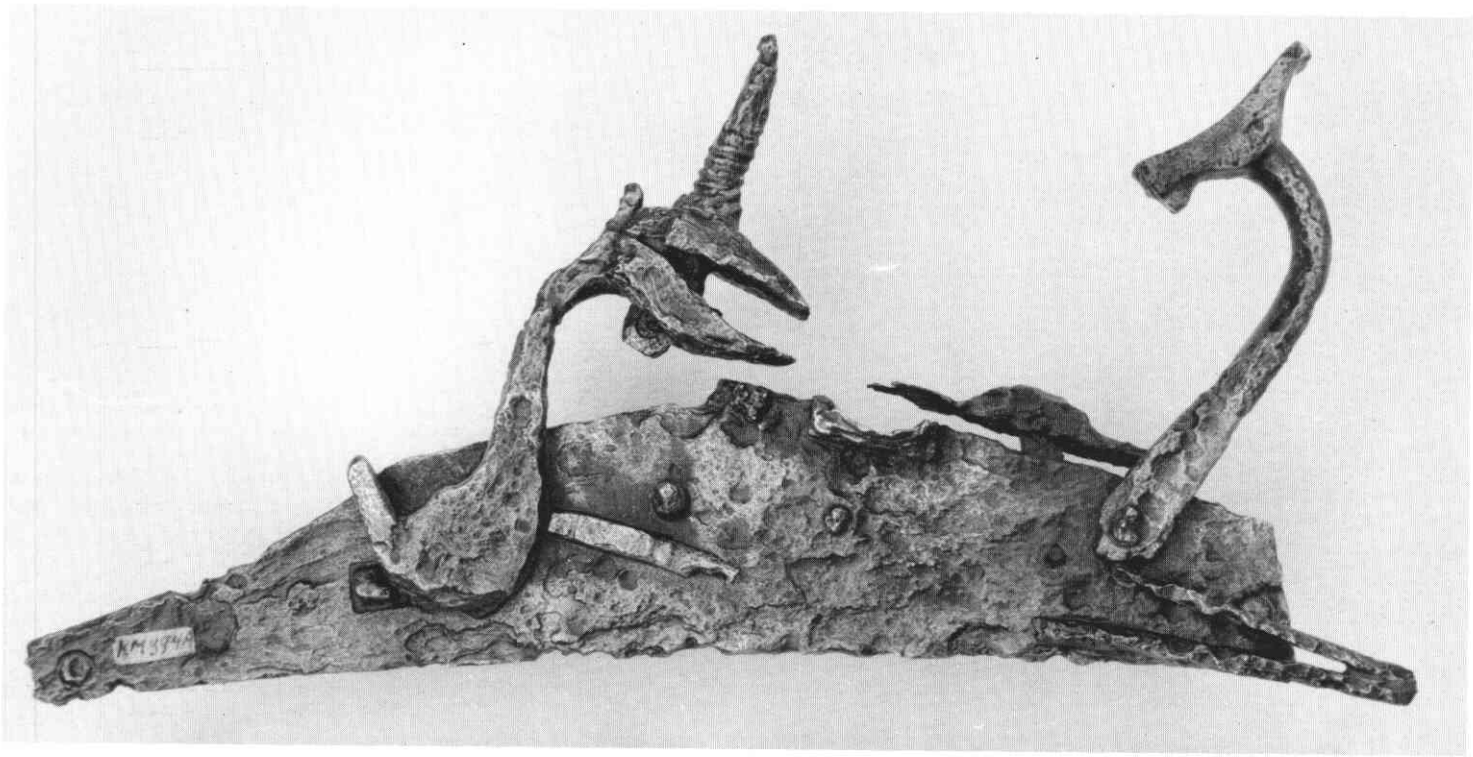


Exterior of snaphaunce lockplate (44KM394A) excavated from Kingsmill Tenement, James City County, Virginia. (From the collections of the Department of Historic Resources, Richmond, Virginia.)

