

EARLY PERCUSSION PRIMER IDENTIFICATION

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This Primer Identification Manual could not have been completed without the assistance of many. A partial list follows, but the names of many who have assisted, have been dimmed by the passage of time. — SJG.

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IN	DE	Y	C20	1857	Eley, W.	P51	1826	Mahiet	P11	1845	Smith, C.
INDEA			C84	1857	Eley, W.T.	C7	1839	Manton, G.H.	C4	1830	Smith, S.
COI	RECT	ED to P84;	T28	1862	Eyraud	P6	1834	Manton, J.A.,	C33	1841	Starkey
134	C92.		C40	1846	Flobert	P63	1825	Manton, Jos	C8	1841	Starkey
			P1	1807	Forsyth	TI	1818	Manton, Jos.	C16	1853	Stirling
C65	XXXX	Alderman	C81	1839	French Mil.	T2	1818	Manton, Jos.	C23	1869	Talbott
P61	1856	Andreane	C51	1836	Gaupillat	T3	1818	Manton, Jos.	T26	1842	Thibert
P42	1872	Andreany	C54	1852	Gaupillat	P31	1816	Manton. Jos.	C14	XXXX	Tibbal
C17	1854	Armstrong	C55	1853	Gaupillat	P40	1857	Martin	C40	1846	Tillet
P72	1837	Audent	C27	1849	Germain	P53	1839	Martin	C42	1862	U.S. Mili
C41	1837	Austrian	C30	1839	Germain	P10	1845	Maynard	C83	1945	"Uni"
C90	XXXX	Austrian	C25	xxxx	Gevelot	P26	1880	Megill	C32	XXXX	Unidentit
P25	1879	Backes	C26	XXXX	Gevelot	C86	XXXX	Mexico	C36	1835	Unidentit
T21	1970	Bailey	C27	1847	Gevelot	C87	xxxx	Mexico	C49	xxxx	Unidenti
T29	1870	Barthe	C27	1849	Gevelot	C88	XXXX	Mexico	C50	xxxx	Unidenti
C62	XXXX	Bellot	C37	1838	Gevelot	C34	xxxx	Mills	C63	XXXX	Unidentit
C53	1841	Berry	C78	1838	Gevelot	C59	1860	miniature	C67	xxxx	Unidenti
P5	1830	Billinghurst	C46	1867	Gevelot	C61	1842	Monteiro	P47	1820+	Unidenti
P44	183±	Bisbee	C70	xxxx	Gevelot	P30	183±	Moore	P57	XXXX	Unidenti
P22	1859	Bishop	C31	1835	Gevelot, M.J.	P32	183±	Moore	P58	XXXX	Unidenti
P56	1866	Blanchon	C15	1853	Goldmark	P48	1821	Moreau	P59	XXXX	Unidenti
P61	1856	Bolasco	P36	1820	Gosset	C60	1820±	Mortimer	P60	XXXX	Unidenti
P17	1857	Bousfield	P38	1824	Gosset	C10	1843	Needham	P62	XXXX	Unidenti
C58	1849	Brooks	P16	1856	Greene	C29	1868	Newens	P64	XXXX	Unidenti
P14	1855	Butterfield	P54	1845	Guibert	C57	1868	Newens	P65	xxxx	Unidenti
P27	XXXX	Butterfield (?)	C48	1822	Guillemin	C44	1856	Nut Caps	P66	XXXX	Unidenti
P23	1866	Canouil	P37	1822	Guillemin	P19	1859	Parsons	P67	XXXX	Unidenti
P56	1866	Canoul	P4	1826	Guthrie	T6	185+	Patstone	P68	XXXX	Unidenti
C28	XXXX	Cardinal cap	P19	1817	Hall	T6	1882+	Patstone	P69	XXXX	Unidenti
C28	XXXX	Cardinal cap	P79	1817	Hall	P39	1825	Plomdeur	P74	XXXX	Unidenti
0.28	XXXX	Cardinal cap	P45	1859	Harmer	P73	1837	Plomdeur	T16	XXXX	Unidenti
P63	1824	Cartmell	T12	1849	Hawker	P34	1818	Pottet	T17	xxxx	Unidenti
014	1800	Chassepot	T7	1841	Heurteloupe	C19	1855	Pratt	T18	XXXX	Unidenti
PIS	1850	Chattaway	T77	1834	Heurteloupe	C2	1820	Prélat	T19	XXXX	Unidenti
P40	1970	Cherepy	C13	1853	Horrocks	T23	1820	Prélat	T20	XXXX	Unidenti
T14	1000	Claster	T22	1835	Jean Lepage	T76	1820	Prélat	T31	XXXX	Unidenti
T14	1855	Clayton	C5	1833	Jones	P33	1810	Prélat,	T75	XXXX	Unidentit
C42	1055	Clara	C38	1838	Jourdan	P35	1818	Prélate	C85	XXXX	Unidenti
C68	1860+	Confederate	C71	1853	Joyce	C17	1854	Pursall	T77	XXXX	Unidentit
C60	1860+	Confederate	P77	1844	La Marmora	C21	1858	Pursall	T79	XXXX	Unidentit
T32	1835	Console	P20	1859	Laidley	C11	1849	Richards	P12	1850	von Gers
P43	1833	Contriner	C48	1822	Lambert	C12	1852	Richards	C22	1859	Walker, I
P7	1840	Cooper	P37	1822	Lambert	C6	1836	Richards	C66	1852	Walker, I
P80	183±	Coriander	T13	1850	Lancaster	P3	1821	Richards	C9	1843	Walker, S
C73	1854	Cox	134	1850	Lancaster	P9	1841	Richards	C22	1859	Walker. I
C56	1863	Daime	125	XXXX	Lancaster	T4	1833	Richards	P55	1856	Ward
Τ15	XXXX	d'Ancion	19	1844	Lancaster	C72	1849	Ritchie	P8	1839	Wilkinso
C82	1839	Danish Mil.	C80	1847	Larochée	P70	1817	Riviere	T11	1844	Wilkinso
P28	1824	de Berenger	P52	1837	LeGrain,	124	1831	Robert	P44	183±	Wilson
P2	1810	De l'Etang	C27	1847	Lemaire	P18	1858	Rollin	C24	1870	Woodsid
T30	1821	de Valdahon	0.56	1863	Lemaire	C47	1872	Rossignol			
C35	1820	Deboubert	P/8	1803	Lemaire-Daime	P21	1859	Rupertus			
P75	1846	du Tillet	045	1821	Lepage	C52	1845	Russian			
C43	XXXX	Dupeyon	0/2	1836	Lepage	P24	1876	Savorel			
Γ8	1842	Edge	P29	1810	Lepage	0.39	1853	Scheidt			
CI	1818	Egg	P49	1821	Lepage	C62	XXXX	Sellier			
Γ5	1835	Egg	P50	1825	Leroy	P13	1852	Sharps			
C18	1855	Eley, W.T.	110	1044	Long	03	1822	Shaw			
C84	1857	Eley, W.T.	F/0	104/	Loron M. Dama	P/1	1822	Snaw			

INDEX Revised to P80; T34; C84

C65 xxxx Alderman P61 1856 Andreane P42 1872 Andreany C17 1854 Armstrong P72 1837 Audent C41 1837 Austrian P25 1879 Backes T21 1970 Bailey T29 1870 Barthe C62 xxxx Bellot C53 1841 Berry P5 1830 Billinghurst P44 183± Bisbee P22 1859 Bishop P56 1866 Blanchon P61 1856 Bolasco P17 1857 Bousfield C58 1849 Brooks P14 1855 Butterfield P27 xxxx Butterfield (?) P23 1866 Canouil P56 1866 Canouil C28 xxxx Cardinal cap C28 xxxx Cardinal cap C28 xxxx Cardinal cap P63 1824 Cartmell C74 1866 Chassepot P15 1856 Chattaway P46 1970 Cherepy P41 1858 Chester T14 1850 Clayton T14 1855 Clayton C43 xxxx Clere C68 1860+Confederate C69 1860+Confederate T32 1835 Console P43 1833 Contriner P7 1840 Cooper P80 183± Coriander C73 1854 Cox C56 1863 Daime

T15 xxxx d'Ancion C82 1839 Danish Mil. P28 1824 de Berenger P2 1810 De l'Etang T30 1821 de Valdahon C35 1820 Deboubert P75 1846 du Tillet C43 xxxx Dupeyon **T8** 1842 Edge C1 1818 Egg T5 1835 Egg C18 1855 Eley, W.T. C20 1857 Eley, W. C84 1857 Eley, W.T. T28 1862 Eyraud C40 1846 Flobert P1 1807 Forsyth C81 1839 French Mil. C51 1836 Gaupillat C54 1852 Gaupillat C55 1853 Gaupillat C27 1849 Germain C30 1839 Germain C25 xxxx Gevelot C26 xxxx Gevelot C27 1847 Gevelot C27 1849 Gevelot C37 1838 Gevelot C78 1838 Gevelot C46 1867 Gevelot C70 xxxx Gevelot C31 1835 Gevelot, M.J. C15 1853 Goldmark P36 1820 Gosset P38 1824 Gosset P16 1856 Greene P54 1845 Guibert C48 1822 Guillemin P37 1822 Guillemin P4 1826 Guthrie P19 1817 Hall

P79 1817 Hall P45 1859 Harmer T12 1849 Hawker T7 1841 Heurteloupe T77 1834 Heurteloupe C13 1853 Horrocks T22 1835 Jean Lepage C5 1833 Jones C38 1838 Jourdan C71 1853 Joyce P77 1844 La Marmora P20 1859 Laidley C48 1822 Lambert P37 1822 Lambert T13 1850 Lancaster T34 1850 Lancaster T25 xxxx Lancaster T9 1844 Lancaster C80 1847 Larochée P52 1837 LeGrain. C27 1847 Lemaire C56 1863 LeMaire P78 1863 Lemaire-Daime C45 1821 Lepage C72 1836 Lepage P29 1810 Lepage P49 1821 Lepage P50 1825 Leroy T10 1844 Long P76 1847 Loron C53 1841 M. Berry P51 1826 Mahiet C7 1839 Manton, G.H. P6 1834 Manton, J.A.. P63 1825 Manton, Jos T1 1818 Manton, Jos. T2 1818 Manton, Jos. T3 1818 Manton, Jos. P31 1816 Manton, Jos. P40 1857 Martin P53 1839 Martin

P10 1845 Maynard P26 1880 Megill C34 xxxx Mills C59 1860 miniature C61 1842 Monteiro P30 183± Moore P32 183± Moore P48 1821 Moreau C60 1820±Mortimer C10 1843 Needham C29 1868 Newens C57 1868 Newens C44 1856 Nut Caps P19 1859 Parsons T6 185+ Patstone T6 1882+Patstone P39 1825 Plomdeur P73 1837 Plomdeur P34 1818 Pottet C19 1855 Pratt C2 1820 Prélat T23 1820 Prélat T76 1820 Prélat P33 1810 Prélat. P35 1818 Prélate C17 1854 Pursall C21 1858 Pursall C11 1849 Richards C12 1852 Richards C6 1836 Richards P3 1821 Richards P9 1841 Richards T4 1833 Richards C72 1849 Ritchie P70 1817 Riviere T24 1831 Robert P18 1858 Rollin C47 1872 Rossignol P21 1859 Rupertus C52 1845 Russian P24 1876 Savorel

C39 1853 Scheidt C62 xxxx Sellier P13 1852 Sharps C3 1822 Shaw P71 1822 Shaw C64 1845 Smith, C.J. P11 1845 Smith, C.J. C4 1830 Smith, S. C33 1841 Starkey C8 1841 Starkey C16 1853 Stirling C23 1869 Talbott T26 1842 Thibert C14 xxxx Tibbal C40 1846 Tillet C42 1862 U.S. Military C83 1945 "Uni" C32 xxxx Unidentified C36 1835 Unidentified C49 xxxx Unidentified C50 xxxx Unidentified C63 xxxx Unidentified C67 xxxx Unidentified P47 1820+Unidentified P57 xxxx Unidentified P58 xxxx Unidentified P59 xxxx Unidentified P60 xxxx Unidentified P62 xxxx Unidentified P64 xxxx Unidentified P65 xxxx Unidentified P66 xxxx Unidentified P67 xxxx Unidentified P68 xxxx Unidentified P69 xxxx Unidentified P74 xxxx Unidentified T16 xxxx Unidentified T17 xxxx Unidentified T18 xxxx Unidentified T19 xxxx Unidentified T20 xxxx Unidentified

T31 xxxx Unidentified
T75 xxxx Unidentified
T77 xxxx Unidentified
T79 xxxx Unidentified
P12 1850 von Gersheim
C22 1859 Walker, R.
C66 1852 Walker, R.
C9 1843 Walker, S.
C22 1859 Walker, S.
C22 1859 Walker, S.
C22 1859 Walker, M.A.
P55 1856 Ward
P8 1839 Wilkinson
T11 1844 Wilkinson
P44 183± Wilson
C24 1870 Woodside

A SYSTEM FOR ORGANIZING PRIMER RECORDS

The illustrated record which follows is an attempt to categorize all of the early primers in a logical, usable format and to provide a means of identification. Eventually, a chronological list and an alpha list by maker/inventor might be produced but the first stage must be a workable system and a comprehensive list.

The System

The first attempt at a list produced in 1985 incorporated all of the primers then known to me in chronological order. By 1988 it had been updated a few times, retaining the original sequence. but that draft incorporated a numbering system capable of being expanded. This created what in museological terms is an "accession record."

Since then, considerable input has been received from many collectors and almost the entire French record has been provided by Philippe Mention.

The early primers can be easily separated into three groupings based upon visible characteristics: pellets, tubes, and caps. It is of extreme importance that identification of these divisions be obvious to all who work in the field. In summary, they include:

Pellets: whether in powder, combustible pellet, pill, or disk, shaped or contained in a capsule, tape, or other ribbon-like material

Tubes: either plain, patented, single, round, flat, or continuous tubes containing a detonating compound.

Caps: common or top hat caps, by design differences but not by maker or marking, unless technically, physically, or historically different, and with that difference being a visible characteristic.

The Accession Record

In the accession record, the prefix "P" "T" of "C" is followed by a numerical figure entered from a master list which henceforth will be compiled in the order of accession. In the system, the number will *always* make reverence to a specific primer, design, or size.

There will undoubtedly be some duplication in this study created in the effort for completeness. For example, P21 and P22 are (almost) certainly the same primer. The specimen P21 which is based upon the 1859 U.S. Patent of J. Rupertus, is conclusive. The specimen called P22 conforms, (almost), to the patent description but it has a contemporary documented Russian provenance and Thomas Bishop is described as the inventor. If it is proven that they are the same, one will be removed and the number will be voided.

This study deals only with the "early primers" but the system could be expanded with little difficulty to the primers designed for self contained combustible and metallic cartridges. This though I will leave to others.

The Master Accession Record

To add a new type to the "Master Primer Record" a few details will be required including size, material, provenance (i.e. if from a cased set, the name of the gunmaker, "model," serial

number, etc.), and any background information available, along with a brief written description.

Please send all available details along with a clear photograph (a photo copy will often be adequate), or a drawing to:

MUSEUM RESTORATION SERVICE

P.O. Box 390, P.O. Box 70 Bloomfield, Ont, Alexandria Bay, NY Canada, K0K 1G0 U.S.A, 13607-0070 Phone (613) 393-2980: fax (613) 393-3378 E-mail: <u>mrsarms@kos.net</u>

The Master Accession Record will be maintained in our Bloomfield office with revisions deposited on a regular basis at the following institutions.

The Musée d'Armes, Liège, Belgium The Stewart Museum, Montreal, Canada The Royal Armouries Museum, Leeds, England The Birmingham Proof House Museum, Birmingham, England The Musée d'Larmée, Paris, France The Kremlin Museum, Moscow, Russia Kungl. Livrustkammaren, Stockholm, Sweden

When required, new primer types with their accession number which have been added since the last published listing, will also be sent to subscribers

PRIMER IDENTIFICATION The Process

Primer Identification and Sources

It would not be difficult to identify primers if they all arrived in a nicely labelled container that could be shown to have the original contents, but that is not the way they are usually found. Once a primer is removed it's container it must have some form of permanent identification, otherwise it will quickly loose its identity. The author's reference collection is housed in 2x2 inch coin holders which can be stapled for security and provide sufficient space for recording data. These are then stored in sheet protectors designed for 35mm slides.

The best primary source for identification is the Patent Office records now housed in the new British Library in London. Patentees usually describe the primer intended to be used and occasionally illustrated them. These of course are most useful but consideration must be given to minor alterations made between the start of the patent process and manufacture of the specimen

Special, and perhaps unique designs, found in cased sets have been identified with somewhat less convincing accuracy but they do provide a place to start. In this category would be the d'Ancion [T15] tube from a cased pair of pistols now in the Roy G. Cole collection in the Royal Ontario Museum at Toronto and the LePage primers [T22] found with the cased revolving pistol in the Royal Armouries Museum at Leeds.

Most gun collectors accumulate all kinds of related "things." Many of those "things" have been primers which have been handed down from collector to collector for almost two centuries, carrying with them their identity as primers from the time they were in the hands of the original purchaser. In the mid 1960s, a Canadian collector purchased a box — a pistol case missing its partitions half full with unusual primers, from Tony Foley. Tony was a long-time London antique arms dealer who, whenever he came across a cased gun, tossed the primers into the box because they could not be sent to a buyer by mail.

