

**MENDEL L. PETERSON**

ENCYCLOPÆDIA OF  
**MARKINGS &  
DECORATION**  
ON ARTILLERY



VOLUME I

**EDITED BY ROBERT P. A. STÉNUIT**

## **“THE WEALTH OF NATIONS WAS MADE BY THE CANNON”.**

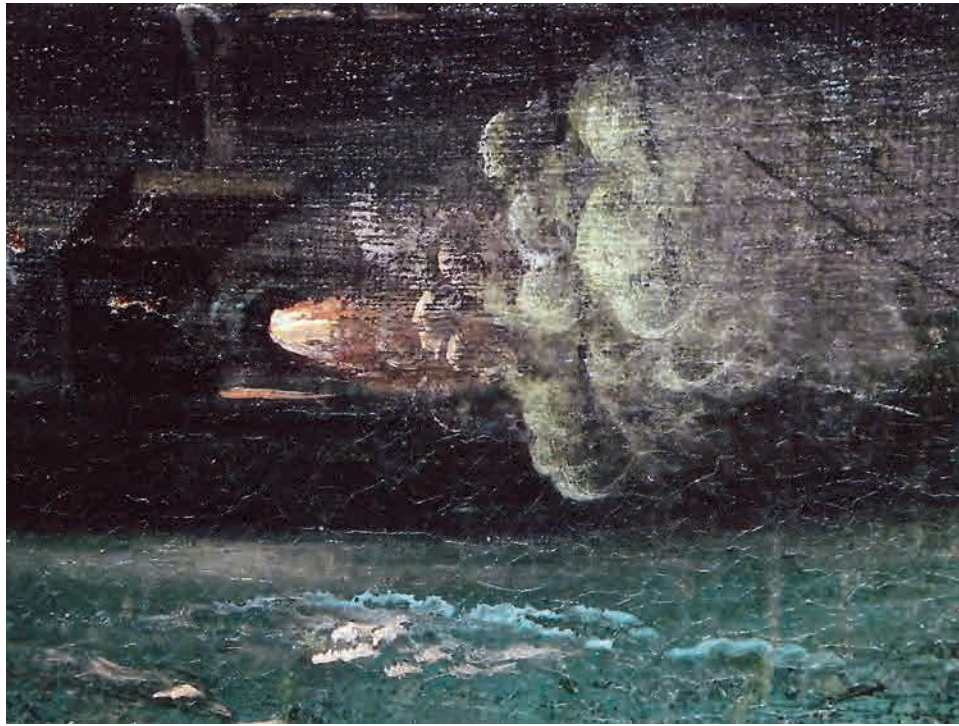
**FRONT COVER:** Bronze, Spanish, “cañon largo” (long cannon). Cast in Manila, Philippines in 1749. Calibre: 14.2cm, length: 2.80m, weight: 5,944 “lbs”. (Toledo)

The 1st reinforce features the full coat of arms of Spain under King Fernando VI. On the 2nd reinforce, the circular shield, under a bishop’s hat with cordons, with a long Latin inscription describing the merits and titles of Bishop-Governor Johannes de Arecheda. The chase features two scrolls, bearing the words “VIOLATI FULMINA REGIS” (The offended King’s Thunderbolt) and separately, the name “EL RAYO” (The Lightning). Near the muzzle is a cartouche with the name of Santa Barbara, the Patron Saint of artillerymen.

(Autorizada por el Museo del Ejército)

**Cover Design and layout: Wendy Tucker and Craig Ferguson**

**Published in 2014.**



The purpose of the present publication is double: To present if belatedly, a record of the information that existed and was available to the historians on the subject of ancient artillery, in the museums of the world, during the lifetime of Mendel L. Peterson, and to inform the historians of what remains where, today, of the material evidence he has seen, photographed and studied some fifty years ago.

The publication is in four parts:

Part One is a volume of introduction (printed in book form), that presents Mendel Lazear Peterson to the reader and supplies a quantity of conveniently grouped background information to which the specialists will be able to easily refer when working from Part Two – which consists in Part Two A and Part Two B – and from Part Three.

Part Two (to be presented on the internet is the actual raw material gathered and used by Mendel Peterson: His photo albums (the so-called LGAs or Large Green Albums with captions and notes) that contain the photographs of the countless cannons he studied in countless museums in Europe (Part Two A) and in the Western Hemisphere (US, Canada, Mexico, Caribbean) (Part Two B). The LGAs are presented in parallel with a review of the present-day state of affairs in each of the same museums, when they still exist, in the form of the so-called Editor's Albums.

Part Three (to be presented on the Internet also, is his actual, never published yet, Encyclopædia Of Markings & Decoration On Artillery (the so-called SGAs or Small Green Albums), the result of his patient examination and analysis of the most significant characteristics and details of the tens of thousands of pieces of artillery present in museums in his day. In his mind, consulting his Encyclopaedia would have given every underwater archaeologist – and so it will do now – the necessary clues to identify any newly found wreck on the basis of the peculiarities of its artillery. But obviously, his unique corpus of specialized, expertly interpreted data will do much more than that. It will bring, in an unprecedented global and handy form, invaluable information to all historians, who want to scientifically and measurably assess the potential effect of artillery, the main “tool for power” that helped write the history of Europe and its colonies all along the “Artillery Age”.

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MENDEL L. PETERSON

**ENCYCLOPÆDIA OF  
MARKINGS & DECORATION  
ON ARTILLERY**

**CONTENTS OF PART ONE**

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(ONLY VOLUME TO BE PUBLISHED IN PRINT. THE FOLLOWING PARTS, TWO AND THREE, WILL BE MADE AVAILABLE ON THE INTERNET ONLY AT WWW.BUEI.ORG. THE PRESENT VOLUME IS TO SERVE AS THE KEY TO PARTS TWO AND THREE)

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- Alphabetic list of Latin and other languages mottos on artillery pieces.
- List of the major European gun founders from the 15th to the 19th century. (As established by MLP and completed by the Editor).
- List of American gun founders in the 18th and 19th centuries. (As established by MLP).
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ACKNOWLEDGEMENTS

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### INTRODUCTION

#### THE PICTORIAL CATALOGUE – THE LGAs FOR THE UNITED STATES OF NORTH AMERICA AND THE WESTERN HEMISPHERE

- Cannons in the United States (Annapolis, Newburg, Washington DC, Louisburg, Saint Augustine, others)
- Cannons in Canada (Ottawa, Toronto)
- Cannons in Mexico (Mexico City)
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- Cannons in Santo Domingo

There are no EAs for the USA and the Western Hemisphere.



## CONTENTS OF PART THREE

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(PART THREE WILL BE MADE AVAILABLE ON THE INTERNET ONLY AT WWW.BUEI.ORG)

MLP'S PHOTOGRAPHIC ENCYCLOPAEDIA OF MARKINGS AND DECORATION ON ANCIENT ARTILLERY PIECES

IN THE FORM OF:

THE SO-CALLED SMALL GREEN ALBUMS (SGAs),  
being systematic key-lists for the identification and dating  
of any given artillery piece

PLAN AND CONTENTS OF THE PHOTOGRAPHIC ENCYCLOPAEDIA

INTRODUCTION

THE SMALL GREEN ALBUMS (SGAs), THE LISTS OF TELLTALE CLUES ON SPECIFIC PARTS OF THE PIECES OF ANCIENT GUNS, (ETC.) THAT CAN BE OF HELP FOR THEIR IDENTIFICATION, HAVE BEEN ORGANIZED AS ORIGINALLY ENVISIONED BY MENDEL PETERSON, AFTER OCCASIONAL REVIEW AND SIMPLIFICATION BY THE EDITOR.

IT IS AS FOLLOWS:

Particular physical features of the gun shown in the photographs:

- Handles (dolphins).

- Cascables, including breech mouldings or decoration, neck and breech button (or knob).

NB: Other parts of the gun, less significant for clear identification purposes, have been temporarily left aside; they include the muzzle of the gun, its vent (or touch hole) with the eventual powder-pan, the sights (hind sights and mouth sights) and the much less characteristic trunnions.

- Informative marks (on any of the piece's parts) either in the form of digits (weight, calibre, serial number, date of casting etc.) or in the form of letters (initials, cyphers, name of the founder, of the master of artillery, of the owner, proper name of the cannon, mottos, dedicatory texts (on presentation guns only), proud commemorative comments etc.)

- Decoration (on any part of the gun), including the very eloquent portraits (of the King or ruler, usually), with his crowned emblem and personal coat of arms, or the arms of a city, an admiralty, a large commercial company, etc., and, also, decoration per se, for mere embellishment purpose. (The dividing line here is often blurred.)

The captions generally include:

- Type of metal (or other material)
- Technique used (forged, cast, mixed techniques)
- Country where gun produced

- General type of the piece
- Name of the founder and date
- First owner of gun
- All dimensions
- Brief comments on the particularities, decoration, marks, etc.
- Other comments if any: origin when relevant, peculiarities (such as erased coats of arms or portraits and their meaning for instance, etc.)

## A WORD OF WARNING:

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### THE OCCASIONAL LIMITATIONS OF THE PETERSON WRECK IDENTIFICATION SYSTEM

In various of his publications, Mendel Peterson has pointed out the occasional limitations to the method of identifying a newly discovered wreck on the basis, only, of the cannons it was carrying. He himself studied, in great detail also, all the miscellaneous artefacts that can be found in the wreckage of an ancient ship.

Possible sources of errors, he underlined, are:

1 – That cannons, for various reasons, may be lost on a site without the ship they came from actually sinking there, or sinking at all, for example:

- Stranded ships often jettison their guns, cargo or even anchors in the hope of floating away with the next tide.
- Ships in danger of being captured may throw their guns overboard rather than risk seeing the enemy going away with them as trophies.
- Ships in danger of sinking because they are bulging with water often leave a trail of jettisoned guns on the bottom, which do not always lead to a wreck.