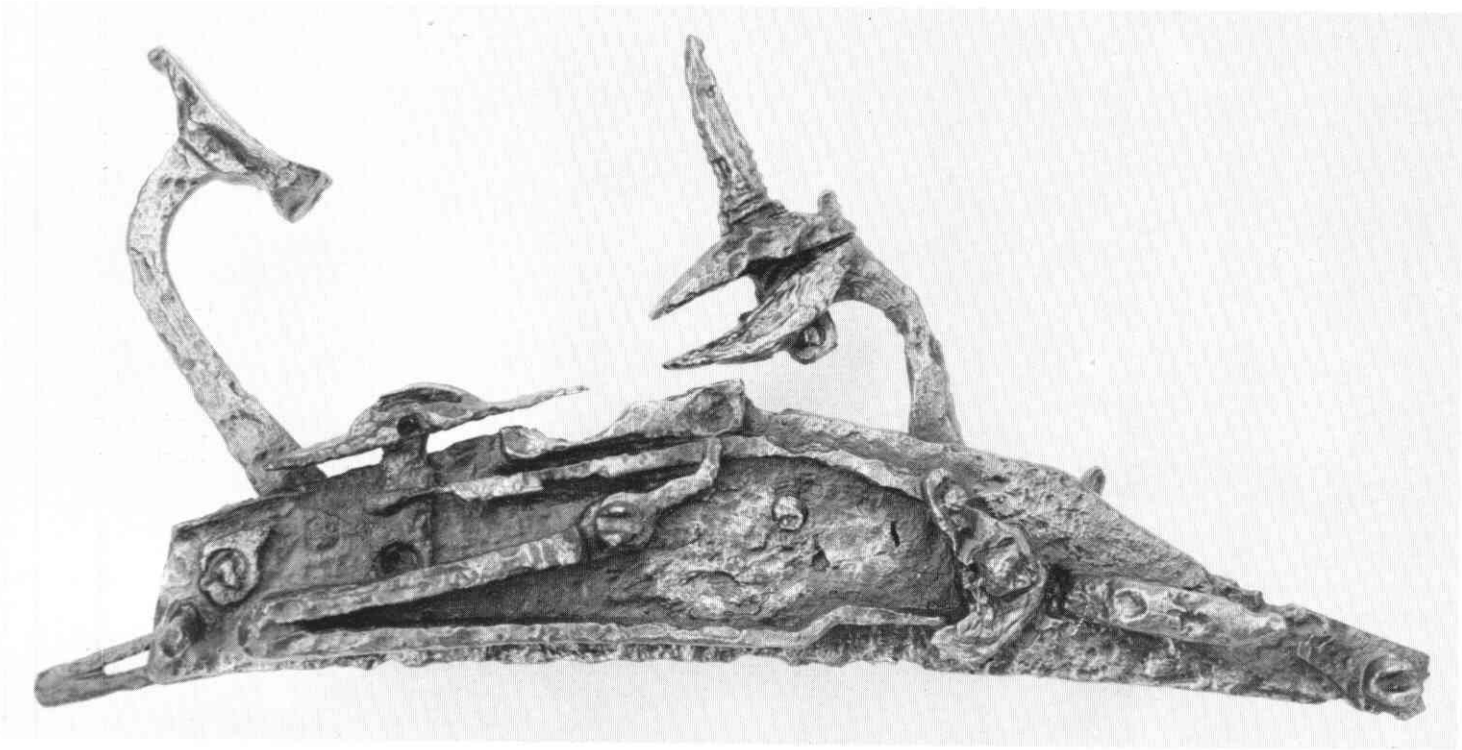


Figure 2. Interior of snaphaunce lockplate (44KM394A).

A Re-Examination of the English-Lock

Beverly Ann Straube

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 develops into 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 seventeenth-century 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.

Admittedly, 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. To provide the necessary background information for understanding the analysis to follow, I will first 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 ensue. 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 some of 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.

Definition of Gunlock Types

The discussion of related ignition types of seventeenth-century firearms will begin with the flintlock, "the major technical invention of the seventeenth century" (Blair 1983:62), 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

Beverly Ann Straube was born in Washington, D.C., received a Bachelor's degree in Anthropology from Chatham College in Pittsburgh in 1970, and in August, 1990, a Master of Arts in American Studies from the College of William and Mary in Williamsburg, Virginia. For thirteen years she was employed by the Virginia Department of Historic Resources as a staff archeologist and curator of archeological collections. While doing so, she found questionable attributions which led to her thesis and the subject of this talk; she is currently working with Dr. James D. Lavin on a book on early English gunlock elements. In 1986 she formed her own company, The James River Institute for Archeology, Inc., which has since been awarded by the National Park Service the largest contract in the nation for cataloging archeological collections.

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.

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 not necessary on its immediate prodecessor, 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 (Haywood 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 flintlock 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 1962: 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 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 reserach beyond the present scope of this paper 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 1620s or early 1630s 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 know 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, 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. 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, 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 is added, 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. 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 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 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 circulated through Europe by the 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 conversant.

The review of the evidence 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, 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 snaphaunces 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 third 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 *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 know 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).

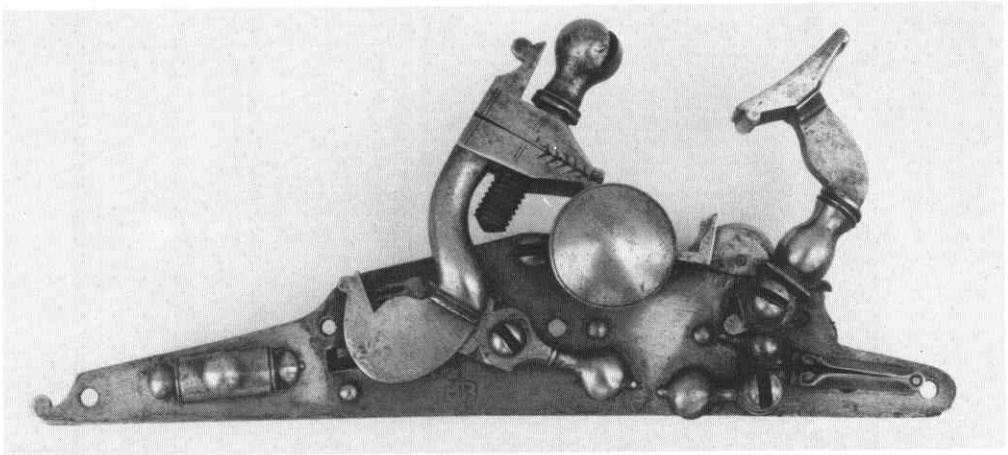
The snaphaunce lock can be seen as a direct development of the wheel-lock. On the exterior of the lock, aesthetic response to the wheel-lock is easily discernible: the rondel or fence at the end of the snaphaunce pan is reflecting the wheel shape, the turnings on the cock and steel copy those of the 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 (Straube: v), were the most commonly used firearm at Jamestown. A complete snaphaunce lock (Figure 1), exhibiting features which identify it with the earliest known Netherland-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 rectangular element. ''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 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 end of the pan as on later English examples (Figure 2).

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



The lock of the English snaphaunce fowler given to Philip III of Spain by James I in 1604. (K.124, Royal Armoury, Madrid)

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, as commonly believed.

> . . . it is possible that . . . the Low Countries were passing on features which they themselves had derived from Northern 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, it is important that it be examined more thoroughly.

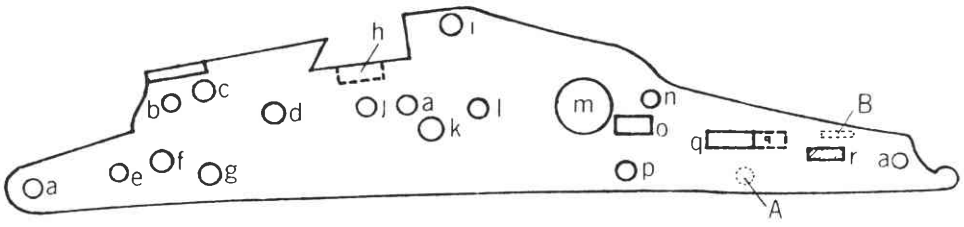
In an attempt to understand the mechanics of the snaphaunce, an intact unmodified example with historical provenance was selected for study (Figure 3). One of the "foure following pieces" given in 1604 by James I to Philip III of Spain it was chosen for its English attribution as well as for the fact 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 or 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 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

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

Not on this lock (found on locks with pivoting safety mounted externally on lockplate):

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

Figure 4. Template of 1604 snaphaunce fowler. (Drawing by James D. Lavin.)

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 example 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 4). 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 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.

The Evidence

"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, I 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 Cruso outlined the firearms drill for "firelocks" and "snap-hanes" in his *Militarie Instructions for the Cavallrie*. These instructions are accompanied by engravings 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" Cruso is describing are snaphaunces and not English-locks (Figure 5). 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

> 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 firelock 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 Cruso 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 Cruso moves on to procedures specifically for the "snap-hane pistoll."