William Keith Neal (1905-1900) built what has been described as the finest collection of early English guns ever assembled. He was also a great accumulator of gun material and when that portion of his collection was sold in July 2002, there was more than 100 of the typical round "pill" boxes, numerous chamois bags and countless little boxes and envelopes with what he considered to be primers in the sale. Happily, I had the opportunity to spend time with him in his gunroom in Guernsey and acquired a number of identifiable, and unidentifiable early primers from him and from the sale. These have been recorded in what follows as "ex WKN."

Most of the WKN "things," only some of which were identifiable as primers but a few which are not *obviously* primers, are nevertheless included here because it is assumed that previous owners knew more about them than I.

The contemporary literature is a reliable source for identification. Peter Hawker, an avid English shooter whose *Instructions for Young Sportsmen* went through eleven editions between 1814 and 1859, covers the early development of the percussion system and many of the editions include illustrations of recently developed primers with a paragraph or more on each. His contributions include identification of those by Daniel Long, Charles Lancaster, Westley Richards, and an improvement to Henry Wilkinson's and one of Joseph Manton's designs. He did not include his own Saucer Plug primer developed in 1849 but he did include Alfred Clayton's improvement to it registered in 1851.

A Capt. R. Lacy, writing in *The Modern Shooter* published in 1842, described and illustrated J.W. Edge's "Eccentric Capped-Tube primer and W. W. Greener illustrated a number of primers in some editions of *The Gun and Its Development*. It must be noted though that Greener was not born until 1834, missing first-hand knowledge of the system, and did not publish the first edition of *The Gun* until 1881 by which time his data was not as accurate as one would wish.

In France, as noted earlier, there were numerous early patents for percussion ignitions and the necessary primers were probably made by local chemists, just as they were in England.* As early as 1817, Marin Gevelot was an *armurier et fourbisseur* (armourer and arms merchant) in Paris and was probably producing percussion primers in pellet form very soon after that date. By 1826 or 1827, his son Marie-Joseph had acquired a manufacturing facility for fulminate of mercury and percussion caps at Issey les Moulineaux. The firm continued as a family business until 1884 when it merged with Gaupilat & Co.

In 1835, André François Gaupillat and a monsieur Delion established a cap making business at 74 Richelieu, Paris, In 1837 they opened a plant at Bas Meudon and it was probably at this time that the "GD" crown mark became a Company trademark. The business went through a number of different partnerships over the next 50 years but remained mainly a Gaupillat enterprise until December 14, 1884 when it merged with Gevelot.

In 1980, the successors of Gevelot & Gaupillat became bankrupt and the individual companies reorganized with the old Issy les Mouilneaux plant forming the new SFM. It was in this period that Philippe Mention was granted access to the archives collection and allowed to make notes on cap development at the Gevelot factories. This was most fortunate as in the late 1980s the collection which had been accumulated over more than 160 years, was dispersed.

In 1988, Mr. Mention was in the shop of Monsieur Regnier at the flea market in Paris. He wrote: "I was in the shop of M. Regnier when a man came in and offered to sell a large number of cartridges, primers and percussion nipples in cardboard primer boxes, cardboard pill boxes with glass tops, a large handful of loose primers, several variations of French tabatiére cartridges including a case draw set, and the glass covered box of "Amorces, Eggs Creation" containing four brass caps [C1]. M. Regnier purchased the whole lot and the customer said he still had a few at home. These were apparently not acquired by Regnier but I do not know what happened to them. From what was said, it appeared that the seller was an employee of SFM and the entire lot came from the company research collection. Regrettably, Regnier refused to sell any to me at the time. Later, I acquired a number of the caps including two of the Egg caps, a number of the nipples and a large group of early and experimental primers, although he kept samples of many of the variations he had purchased. Regnier soon moved to Switzerland and, I guess, disposed of the primers to collectors there. The Egg box which you have was sold to the Canadian collector from whom you acquired it."

^{*} In England, where Forsyth's patent was in force until April, 1821, there were only three patents granted for percussion ignitions before his patent expired. In France, there were at least 16 patents in the same period and there were no restrictions on their manufacture. There were also many designs which were not patented and consequently, a relatively high demand for percussion primers.

PELLETS, TUBES, AND CAPS: AN INTRODUCTION TO PERCUSSION PRIMING

by S. James Gooding

When Reverend Alexander Forsyth invented his percussion lock, his patent granted in 1807 covered the principle of the discharge of a firearm by percussion and thereby thwarted any improvement in England for 14 years unless produced with his approval.

This did not prevent others from trying and over the next three or four decades in England, on the Continent, and in America, there were countless new designs centered around the form of the priming material and the lock to make it work

There were hundreds of primer designs produced throughout Europe over the next few years and all may be classified into one of three categories: Pellets, Tubes, and Caps.

Pellets: whether in powder, combustible pellet, pill, or disk, shaped or contained in a capsule, tape, or other ribbon-like material

Tubes: either plain, patented, single, round, flat, or continuous tubes containing a detonating compound. *Caps:* common or top hat caps, by design differences but not by maker or marking, unless technically, physically, or historically different, and with that difference being a visible characteristic.

The purpose of this note is to identify those which can be identified and to record those which cannot, and to provide a system whereby newly recorded designs can be incorporated into the system.

Although percussion firearms as a class have been frequently discussed in print, the percussion system as a whole has been sadly neglected. The exceptions — Louis Winant's pioneering *Early Percussion Firearms* published in 1959, and Howard Blackmore's excellent, 27 page overview in *Pollard's History of Firearms*, edited by Claude Blair published in 1983, deal with the firearms and their development, but no major study has been made of the many forms of chemical which made it all possible.

Fulminating compounds were well known to those interested in chemistry from at least the 17th century. Blackmore records Giuliano Bossi in 1625, Samuel Pepys in 1663, and Johann Kunckel (1630-1703) as the first to produce fulminate of mercury. In 1781, Benjamin Thompson who was born in Massachusetts in 1753, read a comprehensive paper on his experiments with gunpowder before the Royal Society in London, one of which included *aurum fulminans* — gold fulminate — mixed with gunpowder showed no improvement to its performance.¹

In the last year or two of the 18th century, the Reverend Alexander John Forsyth of Belhelvie Parish in Scotland was thinking about using the detonating compounds which were then known, for sporting purposes. By 1805 he had perfected a system using potassium chlorate for the discharge of a gun to the point where it could be presented to Lord Moira, then Master General of the Ordnance, for consideration. Lord Moira was sufficiently impressed with the possibilities that he contracted with Forsyth to continue his experiments in space provided in the Tower of London, and later, for security reasons, in quarters within the city.

Two years later, a new Master General, the Earl of Chatham, was appointed and he withdrew Ordnance support. Forsyth completed his business obligations with the Board on April 10 and on April 11, 1807, he applied for and was granted Patent, No. 3,032 which gave him fourteen years protection in England, expiring on April 11, 1821. Protection did not extend to the Continent but more on that later.

The text of Forsyth's patent was admirably crafted, probably because he obtained the assistance of the famous engineer James Watt, but the seven illustrations which accompanied it were rather simplistic and described five or six methods whereby the percussion powder could be detonated. The one he initially produced was what he called his "roller primer" but which is now usually identified as the "scent bottle" primer. This continued in production until about 1825. About 1810, Forsyth's slider lock was introduced and was last produced about 1828. A number of mechanical improvements were made to each during their lifetime.

On the lock with the roller primer, a reservoir shaped somewhat like a scent bottle, was attached to the breech so it could rotate on a rod of steel with a



Fig. 1. An example of Forsyth's roller lock fitted to a pistol like stock to be used for demonstration of the action. The roller bears a number which would date it to 1808 but the square end on the lock plate suggests it was assembled about 1810 or 1811.

Fig. 2. Forsyth's slider lock introduced about 1810 used the same powder as that used with the roller lock.

depression on top with a touch hole leading to the barrel. The reservoir was loaded through a door in the bottom. When the scent bottle was turned to the "upside down." position, a charge of the loose powder was deposited in the depression and when it was returned, it located a firing pin, or piston as it was called, in position to be driven into the depression when struck by the hammer, thus detonating the charge.

On the slider lock, a reservoir was mounted on a sliding bar activated by an arm attached to the hammer. When the hammer was cocked, the reservoir was pulled back over the touch hole where it deposited a charge. When the trigger was pulled and the hammer fell, the reservoir was pushed forward to clear the touch hole and a nose on the hammer detonated the priming charge.

The detonator used with both types of Forsyth lock was described at the time as a powder. It was described as a mix of Oxymurate² (3 parts) Sulphur (½ part) and Charcoal (½ part), "Reduced separately to a very fine powder and sifted. The powder afterwards mixed and sifted and as much water added as makes a loose dry paste. For granulating the paste pass through a wire sieve of the proper size."³ This produced an irregular, brownish, crystal form with grains of about the same size as coarse table salt, or perhaps a little larger, and a single charge would probably have contained between about four to six grains.

Although Forsyth's patent included a new lock with a percussion primer magazine, his claim was for the concept that detonating compounds could be used to ignite gunpowder. This effectively gave him, and



Fig. 3. A slider lock which would be considered an infringement of Forsyth's, engraved "Rumford Patent" This lock was designed by an American-born scientist who later became Count von Rumford and was probably ordered to be made for him prior to his move from London to France in 1809.

no other, the exclusive right to manufacture guns on the percussion system in England. For the first eight or ten years, except for a single injunction entered in June 1811 and granted in November against William Beckwith, Joseph Vicars, and Jackson Mortimer which confirmed his patent, there was no more real competition for a while. There were probably individual gunmakers who produced percussion guns experimentally but apparently none were of sufficient consequence to come to Forsyth's attention. That all ended in 1816 when Joseph Manton obtained a patent for a percussion lock using a small pellet placed in a removable nose on the hammer. There was no reason why Manton could not apply for a patent as an improvement to Forsyth's patent but he could not legally manufacture firearms using the system without Forsyth's authorization.

From almost the beginning, the situation on the Continent where Forsyth's patent carried no protection, was quite different and Forsyth could do nothing about it.

In France an efficient Patent Office had been in existence since 1791. There, patents for detonating locks were granted in April 1810 to François Prélat;⁴ in June to Jean Lepage; and in September to Prosper de l'Tang. Prélat, a Parisian gunmaker, also obtained a *brevete d'importation* — a licence on the importation — using an illustration of the lock and roller magazine being produced by Forsyth. In 1818 he obtained



Fig. 4a,b,c. Joseph Manton's pellet lock patented in 1816. The corrosive characteristics of the fulminate combined with the critical fitting of the firing pin prevented the success of this design but it was the first serious infringement of Forsyth's patent. It required a flat pellet of .110 inch diameter. The detached hammer illustrates the critical firing pin.

another patent which included pellet priming, and a *certificate d'addition* in 1820 which covered the tubes (patented by Joseph Manton in 1818) and the percussion cap (introduced by Joseph Egg in 1818). At least 18 percussion related patents were granted in France before Forsyth's patent expired in 1821.

Gunmakers in Europe certainly produced arms of percussion ignition and in later years, a few of them obtained English patents.⁵ This is an area where considerably more research is required but by the 1830s, the military in most European States were experimenting with percussion arms, many of local design.

In America, the evolution of percussion was somewhat later than in England, almost as if sportsman were waiting for a better system although judging from the fact that the pill lock survived for so long it must have been highly successful. Joshua Shaw, whose claim to have invented the percussion cap in 1814 can be dismissed although he patented a wafer primer made of cardboard in 1822 along with a primer of copper which may also have been a wafer or it may have been a form of cap.⁶

While the percussion cap had a relatively large following in England by about 1825, and use of the powders of Forsyth and pellets of others were on the decline, the acceptance of pellets, pills, and balls by sportsmen in the U.S. was strong and they were popular long after they were obsolescent in England.

During the 1820s and 1830s there were a number of American patents granted for firearms but unfortunately the Patent Office fire in December 1836 has prevented identification of most. It is known though that many of them used a pellet or pill for ignition. For example, William Hart, 1827; Samuel L. Faries, 1828 and 1829; Ephriam Gilbert, 1829; Henry Rogers, 1829 and James Miller, 1836, have been identified from the pre-1837 patents. In 1837 a numerical record system was introduced when the new patent office was opened and in the next decade or so there were numerous patents requiring pellet ignition in one form or another. Most well known are the revolving rifles made by James Miller and later his son, William Billinghurst, Benjamine Bigelow, Joseph Medberg, and other eastern gunmakers who were working well into the 1850s.

The patents of Edward Maynard whose tape primer patented in 1845 was probably invented independently but was of the same principle as that invented by La Marmora in Italy. In 1844, after about seven years of percussion experimentation, his tape was adopted by the Italian military but discontinued in 1848. Christian Sharp's pellet primer described in his 1852 patent was probably the last of the pellet primers to be produced in quantity but about the same time there seems to have been a few experimental systems in trials by the U.S. Army.

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Forsyth felt that the rewards for his patent would best be achieved by his control of lock production and, in partnership with his cousin James Brougham, formed the 'Forsyth Patent Gun Company' in 1808. In 1809, James Bagley Uther was appointed manager of the company and in October he became a partner in the newly named 'Forsyth & Co. Patent Gunmakers.' They found it necessary to defend the patent in the courts at least four times and on at least one other occasion we know of, through direct contact by his attorney. In addition to the injunction granted in 1811 mentioned above, he felt he had to take action against Joseph Manton, Collinson Hall, Isaac Riviere, and Joseph Egg. Each used percussion detonators of a dif-



Fig. 5. Engraving of Collinson Hall's patch lock gun which appeared in the Transactions of the Society ... for the Encouragement of Arts, Manufactures and Commerce, Vol. XXXVII in 1818.

ferent type and each played a significant part in the evolution of the system.

- June, 1816 Probably towards the end of June 1816, Forsyth obtained an injunction against Joseph Manton because of his pellet lock patented that February. Manton quickly obtained a temporary dismissal that continued in the courts until 1819.
- May 1, 1818 Application for Injunction against Isaac Riviere.
- June 4, 1818 Injunction granted.
- Jan. 14, 1819 Application for Injunction against Joseph Egg Application withdrawn.
- Aug. 6, 1819 Application for injunction against Collinson Hall. The injunction would have been granted unless Hall agreed to record the locks sold, which he accepted and bring the case before Kings Bench.
- Dec. 13 1819 Jury found for Forsyth-Damages, £300.

Even though Forsyth was able to almost stop production of the infringements, or by granting licence to another gunmaker, the actual primers used by them, although different one from another, provided the designs upon which all early percussion primers are identified:

Percussion Pellets	Joseph Manton, Isaac Riviere,				
	and Collinson Hall.				
Percussion Tubes	Joseph Manton.				
Percussion Caps	Joseph Egg.				

Joseph Manton's Pellets7

On February 29, 1816, Joseph Manton obtained English Patent No. 3,985 for the first serious attack on Forsyth's patent. His lock included a newly designed hammer with a removable nose designed to contain a percussion pellet and a pin to detonate it. When the trigger was pulled and the hammer fell, the pin was activated by striking over the touch-hole on the breech and the flame of the detonation then had to work its way past the pin and through that hole to discharge the gun. Although the process worked, the corrosive characteristics of the composition created real problems





Fig. 6. The lock of a patch lock pistol with a removable nose by Forsyth & Co. Keith R. Dill collection.

Fig. 7. An assortment of patch receptacles by various unidentified makers. It is possible that this refinement was developed by Thomas Cartmell, a gunmaker located in Doncaster.

and it is suggested by Neal & Back that less than 275 guns were made and production ceased sometime in 1818.

On July 12 1816, an application for an injunction was brought before the Court of Chancery to determine if Manton's lock was in infringement of Forsyth's patent but it took more than two years for a verdict, by which time Manton was producing his tube lock.

Collinson Hall's Patch Lock priming

In 1817, Collinson Hall, a gunmaker whose business was in Mary-le-bone High Street, invented a percussion system which altered the hammer on Forsyth's slider lock by removing the long nose and creating a round depression in its place designed to accept, with a force fit, a paper patch primer. He had to design a nipple to direct the fire into the barrel so he can also be credited with that important addition to the evolution of percussion.

Hall did not patent his design but fortunately for history, The Royal Society for the Encouragement of the Arts Manufactures, and Commerce considered his design significant enough to award him the Society's Silver Medal for 1818 and to print a detailed description in their *Proceedings*, in which he described his method of pellet manufacture:⁸



Fig. 8. (Left) Isaac Riviere's hammer magazine held seven pellets. When this one was acquired it was fully loaded with pellets similar to those of Manton's 1816 patent measuring .129 to .131 inch diameter by .74 inch thick. The primers were held in place by a small round piece of paper fixed by what was probably a wax/ tallow mix. (Right) Syke's hammer magazine held six pellets and used the same principle as Riviere's. Both are engraved "Patent" but no patent has been found for either. Although there were three persons in the gun trade by the name Sykes, it is though that these were by Thomas Sykes of Sheffield.

The paste is made of the several ingredients in the following proportions, viz

	Grains
Oximuriate of potash	196
Flour of Sulphur	68
Fine powdered charcoal	34
Gum Arabic	12

Dissolve the gum in as little water as possible: then grind the oximuriate of potash fine, in a Wedgewood's mortar, by itself, and also the flour of sulphur and charcoal together, with a pestle of the same material. The mixture of all with the gum must be effected, either in a wooden mortar with a wooden pestle, or, at any rate, in a Wedgewood mortar with a wooden pestle, taking care to keep it moist during that operation, lest it should explode.