An early 17th century ex-voto commemorating the safe return to harbour of a ship, which was at one time in such a danger of going down that the sailors had to jettison anchors and artillery. The underwater archaeologists, who will find one day these anchors and cannons will look around in vain for a wreck (Collection of the Museo Navale of Venice)

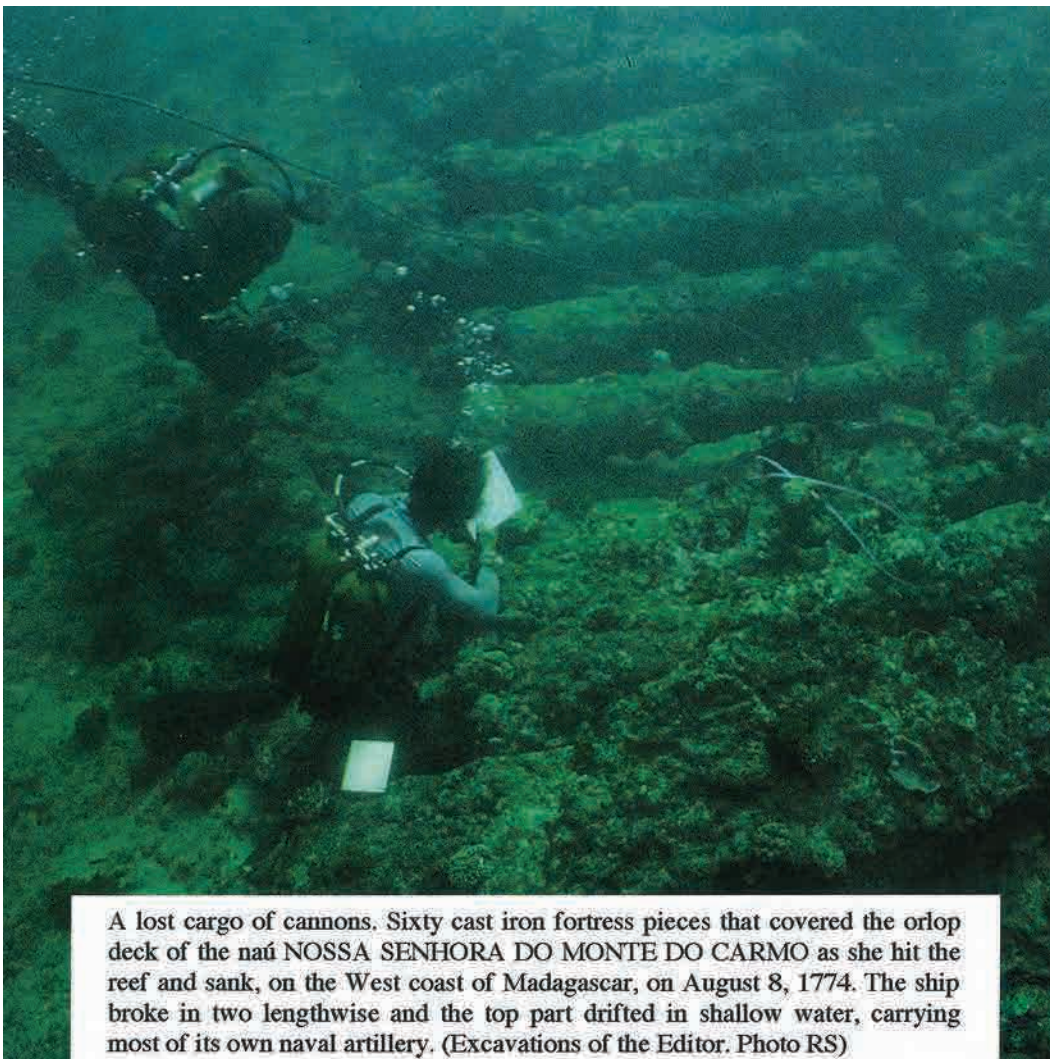
2 - That the iron cannons carried on board any ship can be reformed old pieces used for ballast (although in that case they tend to be carefully arranged head to tail in a row on the orlop deck and/or mixed with the actual stone ballast of the vessel).

3 – That ships can sometimes carry “wrong guns”, unexpected guns captured from enemy ships or guns recovered from some wreck or guns purchased from wreckers or guns purchased from a local foundry at some stop-over, etc.

4 – That pirate ships did carry any artillery piece they could lay their hands on.

5 – That warships in time of penury (and Spanish galleons in particular) often carried such guns as the arsenal could supply at the time of their departure, not the theoretical, mandatory complement: Iron guns for instance in place of scarcer bronze guns or guns of disparate calibres or smaller pieces than per regulation or old pieces that should have been long reformed, etc.

6 – That military transports can be carrying, from the motherland to faraway establishments in Asia or in America, cannons destined to some fortresses or to overseas based squadrons, not in line with the type of ships they are themselves.



A lost cargo of cannons. Sixty cast iron fortress pieces that covered the orlop deck of the nau NOSSA SENHORA DO MONTE DO CARMO as she hit the reef and sank, on the West coast of Madagascar, on August 8, 1774. The ship broke in two lengthwise and the top part drifted in shallow water, carrying most of its own naval artillery. (Excavations of the Editor. Photo RS)

7 – That merchant vessels may be carrying cannons as paying cargo.

And, finally, underwater, guns do not always survive long enough the destructive sea action to still be able to tell their story.



All that remains of the iron guns of the Dutch warship CURAÇAO (Admiralty of Amsterdam, 52 guns, lost in June 1729 on the East coast of the Isle of Unst in Shetland). Only the brass swivel guns (two of which are visible in front of the diver) were found well preserved. (Excavation by the Editor. Photo RS)

The above, however, is but a list of the exceptions that confirm the rule.





Saint-Barbara or "Sainte Barbe", the Patron Saint of all artillerymen on land and at sea. Her patronymic day is on December the 4<sup>th</sup>.

## **PART ONE**

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## FOREWORD BY TEDDY TUCKER

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Mendel L. Peterson was a great, life-long friend. He was a master diver, an intrepid explorer of shipwrecks, a foremost authority on the Spanish Treasure Fleets and on underwater discoveries made in Bermuda, the Mediterranean, Mexico, the Bahamas and other parts of the world. Amongst his many accomplishments, Mendel was a world renowned numismatist, well versed in modern and ancient history and well published. When lecturing, as he did, worldwide, on many subjects, he captivated his audience and brought history alive.

For twenty-five years Mendel was a principal member of the Smithsonian Institution, where he served as Chairman of the Department of Armed Forces History and Curator of the Division of Historic Archaeology. We have the completion of a project begun by Mendel L. Peterson, in 1952 of photographs and catalogues on the methods of marking and decorating early artillery. This book is related directly to the importance of artillery, in identifying shipwreck sites, including iron, as well as bronze artillery from all nations.

To Mendel, all finds were valuable, he was successfully reconstructing history and his attitude towards underwater treasure was that of the historian. He was the founder of marine archaeology, which is the



basic method used today. We taught marine archaeology in Bermuda, during the summers, as an accredited university degree. A cannon identified by me and confirmed by Mendel, sealed the identification of the wreck of the SEA VENTURE, 1609, (discovered by my friend, Edmund W. P. Downing). Sir George Somers ship wrecked to the east of Bermuda and consequently settled Bermuda and became a British colony.

I am deeply indebted to my friend and mentor for the generous use of his extensive library over the years. This book is an outstanding source of information on artillery through the ages and will be of great interest and tremendous value to historians and many generations of explorers.

Robert Sténuit, a friend of many years. Robert, a Belgian citizen, has carried out underwater archaeological excavations on wreck sites around the world, including the first wreck of the Spanish Armada located off the coast of Northern Ireland. Mr. Sténuit is a Director of the “Groupe de Recherche Archéologique Sous-marine Post-médiévale” (GRASP), which studies shipwrecks lost from the 16th to the 19th century.

I had a great deal of pleasure contacting Robert and enquiring if he would complete this important project, of a mutual friend. Thank you, Robert for your diligence in completing this valuable and monumental project.

Edward B. “Teddy” Tucker, MBE  
2013

## A WORD FROM THE EDITOR

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I was enormously interested the first time my old friend, Teddy Tucker mentioned to me the existence of the Mendel L. Peterson archives. Edward B. "Teddy" Tucker, at the time, was arranging with the family the details of the removal to Bermuda of the massive collection of note-books, of manuscripts, of articles and of prepared but yet unpublished scientific papers, of drafted books and finished books, of complete photocopies of rare treaties on ancient artillery, of centenarian museum catalogues, etc. that "Pete" had accumulated during most of his long life and illustrated with thousands and thousands of photographs of cannons, mortars and artillery related militaria.

I knew that "the American father of underwater archaeology", as Mendel Peterson, was called in the media in the early days, had spent a large part of his diving career studying, among many others, the wrecks of some of the countless ships that had been lost over the centuries on the reefs of Bermuda. And I knew that Teddy Tucker, who knows these treacherous reefs like the palm of his hand, had found most of them and had excavated many, often in the company of Pete.

I myself had had the privilege to meet Pete on a number of occasions, usually on board SEA DIVER, the remarkable deep sea exploration and excavations vessel of the late Ed Link (I was, at the time, his Chief Diver), and later in the company of common friends and divers, as well as at a series of underwater archaeology conventions and diving congresses in Europe or in the U.S. and on other social occasions.

But I was left speechless, on my next visit to King's Point House, Mangrove Bay, Bermuda, the beautiful home (with private dock) of Teddy and Edna, when they took me to the drawing room. It was more than half filled by now, up to the ceiling, by filing cabinets and by a mountain of big cardboard boxes all bulging with books and folders, with photographs, albums with negatives and with papers and papers and papers. I glanced at some of the contents of the three boxes that had been opened by Teddy and I understood at once that I was looking at a potential gold mine of information on a subject that had been the life-long passion of Mendel Peterson and the passion of a good slice of my own life.

What Pete had done was to actually put together an unprecedented illustrated thesaurus of specialized in-

formation on ancient artillery. What I was looking at was a mass of knowledge that had never been made available elsewhere in any one location or in organized grouped form.

So, I was overjoyed when Teddy asked me, in the name of BUEI (Bermuda Underwater Exploration Institute, which he had been a founding member many years earlier), if I would consider editing and preparing for publication the whole of Mendel Peterson's archive. I did not hesitate one second before answering that question.

## THE LIFE AND TIMES OF MENDEL L. PETERSON

### A Short Biography

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A bitter cold January morning. The Arlington National Cemetery is covered in snow and I am standing, deep in thought, at the tomb of a great American, a Hemingwayan character, a friend long lost.

Mendel Lazear Peterson – the name was engraved in black on the white marble tombstone in front of me – had not only been a friend and a guide (and I have had and have very few of either), he was someone I had many reasons to admire and, looking at the ground that has received his bones, my thoughts were playing with memories of his out-of-the-ordinary personality and mingling with the scientific legacy of the inventor of American underwater historic archaeology. For so they called at the time the pursuit to which he dedicated his whole adult life, a pursuit, by the way, which, on another continent, is mine also.

A great American, yes. But what makes a great American? I am not sure. What I know is that this particular one, this late friend of mine was – and I put first things first – full of humor, gifted with common sense and as a consequence resolutely unconventional, straightforward, extremely intelligent, clever and quick-witted, occasionally wild, brave when necessary, brilliant in conversation and in correspondence, captivating as a lecturer, imaginative and inventive in the field (which in his case meant on the sea bottom) and infrequently, they say, volcanic.

“Mendel” and “Lazear” are two uncommon given names. Both in fact are in line with the family history and the family spirit. Mendel Lazear Peterson’s father, Dr. Hans Jordan Peterson (1887-1942 and same name as his own father) was a college professor of psychology and, generally speaking, a man of a scientific mind. He named his son, “our” MLP, after Johann Mendel, the Austrian monk (Gregor in religion), the famous botanist and geneticist, and after Jessie William Lazear, an accomplished physician who died at age 34 from Yellow Fever, the very disease on which he was then doing advanced experimental research. In his turn, “our” Mendel gave the same Christian names to his son (after which the genealogist becomes faced with a MLP Sr. and a MLP Jr.). MLP was justifiably proud of his Danish ancestry, which could be traced all the way to a Mads Hansen, born about 1741 in Denmark. Mendel L. Peterson Jr. has traced the details of his own lineage, generation after generation, up to a Hans Pederson (born 1807) whose name was anglicized to Peterson when he immigrated to Utah. He was the great grand-father of “our” MLP. As for the maternal side, his mother was Fanny Eilene Lish, a ranch girl, born 1895 in Mc Cammon, Bannock, Idaho. The Lish family (anglicized from Loesch) immigrated from Germany on or before 1721. The family has been traced to a Jacob Loesch born about 1613 in Trebure, Palatinate, Germany, and it is a William Seely Lish (born 1824) who was the historic Mormon pioneer who traveled across the plains by wagon and entered the Salt Lake Valley in 1850 (there to found the present branch of the family).