Later in the manual, Cruso gives instructions for handling "carabines" which "are for the most part snap-hanes" (Cruso 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 be "order the hammer" and there would be no need to make this command. It appears very clear that Cruso is discussing a snaphaunce and not an English-lock.

Figure 5. Cruso posture 20, "Order your hammer" (Cruso, Figure 3.)

Subsequent military manuals—Henry Hexam in 1637, Robert Ward in 1639, and Richard Elton in 1650—echo Cruso'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.

Militarily, the English-lock is commonly associated in present-day literature with the Engish Civil Wars (1642-1648), even though Howard Blackmore's documentary research into government contracts during these conflicts has revealed that "the majority of the arms supplied [by the London gunmakers] were cheap matchlock musket" (Blackmore 1961: 25). Is this association accurate? If the earliest recognized English-locks are really converted snaphaunces, what proof is there for the use of this gunlock type during the 1640's?

In 1988, the author had the opportunity to inspect what has been described as "the greatest concentration in the world of military flintlocks of the English Civil Wars" (Rimer 1987: 122) in the Popham Armoury at Littlecote House in Wiltshire, England. The preliminary analysis of this collection by the Royal Armouries at the Tower of London admits that it also contains a number of late

seventeenth-century weapons which were not acquired during the Civil Wars and "that a small number of civil-war period arms in the Armoury were not original Popham pieces" (Rimer and Blackmore: 21). The Royal Armouries study was confined to the firearms which were purportedly returned to Alexander Popham by his tenants following the Civil Wars to be "hung as a memorial in the great hall of the house" (Rimer and Blackmore: 19). It is not clear how the researchers determined which of the eighty-two muskets, sixty pistols, and twenty-one carbines were "original Popham pieces" and, likewise, which firearms dated to the Civil War period, although it seems that the decisions were made on appearance.

The muskets were found to be equally equipped with matchlocks and English-locks; and many of the latter had been assembled with matchlock barrels. The stocks reflect two major butt shapes: the fishtail butt, common until c.1630, and the club butt which was popular beginning in the mid-century (Blair 1983: 80). Strangely, the English-locks with the matchlock barrrels are furnished equally with fishtail and club butts. Since it would not be possible to maintain the original matchlock stock with the barrel when replacing the lock plates, these stocks would have to be contemporary with the mounting of the new lock. The fishtail butt was very old-fashioned by mid-century and it seems odd that a gunmaker would resort to this style in restocking the gun. At this point, there is no way to definitely say that this occurred during the Civil-War period; it is entirely possible that the repairs and restockings were done at a much later date, when perhaps there was an attempt to give the arms an appearance of antiquity. In fact, one can not even be sure that "it is most likely that the armoury was set up by Colonal Alexander Popham" (Richardson: 25) as has been claimed.

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 what he believed to be 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 Gunmaker's Company on the barrels shows that they cannot be earlier than 1638 (Hayward: 207-208).

The Royal Armouries study revealed two examples that were obviously converted snaphaunce locks as Hayward describes (Rimer and Blackmore: 21). 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 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.

The Royal Armouries study of the Littlecote collection of arms defined five variations of the English-lock (Rimer and Blackmore: 21). 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 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 1630s (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 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.

In 1973, *The Gun Report* published an article by Anthony D. Darling which 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 it is of the true flintlock ignition system (Darling: 1973). Darling has dated his firearm to 1647 which would lend credibility to a Civil War date for the Popham arms. His 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 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 1630s (Hayward 1962: 207). As has been shown, however, the snaphaunce was used extensively, at least militarily, in England until the 1670s. 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" (Darling: 19). The author had an opportunity to examine this firearm (Figure 6), 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,

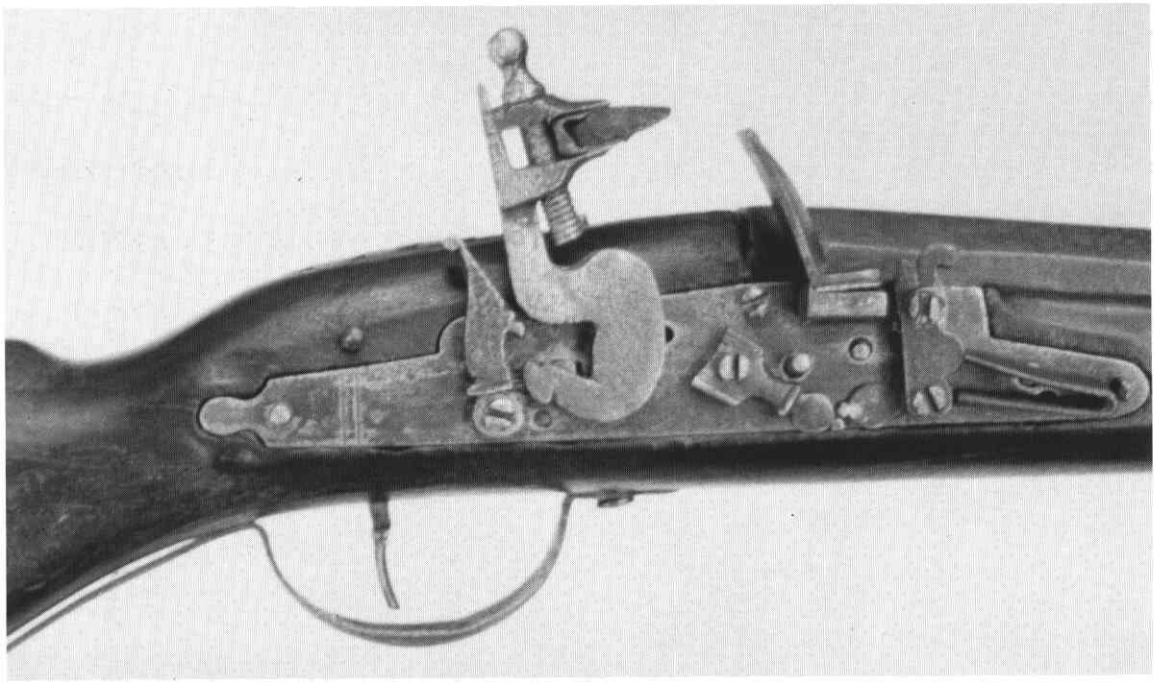


Figure 6. The "Alton" English-lock gun. (Havant Museum, Hampshire, England.)