The paste, being of the consistence of soft clay, is then to be formed into pellets, by means of a mould, made of a plate of brass or copper, one-sixteenth of an inch thick, and filled with holes of one-eighth of an inch in diameter: this plate being placed upon a table, or other flat surface, over which a sheet of paper is first to be laid, the paste is to be spread evenly over its surface, and then pressed into the holes, either by passing roller over it, or by beating upon it with a wooden mallet: the paste is then to be removed from the upper face of the mould, with a thin spatula or palette knife; and the mould is next to be slided, for the length of an inch, along the paper, to separate the paste from it; and it may then be lifted up, and the pellets carefully driven out of the holes in it, by striking upon it with a soft brush; they are then to be dried. The round paper patch being cut by a proper punch are covered on one side with bees wax mixed with little tallow, and coloured red to distinguish the adhesive side from the other: the pellet then gently pressed on the centre of the waxed side of the patch, to which it adheres, and the priming patch is thus com-



Fig. 9. A left tube lock from a double gun by Charles Moore who at the time this was made was located in Regent Circus. The right lock, which in 1923 was in the Herbert Jackson collection, is now in the Royal Ontario Museum, Toronto.

pleted.

Unfortunately for Hall, the fame this produced also brought the design to Forsyth's attention and on August 19, 1819 he was served with an injunction designed to obtain compensation and to prevent further manufacture. The Chancellor refused to grant the injunction at that time but ordered Hall to record what he made and when the case came before the Court of King's Bench on December 13, the verdict was made for Forsyth: Hall was required to pay £300. based on the number of percussion locks he had sold.

Hall's patch lock design was quickly improved by applying Manton's replaceable hammer-nose altered to hold the patch. It is not known who introduced this improvement but in 1821, William Hyde Wollaston, a sportsman who was the only supplier to the gun trade of platinum for touch-hole bushings, suggests in a letter to Sir Thomas Frankland that Thomas Cartmell, a gunmaker in Doncaster, had a "method of preparing a set of pegs at home with patches ready for the field [which] is neat and effectual." Judging from the number of surviving boxes of "pegs" and loose pegs, the system was very popular.⁹

Joseph Manton's Tube Primers

On August 3, 1818, Joseph Manton obtained Patent No. 4,285 for a lock using a "thin metal" tube primer. His patent illustrated a coiled and a solid tube version but all of those found in cased guns are of the



Fig. 10. Percussion gun lock patented in 1828 by Samuel Faries of Middletown, Ohio, from the *Journal of the Franklin Institute*, *New Series*, 1828, pp. 265-6. The editor remarked: "There is in the patent office, one of the above locks deposited as a model, by the patentee. It was sent with the chamber filled with priming powder; on essaying it, one hundred and ninety-one full and perfect explosions were produced before the contents of the chamber were exhausted."

solid copper variety measuring approximately .090 inch diameter and one inch long.

The judgement on Forsyth's suit brought on Manton's pellet lock did not reach the Court of King's Bench until December 1818 and the verdict which was in Forsyth's favour, also covered this ignition. Manton did reach an agreement which allowed him to continue its manufacture but Forsyth had difficulty collecting from him.

The tube lock enjoyed considerable popularity and although the primer was altered by many, it was still being used by some serious sportsmen in the 1880s.

Isaac Riviere

On May 1, 1819, Isaac Rivier (incorrectly spelled Levier in the initial record), was served an injunction which went to the Court of King's Bench on June 4. Messrs Neal & Back have identified a scent bottle of virtually the same design as Forsyth's made by Riviere and this might be the subject of the suit. But Riviere also made a magazine which contained pellets as part of the hammer which could also have been the justification for the application. A number of examples of it have survived and the *Times Law* Réport summary of the trial reports "as the locks differed materially in the manner of going off, one having a fixed pellet, and the other a moveable one," it must also be considered as a reason for the application. In any event, the court found for Forsyth.

Joseph Egg's Percussion Cap

The design of the percussion cap was not patented and there has been no proof found about its ori-



Fig. 11. This punch lock with engraved border which is stamped *E. Gilbert / Patent / Rochester*, was covered in Ephriam Gilbert's 1836 patent destroyed in the Patent Office fire.

gin but Joseph Egg stated on his printed trade card that he was its inventor. It is not possible to date the label's first appearance but even if we could, it probably would not help. What is probably significant though is that it appeared at a time when any other claimants could challenge him and no evidence that they ever did has been located in the sporting journals of the period.

The best evidence for Egg's claim and the timing of it, is found on a few of his percussion arms which are engraved "By Permission of Forsyth the Patentee," or words to that effect. The dating of those arms can be accurately placed to before April 11, 1821 when the patent expired; there would have been no need for it after that date. It can also be deduced that they must have been made after January 14, 1819, the date on a legal proceeding that was to be presented to Joseph Egg. The original of that application for an injunction, written on parchment measuring approximately 24 inches wide by 18 inches high, is in the Public Record Office at Kew. It runs to 3,898 words (by computer count) on unpunctuated lines running the almost the full 24 inches of width, but says little of substance except that Joseph Egg was making percussion guns in 1818. Nevertheless, it warrants the following abstract:10

To the Right Honorable John Lord Eldon Baron Eldon of Eldon in the County of Durham Lord High Chancellor of Great Britain—Humbly Complaining shewith unto Your Lordship Your Orator Alexander John Forsyth of Princes Street Liecester Square in the County of Middlesex ...

But now so it is may it Please Your Lordship Joseph Egg of Piccadilly in the said County of Middlesex

or of the Com TEE OF Jonnymarket

Fig. 12. Joseph Egg's trade label which was printed sometime after 1822 when he obtained his first patent for a "self primer."

gun maker the Defendant hereinafter mentioned ... he the said Defendant has for some time past taken upon himself to make and vend within that part of the United Kingdom of Great Britain and Ireland called England and still continues to make and vend within the said part of the said United Kingdom divers locks and other pieces of Machinery of the Construction or upon the principle invented by Your Orator as aforesaid and that the said Defendant hath thereby received and still continues to receive divers considerable sums of money to a great amount in the whole without obtaining any licence consent or other authority whatsoever from Your Orator ... so the said Defendant will sometimes admit the truth to be but then he pretends that the said Locks and other Machinery are not made for the purpose of Sale but merely by way of experiment and that he has not sold or sought to sale any of the said locks or other Machinery ... and Your Orator Charges that the said Defendant has already made a considerable number of the said locks or other Machinery for the express purpose of Sale ... he also refuses to make any discovery of the names and places of abode of the Workmen whom he has employed in making such locks ... To the End therefore that the said Defendant Joseph Egg and his Confederates when discovered may upon their several and respective corporal oaths full true perfect and x ... ? ... x answer make to all the matters aforesaid to the best and utmost of their knowledge remembrance ... And that the said Defendant may be restrained by the injunction of this Honorable Court from the further making or vending of all such locks and Machinery as aforesaid or of any Guns Pieces of fire arms with one or more of the said locks attached or belonging thereto for all the residue and remainder of the said term of fourteen years Your Orator hereby waiving all pains and penalties which the said Defendant hath incurred ... and that Your Orator may have such further and such other relief in the premises as the circumstances of this case shall require and to your Lordship shall seem meet May it please Your Lordship the premises considered to grant unto Your Orator ... Court to be directed to the said Joseph Egg to restrain him from the further making or vending of all such



Fig. 13. Henry Egg, following in his father's footsteps, advertised that it was Joseph who invented the percussion cap. Henry's later trade label omitted the fact that it was his father's invention.

locks and Machinery as aforesaid ... also His Majesty's Most Gracious Writ of Subpoena to be directed to the said Joseph Egg thereby Commanding him at a certain day and under a certain pain therein to be limited personally to be and appear before Your Lordship in this Honorable Court"

Neal & Back, who first reported this document in 1969, could find no evidence that the injunction was carried forward and concluded that Forsyth and Egg had come to an agreement which included that the inscription recorded above was to be placed on each percussion gun made. Since that inscription has been found only on guns with the percussion cap ignition, it seems pretty near conclusive that Egg was making and selling them in 1818.

Percussion Powder

The earliest percussion powder was manufactured for Forsyth by John Prosser of No. 9 Charring Cross Road who is usually described as a sword and belt maker but who also manufactured guns and locks. He was employed in this capacity by Forsyth from 1807 and produced some percussion powder, but in 1808 he was replaced by Frederick Garden, (later Accume & Garden), of No. 11 Old Compton St., Soho. In 1823, Garden's business and building was acquired by Frederick Joyce.

At the same time Forsyth was working with Potassium Chlorate in Scotland, The Honourable Charles Edward Howard F.R.S. was working with Mercury and by 1800 was in a position to read a paper before the Royal Society and to report in the *Philosophical Transactions of the Royal Society* on his isolation of mercury fulminate, a new process to produce a chemical which could be detonated by percussion. He did not



Fig. 14. A Henry Egg label from at least the mid 1860s still claims the percussion cap and is still using the pre-Victorian arms.

carry his experiments further but in 1823, E. Goode Wright of Hereford, published a lengthy note in the *Philosophical Magazine* "On the Substitution of Fulminating Mercury in place of Detonating Compositions into which Chlorate of Potash enter as a Priming for Percussion Guns." He noted that "It does not create rust so rapidly nor generated dirt from the charcoal after firing; it is not affected by damp." In the third edition of *Instructions to Young Sportsmen*, Peter Hawker recorded:

In August, 1824, I gave the following statement relative to this [percussion] powder:

"Since the first part of this work was printed off, a letter has been received from Mr. Joyce, chemist, 11 Old Compton-street, Soho, commenting, as he is fully justified in doing, on the injury done to fire-arms by oxymuriate of potash; and enclosing a specification of a new 'ANTI-*Corrosive*' percussion powder.

Hawker noted that "Mr. Joyce has had so many obstacles to overcome before he could bring it to perfections that we must, at all events, give him a great deal of credit."

In the contemporary literature, the word used to identify the primer component is not always clear. Forsyth's detonator was an obvious powder: a brownish colored grain about the size of common table salt. It was known as powder and that word was often used, apparently as a generic term, for all forms of detonator including on occasion, caps. To complicate things, "primer" frequently referred to the reservoir to hold and feed primers. As late as at least the early 1850s, Frederick Joyce, by this time the leading London percussion primer manufacturer, described his product as "Anti Corrosive Percussion Gun Powder" and recorded "This Powder as Manufactured by me in the form of Caps, Patches, Balls, & Grain is warranted free from any rusting or corroding quality to be effective in every climate and not to miss fire." At the time, he considered himself to be a Practical Chemist at 57 Upper Thames St., London.

Pellets

In the three or four decades following 1807, there were literally hundreds of what the inventors' considered to be "improvements" in the priming system produced in England and elsewhere. Until 1818 primers were usually in a form which could be produced with little machinery by most chemists or those with a knowledge of mixing chemicals, and it was not until the introduction of primers encased in copper or other thin metal that special machinery would have been required.

In this category are included all of the combustible primers including: powder, balls, wafers, capsule, pellets (covered with something, ie. color, varnish, wax, glass, lead, etc.), tape (cloth, paper, pewter, copper, etc.), stick (but not a tube), patch, plug, disk, pills, and other shapes.

No description of the manufacture of pellets (other than Collinson Hall's mentioned above) has been located although Howard Blackmore arranged for the Research Department of Imperial Chemical Industries Ltd., London, to analyse some red pellets of Charles Moore's design.¹¹ He recorded: "They have been found to consist essentially of mercury fulminate coated with iron oxide (rouge). Microscopic examination showed numerous small globules of mercury, presumably from decomposition of the fulminate."

Tapes

Experimentation with tapes having pellets lined up in a row on a ribbon of flexible material began as early as 1833 if one considers the rosary of Contriner or 1844 with the copper tape of La Marmora. The introduction of gas lights in the second decade of the 19th century stimulated development of igniters for them and it is now difficult to determine if surviving examples were intended for firearms discharge. For example, a few tape primers have been included even though they were probably not appropriate for this study. Megill's 1880 patent was, for example, identified for lamp lighting. To add to the identification problem, Lemaire-Daime's 1863 French patent (P78) was not for a tape but was intended "pour armes á feu et jouets d'enfants — for firearms and toys for kids."

Tubes

Joseph Manton's 1818 patent covering tubes was his most successful patent and the idea was adopted by many. A number of locks were designed to use tubes of various designs and they continued to be altered and manufactured until at least the last decade of the 19th century.

Most of the tubes illustrated are of copper but the class includes any primer with the appearance of a tube: lead, grass/straw, pewter, and perhaps some combustible, etc.

Common Caps

As mentioned earlier, the invention of the percussion cap in 1818 was not patented but during the next four or five decades there were hundreds of new forms – some were patented but most probably were not and they would have been produced in relatively limited numbers.

The two caps illustrated as C1, along with the "pill box" inscribed "Amorce, Eggs Creation" were part of the research collection accumulated by Marin Gevelot the leading primer manufacturer in France who was probably making percussion pellets by 1820 and perhaps as early as 1817 when he is listed by Jarlier as an *armurier et fourbisseur* in Paris.¹² They were acquired when the research collection of SFM (Society pour la Fabrication des Amorces Fulminantes), successor to Gevelot, was dispersed in the 1980s.

Although the advent of self contained cartridges began in the second decade of the 19th century and percussion caps were obsolescent by 1860, inventors were still seeking patents for them long after the military considered them obsolete. The last patent for a percussion cap located was granted to B.F. Woodside of MacDonald Station, Bradly County, Tennessee in 1870.

Top Hat Caps

Top hat caps, which are generally considered to be designed for military use, include all of those with a rim or brim, or flanges, or wings regardless of their intended use. Caps with this feature are illustrated in Prélat's 1820 certificate d'addition (C2) and may possibly be his only original contribution to the subject.

Cardinal Caps

The first recorded examples of this group of unusual caps were found in the collections of the Musée d'Arms at Liège. They were probably made in Belgium for some form of magazine loading but I have not found a patent or seen a gun which would have used them. It has been suggested that they could have been used behind the bullet in a needle fire cartridge but again, none are known to collectors. There is no way they could be placed and retained on a conventional nipple, although there may have been a magazine and a specially designed nipple. Three variations are known.

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There is still a great deal of research to be done on early percussion primers. At present, the manual for which this note is the introduction illustrates 80 pellets, 34 tubes, and 84 cap variations but 1 know there must be a lot more out there and would be pleased to learn of others at mrsarms@kos.net — SJG.

ENDNOTES

1. New Experiments on Gunpowder which in printed form runs to almost 100 pages with many tables, was read to members of the Royal Society in London over five weekly meetings. Thompson moved to England following the Revolution where he was knighted and then to Munich where he served the elector of Bavaria and became Count von Rumford.

2. Potassium Chlorate was also known as chlorate of potash, oxymuriate of potash, oxy-muriate of potash, oxygenated muriate of potash, and hyper oxygenated muriate of potash.

3. W. Keith Neal & D.H.L. Back, Forsyth & Co.: Patent Gunmakers, London: G. Bell & Sons, 196, p.101.

4. The scribe who prepared the documents for Prélat used flourishes and scrolls when writing Prélat's name. This was later interpreted as "Prelaz" and that is the way his first patent was recorded in the subsequent records.

5. Prior to 1852 there was the English Patent Office located in London and the Scottish Patent Office located in Edinburgh, each with patents numbered in the order of granting. The last firearm patent recorded in England was No. 14,289 granted to Stephen Taylor on September 10, 1852 for "Improvements in the construction of fire-arms and in cartridges for charging the same." The patents listed in this study were recorded in the English Patent Office. In 1852 the Patent offices were amalgamated to become the British Patent Office and a new, numerical numbering system within each year was instituted. It is just coincidence but the first patent recorded under the new system was granted to Robert Adams on October 1, 1852 for "Improvements in ball cartridges," Patent No. No. 1/1852.

6. See "Joshua Shaw, Landscape artist ... Con Artist? or inventor of the percussion cap." *Man Arms*, Vol. 26, No. 2, 2004, pp. 34*ff*. This concludes that Joshua Shaw, whose claim to have invented them in 1814, can be shown invalid:

7. "Joseph Manton's First Percussion Lock Patent." Arms Collecting, Vol. 39, No. 2 (May 2001), pp. 39-43.

 The complete text of the article with the illustrations was reprinted in *Arms Collecting*, Vol. 32 No. 1 (Feb. 1994) pp. 3-8.

9. I am grateful to Mr. D.H.L. Back for bringing this letter to my attention.

10. A photostat copy in approximately the original size was obtained by Peter A. Scott-Edeson and this transcript was made from it. In order to follow the lines, each was numbered, to facilitate future reference.

11. "An Early Pellet-Lock Gun" The American Rifleman, July, 1960, pp. 24-25.

12. Pierre Jarlier. *Répertoire d'arquebussiers ed de fourbisseurs français*. St-Julien-du-Sault: François-Pierre Lobies. 1976.



Fig. 15. The Ordnance Workshops and Proof House at the Tower of London wharf on the banks of the Thames River in 1804. It was in one of these buildings that Alexander Forsyth undertook his early experiments for the Board of Ordnance in 1806-7.