Both of MLP’s parents – his daughter LaNelle confirms – were descendants of founding pioneers of the American West. On his mother’s side of the family, he was a descendant of George Soule, who arrived in Plymouth, Massachusetts, on the MAYFLOWER in 1620.

Mendel Peterson Sr. (Pete) was born in Moore, Butte County, Idaho, on March 8, 1918 and grew up in Athens and Columbus, Ohio, where he attended the public schools and later, in Hattisburg, Mississippi (from age 14 years to 19 years). In 1938 he graduated with honors from the Mississippi Southern College, receiving a Bachelor of Science Degree.

At college, Pete had met the very attractive LaNelle Walker of Brookhaven, Mississippi. It was presumably love at first sight for the two youngsters, who were soon married (July 5, 1938, in Purvis, Mississippi). He was 20.



He soon registered in the Vanderbilt University (of Nashville, Tennessee) to study History.

Pete had left his young pregnant wife at the home of her parents, in Brookhaven, while he worked on his Master's Degree. In May 1939, he had to ask permission to go home for the birth of his first child due on May 9, who indeed was born LaNelle Hampton Peterson that very day.

In the same year (1939) he obtained his Masters of Arts Degree in History.

Once graduated, he started looking for a job. The story, as told by his son in later years, was that:

*"... It was difficult, after but still within the pall of the Great Depression and Recession of 1937. The only job he could find was a Civilian Conservation Corps (or CCC) opening. He was fortunate in fact to even get an interview, which was based on family connections. The interviewer told him that there were 2000 job applications for the job. Intelligent and motivated as he no doubt was seen during the interview, his education and family standing raised questions about working in a down-to-earth job with poor people in a rural, agricultural setting. To resolve any concerns (so the story continues as told by MLP Sr. to his son, MLP Jr.), the interviewer handed to the applicant a piece of paper and asked him to get him a drink of water. Without hesitation, Dad left the office, folded a sheet of notebook paper into a simple paper cup and quickly brought back a cup of water. The interviewer said he was the first and only person to pass this simple test. Dad got the job... Dad told stories about his work from 1939 to 1942 with the CCC. He taught the country boys how to build pig pens in such a way that both pigs and pens were easily cleaned and the stock managed. (Pigs, we learn here, are not filthy creatures, only treated that way.) He also taught how to build outhouses and to protect them from black widow spiders. It was a long way from a Masters degree..."*

And MLP Jr. concludes: *"The story revealed a lot about Dad's willingness to get down and do whatever was needed, his creativity and his joy of working."*

In the years he was working for the CCC, the whole family lived in the country near Natchitoches, Louisiana (pronounce Nakadish, MLP Jr. recommends) about 250 miles north of New Orleans, in what Pete called "the swamp" and where they occupied a little Victorian house painted pink, blue and white, appropriately nicknamed "The Birthday Cake". It was so small, LaNelle used to say, "that we could heat the house with the *New Orleans Picayune*".

But building pig pens and keeping away black widow spiders from rural conveniences left him enough free time to develop and perfect his knowledge of the domains that truly interested him.

His passion at the time, the earliest one, contracted in childhood and nurtured until his last days, was numismatics, an auxiliary science to history. So of course is archaeology, his future passion number 2.

He had begun collecting ancient coins at the age of 12 years.

*"In so doing, he learned ancient history and foreign languages setting him on the path to a lifetime of independent study. His first adventures were of his own mind. He traveled to distant lands imagining the people in their daily lives. He envisioned the hand manufacturing of exquisite armor and artillery. He could see warriors setting out to gather riches and conquer more lands for their emperor. He would dream of the architecture and building of ancient cities, and wonder about the craft of producing the ancient coins he so loved".* (LaNelle Spence)

His passion developed over the years and he actually made his Masters Thesis in History at Vanderbilt on "The value to History of the study of coinage" (or words to that effect). He became a respected member of several leading numismatists clubs and associations and gathered finally such a renown collection (classic antiquity and "wreck coins" of the Americas principally) that, later on, a quotation at an auction "*This coin*

*is pedigreed to the collection of Mendel Peterson*”, would always send the price way over the going rate.

His second passion was for the colonial history of the Americas. The case was to become definitely incurable following a complication, rare at the time that he was to catch in his early thirties: an addiction to underwater archaeology. It was that condition that would lead him to devoting the better half of his lifetime to the systematic study, all through Europe and the Americas, of “wrecks artifacts” and above all to the best informed and most talkative of them all, the ancient naval gun. But we anticipate here...

Pete may have been somewhat isolated in “the swamps” but he always saw to it that the postman would bring him twice a week books, manuals, specialized magazines and scientific journals. That, plus his coins collection, soon absorbed a significant part of the family’s budget, his wife noticed. Then came “Little Pete”, Mendel Lazear Peterson Jr., born in May of 1941 (back to Mississippi for his birth).

In the fall of the same year 1941, Pete’s daughter recalls, *“the family moved from Natchitoches, Louisiana, to Ft. Worth, Texas where Pete took a position as a young executive at Montgomery Ward, a large department and catalog store. Upon returning home from his first day at work he discovered that his well-meaning wife had sent all his suits to the Salvation Army, claiming: ‘An executive should be properly dressed, wearing fine, new clothes’. Pete lasted only a short time in the job at Montgomery Ward, finding it unchallenging and boring. And further, he felt guilty for not serving his country...”*

In 1943, Pete enlists in the Navy and is sent to the Harvard Business School to prepare for service as paymaster. He completes a nine month finance course in six months, then asks for sea duty and for the whole of WWII he will serve in the Salomon Islands, the Marshall Islands, the Caroline Islands and the Philippines. He is a Lieutenant whose official duties are as chief supply officer and paymaster aboard the SS TUTUILA, which serves the Pacific Fleet as a kind of floating advanced base.

All over the war, his wife will write to him via the Red Cross and send photographic depiction of her life in the US , especially the pictures of Little Pete and young LaNelle that she took of them, all dressed up, every Sunday. As of this day, these photographs are kept in a “quality hand tooled and laced photo album”, which he made himself over several week-ends in later years. On board ship during WWII Pete had learned to use advanced specialty tools and had become a fine craftsman. He always enjoyed working with his hands as much as with his ever active brain.

1945, the war is over. Lt. Peterson returns unscathed to the US and is reunited with his family. At his request, he is then allowed to attend the US Naval Academy Graduate School at Lowell Technological Institute, in Lowell, Massachusetts, to where the whole family moves. In 1947, after receiving a Degree in Textile Engineering, he is assigned for duty at the Navy Uniform Board in Washington DC.

In Washington, the first step on the Sunday sight-seeing program of the family – as he will have good reasons to forever remember – is for the Smithsonian Institution (SI). One of the exhibits, he notices and stores in his sharp photographic memory, is a display of Civil War hats, part of an ancient uniforms exhibit. At his Navy desk, a few weeks later, Lt. Peterson hears that the Navy is planning to re-institute its full dress uniform, complete with the traditional fore-and-aft hat. *“Junior officer cringed and senior officers were just resigned”* he recalls and also that *“an officer who owned one of the long stiff hats had to carry it about in a special tin box.”*



Lieutenant Peterson in 1943, as he was serving in the waters of the Pacific as Pay-Master on board of the Supply and Repair Ship, *TITUILA*.

At that moment, Lt. Peterson remembered that military hat he had seen at the Smithsonian. Unlike the pre-WWII Navy fore-and-aft, the antique hat, in use during the Civil War, could be folded flat. So flat it could be packed in an ordinary suitcase. The practical advantages were obvious. “So,” Pete keeps telling the story, *“I told my Commander I could design a folding fore-and-aft. Then I saw the Curator at the Smithsonian for taking the hat out of the civil war collection to examine it. It is during that conversation that I learned that two Curators were planning to retire from the Smithsonian...”*

Pete jumped on the occasion. *“The museum profession is quite peculiar”* he later explained *“there is no such thing as a four year course in museum curating”*. So, he hastily totted up his qualifications for a museum post on a SI’s application blank, including his two Degrees in History, his impressive collection of ancient and modern coins, and the titles of some articles he had written. Having sent his application form, he went on to design a folding fore-and-aft hat for the Navy which was never used for the hat project was “sensibly dropped”.

His next job for the Bureau of Supplies and Accounts in the US Navy Department includes designing foul weather gear and safe clothing for the submarine crew members when navigating on the surface in cold climates. For instance, as soon as the submarine had emerged, the gunners needed to quickly dress and immediately man the cannon mounted on the wet, freezing deck.

Pete's greatest yet adventure is about to start (December 1947 to February 1948). Let us him tell us about it, just as he did in an article for the bimonthly *Rocks and Minerals* (of March-April 1952), under the title "Rock Collecting in the Antarctic":

*"... I was happily plugging away at my work in the BSA when my superior called me and informed me that I had been given a rare assignment: Staff Supply Officer with an expedition to the South Polar Area... I was to travel almost 30,000 miles through all the climatic zones known to man, and was to be given the privilege of testing cold weather clothing until I turned blue. We set sail from San Diego for Samoa on the 20<sup>th</sup> of November 1947... on the Navy icebreaker BURTON ISLAND<sup>1</sup>... Her hull was a round as a barrel and she began to roll and continued to do so until we tied up in Tutuila, Samoa, in rendez-vous with the other icebreaker which was to go with us. After refueling and taking on last minute supplies, we shoved off for Scott Island. As we approached the Roaring Forties, we rolled 20 degrees, as we entered the Forties, we rolled 30 degrees, and before we left them, we were continuing rolling 35 to 45 degrees and, for a record, listed to 51 degrees...*

*On December 14, we sighted our first iceberg at 60° S. we entered the icepack the next day and by the 16 of December, were stuck in the heavy ice, still many miles from Scott Island".*

Pete then tells in detail of their navigation in the icepack and towards Haswell Island, of his conversations ("they talked to us in raucous squawks") with the penguins and of his prospective on some yet unexplored little islands not covered in snow. Where, under the guidance of the chief geologist of the expedition, Dr. Apfel, he began to gather a new, personal collection: Samples of rocks (400 kilos of them actually, which he stored under his bunk).

Pete says little about the main official missions of Operation Windmill, which consisted in exploring, surveying and photographing some yet unmapped islands, establishing astronomical control stations, delivering – if need be – any research vessel icebound in the pack – one had to be so rescued – or escorting supply vessels to a permanent British base on land. An accessory mission finally was to bring back seals and emperor penguins for the Washington zoo. (The penguins lived a long peaceful life at the zoo but the seals all died of seasickness on board.) But Pete rather concentrates on the geological prospection.