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) and illustrated in 1959 by Jackson and Whitelaw (24). 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. 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 vertical sear of the French flintlock.

Nevertheless, this lock still would appear to lend credence to a pre-1650s 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 (Figures 7, 8). 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.

Figure 7. Exterior of English-lock signed "Henry Crips" and dated 1679. (Jamestown-Yorktown Educational Fund, Jamestown, Virginia.)

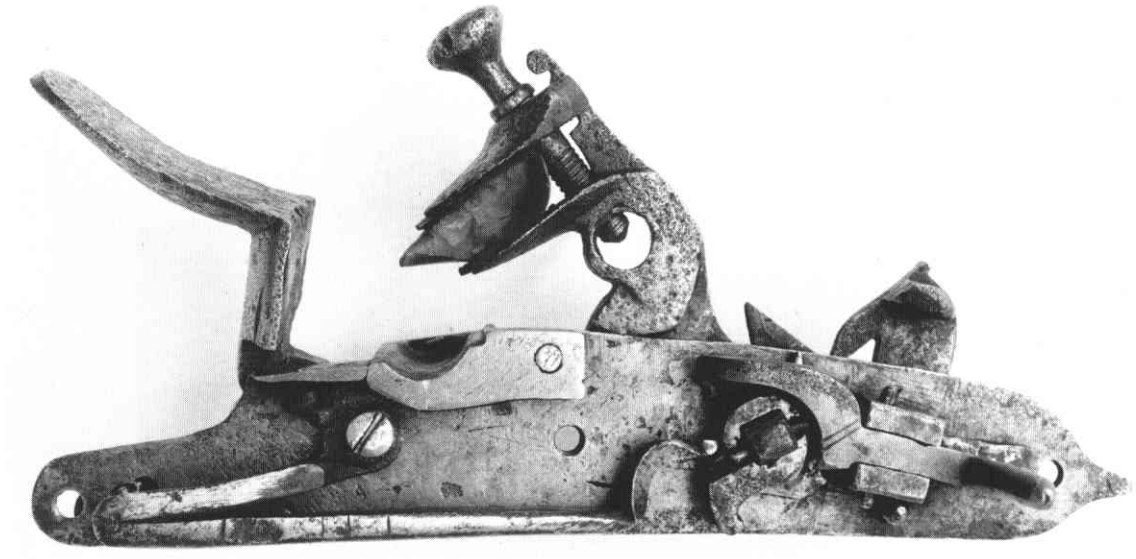


Figure 8. Interior of Crips English-lock.

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 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. 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

Figure 9. English-lock lockplate (Y-206) in Colonial National Park Collections.

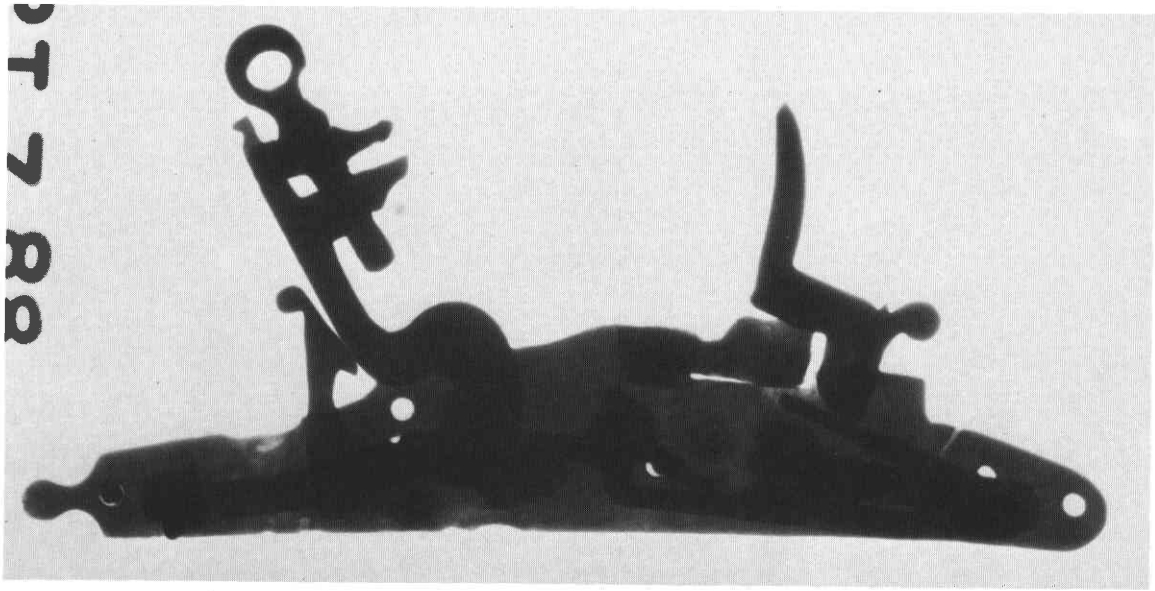


Figure 10. X-ray of Y-206 showing separation of hammer weld between forward and rear portions of lockplate.

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 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 1670s and toward the back on the earlier locks.

An 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 previously mentioned, the French are credited with the development of the