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PELLETS



Powder



Pills

Patches



0

Wafers

Tapes



Primer Catalog, Draft 3.1.1 - 1





P12 1850-von Gersheim





б

C

P18ab 1858-D.G. Rollin





P4d 1826-S. Guthrie



P7 1840-J.R. Cooper



P10b c d 1845-E. Maynard



P13a b 1852-C. Sharps



P16b 1856-J.D. Greene



P19 1817-Hall

PELLETS

- PI 1807 Forsyth Percussion powder English patent No. 3032, 11 April 1807. The basic patent for the percussion system. Specimen: ex W.K. Neal, Slider locks No. 1153, 1154. Alexander John Forsyth.
- P2 1810—l'Etang Powder French patent No. 600, 26 September 1810; *Certificate d'Addition* 8 May 1811; a rotating magazine for detonating powder, Prosper De l'Etang.
- P3a 1821 W. Richards Powder/pellets, .339" dia English patent No. 4,611, 10 November 1821, Composition, Westley Richards
- P3b 1821 W. Richards .306" dia Paper patch in brass band, stamped "WR" on band.
- P4a 1826+ Guthrie .020" black pellet
- P4b 1826+ Guthrie, No. 1 .10"+ gold pellet
- P4c 1826+ Guthrie, No. 2 .05"± gold pellet
- P4d 1831+— Guthrie Red Pellet. Described in American Journal of Science & Arts, 1831-32 and reported by Pauling. Samuel Guthrie. (see also P5a)
- P5a 1838+ W. Billinghurst .085" red pellet Specimen: "Waterproof Percussion Priming Made by W. Billinghurst, Rochester, N.Y." (See also P
- P5b 1838+-W. Billinghurst .100" black pellet
- P6 1834 J.A. Manton Wooden plug English patent No. 6,572, 13 March 1834. A conical wood plug through which runs a small iron pin projecting about ¹/12 inch above the wood.
- P7 1840 J.R. Cooper Conical shape English patent No. 8,347, 21 January 1840. There are numerous drawings and a magazine using percussion caps is described. Joseph Rock Cooper.
- P8 1839 H. Wilkinson Card patch, round English patent No. 8,119, 22 June 1839. Caps or detonating powder fastened upon or between paper or cardboard discs. Henry Wilkinson.
- P9 1841 W. Richards Card patch, wedge English patent No. 9.177, 14 December 1841. Hawker mentions this in 1844 as "a flat pasteboard primer covered with tin-foil."
- P10a 1845 E. Maynard Tape, 680" U.S. Patent No. 4,208; Sept. 22, 1845. Tape primer made of paper. Specimen: First stage in manufacture, erroneously described as experimental. Edward Maynard ; English patent No.1,078; 10 June 1845, George Washington Tyson ; French patent No. 1696; 17 August 1845; G. W. Tyson.
- P10b 1845 E. Maynard Tape, Brown, .198"
- P10c 1845 E. Maynard Tape, Red, .221"
- P10d 1845 E. Maynard Tape, Green, .181"
- P11a 1845 C.J. Smith Various forms English patent No.10,667; 14 May 1845 illustrating many variations. Charles J. Smith. (See also C64, P67)
- P11b 1845 C.J. Smith Brass capsule Specimen: A 2-piece "donut" with a white metal center, .168 inch dia. ..08"deep. (See P67)
- P12 1850 Von Gersheim Nail shaped English patent No. 13,935; 29 January 1852. Three formula to be "made into suitably shaped pellets." Jos.

von Winiwarter Specimen: package label: Gersheim's Percussions Zünder.

- P13a 1852 Sharps Cu. & foil capsule "Pellets ... may be shielded or covered in any way that will be effectual." Specimen: Copper cup with a white metal cover .1785"± inch diameter, .035"± inch thick. Christian Sharps; U.S. patent No. 9,308, 5 October 1852; Christian Sharps; French patent No 15.042, 15 Dec 1852.
- P13b 1853—Sharps Copper capsule Detonating compound between two interlocking copper cups .1840 to .1860" dia.×.029" thick. Christian Sharps; U.S. patent No. 9,820, June 28, 1853.; Christian Sharps.
- P14 1855 J. Butterfield Cu. & foil capsule U.S. patent No. 12,124; 2 January 1855 for a back action lock using a percussion cap, but with no mention of a pellet primer. Jesse S. Butterfield.
 - The capsule P13a (.1785"± diameter), is the only one yet identified which will fit the non military Butterfield pistols; French patent No. 38.195, 28 September 1858. Primers in the shape of flattened disks pilled in rolls and coated with shellac. Joseph L. Chester.
- P15 1856 J. Chattaway Metal tape U.S. Patent No. 15,063, June 10, 1856; Waterproof percussion cap/foil cover of cap soldered in place with bismuth, lead, tin alloy. James Chattaway; U.S. Patent No. 15,370, July 22, 1856. Metallic tape percussion primers made of alloy of bismuth, lead and tin and pressure welded together after fulminate is applied to depressions. James Chattaway.
- P16a 1856 J. D. Greene Cloth tape, Pat. model English patent No. 447, 21 February 1856. A strip of paper or linen formed into a roll. Specimen: fabric with patches of , black detonating powder. Patent version, .21 inch wide. James Durell Greene
- P16b 1856 J. D. Greene Cloth tape Production, version, .26 inch wide.
- P17 1857 G.T. Bousfield Combustible sticks English patent No.2882, 17 November 1857. George Tomlinson Bousfield. French patent, No. 34,673, 7 December 1857. George G. Martin.
- P18a 1858 D. G. Rollin Stick U.S. Patent No. 20,129, April 27, 1858. Detonating compound formed into a thin stick shape to be used as a continuous priming stick.. Pat. model, .120" dia.
 P18b 1858 D.G. Bollin Stick primer
- P18b 1858 D.G. Rollin Stick primer Production model .089" dia.×.5"
- P19 1817—C. Hall Paper patch The Silver Medal of The Royal Society for the Encouragement of the Arts was awarded in 1818 to Collinson Hall for the development of the paper patch and nipple. Most are .150" diameter with white paper on one side and marble paper the other. (See also P79).

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- P20 1859 T.T.S. Laidley Metal tape, patent model U.S. Patent No. 22,957, February 15, 1859; Tape of shallow metallic percussion caps held on a paper tape. (This description does not conform with the model submitted to the U.S. Patent Office with the patent application). Theodore T. S. Laidley
- P21 1859 J. Rupertus Lead covered pellet U.S. Patent No. 25,142, August 16, 1859; Fulminate enclosed in metallic sphere, in hemispherical form. Jacob Rupertus.
- P22 1859 Bishop Lead covered pellet, 170" Specimen submitted "on behalf of the inventor" Thomas Bishop, to British ambassador in Moscow.
- P23 1866 C. Canouil Paper, suitable shapes French patent 23 June 1866; No. 72,052; priming powder compressed between two identical and non metallic units. Charles Maurice Paul Canouil. English patent No. 1.896, 21 July 1866. Pellets between sheets of paper "divided into strips, rounds, squares, or other suitable forms." Specimen: perforated green paper square.
- P24 1876 E. Savorel Perforated metal strip U.S. patent No. 174,675, 15 February 1876; .199" wide on .30" centers. Edward Savoral.
- P25 1879 M. Backes Wafer strips U.S. patent No. 221,015, 28 October 1879. M. Backes
- P26 1880 H. F. Megill Paper tape U.S. patent No. 227,560, 11 May 1880. A blue pellet .25" wide tape. This patent was described as a lamp starter. Henry F. Megill.
- P27 xxxx Butterfield (?) Red/White paper wafer Specimen: Paper wrapped package with identification "Butterfield Primers" in pencil, containing wafers of cardboard, .33 inch. diameter x .040 inch thick, red one side, white the other.
- P28 1824 de Berenger Pellet English patent No. 4990, 27 July 1824. The percussion priming may be made up in powder pellets, patches, metallic caps, or other forms. Charles Radom de Berenger.
- P29 1810 LePage Varnish or rubber coated French patent No. 585, 23 June 1810. Jean Lepage Pellet dispenser in cased set indicates a ball of less than .06 inch.
- P30 183± Charles Moore Red pellet A red pellet .090"dia. found in Charles Moore, London, dispensers.
- P31 1816 Manton grey/black pellet English patent No. 3,985, 29 February 1816. Joseph Manton. Specimen: A flat, grey/black pellet, 110" dia., found with cased pistols S/N 8274
- P32 183± Charles Moore Adaptation of P-31
 P31 pellet between paper, cut to .25"± in squares. Cased with C. Moore revolver S/N 861 (See P30)
- P33 1810 Prélat, Pills/Powder French patent (*Brevete d'Importation*) 17 April 1810 for Forsyth's patented roller lock. François Prélat
- P34 1818 Pottet Pills/Powder French patent, 28 August 1818, 2nd *Certificate d'Addition* 11 October 1819, magazine containing 28 pills. Clément Pottet.

- P35 1820 —Prélate Pills/Powder French patent 29 July 1818, Certificate d'Addition in 1820. The use of pills, size of a pea, waterproof and fireproof. François Prélat.
- P36 1820 Gosset Brass/paper, 1cm. dia. French patent 11 July 1820; cardboard trimmed in the center with fulminate powder and covered with a very thin sheet of copper. Louis Marin Gosset
- P37 1822 Guillemin-Lambert Patch/Pastille French patent No. 1,417/2,039; 27 Sept 1822; lead disk of 3 'lignes' (.26 inches) lined with paper or parchment and fulminate in the center, Philippe Guillemin-Lambert.
- P38 1824 —Gosset Patch/Pastille French patent 20 Dec 1824; No. 2,536; round primer covered with lead or copper metal with priming powder in the center. Louis Marin Gosset.
- P39 1825 Plomdeur Pellet French patent No. 2,556; 29 Dec 1825; copper mushroom primer, Jacques Joseph Plomdeur
- P40 1857 Martin Stick primer French patent No. 34,673, 7 December 1857. George G. Martin of New York, patentee, Devos, agent.
- P41 1858—Chester Patch/Pastille French patent No. 38,195, 28 Sept 1858; primers in the shape of flattened disks pilled up in rollers and coated with shellac. The patent for Butterfield's priming device. Joseph L. Chester
- P42 1872 Andreany Pellet French patent No. 96,091, 31 July 1872, Capsule without metal, Rocco Andreani.
- P43 1833—Contriner String of beads In 1833, the Viennese gunmaker Joseph Contriner offered the Austrian military a conversion with a magazine using a cord imbedded with wax protected pills which looked like a rosary.
- P44 1830± Bisbee & Wilson Black pills Specimen: Black pills .07"± dia. labeled manufactured by Bisbee & Wilson, Garrotsville County, Ohio.
 P45 1859 — Harmer/Parsons Metal tape
- P45 1859 Harmer/Parsons Metal tape English patent No. 1,145; 16 June 1859. "Caps" in a metal tape with edges bent and shaped to form a ratchet. John Harmer and William Parsons.
- P46 1970—Cherepy Paper patch, modern. Specimen: The alteration of a toy cap to illustrate the action of a patch lock. Louis S. Cherepy Sr
- P47 1825± Unidentified Pellet, .146" dia. Specimen ex W.K. Neal, D.H.L. Back. See also P62. Paper covered pellet. Appropriate for use with Francis Fox's English patent of 15 January 1820. (See also P60, P62, P72).

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- P48 1821 Moreau waxed pills French patent No. 1,156; 8 February 1821, A wax or resin covered pill to be placed in a cavity in the hammer. Moreau.
- P49 1821 Lepage Pill French patent No. 1,358; 12 March 1821; Pill covered with resin placed in the cavity of the hammer. Jean Lepage
- P50 1825 Leroy Varnished pill French patent No. 1,797; 8 September 1825; the pill is coated with a vanish of specific mixture. Julien Leroy.
- P51 1826 Mahiet Wafer/patch primer French patent No. 1,834, 10 February 1826; the priming powder is placed between two sheets of varnished and oiled parchment and placed in a cavity of the hammer. Philippe Mahiet.
- P52a 1837 Legrain Metal covered pill
- P52b 1837 Legrain Glass globule French patent No. 6,076, 12 December 1837; Pill coated with a thin sheet of metal or metallic powder. Glass globule size of a pearl filled up with fulminate powder. Louis Legrain
- P53 1839 Martin Tape French patent No. 5,243; 7 July 1839, Improvement in Heurteloup's pat. used a primer tape of unknown description; Martin (see T7, T26)
- P54 1845 Guibert Pill French patent No. 1,808, 15 July 1845; Guibert, "Pilamorce" of a particular compound, Auguste Marie Denis Guilbert.
- P55 1856 –Ward Tape primer U.S. patent No. 15,262, July 1, 1856, hammer magazine; Maynard's tape (P10) might have been used but the diameter of the roll would have to be less than .75 inch diameter. James N. Ward.
- P56 1866 Canouil & Blanchon xx Tape French patent No. 72,213, 9 July 1866; use of tape primers. The tapes made for Maynard's patent arms would fit but the diameter of the roll would have been too large.
- P57 xxxx Unidentified Tape
- P58 xxxx Unidentified Tape
- P59 xxxx Unidentified Tape
- P60 xxxx Unidentified Grey/black wafer, .141x.033"
- P61 1856 Andreane/Bolasco Capsule French patent No. 26,513, 20 February 1856, A primer for artillery. Andreane & Bolasco
- P62 xxxx Unidentified Pellet Specimen: Paper covered pellet w/ black crystalline core. .1465" dia.×.050 - .058" thick (See P47).
- P63 1824/1825 Cartmell/Manton Pellet English patent No. 5,033, 6 November 1824; Thomas Cartmell; English patent No. 5,106, 26 February 1825; Joseph Manton. Specimen: Round, grey ball .040-.060" dia. Ex W. K Neal collection, consistent with patent illustrations.

- P64 xxxx Unidentified Orange balls, .090-.096" dia.
- P65 xxxx Unidentified Grey wafer, . Specimen: A grey wafer 2258-.2510"×.0740-.1035" dia. ex W. K. Neal.
- P66 xxxx Unidentified pill Specimen: A brown, crystoline pill-like with illegible inscription. From the primer collection of W. Keith Neal.
- P67 xxxx Unidentified Copper pellet A copper pellet composed of bands of copper: a multi piece pellet .254 0215×.1095" (see P11)
- P68 xxxx Unidentified Shiney, brown wafer .294×.069"
- P69 xxxx Unidentified Wafer Specimen: A black, metallic colored wafer, .180×.092"
- P70 1817 Riviere Pellet Specimen: black crystalline appearance, .129-131" dia.×.074". Recovered from magazine No. 678 of Isaac. Riviere's "patent" hammer-magazine where it was covered with white paper disk over the opening.
 P71 1822 — Shaw Wafer
- U.S name & date patent 19 June 1822 for a cap (no description but possibly a wafer) made of copper and a wafer. Joshua Shaw. (See C3)
- P72ab 1837—Audent Ctg. primer French patent 8,066, 22 December 1837. Primer for a cartridge showing the old form (left # 27) and the new form (right # 25). The detonating pellet was placed in a depression in the wooden shape and covered with a paper retainer. Ernest Audent
- P73 1837 Plomdeur Mushroom French Patent No. 7,876, 4 October 1837. A copper mushroom shaped primer with the fulminate in the head. Jacques Joseph Plomdeur.
- P74 xxxx Unidentified Pellet A paper pellet, orange on one side, white on the other, with small round detonator between. Diameter .182 inch diameter, .027" thick.



P79 1817-C. Hall

P80 1845±-Coriander seed

P75abc 1846 — du Tillet & Flobert Various French patent No. 3,589, 18 May 1846. Three variations of a "new cone shaped capsule" of copper for muzzle loading or cartridge loading guns. No. 15 is for military muskets. Antoine Paul du Tillet & Louis Nicolas Auguste Flobert.

P76 1847 — Loron Ctg. primer French patent No. 4,857, 4 January 1847. A nail shaped primer or percussion cap to fit into a specially constructed cartridge. Pierre Antoine Loron

P77 1844 — La Marmora Continuous Italian military trials beginning in 1837 led to the introduction in 1844 of a 4.5mm copper tape in a roll of 39 or 40 pellets on 11mm centers. Up to 1846 when machinery was introduced, the tapes were workman-produced;. It was discontinued in 1848. Colonel (later General) Alesandro La Marmora. P78 1863 — Lemaire-Daime Parchment+ French patent No. 61,249, 17 Dec 1863; parchment, paper, fibrous or filamentous material for the manufacture of primers "pour armes a feu & jouets d'enfants." Jacques Louis Lemaire-Daime.

Parchment/paper

P78 1863-J. LeMair-Daime

 P79 1817 — Hall Patch .292 in. dia. An early variation of Hall's patch with dimensions consistent with his description and illustration, covered on both sides with plain paper. (See also P19).
 P80 1825 — Coriander Seed .130-.170 in. dia.

80 1825 — Coriander Seed .130-.170 in. dia. English patent No. 5,242 granted Aug. 15,1825 to Charles Downing of Devon: "...by use of any of the species of compositions known by the name of percussion powder, which composition or compositions I form into small pellets or grains about the size of coriander seeds, in the way in which medicinal pills are shaped..."

8 — Primer Catalog, Draft 3.1.1
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- P48 1821 Moreau waxed pills French patent No. 1,156; 8 February 1821, A wax or resin covered pill to be placed in a cavity in the hammer. Moreau.
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- P56 1866 Canouil & Blanchon Tape French patent No. 72,213, 9 July 1866; use of tape primers. The tapes made for Maynard's patent arms would fit but the diameter of the roll would have been too large.