From the story he wrote, one would conclude that Pete has become overnight an expert geologist. And, with his known facility to learn and memorize, he probably did. (Dr. Apfel, he later said, "taught me enough, I was able to lecture on it coming back. People thought I was the graduate of a University." Still, the treasure hunter in him already pierces under the varnish of the scientific specimen's collector: The day he missed a sample collecting expedition on a particularly promising island, he wrote:

*"I had suffered acutely with visions of them shoveling up garnets by the bushel, so it was rather a relief to find that nothing in the way of gems existed there...*

*The 20<sup>th</sup> of January 1948, we set sail for the Ross Sea area and McMurdo Sound, on which is located Mt Erebus, the best known active volcano in the Antarctic... In the Ross Sea we encountered head winds ranging up to 30 miles per hour and the lower parts of the ship were soon encased in an ice mantle festooned with lace-like edges of icicles. These were the perfect conditions under which to test some of the gear I had brought for experimental purposes. Soon, one of my storekeepers and I were encased in outlandish garments and were standing on the fore peak of the ship, exposed to the wind and chilling water. Before long we were cool, some time later cold, and a little after that practically frozen. That was when the experiment ended*

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1 Launched the previous year, 6,600 Tons and capable of breaking 3 feet of pack ice at 10 knots. The EDISTO was her companion icebreaker during this operation, the US Navy "Second Antarctic Development Project". It was later referred to as "Operation Windmill", on account of the extensive use of helicopters made by the group.

*and we hurried below to thaw out”.*<sup>2</sup>

And a few days later:

*“I shall never forget the scenes of utter grandeur, which met our eyes in Murdo Sound... or the majestic bulk of Mt Erebus first summit, some 13 thousand feet above us, or the snow covered mountains... or the gigantic triangular fins of the killer whales that appeared from the water as they emerged and sank back.”*

Pete doesn't miss any occasion to accompany shore parties formed by Dr. Apfel to collect geological specimens. As he is writing for specialists, he enters into minute details about local geology. On one occasion he mentioned he found, on an unexplored island, a very large petrified tree *“probably the first evidence of the continent having been temperate in geological history. I showed it to Dr. Apfel and he almost fainted”*.

Early in February they reach Peter I Island. Then to Marguerite Bay and Stonington Island where their troop met members of a permanent British post.

*“Stonington Island was a rock hound's dream. Here was an ice free beach consisting of glacial drift material of infinite variety and form. Glaciers had for eons scooped up rock from the surrounding lands and deposited it on the little island, broken into sizes convenient for collecting. Further action of moisture in the rocks had split them up into perfect cabinet specimens...”*

It is on board the icebreaker USS BURTON ISLAND that he received by radio the news that he had been hired for the position of “Acting Head Curator of History, Smithsonian Institution”.

He was 30, he was a historian, he was acquiring maritime experience, he always had had an inquisitive mind and an adventurous spirit, and his deeper interest, it so happened, was now concentrating more and more on a specific subject: The maritime and cultural history of the Americas in the colonial period.

He only had to put the ingredients together and he would start on the road that would eventually lead him to becoming – as he would affectionately be called in later years – “the father of New World underwater archaeology”.

Such, I imagine, could have been his thoughts as the cruise of USS BURTON ISLAND proceeded. They were now exploring a rocky island lying south of Adelaide Island, a place Pete seems to have particularly enjoyed:

*“Here also was the home of hundreds of penguins and cormorants... That night, at 8.30 p.m... the sun was shining very brightly over the ice field ... Off to our stern lay the cold mountainous wastes of Adelaide Island and far off to port, the ranges of the Palmer Peninsula, lay in a tumbled white mass along the horizon. It was a scene which few have been fortunate enough to see and which we shall never forget...”*

Months had succeeded to months and the little icebreaker was now on her way back to the north “... We encountered rough weather again in the Forties and for a week we rolled between 35 and 45 degrees... after which the smooth, blue waters of the Humboldt current were a welcome sight. About the 7 of March we stopped at some small rocks lying far off the coast of South America for a try at some fishing. Our luck was excellent and several “whoppers” were taken. We proceeded northward and on the 12<sup>th</sup> of March entered Callao, the port of Lima, Peru. Here we enjoyed the hospitality of a friendly people for five most interesting days. The shops of Lima, loaded with native silver and leather work were a constant source of pleasure. The wines and food were

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2 In a more serious moment, later, he told his son that he redesigned the suit based on the experience of the trip and that in the end “the US N got their moneys worth”.





Mendel Peterson in the Antarctic, preparing to test some of the foul weather equipment, he had personally developed. (The color of Ektachrome color slides and prints are known to fade and to turn purple, as this document has.)

Photo MLP.



The ice mantle, which formed on the fore deck of the icebreaker, BURTON ISLAND when spray carried by headwinds froze on the ship. It is in such occasions that Mendel Peterson tested the foul weather gear he had himself developed, the previous year in Washington.



another. With Champagne selling for the equivalent of 85 cents a bottle in the best hotels, who couldn't have fun?

*After five days of shore leave, we shoved off for Panama... Four days later we entered the Canal and the 17<sup>th</sup> of March, tied up in the dock of Norfolk, Virginia. The reunions with our families were indeed a joyful one. We had been gone over five months.*

*Now, in my collection of Antarctic rocks, I have many nice specimens which represent the geological structure of one of the most remote areas of the world. I shall treasure these mementos which will always be the reminders of one of the most interesting adventures of my life."*

Pete always remained a nostalgic of Antarctica. He visited the continent again in 1963 "as a distinguished guest", at McMurdo Sound, the multinational research center and flew over the South Pole. To his last days he took great pleasure in evoking his Antarctic souvenirs for his family.<sup>3</sup>

But surely, we do not want to leave the Antarctica latitude before demonstrating that a sense of humor is a genetic trait. For it is MLP Jr. who has piously kept for posterity (even if some non-believers may nourish suspicions of some added filial fabrication) the following Antarctic anecdotes:

*"The crew called Peterson 'Seagull', which he appreciated as it connoted 'soaring, ocean-faring and independent', all in his opinion appropriate for a Naval Officer. However when he learned the nickname was because of his constant 'eating, squawking and crapping', he simply said: 'I don't give a coprolite!' which was not understood by anyone but Dr. Apfel.*

*Peterson created a suit for foul weather with an attached white, goose feather boa. It was seen as very festive and greatly admired by the crew. However, the officers didn't like it. He said in defense: 'This is foul weather gear'.*

*Peterson constantly tried to relieve the tension of the voyage. However, it was not appreciated when he ran around the crew quarters at 2 a.m., carrying an electric drill yelling 'This is a drill, this is a drill'."*

Under the subtitle "Prolific", the next anecdote reads:

*"Peterson claimed to get Father's Day cards from all over the world."*

As for other examples of the Peterson family's hereditary humor – such as for example the Peterson designed cold weather pajamas complete with a "lavender, foam rubber codpiece effective in preventing frostbite to the lower pelvic appendage" which was considered very desirable by the crew – perhaps it should be best to leave them outside of the present publication.

And as a last, more serious footnote, it is as a result of this US Navy mission, Operation Windmill, that "Peterson island" was officially named after him, "in recognition of his efforts" by the US Advisory Committee on Antarctic names. It is a rocky island two miles long, one of the Windmill Islands (which are west of the Browning Peninsula). Its position is reportedly 66°28'S – 110°30'E.

As soon as he is ashore and on leave, Pete visits his future employers at the Smithsonian to reconfirm his application, to arrange administrative matters and sign in.

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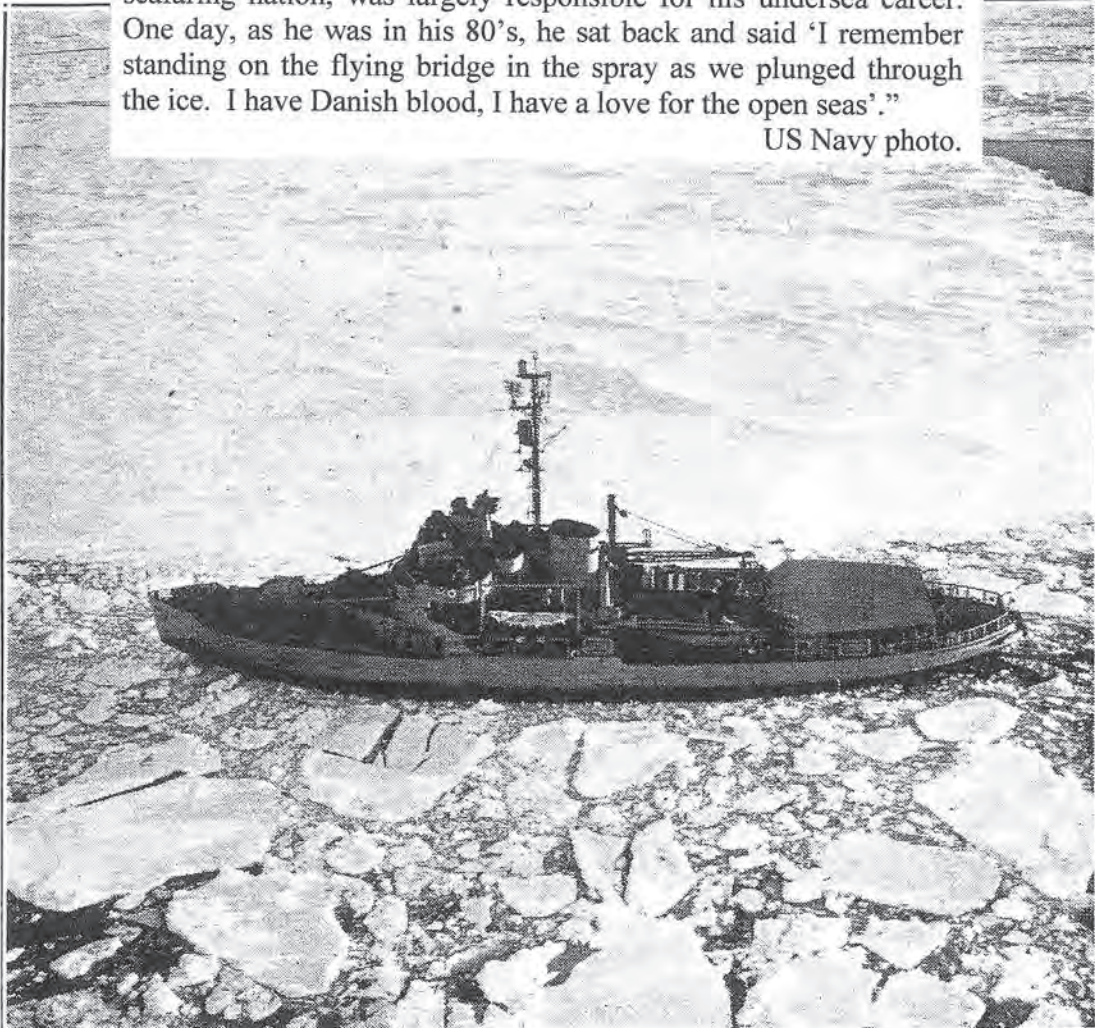
<sup>3</sup> Pete's first wife, LaNelle W. Peterson, a biologist for the Smithsonian, later made two trips to Antarctica. In 1965, on the RV ELTANIN, she identified and preserved for the SI the benthic creatures that the vessel was collecting in its deep ocean trawls. The second trip, in 1970, was a pioneering eco-touristic cruise to, namely, Palmer Station, on the Antarctic mainland on board the famous LINDBLAD EXPLORER.