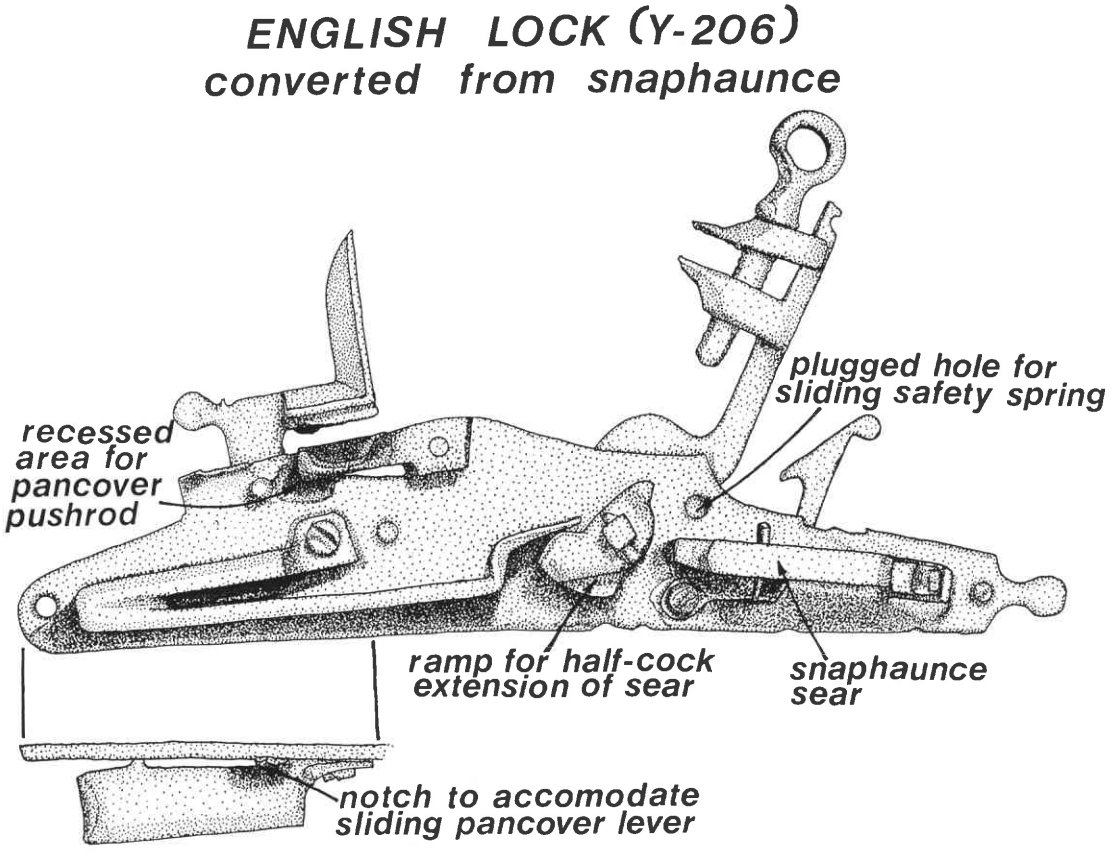


Figure 11. Illustration of Y-206 inner lockplate, revealing snaphaunce elements. (Drawing by Jamie E. May.)

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).

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.

Thus far this study 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," . . . "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, beginning with the "Yorktown dog lock".

Peterson encaptioned an illustration of the gunlock in Figure 9 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 gunsmith 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, which was compiled by park superintendent B. Floyd Flickinger for legal purposes.

Park archives contain photographs of this object dated September 17, 1938 (Photos # 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 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 4), 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, illustrated in Figure 11, 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, evidenced by the inner notch required to accomodate the lever of the sliding pancover. There is a partially plugged hole above the opening for the sear which corresponds to "n" on the diagram for the 1604 gift gun 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 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 rear portions of the lock plate (Figure 10). 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 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, 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 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.

An obvious example of a converted snaphaunce is the Alderman lock now in the collections of the Massachusetts Historical Society in Boston (Figure 12). This lock is 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 13) 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

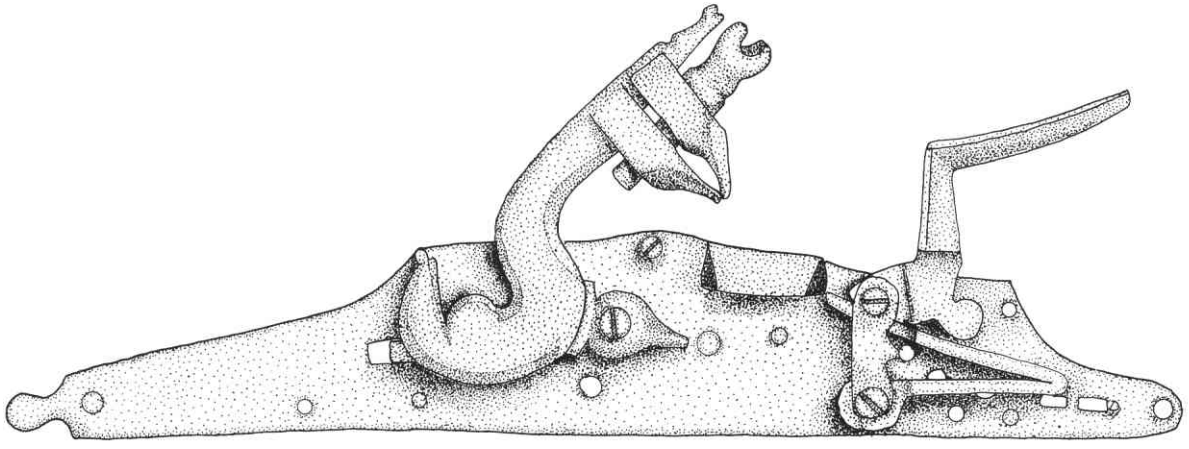


Figure 12. Exterior of Alderman lock. (Drawing by Jamie E. May based on original rendering by Richard T. Colton.)

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.

The remainder of this study will discuss 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 14) 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 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 15). 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 17).

Using the plan provided by the James I gift gun, the lock was reconstructed to its original snaphaunce form. Figure 16 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 1620s. 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 18), the guide finger on the pan for the snaphaunce pancover pushrod remains and the 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 19).

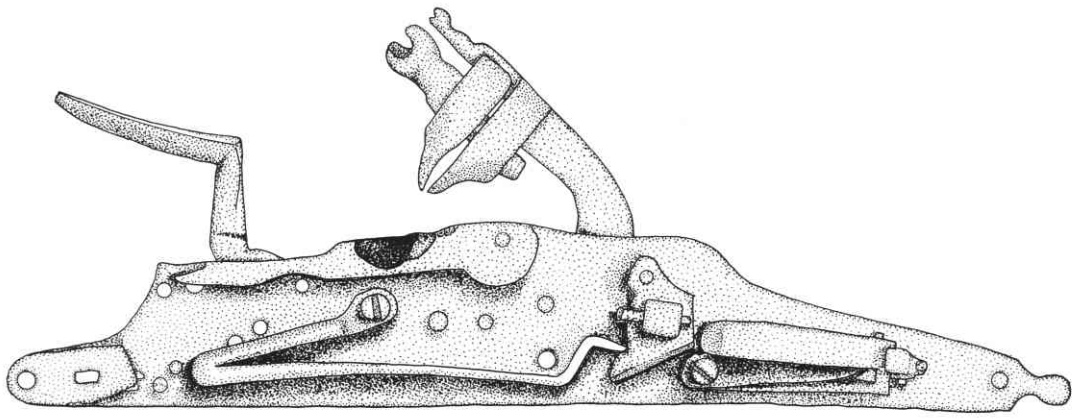


Figure 13. Interior of Alderman lock, revealing snaphaunce elements. (Drawing by Jamie E. May based on original rendering by Richard T. Colton.)