P57 xxxx — Unidentified Tape

- P58 xxxx Mass. Light Co. Tape
- Specimen: 100 Repeating Matches Pat. Nov 7, 1865. .257-.300 wide. 259 xxxx — Unidentified Tape
- P59 xxxx Unidentified Tape .490 inch wide.
- P60 xxxx Unidentified Grey/black wafer, .141x.033"
- P61 1856 Andreane/Bolasco Capsule French patent No. 26,513, 20 February 1856, A primer for artillery. Andreane & Bolasco
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P75 1846-Du Tillet/Flobert



P79 1817-C. Hall



P83 1837-Plomdeur



P76 1847-P.A. Loron



P80 1845±-Coriander seed



P84 1866-P. Canouil Fils

Tape of copper

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P77 1844-A. La Marmora
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P81 1823+-Samuel Nock



Parchment/paper

P82 xxxx-Billinghurst gold

cussion powder, which composition or compositions I form into small pellets or grains about the size of coriander seeds, in the way in which medicinal pills are shaped..."

- P81 1823+ Samuel Nock Wafter primer A pair of pistols by Samuel Nock of London (at a post 1823 address, with a pan .25 inch diameter and a central depression approximately .1875 inch deep (7mm/ 5mm). The hammer nose is square at the base but becomes a round shaped peg. It is this pag that lands in the smaller hole.
- P82 xxx—William Billinghurst Gold Pills. Pills of irregular shape and inconsistant size, similar to those produced by Samuel Guthrie, Container marked "Made by William Billinghurst".
- P83 1837—J.J.Plomdeur Nail shape French Patent No. 7,876, 4 October 1837. Mushroom/ nail shape with fulminate in the head. Jacques Joseph Plomdeur. See P73.
- P84 1866—P. Canouil Fils Patch Small, plain paper patch measuring approximately .3 inch square. Specimen box printed P. Canouil Fils, Amorce pour Jouets. See P73.

- P75abc 1846 du Tillet & Flobert Various French patent No. 3,589, 18 May 1846. Three variations of a "new cone shaped capsule" of copper for muzzle loading or cartridge loading guns. No. 15 is for military muskets. Antoine Paul du Tillet & Louis Nicolas Auguste Flobert.
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- P77 1844 La Marmora Continuous Italian military trials beginning in 1837 led to the introduction in 1844 of a 4.5mm copper tape in a roll of 39 or 40 pellets on 11mm centers. Up to 1846 when machinery was introduced, the tapes were workman-produced;. It was discontinued in 1848. Colonel (later General) Alesandro La Marmora.
- P78 1863 Lemaire-Daime Parchment+ French patent No. 61,249, 17 Dec 1863; parchment, paper, fibrous or filamentous material for the manufacture of primers "pour armes a feu & jouets d'enfants." Jacques Louis Lemaire-Daime.
- P79 1817 Hall Patch .292 in. dia. An early variation of Hall's patch with dimensions consistent with his description and illustration, covered on both sides with plain paper. (See also P19).
- P80 1825 Coriander Seed .130-.170 in. dia. English patent No. 5,242 granted Aug. 15,1825 to Charles Downing of Devon: "...by use of any of the species of compositions known by the name of per-

8 - Primer Catalog,

TUBES



Manton's Tube



Saucer Plug

Unpatented



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T1a 1818—Joseph Manton



T2b 1818—Joseph Manton



T6a 1882-Patstone



T9 1844-C. Lancaster



T13 1850-C. Lancaster



T16 xxxx—Unidentified



T20 xxxx-Unidentified

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T1b 1818—Joseph Manton



T3 1818—Joseph Manton



T6bcd 1850+-Patstone



T10 1844—D. Long



T14 1850-A. Clayton



T17 xxxx—Unidentified



T21 1970—D.W. Bailey



T1c 1818—Joseph Manton



T4 1831-W. Richards



T7 1841-C.L.S. Heurteloupe



T11 1844—H. Wilkinson?



T14b 1855-A. Clayton



T18 xxxx-Unidentified







T2a 1818—Joseph Manton



T5 1835—J. Egg



T8a b 1842-J.W. Edge



T12 1849—P. Hawker



T15ab xxxx-D. d'Ancion



T19 xxxx-Unidentified





- TUBES
- Wrapped tube: .09×.550 inch Tla 1818 - Manton English patent No. 4.285, 2 February 1818, Joseph Manton
- straight/plain tube T1b 1818 - Joseph Manton English patent No. 4,285, 2 February 1818. Joseph Manton. Plain tube, .0875 inch diameter, .527 inch long French
- .092×.675" Tlc 1818 — Joseph Manton
- .090×1.45" T1d 1818 — Joseph Manton
- 1818 Joseph Manton .090×1.650" Tle
- T₂a 1818 - Joseph Manton Ring end Illustrated by P. Hawker in the 9th edition (1844) of Instructions to Young Sportsmen.
- T_{2b} 1818 — Joseph Manton Ring end .080×.990" The end ring has a diameter of .239 inch.
- .090×.685" T3a 1818 — Joseph Manton
- T3b 1818 - Joseph Manton .090×.710" A tube identified by W.W. Greener in The Gun and Its Development as being invented by Joseph Manton. It was also incorporated into the designs of others. (See T9, T13, T17, T33)
- T4 1831 - W. Richards All steel, .150×.610" English patent No. 6,071, 11 February 1831. Westley Richards. First reported by Hawker in 1833 as the "all steel" primer but all specimen examined have been of brass. Also named, by Hawker, "Westley Richards' Hermetically Sealed Primer."

French patent No. 4,735, 6 August 1831; imported pat. for the W. Richard mushroom primer. William Newton

- Short tube. .086×.275" T5 1835 — J. Egg English patent No. 6.829, 9 May 1835. Joseph Egg. Primer magazine using short primers.
- T6a 1882± - Patstone Saucer Plug Sir Ralph Payne-Gallwey illustrated this form of tube for a saucer plug ignition in The Fowler in Ireland published in 1882. They were being made for him by "Patstone of Southampton," and is a minor design change to T14.
- 1850+ Patstone T6b Saucer plug, .09×81"
- T₆c 1850+ - Patstone Saucer plug, .09×.63"
- 1850+ Patstone Saucer plug, .088x.642" T6d
- 1834 C.L.S. Heurteloup Continuous tube T7 English patent No. 9,084, 9 September 1841, 'Soft metal drawn tubes of pewter or other soft metal of about 1/10" in diameter (by approx. 9 inches long) pressed through rollers, which will flatten them ... to assume the form of tapes." Magazine illustrated at T26. Charles Louis Stanislas, Baron Heurteloup. French patent No. 10,235; 21 August 1842; tin alloy gutter filled with priming powder and closed to form a tube. C.L.S. Heurteloup.
- T8a 1842 - J.W. Edge Eccentric cap/tube Described by Lacy, Modern Shooter, 1842. Specimen: Crown with raised mark "Edge," .09×.530" long
- 1842 J.W. Edge Eccentric cap/tube T8b A larger version of Edge's tube with a plain crown. .112×1.07"

- **T9** 1844 - C. Lancaster Umbrella tube, .09×.665" Illustrated by P. Hawker in the 9th edition (1844) of Instructions to Young Sportsmen. Based upon a T3 tube with a galvanized iron "umbrella."
- T10 1844 - D. Long Cone shape head Illustrated by P. Hawker in the 9th edition (1844) of Instructions to Young Sportsmen
- T11 1844 - Wilkinson Mushroom tube, .150×.610" Tentatively attributed to Henry Wilkinson who created an underhammer improvement using a primer somewhat like Westley Richards' (T4) primer.
- 1849 Hawker T12 Saucer plug Primer The design and manufacture of this tube is described by Hawker in his Diary under 1849. Tube .090×.64". The head is of brass gilt. Peter Hawker.
- T13 1850 - C. Lancaster Leather head English patent No. 13,161, 3 July 1850. A number of head designs are described. The tube is the basic P3 tube .09 ×.5 inch.
- T14ab 1850 A. Clayton Saucer plug Registered under the Non Ornamental and Useful Design Act, No. 2,586, Dec. 2, 1850 by Alfred Clayton of Llymington, where it was described as "an improved tube for Col. Hawker's new ignition,." .09×.91" length. All examined specimen record the Southampton address to which Clayton moved in 1855.
- T15a Tube .07×.530" xxxx-Ancion Specimen: Attributed to D. D Ancion of Liège, based upon a cased pair of pistols in the Royal Ontario Museum, Toronto.
- T15b Tube .09×.64" xxxx - Ancion
- xxxx Unidentified Soldered tip .10×1.435" T16
- T17 xxxx -- Unidentified Flat clip/tube An addition to, or alteration of, T3.
- T18 xxxx - Unidentified
- Notched block & tube T19 xxxx - Unidentified Square block & tube On some of these primers, it appears as if the T18 block has been soldered with the notched side of the block against the tube.
- xxxx Unidentified T20 Wrapped tube A tube illustrated by W.W. Greener in The Gun and its Development which he described as "a priming tube, the one end being inserted in the touch-hole and the other struck by the cock."
- T21 1970 - Bailey L. Shape tube, .09×.64 inch A tube constructed by D.W. Bailey and W.S. Curtis in the 1970s in order to shoot a tube lock gun
- T22 1835 - Lepage .078×.468" A short tube with notches at one end, attributed to Jean Lepage because of its association with a revolving pistol in the Royal Armouries Museum, Leeds.
- T23 1820 - Prélat, Short Tubes French patent 28 July 1818 and certificate d'addition 28 July 1820. A tube of metal containing the fulminate used in the fourth lock type of the patent. François Prélate.









T33 xxxx—Unidentified



T25 xxxx—Chas Lancaster



T29 1870-J. Barthe



T32b 1836—G. Console



T34 1850-C. Lancaster



T26 1842—A. P. F. Thibert



T30 1821-LeB. de Valdahon



T32c 1840—G. Console







T32d xxxx—G. Console-like

- T24 1831 Robert, Short Tubes
 French patent No. 4,677, 27 April 1831; ; Robert, copper tube filled up with powder and pushed into the bottom of the paper cartridge.
 English patent No. 6,137, 13 July 1831. August Demondion.
- T25 xxxx Lancaster Tube .090×.635-.647" Specimen: A proprietary brand, marketed by Charles Lancaster, differing only in length from the Manton tube
- T26 1842 Thibert, Continuous French patent No. 13669, 9 Aug 1842; ; A copper tube rolled up containing a particular mixture described as an improvement to the continuous tube of Heurteloup's Koptipteur ignition., Augustin Pierre Félix Thibert.(see T7, P53).
- T27 1834 Heurteloup Continuous metal tube English patent No. 6,611, 22 May 1834; English patent No. 7,980, 22 June 1839; A straight, round, soft metal tube fed through the stock or placed in the end of a primitive cartridge. Charles Louis Stanislas, Baron Heurteloup.
- T28 1862 Eyraud Chemical pin French patent No. 56,029, 7 Nov 1862; chemical match or pin primer; *Certificate d'Addition* 28 January 1863, Chrysos Tôme Eyraud,
- T29 1870 Barthe, Stem Primers French patent No. 91,656, 15 October 1870, Joseph Barthe.
- T30 1821 de Valdahon Grass or straw French patent No. 1,298; 21 Sept 1821; Specimen: a straight straw or grass tube filled with the priming compound; .83 inch long; .15 inch dia. tapering to .12 inch. Ex H.P. White collection J.C.A.J. LeBoeuf de Valdahon.
- T31 xxxx Unidentified Lead Tube Specimen: ex H.P. White collection. A lead tube approx. ¹/₈ to ⁵/₃₂×1¹/₈" long, bent in the middle, straight (more or less) seam, rounded/folded over at the ends.
- T32a 1835 Console Shaped brass tube A flat tube of brass fastened to a cartridge by a wire was tested by the Austrian army in a lock designed by Console in 1835. Specimen, ex H.P. White collection. Tube of brass w/card wad wired to the end. Wad 7/16 inch diameter by 1/16 inch thick; wire twisted, 1 inch long; Tube of thin sheet brass shaped flat on one side over a cardboard or wooden strip, rounded on the other, 5/8 ×7/32" wide. The illustration conforms with that tube. Guiseppe Console.
- T32b 1836 Console Triangular brass tube In January 1836, a triangular brass or copper tube was adopted for the Console lock by the Austrian army and continued in service until 1840
- T32c 1840 Consule Coiled brass, .150×.81" The Console lock was improved by General Vincenzo

Augustin in 1840 and used a round tube. There are a number of slight manufacturer's variations.

- T32d xxxx Consule-like Copper tube, .100×.830" Tube pressed closed at both ends, one end drilled. All of the specimen known to the compiler can be traced to a source in Liège.
- T33 xxxx Unidentified Cruciform tube Four-blade "handle" of galvanized iron, soldered to end of a T3 tube. $.089\pm \times .681$ ".
- T34 1850 Lancaster Leather tubes English patent No. 13,161, 3 July 1850. "Percussion tubes are made of softened leather." Charles William Lancaster.

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Common Caps



Top Hat Caps

Hammer Caps



Patented & Unpatented





C1 1818—J. Egg



C5 1833-C. Jones



C9 1843-S. Walker



C12 1852 -W. Richards



C16 1853-J.D.M. Stirling



C20 1857—W.T. Eley



C23 1869-J. Talbott

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C2 1820—F. Prélat



C6 1836 -W. Richards



C10 1843—W. Needham

Gutta Percha Lining

C13 1853-J.& J.D. Horrocks



C17 1854—Armstrong/Pursall



C21 1858—W. Pursall



C24ab 1870-B.F. Woodside



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C3 1822—J.Shaw
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C7a 1839-G.H. Manton







C14 1860±—W. Tibbal





C22a 1859-M. & A. Walker



C25 xxxx-Gevelot



C4a-d 1830-S. Smith



C8 1841 — T. Starkey



C11b,c 1848-W. Richards



C15 1853—J. Goldmark





C22b 1859-M. & A. Walker



C26 xxxx—Liège?



CAPS

C1 1818 — Egg Brass, untrimmed cap Unpatented, but supporting documentation indicates its introduction by Joseph Egg late in 1818.

C2 1820 — Prélat Cap Certificate de addition in 1820 to French patent 28 July 1818, red copper drawn cap with the shape and size of the nipple. Joseph François Prélat..

C3 1822 — Shaw Iron U.S. patent, 19 June 1822: A name and date patent for a cap (no description) made of copper. Specimen: Package labeled as "Joshua Shaw's Superior Double Loaded Patent Spring Primers."

C4a 1830 — Smith Flat nipple, coronet .330-.364" English patent No. 5.978, 7 August 1830. There are three sizes measuring (inside diameter); .330, .338, and .364". Each size seems to have a slightly different embossed crown and shape to the raised central "nipple." Specimen .330" round nipple, coronet

C4b 1830 — S. Smith .338" flat nipple, Crown

- C4c 1830 S. Smith .364" wide flat nipple, Crown
- C5a 1833 C. Jones Hammer cap English patent No.6,394, 7 March 1833; English patent No. 6,436, 12 June 1833; Although Charles Jones obtained two patents covering the lock requiring this hammer cap, and described them as patented on packaging, there was no mention of them in either patent. Embossed "J" on the inside.
- C6 1836 W. Richards Truncated/enlarged English patent No. 7,041 22 March 1836. The cap is placed in an outer casing.
- C7a 1839 G.H. Manton Hexagonal English patent No. 7,965, 11 February 1839. George H. Manton covered a circular magazine and illustrated this primer. The first of this type examined were found in England. Numerous crown marks (TF, G, Fque, G Gevelot) have since been recorded
- C8 1841 T. Starkey Crown Mk. English patent No. 9,188, 16 December 1841 illustrated a number of variants consisting of an inner and outer case. That illustrated bears the crown mark of Thomas Starkey
- C9 1843 S. Walker Six-split William Greener credited Sarah Walker at 12 Legge St., Birmingham, with invention of the six split cap in his Science of Gunnery published in 1846 (p. 308).
- C10 1843 —Needham Embossed crown English patent No. 9,801, 24 June 1843. Tubular magazine using outside primed cap. William Needham
- C11a 1849—Richards 2-step short English Registered Design Act, 9 March 1849. Westley Richards. Crown marked (C11a) and two lengths plain (C11b, C11c), are known.
- C12 1852 W. Richards Gutta Percha/cap English patent No. 14,027, 28 March 1852. A tube of Gutta Percha in which a percussion cap of the ordinary form and construction is inserted.
- C13 1853—Horrocks Gutta Percha lining English patent No. 1,404, 8 June 1853. Metal, Lined with an elastic waterproof material, such as gutta percha or other lining. Woven fibrous material may

replace the metal. John & James Dunlop Horrocks.