The bow of the ice-breaker BURTON ISLAND, as she fights her way through heavy seas in the Roaring Forties.

In the words of MLP Jr: "My father was very proud of his ancestry. He thought that his Danish blood, Denmark being a seafaring nation, was largely responsible for his undersea career. One day, as he was in his 80's, he sat back and said 'I remember standing on the flying bridge in the spray as we plunged through the ice. I have Danish blood, I have a love for the open seas'."

US Navy photo.



The USS BURTON ISLAND, moored to the solid bay ice in the Bay of Whales. Loose pack ice in the foreground.

US Navy photo.



Before his leave is over, he resigns from the Navy (but remains in the Naval Reserve where he will reach the grade of Commander).

Here, for the non-American reader, an introduction to the most venerable Smithsonian Institution (SI) of Washington DC may not be superfluous.

It was founded in 1846. It is, in their own words, “*an independent establishment devoted to basic research, care and documentation of collections, public education and national service in the domains of History, the Arts and Science*”. Its work is conducted in the United States and in many foreign countries. It is the world’s largest museum complex, attracting – at the time Pete applied for a position – more than twenty million visitors yearly to its museums, its galleries and its zoological park, on top of the additional millions who crowd to view its traveling exhibition appearing across the United States and abroad and its annual folk-life festival. As custodian of the national collections it possessed – at the time – more than seventy million natural history specimens, artifacts and art objects, only a few percents of which were on public display. The rest was and is available for scholarly study by the staff of the Institution and by many hundreds of visiting students, scientists and historians every year. A wide range of programs and grant-supported activities are conducted with other museums and similar institutions, with colleges and universities and with Federal, State and foreign government agencies. Active education programs are conducted from the elementary to the senior post-doctoral levels. Major museum buildings, laboratories, collections, spaces and wild-life preserves provide facilities for such purposes. Basic scientific and historical research is the foundation of the institution’s accomplishments and potential in its principal area of output: The preparation and dissemination of scholarly research works and educational exhibits. Studies of man in his natural environment, his cultural and technical progress and his history in general are given high priority.

The position which Pete had applied for, was with the Department of Armed Forces History.

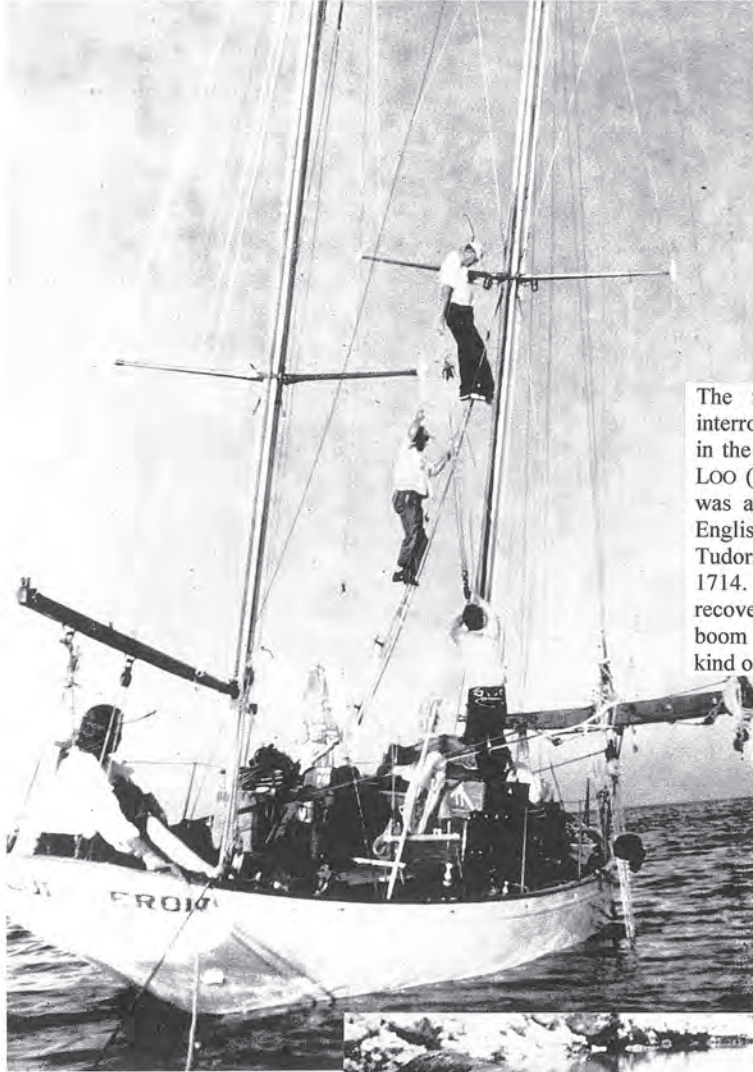
So, in 1948, Pete joins the SI, as Acting Head Curator of History. His daughter LaNelle remembers that “*when he called his mother to tell her he had landed a job at the Smithsonian Institution, she replied ‘Why, Mendel, I always thought you would end up in an institution!’*”.

There begins a 25 years long career, which will make him Curator of the Division of Military and Naval History (1948-1957), Head Curator of the Department of History (1951-1957), Head Curator and Chairman of the Department of Armed Forces History (1957-1969) and, finally, until his retirement from the Institution, Curator of the Division of Underwater Historic Archaeology (1969-1973). (That division became extinct on his retirement in 1973.)

The field studies of the Smithsonian in “Underwater Historic Archaeology”, as this new, somewhat suspicious discipline – which he has so largely contributed to invent – was then officially called, begin in 1951 on Pete’s insisting initiative. At first, in fact, he goes and works on his underwater surveys and excavations on his own time, during his summer vacations, even if the work is carried out under the auspices of the Division of Military and Naval History. In 1969, a Division of Historic Archaeology will be officially established and it is in the framework of this new division that most of his further surveys and excavations of shipwrecks in the Florida Straits, the Bahamas, Bermuda, the West Indies and the Caribbean, in general, will be undertaken.

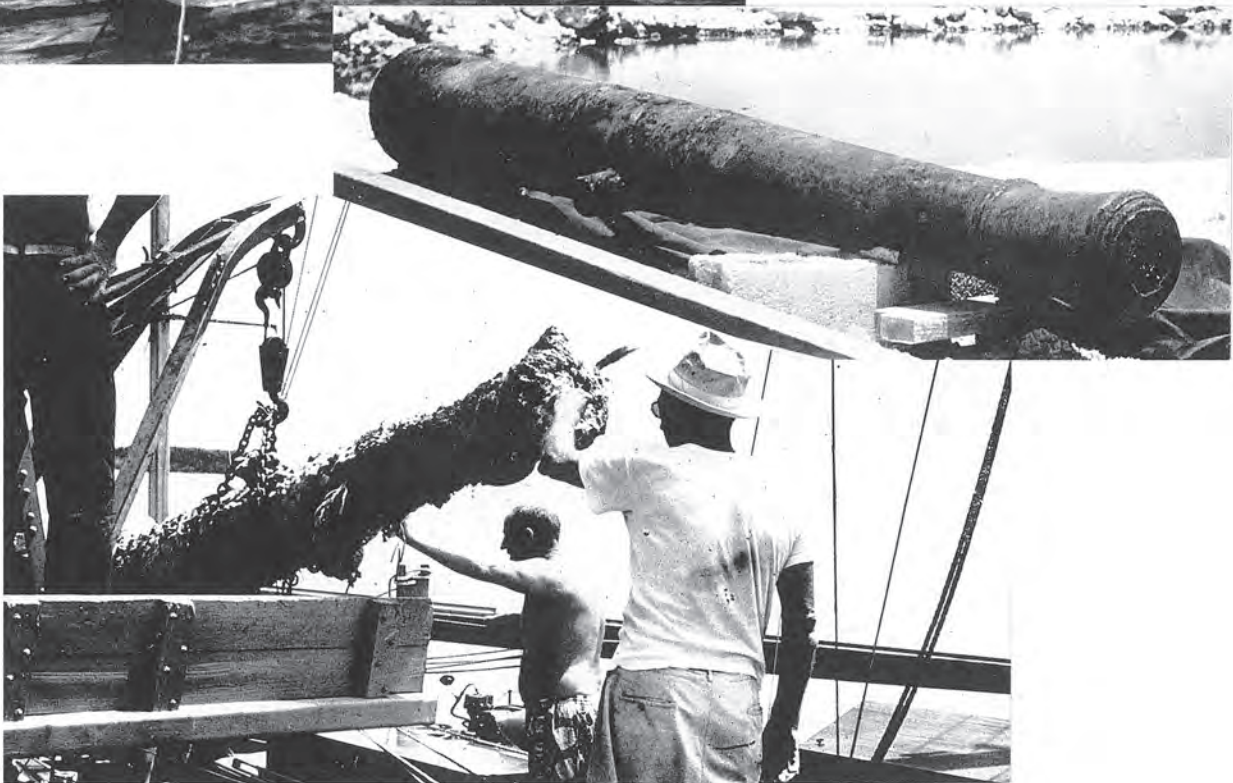
His first ever underwater survey takes place in the spring of 1951, when he joins the Looe Key expedition with Ed Link (on his racing yacht, the BLUE HERON) and others.

Two men were to play a major role in the underwater career of Pete, which means, in his life: They are Edwin A. Link, “Ed”, whom we first meet here, and Edward B. Tucker, “Teddy”, whom we shall meet often in the forthcoming pages. The reverse is equally true. In fact, these three, were people who could not, NOT



The first cannon recovered from a wreck “for interrogation” by Mendel Peterson and his associates, in the spring of 1951, came from the wreck of HMS LOO (lost in 1744 on the eponymous Looe Key). It was a long cast iron 6-pounder bearing the telltale English crowned rose employed as an insigne by the Tudors and Stuarts until the death of Queen Ann, in 1714. Perfectly calm weather allowed Ed Link to recover the 1 tonne piece with the help of the main boom of his sailing yacht, the BLUE HERON (not the kind of salvage boat recommended).

Photographs : Dr G. Crile, Jr.



have met each other and, consequently, explore together, dive, search, survey, excavate, study, publish and become very close friends. For meeting “Pete” also changed the life of Ed and Teddy as they began to look more and more at the wrecks they were diving and working on and at their contents in a new, different way. Under the learned but wisely reasonable guidance of Pete, Ed and Teddy were to be among the first treasure hunters to emerge as marine archaeologists.