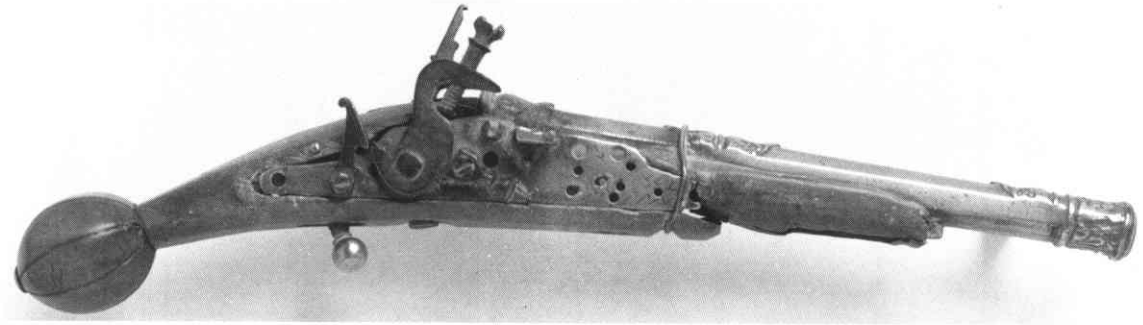


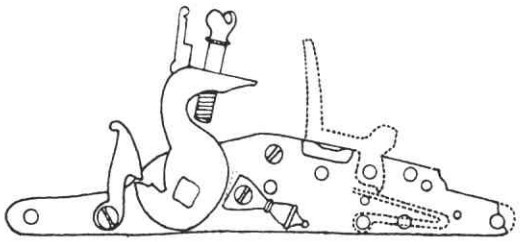
Figure 14. The Thompson pistol. (Pilgrim Society, Pilgrim Hall, Plymouth, Massachusetts.)

Figure 15. Thompson pistol. View from top showing cast brass barrel chased with raised moldings and acanthus leaf ornament.

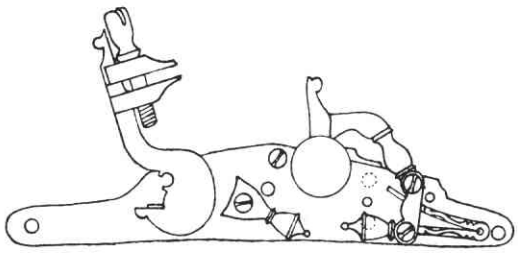
Overall, the pistol's alteration appears to have been an inexpensive endeavor leading Ian Eaves to categorize the pistol as "an interesting example of a lower class civilian arm" (Eaves 1970: 292) even though he did not realize at the time that he was looking at a conversion. The lock plate was not shortened 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 20, 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 the mechanism from the three moveable parts of the safety to the single part of the back-catch. This same trend toward simplificaton 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 Thompson 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.



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 16. Drawing of Thompson pistol showing it (top) as an English-lock, and, (bottom as it probably looked in its original snaphaunce form. (Drawing by James D. Lavin.)

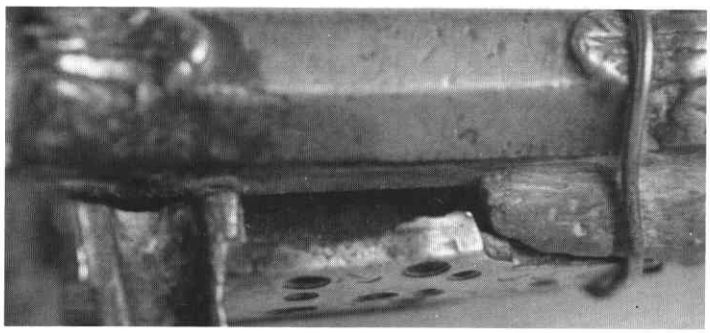


Figure 19. Gap between lockplate and barrel on Thompson pistol to accommodate snaphaunce sliding pancover.

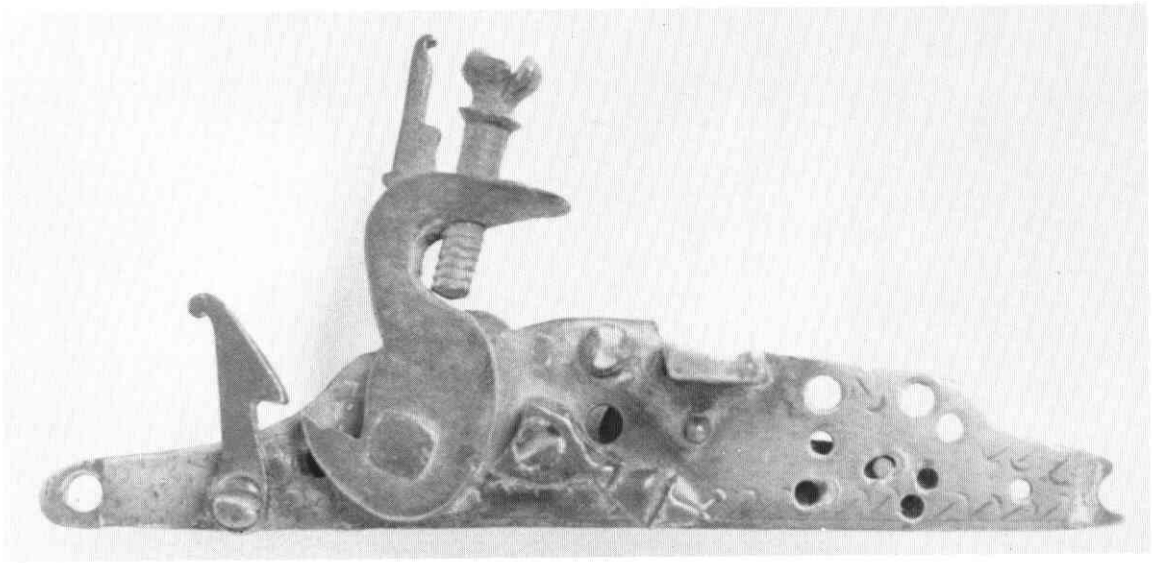


Figure 17. Thompson pistol lockplate, exterior.