- C14 1860±—Tibbal Gutta percha Specimen: A Gutta percha cap-like component found inside a .36 cal. revolver cartridge labeled as "Explosive Tipped.".274"o/d ×.171" deep. William Tibbals.
- C15 1853 J. Goldmark Waterproofing U.S. patent No. 10,262, 22 November 1853. for a machine to grind the edge of percussion caps. Joseph Goldmark. Some are crown embossed with his name.
- C16 1853 J.D.M. Stirling Zinc plated English patent No. 66, 10 January 1853. John Davies Mories Stirling. Caps of tin, zinc or silver, plated.
- C17 1854 Armstrong/ Pursall 2-piece cap English patent No.157, 23 January 1854. Charles Clarke Armstrong and William Pursall. An outer case (a) and an inner case (b) with a depression (c). French patent No 20511, 3 Oct 1854;; Amstrong & Pursell, Imported pat.
- C18 1855—Eley India Rubber Waterproofing English patent No. 1,272, 4 June 1855. A disc of vulcanized India-rubber is placed over the priming. William Eley
- C19 1855 W. Pratt In Chains English patent No. 1,677, 24 July 1855. Caps in chains, being connected by single central links or double side links. The English agent acting on behalf of John Henry Johnson of Baltimore.
- C20 1857 Eley xx Reinforcing English patent No. 2,440, 19 September 1857. Provisional protection only. "It is proposed to place round percussion caps, disks or short tubes prevents their bursting or opening when forced on the nipples." William Thomas Eley.
- C21 1858 W. Pursall Waterproofing English patent No. 1,982, 1 September 1858. Provisional protection only. Waterproofing caps by placing a metallic powder covering the priming and sealing it by pressure or friction.
- C22a 1859 MA & R Walker xx Metal, red gilt washer. English patent No. 286, 1 February 1859. Waterproofed paper covered with a gilt or silvered washer pressed into place.
- C22b 1859 M.A. & R. Walker Small diameter English patent No. 286, 1 February 1859, Caps made smaller and longer than usual with an enlarged head to fit into an enlarged nipple, M.A. and R.Walker.
- C23 1869 J. Talbott 2-step, Gutta Percha U.S. Patent No. 92,398, July 6, 1869. Cap with ring of rubber or gum around the inside of its mouth to make a waterproof joint with the gun nipple.
- C24a 1870 B.F. Woodside Paper, common cap U.S. Patent No. 105,874, July 26, 1870. Percussion cap made of paper pulp reinforced with hair and coated with collodion or shellac. A second design (C24b) with serrated rim folded out to simulate a top-hat cap was also submitted.
- C25 1847+ Gevelot à Collier A copper cap enclosed in a shaped band or collar of copper or brass. (See also C80, C84).
- C26 xxxx Liège Heavy Ribbed A common-like cap but with deep, wide flutes. Probably of Belgian manufacture.

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C27b 1849-Gevelot + Cap of parchment, skin, leather, etc. C29 1868-Newens () ros C33 1841-T. Starkey 1 C37 1838-Gevelot Fig: JV C41 1837-Austria

3

C45 1821-Lepage



C49 xxxx—Unidentified



C28a xxxx-Cardinal cap



C30 1839-M. Germain







C38 1838—Jourdan



C42 1862—Frankford Arsenal



C46 1867-Gevelot



C28b xxxx-Cardinal cap



C31 1835-M.J. Gevelot



C35 1820-Deboubert



C39 1853-Scheidt Bros.



C43 Clere & Dupeyon



C47 1872-Rossignol



C51 1836—Gaupillat

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C27a 1847 — Gevelot/Le Maire, Donut shaped anvil French patent No. 5,454, 19 April 1847. Certificate d'Addition, 3 June 1847, Capsule à feu dirigé; drilled washer covers the priming mixture.

C27b 1849 — Gevelot Patented caps

French patent No. 5,454, 19 April 1847. Certificate

d'Addition, 3 June 1849, Capsule à double échancrure, A

notched lining inside a cap. Gevelot and Germain

- C28a xxxx Cardinal cap .342" dia.
- C28b xxxx Cardinal cap ...280" dia. 4-split
- C28c xxxx Cardinal cap .330" dia. C29 1868 — Newens Paper French patent No.80,949, 16 May 1868. Newens, cap
- of cardboard, parchment, skin, leather, made by molding or stamping. (see a, so C47)
- C30 1839 M. Germain With moveable anvil French patent No. 6,285, 2 May 1835. cap with moveable anvil. Martin Germain.
- C31 1835 M.J. Gevelot Capsule à bombe intérieur French patent No. 6,511, 18 September 1835. Capsule à bombe intérieur hemispherical concentration of priming compound inside the center of the cap. Marie Joseph Gevelot.
- C32 xxxx Unidentified Mortar-board cap From the miscellaneous accumulation of a Liège cap manufacturer left with the Museé d'Armes, A plain copper cap with the hole in a .310" brass square soldered flush with the crown.
- C33 1841 T. Starkey Crown Mk. English patent No. 9,188, 16 December 1841 A number of variants consisting of an inner and outer case or a distinctive shape are illustrated. Thomas Starkey (see C7).
- C34 184±—F.W. Mills Hammer cap Specimen: package labeled "F. W. Mills Inventor." with caps similar to those sold by Needham & Jones.
- C35 1820 Deboubert Patented Caps French patent 22 Sept 1820; Deboubert, copper cap and nipple using the Howard mercury. Deboubert. (See also C60).
- C36 1856 French military Paper cap A thick walled paper cap. An inexpensive cap described in the Aide mémoire des officiers d'artillery, 1856. for target practice.
- C37 1838 Gevelot, Capsule à Bombe extérieure French patent No. 9,107, 20 March 1838. A ribbed Capsule à Bombe extérieure with the priming in a nipple raised on the crown.
- C38 1838 Jourdan, Patented Caps French patent No 4,642/8,227, 21 Feb 1838; primer with ear to, tie it at the bottom of a paper cartridge. Jean Joseph Napoléon Jourdan,
- C39 1853 Scheidt Bros. Priming cover Specimen: "Percussion Caps of Superior Quality with Metallic Cover Warranted Waterproof" "Exhibition of the Industry of all Nations, New York, 1853." Scheidt Bros. in Dillenberg.
- C40 1846 Flobert & Du Tillet Patented Caps French patent No. 3,589, 18 May 1846; Flobert & Tillet, Truncated cone capsule fitting the nipple, Louis

Nicolas Auguste Flobert and Antoine Paul Du Tillet.

- C41 1837 Austrian Top hat cap Holes in the flange to fasten the cap, by wire, to a paper cartridge. Illustrated in Auflösung des wichtigen Problems, die Percussions-Schlösser auch in der Armee einzuführen by H...de B..., Vienna: Carl Gerold, 1837.
- C42 1862 Frankford Arsenal top hat cap Specimen: A small top hat cap packed 1000 in a canvas bag. , 180"×.175" high .262" brim diameter
- C43 1842± Clere & Dupeyon Cap A two-step copper cap with loops or ears soldered to the sides to tie the cap to a paper cartridge.
- C44 xxxx Celebrated Nut Caps Common cap Specimen: Labeled container in the W. K. Neal Collection. There is no visible distinction from a common cap.
- C45 1821—Lepage Cap French patent 12 March 1821. Although the cap is not illustrated, a distinctively shaped nipple suggests a special cap.
- C46 1867 Gevelot Patented Caps French patent No. 75,266, 31 March 1867, Jules Felix Gevelot.
- C47 1872—Rossignol Patented Caps French patent No. 95,493, 3 May 1872; Rossignol; cap pressed from a paper patch. (see C29)
- C48 1822 Guillemin-Lambert Special Design French patent No. 1.417, 27/Sept 1822; cap with two thin shoulders, by this way it is possible to tie up the cap to the cartridge, Charles Guillemin-Lambert.
- C49 xxxx Unidentified Cardinal cap A small cap, .174 inch dia. inside a large, heavier shaped cap .327"o/a dia.×.216" high.
- C50 xxxx Unidentified Dished crown This variation with a dished crown is found in a number of sizes, always with smooth sides.
- C51 1836 Gaupillat Gauppillat French patent No. 7,396, 26 Sept 1836; split primer made in one pass with the illustrated punch die, André François Gaupillat.

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C52 1845-Russian



C56 1836 — Lepage



C60 1820±-T. Mortimer



C64 1845-C.J. Smith



C68 1860+-Confederate



C72 1849-W.H. Ritchie



C76 1820-Prélat

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Cap with hole in crown

C53 1841-M. Berry



C57 1868—Newens



C61 1842-C. Monteiro



C65 xxxx—Alderman



C69 1860+-Confederate



C73 1854—J. Cox



C77 xxxx-Unidentified



Zinc

C58 1849-Edward Brooks







C66 1852-R. Walker



C70 xxxx-Gevelot



C74 1866-Chassepot



C78 1838-Gevelot



C55 1853-Gaupillat



C59 1860-Gevelot miniature



C63 xxxx—Unidentified



C67 xxxx-Unidentified



C71 1853-F. Joyce



C75 xxxx-Unidentified



C79 xxxx—Unidentified







- C52 1845 Russian Tapered cap Illustrated in Russian manuals and possibly also Prussian
- C53 1841 BerryCap Design French patent No. 10,526, 28 Feb 1841; cap drilled in the center with a 1.5 millimeter hole, to be used with a combined nipple/firing-pin.
- C54 1852 Gaupillat Zinc French patent No. 13,935, 21 August 1853; zinc primer.
- C55 1853 Gaupillat Iron caps French patent No. 15,543, 5 Feb 1853; iron caps
- C56 1836 Lepage Chain of caps French patent No. 7396, 13 July 1836. A link arrangement to join a string of caps together. Lepage Freres.
- C57 1868 Newens Paper+ French patent No 80,949, 16 May 1868; a cardboard paste, material: parchment, skin, leather, made by moulding or stamping, Edmund Newens.
- C58 1849 Brooks Watertight cap English Registered Design Act, No 1941, 30 June 1849. Edward Brooks & Son. Rim of cap chamfered to mate with groove in the nipple.
- C59 1860± Gevelot Miniature cap Specimen, Embossed brass container. Made for miniature firearms. Inside dia. of cap 1.36mm; height 1.5mm, metal thickness, 0.1mm. Caps illustrated are full size. Scale of nipple with cap in place is in mm.
- C60 1820± Thos. Mortimer Tapered cap A tapered cap with a rim similar to, and possibly covered under, Deboubert's 1835 patent. Caps associated with Thomas Mortimer rifle S/N 4230. (See also C35)
- C61 1842 Monteiro Calotte Conversion of flint to percussion by the 2nd pattern suggested by Col. Costa Monteiro. The wire was to be wrapped around a hook on the nose of the hammer.
- C62 xxxx Sellier & Bellot Two-piece cap A two-piece cap with raised crown and small rim. Embossed SB.
- C63 xxxx Unidentified

A shallow copper cap with notches on the rim. C64 1845—Smith Caps

- English patent No.10.667: 14 May 1845. Charles J. Smith. (See also P11a) Caps measure .140 to .148 diameter by .129 to .135 high. Charles James Smith. This may possible by a cap illustrated in the 1885 Kynoch catalog described under "Military and Sporting Percussion Caps" as a "Double Primer."
- C65 xxxx Alderman Brass cap Specimen: Alderman's Improved Anti Corrosive, brass, ribbed.
- C66 1852—Walker "percussion cap" English Registered Design Act No. 85,386 dated 19 June 1856; An "Ornamental design for [a] percussion cap." Richard Walker.
- C67 xxxx Unidentified Narrow brim The narrow brim and bunted crown seems intentional..

- C68 1860+ Confederate Leather cap It has been documented that leather percussion caps were produce by at least one Confederate cap making facility.
- C69 1860+ Confederate Top hat cap Specimen: Obtained with paper cartridges manufactured for the Confederacy. Some caps embossed from the inside with "R" (reading reversed from the outside), have been attributed to, but not confirmed as, Richmond Arsenal.
- C70 xxxx Gevelot Gilded cap Specimen: A design similar to C8 by Thomas Starkey, but compare size. .156"×.304" Embossed crown; brass, apparently gilded or gold washed.
- C71 1853 F. Joyce Pyroxyline lined English patent No. xxxxxx 3 April 1853. "Joyce's Patent Pyroxyline [a soluable gun cotton, mainly cellulose tetranitrite] Percussion Caps" This patent date is listed on an advertising flyer but is not recorded in the Abridgments of the Patent Specifications.
- C72 1849 Ritchie Square copper cap English patent No. 12,648, 7 June 1849. A "self acting priming apparatus ... the caps may be made square, and have one side removed so that they may be easily pushed upon the nipple. William Henry Ritchie.
- C73 1854 Cox Lined cap English Patent No. 1,153, 23 May 1854. A cap "completely lined with tin or other thin metallic foil." John Cox.
- C74 1866—Chassepot Cartridge Top hat cap with two holes in the crown designed for the Chassepot needle-fire cartridge. Discontinued in 1868.
- C75 xxxx— Unidentified Top hat cap Specimen, SFM Archives: Artillery top hat 9.46mm (od)x15.15mm (.37x.60 in.)
- C76 1820—Prélat Cap Specimen, SFM Archives: These copper caps have the configuration of those illustrated in Prelat's 1820 *cértificate de addition* to his 1818 patent. They were acquired with other very early caps, including the Egg caps (C1), made at about the same time, which can be traced back to 1820. 2.7mm brim; 4.0mm dia.x8.25mm high (.106x.157x.325 in.)
- C77 Unidentified Top hat cap Specimen, SFM Archives: Possibly an unfinished cap. Large top hat, 9.5mm (od)x 15.54mm (.374x.612 inch)
- C78 1838—Gevelot. Capsule á bombe extèrieur French patent No. 9,107, 20 March, 1838. A plain cap with the priming in a nipple raised on the crown. A number of sizes were available. (See also C37)
- C79 xxxx—Unidentified Copper Cap Speciment, SFM Archives: Large top hat 4.75mm (od)x 10.92mm (.19x.43 in.).

Metric x .0394 = inches



- C80 1847—Larachée á Collier A copper cap strengthened with a brass "*enveloppe*." Patent applied for but not issued. Edouard de La Rachée. The design was developed by Gevelot. (See also C25, C84).
- C81 xxxx—French Military Common Cap Specimen, SFM Archives; French smooth common cap 5.26mm (od)x6.55mm (.21x.26 in.).
- C82 1839— Danish Military Copper Cap A large cap with embossed crown over the monogram of Frederick VI of Denmark (1808-1839). 12.57mm (od)x9mm (.5x.35 in.).
- C83 1945—French Childrens' Toy 1940+/—Iron cap-like detonator incorporated into the nose of a toy aeroplane which detonated when the plane crashed into the ground. A dished crown impressed with "Ofi" 10.25/18.30mm(od)x8mm (.40/ .72x.31 in.).
- C84 1857—Eley Hoops on caps British Patent No. 2,440, 19 Sept. 1857. Provisional protection only—no illustration. "Strengthening metal hoops are fixed exterior of the percussion caps. Such hoops may be simple disks or short tubes which being placed around the percussion caps, prevents their bursting." William Thomas Eley (See also C25, C80)
- C85 xxxx—Unidentified Nipple on Cap A fluted, common cap with a distinct nipple on the crown. .131 in dia x.186 in. high. (Ex WKN).



C80 1847-Larachée



C84 1857-W.T. Eley



C88 xxxx-Mexico





C81 1839 — French



C85 xxxx-Unidentified



C89 xxxx-Prussian



C82 1839-Danish



C86 xxxx-Mexico







C83 1945—French Toy



C87 xxxx-Mexico





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- C80 1847—Larachée á Collier A copper cap strengthened with a brass "enveloppe." Patent applied for but not issued. Edouard de La Rachée. The design was developed by Gevelot. (See also C25, C84).
- C81 xxxx—French Military Common Cap Specimen, SFM Archives; French smooth common cap 5.26mm (od)x6.55mm (.21x.26 in.).
- C82 1839— Danish Military Copper Cap A large cap with embossed crown over the monogram of Frederick VI of Denmark (1808-1839). 12.57mm (od)x9mm (.5x.35 in.).
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- C84 1857—Eley Hoops on caps British Patent No. 2,440, 19 Sept. 1857. Provisional protection only—no illustration. "Strengthening metal hoops are fixed exterior of the percussion caps. Such hoops may be simple disks or short tubes which being placed around the percussion caps, prevents their bursting." William Thomas Eley (See also C25, C80)
- C85 xxxx—Unidentified Nipple on Cap A fluted, common cap with a distinct nipple on the crown. .131 in dia x.186 in. high. (Ex WKN).
- C86 xxxx—Mexico Iron top hat cap A tinned (? shiney white metal plating) iron musket cap with silver cover over black compound—most of which are loose. The round top is distinctive and boxes are labeled "La Jalisco" Fabrica de Capsules."
- C87 xxxx—Mexico Iron common cap A tind iron common cap with a round top and a very small flange. Packaged with the same label as C86.
- C88 xxxx—Mexico Copper top hat A copper top hat cap of non military size. The cap tin is labeled "Tiger Percussion Caps" and contains 100 Sombreros.
- C89 xxxx—Prussian Musket size cap A smooth side, musket size, cap without flangs. The crown has a pronounced blister which is impressed with a single headed eagle. This crown mark is also found on common caps by Dreyse & Collenbusch.
- C90 xxxx—Prussian Musket size top hat A top hat cap with four flanges but otherwise the same as C89. There are minor variations in the eagle shape and the quality of the stamping dies varies considerably in this series.

Add-ons for Draft 4.1, p. 1

BIBLIOGRAPHY — ADDENDA

From June 2005 to 14 July, 2006

Boothroyd, Susan The Forsyth Patent Gun Company. *Classic Arms & Militaria*. Vol. 9, No. 4. (August, 2002), pp. 22-23.

A brief general history with a mention of the memorial plaques in the Tower of London and King's College, Aberdeen.

Cimino, Silvio. "Meccanismi di accensione a Napoli." Diana Armi, 1978 No. 6, pp. 30-32.

A discussion with illustrations of experimental percussion systems undertaken at the Naples arsenal.