Edwin A. Link (1904-1981), who couldn't stop working one minute and always said he “*never worked one day in his life*”, was a remarkable man. Everything he ever did was motivated by his unending enthusiasm which, over the years, took him in several quite different directions, but always with the same energy. As a young man, in the mid-1920s, he had taken up flying. As his loving wife Marion was to write much later (in her excellent book *Sea Diver*, New York, 1958):

*“Those were the days when there were few flying schools; equipment was elementary, and so was the type of instruction it was possible to receive from the barn-storming pilots who eked out a precarious livelihood from the grass airstrips scattered here and there about the country.*

*By the time Ed had learned to fly, he was well aware of the need for a better system of instruction. He designed and built the first Link trainer, a simple creation intended to give the student pilot familiarity with handling the controls of a plane before he left the ground. Throughout the years of the depression Ed made a meager living by using this device as the center of a unique flying school which he established.*

*It took years before his invention at last caught hold and was adopted by the Army Air Force. Today the Link trainer is world famous, its complicated electronic successors simulating the very latest developments in modern aircrafts instrumentation.*

*Along with Ed's interest in flight training came a lively interest in developing new and better methods of air navigation, new types of aviation instruments and equipment... During World War II his small company mushroomed until he found himself at the head of a booming enterprise which played an important role in the success of the whole Allied air effort.”*

The carefully patented Link trainer also brought a fortune to its inventor and the consubstantial freedom. (This editor has to say here that he has not very often met a very rich man who made so very wise a use of his wealth as did Ed Link, his first patron.)

The Looe Key wreck diving expedition off Florida in 1951 was Pete's first. That is certain. But the very beginnings of his underwater career and his schooling, or lack of it, in the art and techniques of diving are a matter of conjecture.

The following has been stated in an obituary published in the *Institute of Nautical Archaeology Quarterly* some weeks after his death:

*“During the war he had laid the ground work for his future career by diving on wrecks in the Pacific Theatre. Those initial dives with old Navy equipment led him to apply for his first position with the Smithsonian...”*  
No source for the above, or reference, is quoted and the obituary is unsigned.

The *Washington Post* staff writer Bart Barnes had written earlier, in his MLP obituary: “*During WWII he served in the Solomon, Marshall, Caroline and Philippines Islands in the Pacific. It was there that Dr. Peterson made his first sea dive, using old Navy gear, and his first look at the underwater world triggered a lifelong interest*”.



MLP Jr., in still another, family written and approved obituary, wrote:

*“Mr. Peterson had a special interest in the field of Underwater Archaeology. During World War II, he made his first dive in the Florida group of the Salomon Islands, using some old Navy gear for his first look at the underwater world, a view that gripped his imagination for the rest of his life...”*

I myself do not remember Pete mentioning anything of the sort and such statements seem to be at odds with what he himself has written about this, his first underwater survey off the Florida Keys in 1951. For, later, in 1974, he wrote in retrospect: *“There in Marathon I spent a day in a shallow swimming pool, learning to use a diving mask and to breathe compressed air pumped from the surface. It seemed easy enough. But on the wreck-site, when I jumped in – cotton ware clothes and all – I learnt that the open sea is not like a swimming pool. I felt very insecure in that limitless, liquid world, and had to make a sustained mental effort for two years before I overcame my fear and became a competent diver.”* On the same subject, he also wrote, referring now to the summers of 1953 and 1954 when he was working again in the Central Florida Keys with Ed Link: *“I had improved my diving by training with Scuba in the Navy’s Experimental Diving Unit tanks in Washington; now I could work as well in water as I could on land. I still prefer the mask and hose for hard work in shallow water. Without the bother of coming up for a new tank of air, I can work three hours stretches...”* Strangely, in the above statements he makes no reference to any previous diving experience, even with a complete different type of gear. Had he felt safer with the protection of a copper hat and a thick rubberized canvass suit – if that was indeed the gear he used? – And did he feel more vulnerable when skin diving? As a diver, I doubt it and if his daughter LaNelle remembers well that:

*“He was training with scuba in the Navy’s Experimental Diving Unit Tanks. He trained after his work day at the museum”,* she also writes: *“He never mentioned to me any experience using the old copper helmet and the canvas and rubberized suit”*. On the same subject she also quoted her father more lightly: *“The joke he always made about diving gear is he wished he had a barbed wire jock strap to protect the ‘family jewels’”*

In any case, underwater archaeologists do not need to be great divers since, with few exceptions; the wrecks they are working on are shallow wrecks lost on a reef or at the foot of the rocks and their precise, methodical type of work is stationary and does not require great diving expertise or athletic capacities.

Back, to the story of Pete’s first expedition, the genesis of which is that in 1950, an amateur diver from Marathon, Florida, Bill Thompson, in company with his friend, Dr. George Crile Jr., of Cleveland, had discovered the wrecks of no less than three ancient ships lying on Looe Key and Delta Reef, a couple of miles off the east coast of the Florida Keys. Bill Thompson was an old yachting acquaintance of Ed Link and, the following year, the three men (together with their spouses) were diving on site. The then acting Head of the Department of History at the Smithsonian had joined the expedition as a part of his summer vacations, a consequence of his having been requested earlier to identify some of the artifacts recovered. In early 1951 indeed, in his Washington office, he had been asked by a Mrs. Jane Crile from Cleveland, the wife of a Dr. Crile, to please identify and kindly date a number of artifacts just recovered from several shipwreck sites. He had recognized the artifacts and, as a result, he was immediately invited to join the next expedition on the site. Pete accepted the invitation with delight and it was, as he later wrote, *“that trip which would mark the beginnings of archaeological work in North American waters and the beginning of my career in that field”*.

In the spring, he joined the Criles and friends of them in Marathon, about half way down the Keys, where he was to meet Bill Thompson, the discoverer of one of the wrecks, “Art” McKee (Arthur McKee, a professional diver and owner of the Museum of Sunken Treasures in Plantation Key, Florida) and Edwin A. Link on his racing yawl the BLUE HERON.

Bill Thompson owned and managed a marina. Art McKee, nicknamed “the grandfather of treasure hunt-



ing”, had found his first sunken treasure in 1937 and had since visited about three hundred wreck-sites in the Florida Keys, the Caribbean and the Bahamas. He had eventually filled his “Florida Sunken Treasure Museum”, the first of its kind, with all the cannons, the pots and pans, the gold bars and the silver coins and jewels he had collected over the years. Pete later wrote of him: “*Art became my first underwater teacher... I came to respect his practical knowledge of diving and recovery techniques*”. He also wrote that it is Art’s success in finding treasure and the nation wide publicity it received that was to spark, in following years, the rush of searches by divers in Florida.

So, Pete’s first professional job in the field consisted at first in trying and identifying more of the material brought up the previous year: coral encrusted cannon balls, a battered pewter cup and tankard, worn and corroded coins, metal buttons, brass basins and cooking utensils, as well as yellowed and flaking ivory tusks. Underwater, he brought order and method in the survey work and in the excavations procedures (or lack of them) of his well meaning but overenthusiastic and excited team members.

Understandably, when he set off from the Smithsonian Institution to dive on his first undersea wreck, his chief (for whom he always had a great affection) had said to him sternly: “*Peterson, we don’t want this to be a lark*”.

It was not. His first undersea expedition was no joke and neither were any of the following ones. It was hard work and consequently satisfying work, thanks to which, as he would write many years later, he “*became intimate with his country’s past, not merely in terms of events but of human lives*”.

The ill-assorted salvage flotilla included a chartered, sturdy LCT, a sport-fishing cabin cruiser and Ed’s sleek and graceful sloop, the BLUE HERON. BLUE HERON, a delicate sailing ship, had never been meant to raise large, coral encrusted cannons from the bottom of the sea and to bring them to shore alongside its spotless hull. Still, using a boom and the anchor winch, Ed and Pete managed to raise one of the big guns and to take it ashore. There, as they chipped away together the coral and the accretions that covered it, the gun, a cast iron piece with four reinforce-astragals and fillets and tapering from its heavy breech to a narrow muzzle, suddenly revealed to Pete, crudely cast in the metal, the inscription: “ANNO 1617”.

This was the first message delivered to him by a recovered cannon. It was clear, factual and fully reliable. It came from the easiest to spot, quickest to raise and examine artifact of that wreck and of any wreck under the sea. He got the message five by five and decided there and then that, as a nautical archaeologist, he should concentrate, from then on, on learning the language of the cannons.

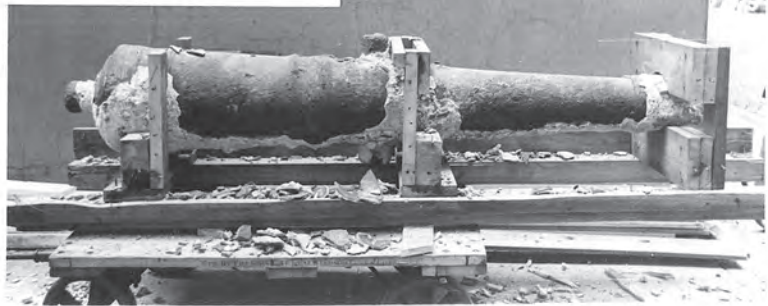
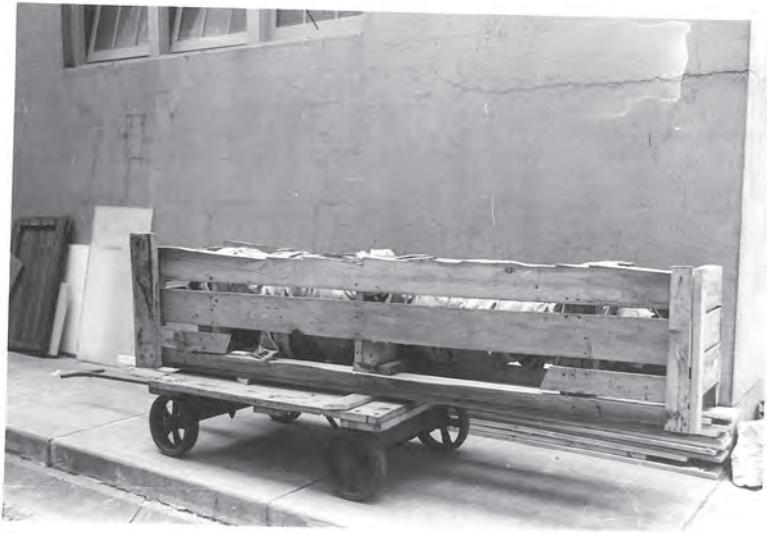
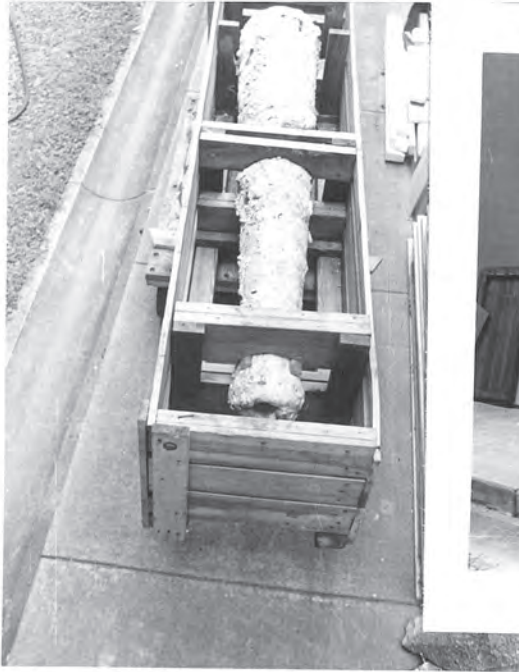
That first gun had been raised from the wreck on Delta Reef and Pete believed it to be Spanish. As for the wreck on Looe Key, Pete was to confirm later by studying in detail recovered cannons and artifacts that they had belonged to the very ship that had given her name to the reef, the wreck of HMS LOOE.<sup>4</sup>

For cannons talked again.