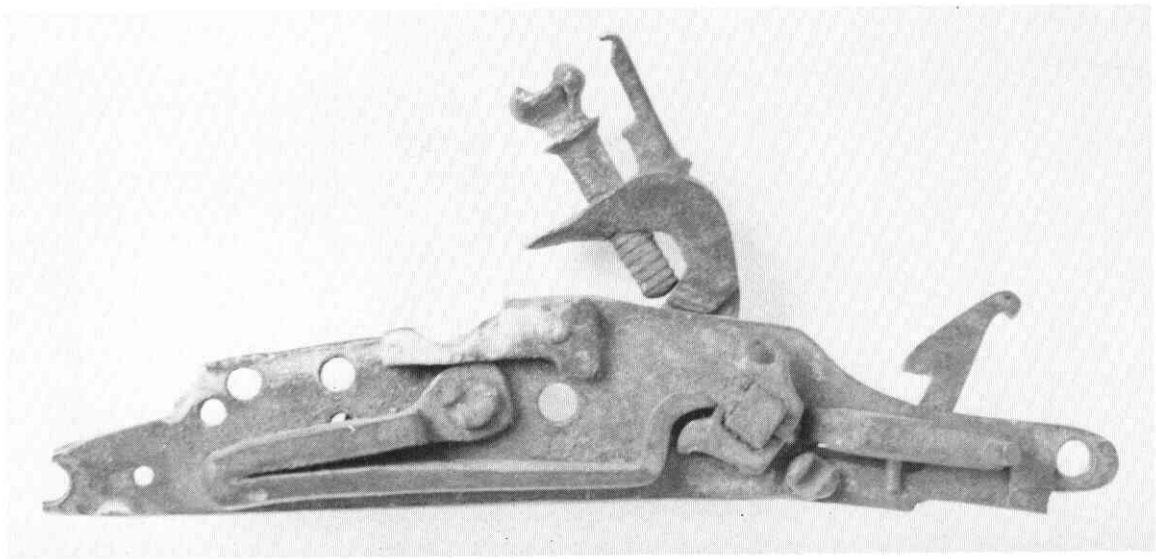


Figure 18. Thompson pistol lockplate, interior.

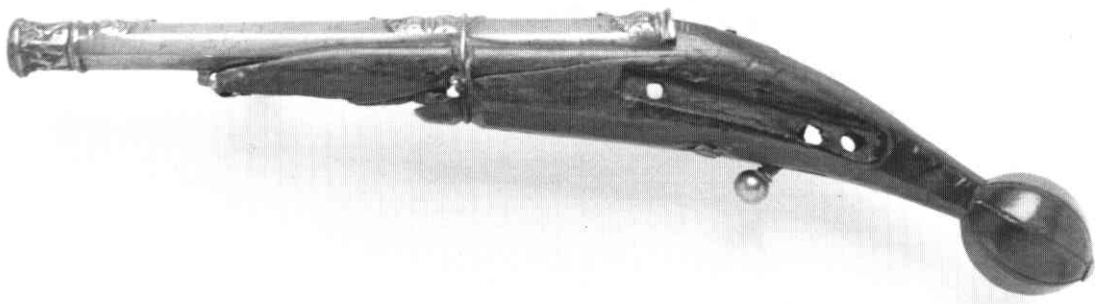


Figure 20. View of Thompson pistol showing slot for sideplate with hole to accommodate the snaphaunce safety.

An English-lock fowler (Figure 21), 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 indentified in the literature (Peterson 1956: 42), it is not possible to prove by the wood whether it was restocked in England or America. Beech is a typical

Figure 21. Thompson fowler. (Old Colony Historical Society, Taunton, Massachusetts.)

Figure 22. Thompson fowler lockplate, exterior.

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 22), 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 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.

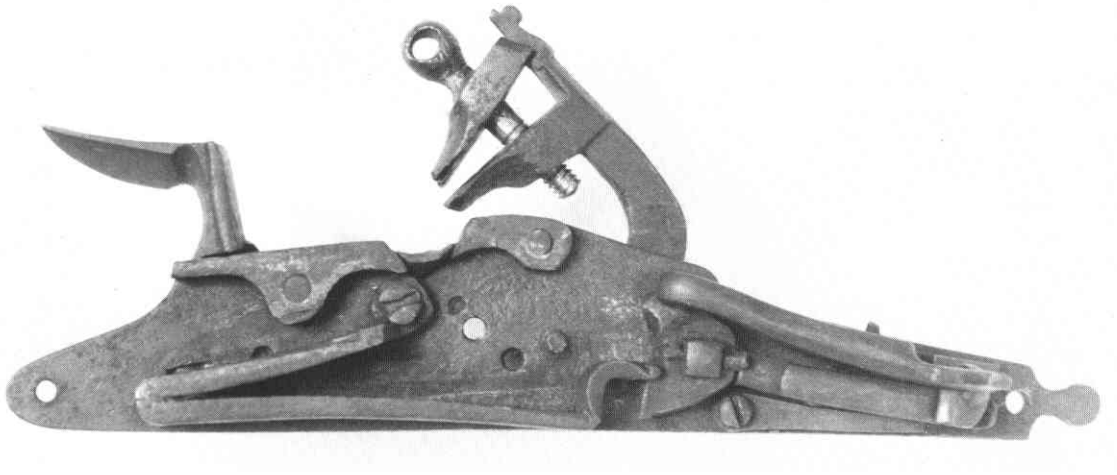


Figure 23. Thompson fowler lockplate, interior.