Cimino, Silvio. "Meccanismi d'accensione a Napoli." Diana Armi, 1984 No. 9, pp. 17-19.

Perhaps part two of the above, in which the author discusses the Fucile Console and the Fucile Guitierrez which is a sliding lock described as "o Forsyte II tipo a slitta"

Dyson, Peter. "The Rev Alexander Forsyth MA, LLD 1768-1843." *The 76th London Antique Arms Fair.* London: Spring 2006, pp. 28-31.

An excellent, large, clear photographic record with brief descriptions, of the small components, accessories and tools provided with Forsyth's roller and slider locks.

Engineer, The. The Central-Fire Cartridge before the Law Court, the Government, and the Public; showing who Introduced the System into England, who has Improved It, who has Benefited by it, and who ought to be Rewarded for it. By George H. Daw. The Engineer, August 30, 1867.

A review of the above title outlining and illustrating the development of the primer used in the early center fire cartridges. Reprinted in *International Ammunition Association Journal*, No. 428, Nov/Dec. 2002, pp. 29-31.

Farley, James J. Making Arms in the Machine Age: Philadelphia's Frankford Arsenal 1816-1870. University Park: PA; Pennsylvania State University Press, 1994

An excellent history of the development of Frankford Arsenal discussing the construction of facilities for cap making and the process. pp. 661-63; 82-83. With illustrations of the machinery of Wright and Boulton,

Ferrari, Sergio. "I 'nuovi accurini a fulminante' sperimentati dall' esercito di napoli." *Diana Armi*, Year VI, No. 9 (Sept. 1972), pp. 28-33

The author reconstructs a percussion lock submitted in 1833 by Col. Guiseppe Mori of the Neapolitan artillery and traces the evolution of percussion from Forsyth to Maynard. Includes ill. of Sloat's 1818 Springfield flintlock frizzen magazine primer design from Hicks Notes on U.S. Ordnance (1940). Filippi, Guilio. "Elogio dello schioppo a fulminante," Diana Armi, Year VI, No. 6 (June, 1972), A general discussion of fulminates.

Glackin, James J. "The Primer and its Importance." The American Rifleman, December 1968, pp. 29-30

A basic introduction to the development of the primer used in center fire ammunition with particular emphasis on the chemical components. Illustration of Boxer centerfire components.

Gooding, S. James. "I am Sorry Senator Buchanan, Joshua Shaw did not Invent the Percussion Cap." *Black Powder [MLAGB]*, Autumn, 2005, p. 33-39.

Although Shaw seems to have been building a case for his invention of the percussion cap for some time, it was not until 1844 that it was first brought to the U.S. Senate by James Buchanan (later President Buchanan). This note documents Shaw's claims and dismisses their accuracy. An expanded version of the article which appeared in *Man at Arms*, April 2004.

Ironmonger, The. "Percussion Cap Experiments." April 30, 1869, p. 281.

A report on a series of experiments undertaken at the premises of E. & A. Ludlow, to "demonstrate that percussion caps, even when made up in cartridge-cases, are not dangerous in transit." This is a summary of the "Percussion Caps Not Dangerous Experiment" undertaken under the direction of Alfred Field, (qv) Chairman of the Birmingham CofC on 28 April, 1869.

Lupi, Gianoberto. "La conquista e l'avvento della percussione centrale." *Diana Armi*, Part 1, 1978 No. 5, pp. 85-88; Part 2, 1978, No. 6, pp. 57-59.

Part 1 illustrates and describes the J.S. Pauly patent of 1812; Part 2 illustrates a DB tube lock engraved "Charles Lancaster's Improvement."

Lupi, Gianoberto. "Una rarità scampata all'ingiurie del tempo" *Diana Armi*, Year VIII No. 3 (April 1974), pp 44-49.

A detailed examination of a double barrel "Lancaster's Improvement" using Joseph Manton's 1818 tube lock patent and a comparison with that patent.

Marchi, Bruno. "Il fucile Austriaco sistema Console." Diana Armi, Year IV, No. 5 (Sept. 1970), pp. 21-24.

A comprehensive look at the system proposed by Guiseppe Console and introduce in 1835. It used a triangular tube and was later improved by Vinzenz Augustin.

Marchi, Bruno. "Sistema Augustin." *Diana Armi*, Year IV, No. 6 (Nov. 1970), pp. 105-109.

The Console alteration to percussion was improved in 1835 by baron Vinzenz Augustin, a General in the Austrian artillery. This article, combined with that above, provides a detailed history of the systems known as the Console system or the Augustin system.

Pierallini, Livio, "Il systeme del dottor Robert" Diana Armi 1994-No. 3, pp. 96-98.

A description with a number of illustrations including a patent drawing of a pistol and cartridge covered in

Add-ons for Draft 4.1. p.2

French patent No. 4677 dated April 27, 1831 granted to Jean-Antoine Robert. This ignition was also covered by Augustus Demondion in English patent No. 6,139, July 13, 1831.

Rumford, Count von, (Thompson, Benjamin) "Experiments to determine the Force of fired Gunpowder." The Monthly Review for May, 1798— Philosophical Transactions of the Royal Society, Part II for 1797, London, 1798

An abstract of Rumford's second paper on the subject but unlike his earlier paper he does not mention any fulminating compound. He was though the inventor of a sliding primer lock using percussion powder, about 1809.

Sadler III, Robert. "The Rupertus Self-Priming Pistol" PAGCA Monthly Bugle (No. 434, Dec. 2005), pp. 2-3.

A photo and brief background record of the hammer designed by Jacob Rupertus covered under U.S. Patent No. 23,962 dated May 10, 1869, applied to a Pattern 1842 Johnson

Salvatici, Lusiano. "Armi Piemontesi: il vitone all'inglese dei fucili francesi." *Diana Armi*, 1981, No. 7, pp. 25-25.

The author traces the early percussion development from a locally designed tube lock through percussion cap breeching.

Salzer, Dick. "Accoutrement Corner" *The Gun Report* Vol. 51, No. 12 (May 2006). pp. 46.47.

A photographic record of a number of automatic priming systems applied to the US Model 1842 percussion pistol, Include are the Maynard, Gedney, Rupertus, and version unidentified, along with a Maynard produced at the Springfield Armory.

Thiery, Capt. A. Description des Divers Systemes à Percussion des étoupilles à friction Paris, 1819.

A description of various percussion systems nd percussion fuses. Riling 497.

United States. "The Frankford Arsenal Cartridge Primer." *Report of the Chief of Ordnance*, 1983, pp. 151-156, Plate II-VIII.

A description of the manufacturing processes of center fire and friction primers using illustrations procured from the Union metallic Cartridge Co. of Bridgeport, Conn. There are 10 related full page plates although the title calls for only seven. Plates IX and X illustrate friction primer machines.

ACKNOWLEDGMENTS: I am grateful to Alan C. Aimone, Edward J. Anderson, David H.L. Back, Howard L. Blackmore, James Buchanan, Bruce A. Bydal, Michael F. Carrick, Frederick C. Gaede, David F. Harding, John H. Hintlian, Richard Labowski, ... and ...add-ons ... for their additions to this bibliography.

New additions for this bibliography would be appreciated. A photocopy of articles (in any language), which are suggested for inclusion, should be sent to the compiler at P.O. Box 70, Alexandria Bay, NY U.S.A., 13607 or P.O. Box 390, Bloomfield, Ont. Canada, K0K 1G0.

ADDENDA; ERRATA; CORRIGENDUM

C67 This cap bears a S•B Crown mark which indicates manufacture by Sellier & Bellot of Prague.



TI Braun & Bloem, Dusseldorf; a brass tube, formerly considered a Manton tube variant; Paul Molans sectioned one to find that it is not a tube primer and it is not a tube for a pinfire cartridge. The dimensions are .088 inch diameter x .780 inch long, with one end closed

C62 This might be identified as a "reinforced crown cap" manufactured by Sellier & Bellot

T33 It has been suggested that these are fired T9 tubes. Not so. There was a small quantity in WKN collection, none with crushed tubes. They are though made with the same T3 tube and a tinned "handle" which may have had its origin as a variant from a T9 die.

P67 This is almost certainly what are called "Double Primers" illustrated in Kynoch's 1884 catalog under "Sporting and Military Percussion Caps." It is most unlikely to be a Smith patent variant.

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April 9, 2007

To: Primer Identification Manual subscribers From; S. James Gooding

Re: Early Percussion Primer Identification—Draft 4.2

This second update to the *Early Percussion Primer Identification* manual records a couple of typos and a little new information.

There is a new page to be inserted to replace page 8 in the Pellets Chapter, recording a pair of pistols with a new wafer primer size, located in the Bath Royal Literary & Scientific Institution in England (Inventory No. FA027)

There have been no additions to the "Tubes" Chapter and only a few notes to the others. I had hoped for more and will look forward to any additions you might send for future modifications.

A few additions to the Percussion Bibliography have been recorded but not enough to warrant a new print-out. Any new additions for this chapter would be appreciated; a photocopy of articles (in any language), which are suggested for inclusion (along with a suggested abstract), should be sent to the compiler at P.O. Box 70, Alexandria Bay, NY, USA., 13607 or P.O. Box 390, Bloomfield, Ont. Canada, K0K 1G0.

As noted earlier, a number of articles expanding on some of the material in this manual have been published in *Arms Collecting*. All are available at US\$6.00 each or \$20.00 for the four, sent postpaid. They include:

- "Collinson Hall, Inventor of the percussion nipple and the patchlock." Vol. 32, No. 1, (Feb. 1994) pp. 3-8.
- "Joseph Egg, Inventor of the Percussion Cap...", Vol. 36, No. 3, (Aug. 1998), pp. 75-79. (with errata note)
- "Joseph Manton's First Percussion Lock Patent, Feb. 29, 1816, No. 3985." Vol. 39, No. 2 (May 2001), pp. 39-43.
- "Unsuccessful Magazines for the Percussion Primer." by Hartwig Petz, . Vol. 35, No. 2 (May, 1997), pp. 48-52.

The text of the Introduction was reprinted in the October, 2006 issue of *Man at Arms*. Copies are available at 54 East School St., Woonsocket, R.I., USA, 02895.

Any suggestions that will improve this project would be appreciated.

Yours sincerely

5 Conding

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July 15, 2006

To: Primer Identification Manual suscribers From; S. James Gooding

Re: Early Percussion Primer Identification-Draft 4.1

It was just a year ago last month that the first copies of the *Early Percussion Primer Identification* manual were mailed and I would like you to add the enclosed additions to your copy. They have been printed in order that you may replace page 22-23 in the catalog; insert another page in the Bibliography; and an "Addenda" page of notes.

There have been no additions to the "Pellets" or "Tubes" Chapter and only eight to the chapter on Percussion Caps. I had hoped for more and will look forward to any additions you might send for future modifications.

The additions to the Percussion Bibliography have been considerable but there is a significant absence of non-English language material. New additions for this bibliography would be appreciated; a photocopy of articles (in any language), which are suggested for inclusion (along with a suggested abstract), should be sent to the compiler at P.O. Box 70, Alexandria Bay, NY, USA., 13607 or P.O. Box 390, Bloomfield, Ont. Canada, K0K 1G0.

A number of articles expanding on some of the material in this manual have been published in *Arms Collecting*. All are available at US\$6.00 each or \$20.00 for the four, sent postpaid. They include:

- "Collinson Hall, Inventor of the percussion nipple and the patchlock." Vol. 32, No. 1, (Feb. 1994) pp. 3-8.
- "Joseph Egg, Inventor of the Percussion Cap...", Vol. 36, No. 3, (Aug. 1998), pp. 75-79. (with errata note)
- "Joseph Manton's First Percussion Lock Patent, Feb. 29, 1816, No. 3985." Vol. 39, No. 2 (May 2001), pp. 39-43.
- "Unsuccessful Magazines for the Percussion Primer." by Hartwig Petz, . Vol. 35, No. 2 (May, 1997), pp. 48-52.

Any suggestions that will improve this project would be appreciated.

Yours sincerely

Derordin

by Fred A. Datig, Lucerne, Switzerland: 1983.

De Maistre. "Fulminating Gold." American Journal of Science. (1820). Vol. 2, Series 1, p. 350.

Deane, J. Deane's Manual of the History and Science of Fire-Arms. London: Longman, Brown, Green, Longmans & Roberts. 1858. Reprinted, Standard Publications, June 10, 1946. Riling 694.

Provides a history of percussion development from French sources: "...as early as from 1807 to 1810, Lepage, a then celebrated gunmaker in Paris, distinguished by the estimation in which his productions were held by Napoleon, brought out the first new mechanism for portative percussion arms...The road thus thrown open, other Parisian, London and German gunmakers were not long in entering it as competitors ... Forsyth in England was not long in following ..." He mentions Prelat's varnish coating of pills 1818, Deboubert's percussion cap 1820, etc. and the work of Console, Augustin and others, pp. 88-93. A chapter on nipples and caps, pp. 143-145.

Demeritt, Dwight B. Jr., "Joseph Goldmark, M.D., Reformer, Refugee Scientist, and Brooklyn Percussion Cap Manufacturer." *Arms Collecting*, Vol. 30, No. 1 (Feb. 1992) pp. 3-15.

A detailed, illustrated, history and biography of one of the leading American percussion cap makers.

Dexter, F. Theodore. "Reverend Alexander John Forsyth." Sales List No. 18. October, 1947, pp. 1-2.

Dexter's text records that: 1). William Green of London patented a repeating primer magazine; 2). the percussion cap was invented by Pauly; 3). percussion caps were first made by "Collenbush and Dreyse (or vice versa) in 1809 and 4). improved by Dr. Samuel Guthrie in 1823-24. The material of which legends are made.

Dickens, Bernard. "Forsyth & Co., An Unrecorded Ignition System." Man at Arms 2003, No. 6.

An illustrated discussion of an unusual over/under percussion pistol engraved "Forsyth & Co. patent."

Dunlap, William. A history of the Rise and Progress of the Arts of Design in the United States. 1834; 2nd edition, 3 vols. Boston: C.E. Goodspeed & Co., 1918, Vol. 3, pp. 101-102.

A short biographical note on Joshua Shaw's artistic background and the comment: "Of late years he has turned his attention to mechanics, and invented improvements in gun locks with eminent success ... I see by the public prints that he has obtained a premium from the emperor of Russia, for improvements in naval warfare.

Engineer, The.

Reprinted in International Ammunition Association Journal, No. 428, Nov/Dec. 2002, pp. 29-31.

Field, Alfred. Percussion Caps Not Dangerous: Shown by experiments exhibited under the supervision of the Birmingham Chamber of Commerce on April 28, 1869. Birmingham: May 6, 1869.

Foreword by Alfred Field, Chairman of the Birmingham C of C. Witnessed by Capt. Sherard Osborn for the Great Western Railway, George Shaw for the London & St. Katherine's Dock Co. and E. W. Boxer, R.A. (sic) of Woolwich Arsenal. A series of experiments undertaken at the premises of E. & A. Ludlow, to "demonstrate that percussion caps, even when made up in cartridge-cases, are not dangerous in transit." A summary of the experiment was included in *The Ironmonger*, April 30, 1869, p. 281.

Figuier, Louis Armes de Guerre et Batiments Cuirassés. Paris: Furne, Jouvet et Cie. n.d. [c.1870] pp. 173-178.

Chapter II contains a French history of percussion chemicals from the work of Pierre Bouilduc in 1699. He notes that fulminate of mercury was known as "Poudre de Howard."

Forsyth, A.J. "On certain useful properties of the oxygenated muriatic acid (as a mordant)." *Nicholson's Journal*, Vol. 111, 1800, pp. 158-60.

France. Aide-Mémoire á l'Usage des Officiers d'Artillerie, Second eidition—1844, 1850.

A compilation of articles on military pyrotechnics used by the French Artillery. The 1850 edition describes paper percussion caps used for target shooting.

France. Aide-Mémoire d'Artillerie Navale. Published by authority. 1844.

Contains an account of the manufacture of percussion cannon tubes not contained in the Aide Mémoire d'Artillerie

Franklin Institute. "Report of the Committee appointed by the Managers of the Franklin Institute, Philadelphia, to Investigate the Merits of, and Advantages to be Derived from the use of Joshua Shaw's Improved Percussion Primers &c., &c." *Mechanic's Magazine*, Vol. iii, 1825, pp. 142-3.

The Report was dated July 1, 1824 and signed by D.H. Mason, Isaiah Lukens and John S. Phillips. It apparently, (but not categorically), details Joshua Shaw's June 19, 1822 patent which is titled "An Improvement in Guns and Firearms" in the *J. of the Franklin Institute*, Vol. 8, p. 124. The report mentions primers of copper and pasteboard.

Fuller, Claud E. Springfield Muzzle-Loading Shoulder Arms New York: Francis Bannerman Sons, 1930.

Chapter VI (pp. 77-95) deals with the percussion system, the background of Forsyth's invention, and Joshua Shaw's claims, followed by descriptions of the systems of conversion.

Gaede, Frederick C. "Enoch Hidden and his Cannon Locks." Arms Collecting, Vol. 36, No. 4 (Nov. 1998), pp. 111-120.

Gaede, Frederick C. "A Further Note on Hidden's Cannon Locks for the U.S. Army." *Arms Collecting*, Vol. 39, No. 2 (May, 2001), p. 57.

Gaede, Frederick "Cones & Caps for American Civil War Pistols." Arms Collecting, Vol. 39, No. 3 (Aug. 2001), p. 90-92.