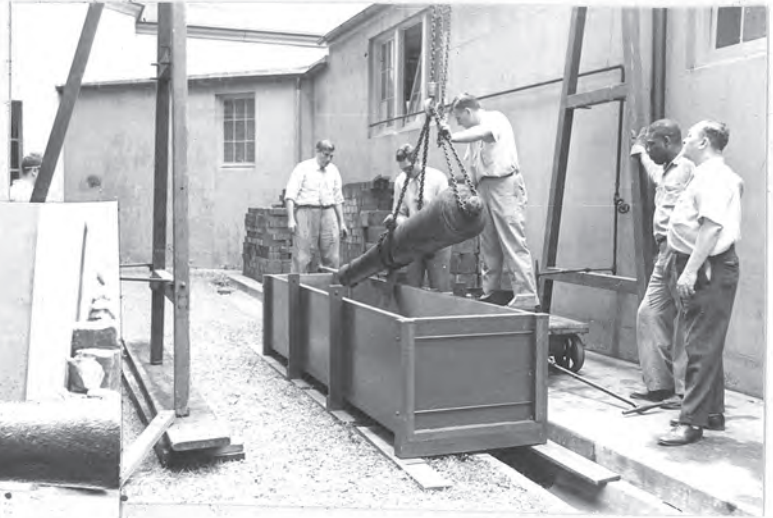
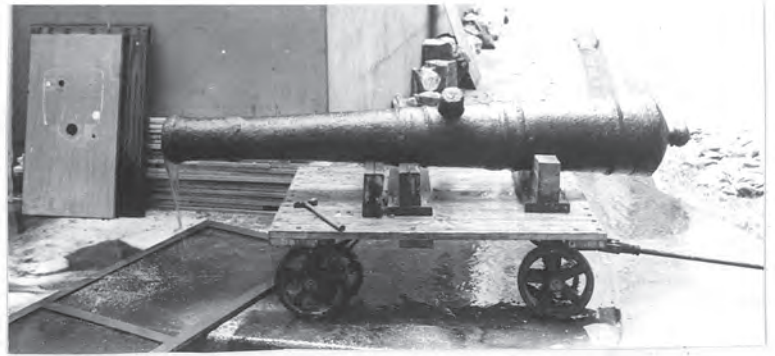
On the chase of the first cast iron gun they brought up from Looe Key, Pete found a crowned rose, the insignia of the English monarchy in the 17<sup>th</sup> century. Other artifacts from the site, shots and grape shots, a copper handle from a powder keg, bits of Chinese porcelain, a fine crystal unguent jar, a pewter mug, some copper plates and utensils and a brass door knocker, all confirmed that early clue. So did later finds: Salt glazed 18<sup>th</sup> century pottery, pieces of green glass rum bottles, clay pipes and several worn and corroded coins of various nations, the oldest dated 1720.

In the early days of underwater archaeology in the US, the first efforts pioneered by Mendel Peterson of the Smithsonian, for safe transportation and preservation of iron cannons and for their subsequent long term conservation treatment in the first, still basic installations at the SI.

(Photos MLP)







Early preservation and conservation at the Smithsonian (continued).



The number and size of the cannons, together with the large amount of ammunition and the permanent iron-bars ballast confirmed the warship theory. The absolute proof however, to the nationality of the wreck was to be found on its 6-pound and 12-pound cannon balls, which were engraved with a broad arrow. The broad arrow, as Pete knew very well, identified artifacts that were English Government property and, especially, the property of the Ordnance Board. Pete also knew that the crowned rose insignia was not used after the death of Queen Ann in 1714 and that the life of iron cannon at the time would have been at the very most thirty-five years. So he figured that such a cannon would not have been on board the ship later than 1750.

He was right. Back in Washington, at the Library of Congress, he searched through the published casualty lists of the Royal Navy and found the entry: “1743 (*sic*) Looe 44 guns, Capt. Ashby Utting. Lost in America.” Further research in the British Navy archives allowed him later to slightly correct the date of the loss and to learn of its circumstances. The frigate LOOE in fact had perished on February the 4<sup>th</sup> 1744, shortly after midnight, “having found herself in the white breakers marking a small key which raises itself slightly above the surface of the water...” A Spanish snow, had just been captured by Capt. Utting, also piled up on the reef, a short distance to port, and soon broke up. The captain managed to save his crew and the crew of the Spanish prize in the frigate’s boats and on board another Spanish sloop, which had innocently approached the stranded English vessel and that he had sent his crew to capture. The captain ordered both ships to be burnt down to floatation in order to prevent the Spaniards from salvaging them and all arrived safely at Port Royal, Jamaica, and/or in New Providence, Bahamas.

As for the “Ivory Wreck” as they had called it (the one with a cannon cast in 1617), Pete assumed it had been a vessel engaged in the slave trade. It was and remained of uncertain nationality.

It turned out that their collaboration on that early expedition in 1951 would be crucial in shaping both the lifelong career of Mendel L. Peterson and the new, the second career of Edwin A. Link, as for Ed, in the words again of his wife Marion, it was Pete who was “responsible of channeling Ed’s developing interest in the underwater world into the field of marine archaeology for it was impossible to discover these ancient artifacts without feeling a tantalizing curiosity as for their origin. What had started out to be merely a new sport soon resolved itself into a consuming and enthralled interest in the past history of our part of the world”.

It is during the following winter that Pete, having understood, among the very first of his colleagues, the crucial importance of preservation and conservation of the recovered artifacts (which, being left alone and, with the exception of gold and lead objects, would rapidly deteriorate and disintegrate) begins to develop the proper techniques and to install at the Smithsonian the necessary equipments and installations to safely preserve sea water soaked organic material and ferrous metal artifacts, first during their transportation to the conservation laboratory, and then for their permanent conservation. This latter part of the process involves electro-chemical treatments and chemical processes that require constant attention and may last many years.

Preservation and conservation was to occupy him for most of the winter, as a priority before recovering any more historically valuable artifacts from more wrecks.

The beginnings of the Smithsonian’s conservation laboratories were not grand but modest. In the words of his daughter LaNelle: “I remember his first preservation vat to be an old claw-footed bathtub filled with water and cannon balls and a small cannon barrel, of all places, in his tower office in the Old Smithsonian Castle building”.

But he will soon also obtain the help of a specially hired assistant, Alan Albright, who will become a close friend, and he will assign to him the principal responsibility of supervising the SI’s conservation laboratory.

Meanwhile, Pete's enthusiasm and the new exciting activities he is introducing in the routine of the more traditionally minded Institution seem to be winning him the respect and affection of all his staff.

Pete's office was then in the old red brick part of the museum, the old "Arts and Industries Building" now aptly nicknamed "The Castle". The Criles, who visited him in the fall of 1951, have described the place in their amusing book *Treasure Diving Holidays*:

*"We walked past the Wright Brothers Kittyhawk plane and Lindberg's Spirit of St. Louis, past the inauguration dresses of all the President's wives and came upon our Looe Key cannon, fresh from its boiling bath in mossy zinc. We climbed a rickety flight of winding stairs and found Pete in a loft, behind an enormous desk littered with photostats, translations and pictures. Everything inside pertained to 17<sup>th</sup> and 18<sup>th</sup> century ships. The walls were lined with book cases containing volume after volume of naval history. Here were the archives of the sea, tied with bright red tape."*

It is also in 1951 or early 1952, shortly after the end of the Looe Key expedition, that Pete presumably introduced his first official request on a *ad hoc* "Notice of Research Project" form to be allowed to carry on, in the line of duty, his long term research on the means of identification of just discovered ancient naval artillery pieces. I have not found the copy of this first document in the SI archives, but a surviving official Smithsonian form dated "1-31-67" indicates that, fifteen years later, not surprisingly, he was far from finishing the Benedictine's task he had undertaken. The form, another "Notice of Research Project", reads<sup>5</sup>:

*"Title of Project: Marking and decoration on muzzle-loading artillery"*.<sup>6</sup>

The research project is originated by Mendel L. Peterson, Curator Division of Historic Archaeology:

*"Summary of proposed work: Continuation (and hopefully conclusion) of a project begun in 1952 to photograph, catalogue and discuss the methods of marking and decorating early artillery. This program is related directly to the importance of artillery in identifying shipwreck sites. There is only one similar study, which covers German bronze guns only. This study will include iron as well as bronze pieces, and of all nations"*.

The day his research project had first been accepted by SI, in May 1952, Pete had in fact secured the necessary support of his employers to devote as much of his company time as necessary to his ambitious project and obtained the green light to travel as much as necessary for his research worldwide and for the photographic inventory of ancient cannons he was preparing. So, fifteen years later, he was in the saddle again with salary and all expenses paid, for an additional five years. His first voyage on his renewed green light will be from October 15 to November 20 of the same year 1967.

But we anticipate again.

Pete is actively preparing the next underwater survey campaign for 1952, relying a lot on his new friends Ed and Marion Link. For Marion was to write later that:

*"The Smithsonian curator who had kept us supplied all year with a constant bombardment of charts and records, was as eager as we to locate some of the old wrecks and to dive upon them. He made great plans for developing the marine archaeology section at the Smithsonian which had its inception the previous year with the discovery of the Looe and the other wrecks near Marathon. Together he and Ed had worked out an arrangement whereby,*

5 See illustrations hereafter.

6 The restriction may seem surprising since breech-loading guns are sometimes decorated also and many are marked but it is after they came out of fashion in most navies of the world that the decoration and marks on cannons which, at the time, were almost exclusively muzzle-loaders and cast, became generalized. The technique of casting additionally allowed sculptors to decorate the guns in relief with much greater refinement and freedom of inspiration.





Mendel Peterson at work in his office at the Smithsonian Institution, in "The Castle", about 1952.

"An enormous desk, in a loft, littered with photostats, translations and pictures. Everything inside pertained to 17<sup>th</sup> and 18<sup>th</sup> century ships..." (J. & B. Crile, 1954)

"Pete's Smithsonian Tower office [was] a virtual rabbit warren of shipwreck artifacts, boxes, papers, coins, photographs, charts, nautical instruments, etc. I have seen junk-yards that were more orderly, except that Pete always knew exactly where everything was, in spite of the mess. (D. Geddes 2013, personal communication.)