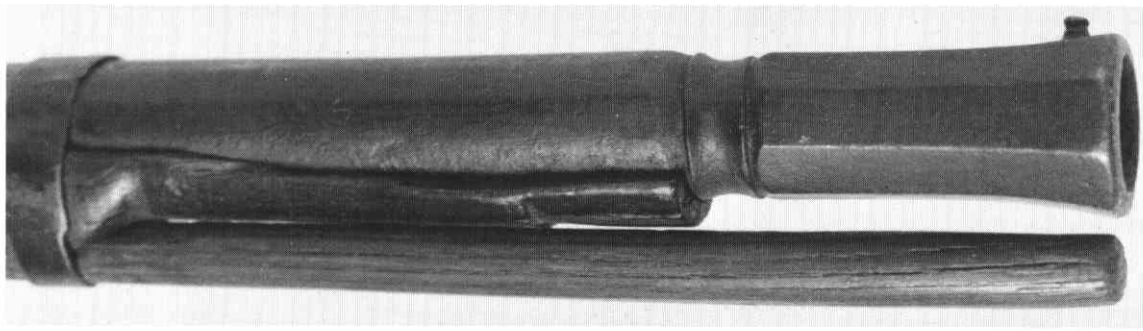


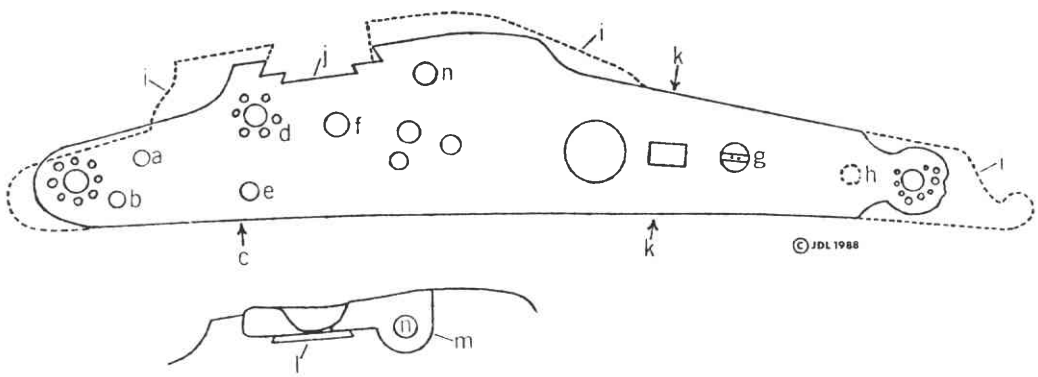
Figure 24. Belled muzzle of Thompson fowler snaphaunce barrel.

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 23), 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 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 24) and is fitted with an iron bead 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



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 25. Conjectural reconstruction of Forbes fowler lock. (Drawing by James D. Lavin.)

age. The bands may date to 1973 when museum records report 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 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 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 1620s, 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 25 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 26). The buffer is of Glendenning's "blob and tit type" (Glendenning 1951: 106) and, just as the case of the Thompson fowler, the decorative elements of the cock and buffer do not line up, suggesting that they

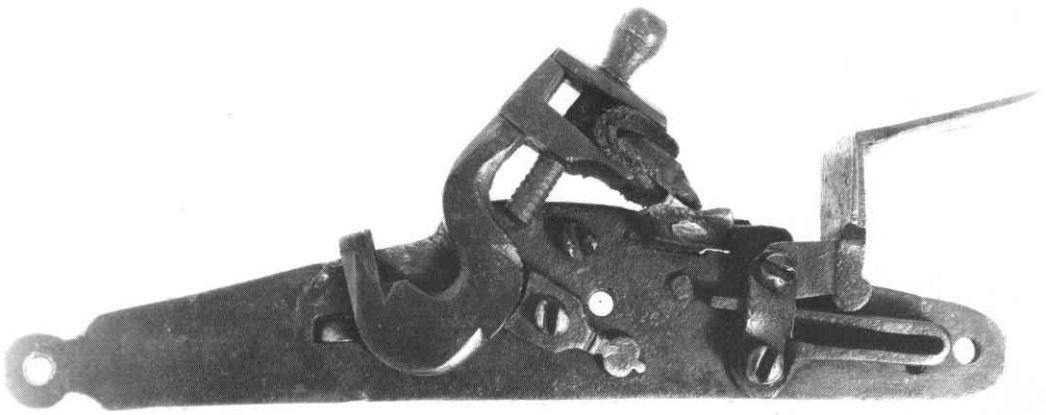


Figure 26. Forbes fowler lockplate, exterior. (Photograph courtesy of Smithsonian Insititution, Washington, D.C.)

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 27).

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 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 goove 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

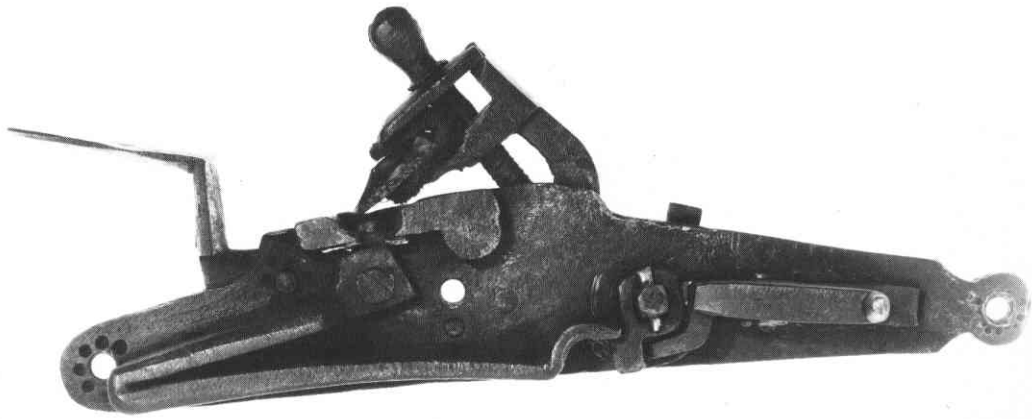


Figure 27. Interior of Forbes fowler lockplate. (Photograph courtesy of the Smithsonian Institution, Washington, D.C.)

any case, there is nothing about the Forbes fowler in its present form to suggest a date of manufacture in the 1620s.

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 1620s 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 Englilsh-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.

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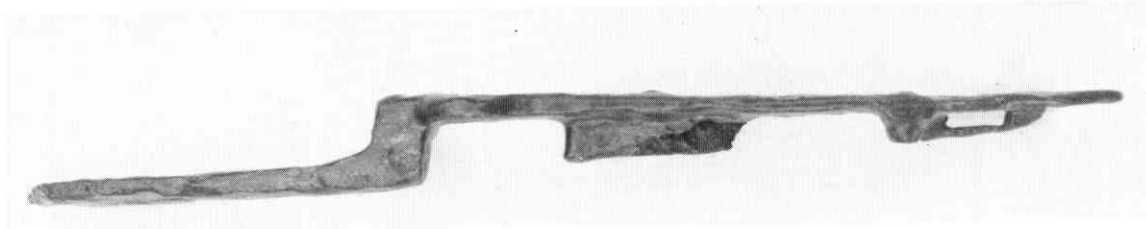

Figure 28. Postscript: in the study of the Thompson pistol, there is discussion of a "sideplate with a manual safety and most probably a belt hook". How the safety and belt hook were fitted is shown in the photo above. The belt hook is to the left; the center "lump" was a spring for the safety, which would fit through the slot to the right.

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Dr. R.L. Moore preparing to introduce Ms. Straube to her Milwaukee audience.