Gaede, Frederick C. "An Early Pecussion Cap Packing Bag. "Military Collector and Historian. .Vol. 56, No. 2 (2004). pp. 112-114.

The author describes a 10,000 cap bag, how it was made and how it was distributed. He provides documentaton fro the 1850 *Ordnance Manual* on the design and construction of the packing box for 100,000 percussion caps.

Gelder, Arthur Pine van & Schlatter, Hugo. *History of Explosives Industry in America*. New York: Columbia University Press, 1927.

A brief history included on detonating materials and percussion caps, pp. 732-736.

Gibbs, George, *American Journal of Science*. "Cautions regarding fulminating powders." (1819). Vol. 1, Series 1, p. 146.

of Military Stores which have been Approved and Sealed with Instructions Relating Thereto. London: Various dates; first issued May, 1860.

Paragraphs cover: \$51 zinc containers; $$52 V_4 barrels$; \$295, compound; \$640 caps with flanges for revolvers; <math>\$642 marking of HP caps; \$982 composition; \$1025 new composition, caps & packages marked A; <math>\$1498 revolver caps with flanges.

Great Britain. Patents for Inventions, Abridgements of Specifications, Class 9, Ammunition, Torpedoes, Explosives, and Pyrotechnics. London: H.M.S.O., (various dates).

A series of books recording a brief description with illustrations, of the patents issued in England during the period from 1855 through the end of the century, published periodically from 1905. The series was reprinted by Museum Restoration Service in seven volumes: 1855-66; 1867-76; 1877-83; 1884-88; 1889-92; 1893-96; 1897-1900.

Guns Review. "Percussion Cap Controversy." Vol. 15, No. 4 (April 1975) p. 127

An editorial comment on the British Government's reclassification of percussion caps under the Explosives Legislation.

Guthrie, Dr. Samuel. Letters to Prof. Silliman of Yale University and editor of American Journal of Science and Arts about his experiments with gunpowder and fulminates. These were reprinted by Pawling, *q.v.*

Guthrie, Dr. Samuel. "Notice of the Vaporization of mercury in the fumes of nitric ether during the formation of fulminating mercury." (1832). *American Journal of Science*. Vol. 21, Series 1, p. 90.

Guthrie, Dr. Samuel. "Chlorate of Potash (for use in prming powder)." (1832). *American Journal of Science*. Vol. 21, Series 1, p. 92.

Guthrie, Dr. Samuel. "Fulminating Preparations." (1832). American Journal of Science. Vol. 21, Series 1, p. 292.

Guthrie, Dr. Samuel. "Fulminic acid and fulminates." (1832). American Journal of Science. Vol. 21, Series 1, p. 185.

H-----n, G.M. Royal Navy, in a letter to Editor of *Mechanic's* Magazine, 1 April 1826.

Proposes simple percussion cap lock, cock on spiral spring. With illustration of cock.

H... de B... B.... Auflösung des wichtigen Problems, die Percussions-Schlösser auch in der Armee einzuführen. Vienna: Carl Gerold, 1837.

Covers solutions to important problems to be encountered with the percussion locks to be introduced into the Austrian army. One plate illustrating a lock with a cap guard and methods of attaching a top hat cap to the paper cartridge.

Hagner, P.V. "Brevet Major Hagner's Report." *Executive Documents Printed by Order of the Senate of the United States.* Washington: 1850, pp. 374-424, plus illustrations.

Notes and observations made on a tour of the armories of Europe with particular attention to cap manufacture in England, Belgium, Holland and France.

Harding, D.F. Small Arms of the East India Company 1600-1856. London: Foresight Books, 1999.

Vol. III, Chapter 23, Ammunition and Performance; Percussion Caps and their Supply, pp. 206-217. A detailed study of their manufacture in London and the East India Company arsenals at Bombay, Hyderabad, Bengal, Madras. Includes the manufacturing process described at Madras [q.v.] in 1847.

Hare, Robert. "New Fulminating Powder." American Journal of Science. (1829) Vol. 16, Series 1, p. 397.

Hare, Robert. "Process for a fuminating powder, and the galvanic ignition of gunpowder." (1839) *American Journal of Science*. Vol. 37, Series 1, p. 268.

Harrison, G. Charter, Jr. The Gun Collector, No. 46.

A collection of unsigned articles, probably by G. Charter Harrison, Jr., copyright 1956. Included are: The Coming of Percussion, Joe Manton and Percussion, Forsyth & Co., Patent Gun Manufacturers, The Percussion Cap, The Flood of Invention, and The Acrotormentarian Society and Riviere. The following issue, (No. 47), contained an article titled "More About Forsyth" written by the same author from information provided by Harry Lichter. G. Charter (Nick) Harrison, was one of the leading arms researchers of the period and was the Editor/Publisher of *The Gun Collector*:

Hawes, Arthur B. Rifle Ammunition. Being Notes on the Manufactures connected therewith, as conducted in The Royal Arsenal, Woolwich. London: W.O. Mitchell, 1859.

A chapter on the manufacture and packaging of British military percussion caps. pp. 58-69. Reprinted with additional material, by Dean Thomas Publications, Gettysburg PA, 2004.

Hawker, Col. Peter. Instructions to Young Sportsmen in all that relates to guns and shooting. London: Various publishers.

Hawker's *Instructions* went through ten London editions; 1814, 1816, 1824, 1825, 1826, 1830, 1833, 1844, 1854, and a Philadelphia edition in 1846. Each, from 1824, contained information on new developments in the percussion system.

Hayes, M. "India-rubber Cap Primers." Journal of the Royal United Service Intitution. (1859). Vol. 2, p. 116.

Hidden, E. An improvement in the Percussion Lock for Cannon. J. of the Franklin Inst., Jan. 14, 1831. Vol. VII, p. 308.

Hodgetts, E.A. Brayley, ed. *The Rise and Progress of the British Explosives Industry*. VIIth International Congress of Applied Chemistry, Explosives Section. London, Whittaker and Co., 1909.

Houze, Herbert G. "Percussion Patent Ignition Systems." Arms Gazette, Vol. 4, No. 11 (July 1997), pp. 20-22, 24, 48.

Coverage of the large collection of percussion models in the Milwaukee Public Museum collection with illustrations of the ten variations.

Houze, Herbert G. "The 1861 Inventory of the Arms and Miscellaneous Material in the Office of Colonel Samuel Colt." *Armax* (Journal of the Winchester Arms Museum) Vol. 1, No. 1 (Spring/Summer 1987).

Excerpts from the catalog and illustrations relating to Forsyth firearms and lock mechanisms in the Colt collection, pp. 30-34.

Houze, Herbert G. "Further Notes on the Forsyth Material in the Arms Collection of Colonel Colt." *Armax*, Vol. 1, No. 1 (Spring/Summer 1987), pp. 63-95.

A considerable expansion of the above article, including a number of additional specimen, with large illustrations. Many of the locks have been sectioned, with an analysis of their place in the Forsyth story. They were probably acquired by Colt when the Forsyth Company was closed in 1852. MacDonald, George W. "Howard's Discovery of Fulminate of Mercury (1800)" *Arms and Explosives*, Vol. XIX No. 221 (February, 1911) pp. 24-25.

An outline of Howard's discovery and manufacture of fulminate of mercury. Reprinted in Historical Papers on Modern *Explosives*. London, Whitaker & Co., 1912. pp. 1-4.

[Madras Artillery Depot of Instruction]. The Course of Instruction in Laboratory Work, and Directions for Making Percussion caps also an Explanation of the Various Instruments in use with the Madras Artillery. St. Thomas' Mount [Madras]: 1847.

Describes the method of manufacture of percussion caps at the East India Company establishment at Madras in 1847. The processes are recorded in Harding, (1999), *q.v.* vol. 3, pp. 211-213

Mention, Philippe. "Adoption of the Percussion System in the French Army." *Arms Collecting*, Vol. 29, No. 3 (Aug. 1991), pp. 90-92.

Meyer, Moritz. *Pyrotechnie Raisonnée. Bruxelles*, Société Typographique Belge, Adolphe Wahlen, 1827.

This book aspires to an entirely new arrangement in the preparations for military pyrotechnolgy and furnishes a method for simplifying operations.

Minutes of the Society for Philosophical Experiments and Conversations, London, 1795.

At a meeting on June 14, 1794: Report on Experiments with fulminating powders, gold and silver. Blew holes in metal, damaged demonstrators hand.

Moore, Warren. Guns Told in Pictures. New York: Gosset & Dunlap, 1963.

Contains eight chapters on variations of the early percussion systems, pp. 20-27.

Moore, Warren. "Between the Flintlock and Percussion Cap." *Guns & Ammo*, February 1964. pp. 42-45, 46, 73.

Moy, Maurice. "Les Armes Reglementaires a Percussion: Période de 1785 à 1840." *Les Arquebusier de France No.* 21, (Mai-Juin 1967), pp. 5-22.

A study beginning with the experiments of Fourcroy, Vauquelin and Bertholet in the 18th century and a record of the military conversions to percussion to 1840. The systems of LePage; Daulnoy; LeRoy; Latura; Vergniaud; Bruneel; Heurteloup; Console; and Charroy are illustrated.

Monroe, Charles E. Index to the Literature of Explosives. Baltimore: Isaac Friedenwald, 1886.

A bibliography containing much on early percussion priming with abstracts from contemporary journals which have been include in this bibliography.

Neal, W. Keith & Back, David H.L. Forsyth & Co. Patent Gunmakers. London: G. Bell & Sons. 1969.

This is the classic study of Alexander Forsyth's gunmaking enterprise based upon thorough research and considerable contemporary documentation.

Newland, M. "Sarah and Richard Walker, Cap Makers." Black Powder Vol. 39. (1993). pp. 6-8.

Biographical material on this Birmingham capmaker by the arms curator of the Birmingham Museum of Science and Industry.

Newland, M. A. "John Jones Improved Percussion Lock."

Trafalgar Muzzle Loaders Yearbook 1998. pp. 19-22. An examination of this Forsyth infringement.

Nock, Samuel. "Comparative Merits of Flint and Percussion Guns." J. of the Franklin Institute. Vol. 4, 1827, pp. 205-6.

Owen, Charles H. Elementary Lectures on Artillery for ... The Royal Military Academy. Woolwich: Royal Artillery Institution. 1865. pp. 118-119.

A brief description of the construction and packing of percussion caps is presented in Lecture IX, Ammunition.

Pagel, Keith [Editor]. "Percussion Primer Information — Part 1." *The IAA Journal*, No. 439 (Sept/Oct. 2004) pp., 12-18; Part 2, No. 440, (Nov/Dec. 2004), pp. 12-16.

This article is a compilation of technical papers, industry presentations, personal notes, and previously published articles on the subject of small arms ammunition primers; their history, development and composition. It is described as "Compiled by Dr. Chem-E." A very limited bibliography is provided. Part 2 begins with Primer Formulas (sic) in Military Small Arms Ammunition.

Paulin-Desormeaux, A.O. Nouveau Manuel Complete du l'Armurier du Fourbisseur et de l'Arquebusier or Traité simplifié de ces arts. Paris: Manuels-Roret, [1851].

Pawling, Jesse Randolph. Dr. Samuel Guthrie, Discoverer of Chloroform, Manufacturer of Percussion Pellets, Industrial Chemist. Watertown, NY, Brewster Press, 1947.

Petz, Hartwig. "Unsuccessful Magazines for the Percussion Primer." *Arms Collecting*, Vol. 35, No. 2 (May, 1997), pp. 48-52.

An illustrated listing of almost 100 magazines for primers which were produced form c.1810 to c.1845, none of which were particularly successful.

Powell, Allan T. Small Arms Ammunition Primers. Privately printed, n.d.

A paper read to the Canadian Chemical Society, June 11, 1936. The meeting held at Niagara Falls, Ontario. Published for very limited circulation.

Préaux, Colonel. *Manuel d'Artificier* Published by the author? n.d.

A pamphlet containing a very detailed account of the manufacture of percussion cannon tubes for the Navy, as practised in the French Laboratories.

Quarterly Review, The. "Woolwich Arsenal and its Manufacturing Establishments." Vol. 103 (January & April, 1858) London: John Murray, Albemarle Street, 1858. pp. 218-253.

This article was probably based upon the "General Statement of the Past and Present Comdition of the several Manufacturing Branches of the War Department, as called for by a Letter dated 8th May, 1856, presented to both Houses of Parliament by Her Majesty's Command" prepared by John Anderson, Inspector of Machinery, as well as a tour taken by the editors. A detailed description of percussion cap manufacture (p. 232), probably at 1856, js included. The actual filling of the caps is not included.

Regalado, Jaime. "The Transition from Flint to Percussion in the Portuguese Army." *Arms Collecting*, Vol. 40, No. 3 (Aug. 2002), pp. 75-81.

Reid, A.J.F, *Rev. Alexander John Forsyth*, MALLD, Inventor of the Percussion Lock. Aberdeen University Press, 1909.

A biography of the inventor by a member of the family. This

terre. Lt. Col Mollière, Paris, 1841. - under amorces?)

Sporting Goods Review. "Great Scottish Inventor and the Tower Armouries, A." *The Sporting Goods Review and the Gunmaker*. April 30, 1929, pp. 55-57.

Background on the Forsyth-Reid gift of Alexander Forsyth memorabilia to the Tower Armouries and an announcement and solicitation of funds for erection of a Forsyth memorial in the Tower of London. See above, Jenkins, P.B., 1930.

Stevens, Lieut.-Col. Royal Marine Artillery. "Of Fulminating Compositions used in Military Pyrotechnics." also, "Short Notice of some Books on Military Pyrotechnics." Royal Engineers, Committee of the Corps of, (Edited by). *Aide-Memoire to the Military Sciences*. London, John Weale, 1852 Vol. 3, pp. 164-166.

A note on the formulation, production and characteristics of numerous fulminating compounds. The related titles in the "Books" have been included here.

Temple, R. & C. The Temple Anecdotes. London: 1865, pp. 93-95.

Recounts story of Wellington informing Wright that "there are strong objections to the use of the copper cap." When the Ordnance finally adopted it, a Lord Dundonald observed on the above remark "the greatest characters may be led to acquiesce in wrong conclusions (from mental indolence) by trusting to ignorant, jealous or interested officials."

Theiry, Capt. A. Description des Divers Systèmes à percussion, et des étoupilles à friction. Adoptés jusqua à ce jour en France el l'etranger, sachels en étoffe in inflammables. Aris: J. Carreard, 1839.

Descriptions of systems of percussion and friction primers.

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One of the classic studies on the technical development of firearms with considerable coverage of the percussion systems. Reprinted by Akademsiche Druck u. Verlagsanstalt, Graz, Austria, 1965.

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A collection of unsigned articles, probably by G. Charter Harrison, Jr., copyright 1956. Included are: The Coming of Percussion, Joe Manton and Percussion, Forsyth & Co., Patent Gun Manufacturers, The Percussion Cap, The Flood of Invention, and The Acrotormentarian Society and Riviere. The following issue, (No. 47), contained an article titled "More About Forsyth" written by the same author from information provided by Harry Lichter. G. Charter (Nick) Harrison, was one of the leading arms researchers of the period and was the Editor/Publisher of *The Gun Collector*.

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Scrullas, "Constitution of Fulminating Silver." (1830) American Journal of Science. Vol. 18, Series 1, p. 154.

Serven, James E. "Joshua Shaw's Percussion Cap." *The Gun Report*, November, 1960, p. 36.

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Shaw, Joshua. "Remarks on an article in the Journal of the Franklin Institute for February last, on Fulminating Powders, and their use in Firearms." *J. of the Franklin Institute*. Mar. 20, 1829. pp. 271-3.

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Under Five Flags. London: Imperial Chemical Industries, 1962.

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United States. Ordnance Manual for the Use of the Officers of the United States Army. Third Edition, Philadelphia: J.B. Lippincott & Co, 1861.

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White, Terry A. "The centerfire combustible paper cartridge."

The Rocky Mountain Bullet, Issue No. 53, July/Aug., 1994. Discussion and illustration of combustible cartridges manufactured by William Tibbals having a gutta percha percussion cap mounted in the base.

Whitmore, Maj. James M. and Heath, Lieut. F. "Ammunition, Fuses, Primers, Military Pyrotechny, Etc." Ordnance Memoranda No. 21. Washington: G.P.O., 1878.

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Wright, E. Goode. "On the Substitution of Fulminating Mercury in place of Detonating Compositions into which Chlorate of Potash enter as a Priming for Percussion Guns." *The Phylosophical Magazine & Journal.* Vol. LXII, 1823, p. 203.

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ACKNOWLEDGMENTS: I am grateful to Alan C. Aimone, Edward J. Anderson, David H.L. Back, Howard L. Blackmore, James Buchanan, Bruce A. Bydal, Michael F. Carrick, Frederick C. Gaede, David F. Harding, John H. Hintlian, Richard Labowski, Philippe Mention, Paul Molans, Jeff Paine, Hartwig Petz, Christian Ramio, Peter Scott-Edeson, Dean Taylor,

... and ...add ons ... for their additions to this bibliography.

New additions for this bibliography would be appreciated. A photocopy of articles (in any language), which are suggested for inclusion, should be sent to the compiler at P.O. Box 70, Alexandria Bay, NY U.S.A., 13607 or P.O. Box 390, Bloomfield, Ont. Canada, K0K 1G0.