*with Pete's knowledge and help, SEA DIVER would be used to search for and dive upon whatever wrecks the two men might consider of historical value... collecting relics... to augment those from the previous expedition which had already created a tremendous interest among the thousands who viewed them in the rotunda of the Smithsonian. Pete was young and enthusiastic, an inveterate collector of everything but specially interested in coins and old armament. His head was packed with an impressive fund of historical facts and figures... In addition, we found him to be a willing and helpful crew member and a most entertaining companion."*

This, I can confirm absolutely from personal experience.

As for Pete's wife, LaNelle, or "Nellie", Marion Link, who later befriended her as an occasional crew member of SEA DIVER I, described her as *"the plump pretty wife of Pete, a perfect member of our crew and an excellent cook. LaNelle in fact was a specialist in Marine Zoology and she had successfully applied for a job at the Smithsonian Museum of Natural History, so Pete and she did drive together every morning to the museum."*

The 1952 underwater surveys with Ed and Art McKee were to be marred from the start by continuous rough weather. They managed nevertheless to explore a cannon site on Sambo Reef, near Key Largo, discovered by Art, where they found out that two different ships had been lost on the reef: an English warship, whose armament indicates she was of the late 18<sup>th</sup> century, and a Spanish ship at least a century older, which could not be identified but dated only thanks to one of her cannons that bore the date of 1657. With more and more rough weather and without sufficient digging equipment, nothing more could be done. At least, one of the positive results of the season was the lease to Ed Link of a state-of-the-art "magnetometer-gradiometer" that he and Pete had managed to obtain on loan from the Navy. But it was ready to be tried at sea only after Pete and LaNelle left for home, the holiday period being over.

It is in the fall of the same year 1952, that Pete starts on the first of his many research trips to Europe – that are part now of his official Smithsonian project, no more holiday benevolent work – where he will study the history of naval artillery and learn "cannons language".

He has indicated to his boss at the Smithsonian that he has about finished exploiting the historic information that can be obtained on the few ancient cannons present in the collections of the museums of America, Canada, Mexico and the Caribbean. It is time he should go and continue his studies at the source of ancient artillery production, in Europe. (Most of the "cannons" extant in America are 19<sup>th</sup> and 20<sup>th</sup> century massive, cast iron fortress pieces – or rather "fort pieces" in the case – unmarked and undecorated, from which there is little to learn and that interested him little.)

It is probably no coincidence if his first pilgrimage in Europe is for Copenhagen, in the land of his ancestors who had given him, he was sure, his love for the sea. The Tøjhusmuseet, in the very old Copenhagen arsenal will be his first Station of the Cross.

His field notes and negatives show that he photographs cannons in the "Tøjhusmuseet", the Royal Danish Arsenal Museum in Copenhagen, under an agreement for publication with the director Egon Eriksen. Their correspondence that lasts until mid-1953 indicates very friendly relations between the two men. His photographs and close up photographs clearly show, already, his meticulous interest for any clue, any indication that can be derived from the careful observation of forms, sizes, dimensions, marks, coats of arms or erased ones, mottos or other inscriptions molded or engraved, decoration, special features etc.

The request forms for photographic services (developing and printing) scattered among the massive Pete's personal records have often allowed me, as his biographer and as his posthumous editor, to follow his travels step by step and year by year. Pete used to send these official forms by airmail every fortnight or

so, with his black and white exposed negatives, to the Photo Laboratory of the Smithsonian Institution in Washington DC, where they were always printed in triplicate, and one copy sent immediately to him wherever he happened to be in the world. Administratively, this routine procedure had been approved by the Chairman of the Department of National and Military History, Edgar M. Howell, to whom he reported. The costs came under the “Federal Accounts” heading.

In parallel, the carefully filled in traveling authorization forms of the Smithsonian Administration, now kept in good order in the SI Archives, in Washington, have supplied the main story for his peregrinations year after year.

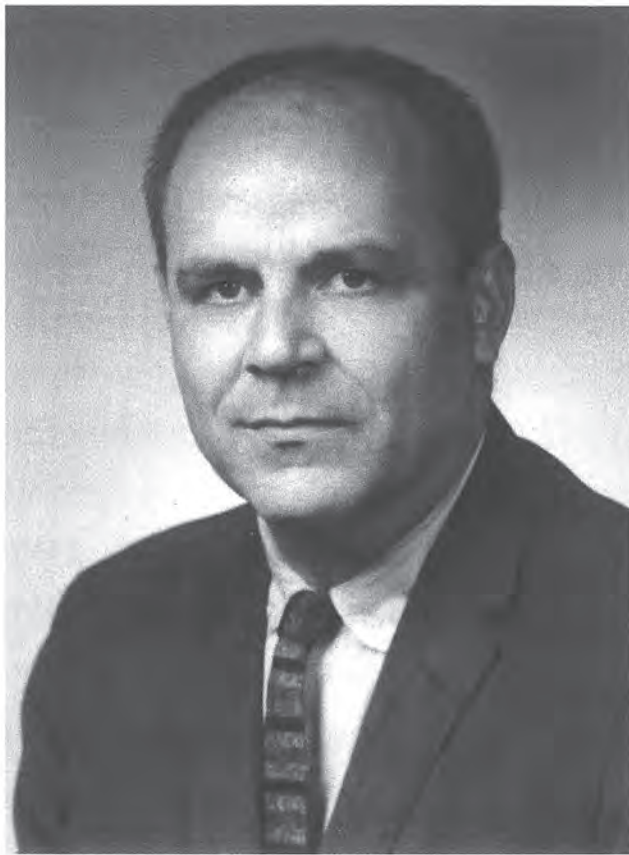
During the winter 1952-1953, Pete spends much of his time busily gathering in Washington and in Florida the scant information available there concerning the destruction of two Spanish treasure fleets on the Florida Keys: The “plata flotas” of 1715 and 1733, both victims of a hurricane that had overtaken them on their way from Havana (Cuba) to Spain. Eventually, he will commission a professional researcher, who will find mountains of information in the Archivo General de Indias, in Sevilla.

In 1953 also, his 35mm still camera captures the guns of Fort Frederica (Sea Island, Georgia), then of St. Augustine and, in July, of the USNR building, in Georgetown SC.

Later in the same year (1953), we find him off Florida again, diving with Ed Link and Art McKee on the wreckage of some of the galleons and naos lost with the “plata flota” of 1733. This time, the lack of digging equipment that had marred their earlier efforts has been remedied, partly remedied, they will find out... They operate from Ed’s new diving vessel SEA DIVER, a sturdy Florida shrimp trawler that has replaced the lovely 43 feet yawl, BLUE HERON (lovely but useless for wreck diving). Marion was a bit sad and used to complain about the smell of gazoil and shrimp. I distinctly remember however how, aboard SEA DIVER, Ed once told me, with a smile to his wife that he had bought the boat brand new and that no shrimp or fish had ever been hauled aboard, except if deep frozen in plastic and just from the supermarket.

Mendel’s and Ed’s operations with Art McKee concentrate on the site of what was probably the wreck of the galleon nicknamed RUI (after his owner?). So would seem to indicate a chart prepared by a Spanish navigator at a time when the wrecks or parts of them were still visible. The site, as he wrote later, was “*a virtual submerged museum... Every aspect of the working and defense of the ship and life aboard, as well as the treasures and the cargo carried was represented*”. They recovered heavy cast iron guns from the main battery of the vessel, hand weapons, including the standard 0.70 caliber military musket, boarding axes, pistols with the Spanish Miquelet lock (flintlocks) and of course the typical Spanish swords. The ammunition included the standard solid iron shot, the fixed-bar shot and iron hand grenades. Every single part of the rigging seemed to be represented, as well as, on the other hand, every artifact that had been used to cook and to eat: pewter plates, dishes of Majolica and red ware bowls in which – as could be deduced from identifiable bones – beef, pork and fish had been prepared and served before coffee and chocolate. All kinds of small personal objects were recovered, coming no doubt from the chests of the passengers. The cargo had included cochineal, indigo, tanned leather, mahogany billets, children toys, dishes of Guadalajara ware and Chinese porcelain from the Manila galleons trade. The treasure had been largely salvaged by the Spaniards after the disaster. Still, there remained a quantity of scattered “cobs” (of 2, 4 and 8 reales), a small number of gold coins and some gold jewelry. Of the large number of silver bars that were listed in the manifest, none were found, and it is believed that the Spaniards recovered them all.

Perhaps the most valuable items recovered and the most exciting surely for numismatist Peterson, were two



A black and white image of a handwritten signature in cursive. The signature reads "Mendel Peterson" on the top line and "Pete" on the bottom line, enclosed in quotation marks.

“Pete was a fascinating character with a razor sharp mind, a volatile temperament and a wild sense of humor. He should have been cloned — they don’t make many men like that anymore.”

(Donald G. Geddes, a friend and diving companion of MLP, Ed Link, Art McKee and others since the early 1950’s.)

“A good-looking young man with rather bold brown eyes and a heavy shadow of beard on his mobile face. I was impressed to learn that this was Mendel Peterson, acting Head of the Department of History at the Smithsonian Institution in Washington.”

(Marion Clayton Link, 1951. In *Sea Diver*, p. 10)

“I thought he was nuts. I loved having a Dad who was nuts”.

(LaNelle Peterson, at the age of 12)

“A giant ball of energy... To me, he seemed like a man shot out of a cannon”.

(His daughter LaNelle. Personal communication, 2013.)

“A jolly, mad genius”.

(MLP’s son-in-law Gerry Spence. In his book *Gunning for Justice*.)

of the very rare “pillar dollars”<sup>7</sup> of the new design bearing the date 1732, the first year when pieces of eight were actually milled and no longer struck, in Mexico. Coins of that year were and still are rare precisely because nearly all of them were lost in the 1733 hurricane disaster.

Over the years, Pete was to assist and advise Arthur McKee in his recoveries on several more wreck-sites of the 1733 fleet. Besides Art McKee, the “grand-father of all American treasure hunters”, he would also meet and befriend in these years all of the most successful ones: characters like Bob Marx, Willard Bascom, Kip Wagner, Mel Fisher, Bob “Frog Foot” Weller, Burt Weber, Jack Kelley, Craig Hamilton, Alex Storm and a few others no doubt. Pete knew them well (I have had myself the privilege to meet most of them); he worked with some, helped them all and, in his own words, learnt a lot from them in return.

Among the divers who were working with Pete, not all were to remain treasure divers, as Art McKee did. The reason, as I found out myself at about the same period, is simple. Excavating a wreck intelligently, that is correctly and according to the basic rules of archaeology, is more fun than just quickly picking up “the goodies”. Granted, a gold bar has a friendly touch in the hand, and an intact olive jar looks nice on the mantel piece. But that is only the first part of the reward. Understanding all the marks and stamps and numbers on your gold bar and learning from that all it means in terms of its actual economical significance or realizing what could be the political results of a drying up of the flow of gold from the Americas to Spain – if only for the King to be able at least, or not, to pay the *tercios* in Flanders –, that is the real reward for all the calories spent in the water and the chronic tennis elbow. And so it is when you become able to identify an olive jar at first sight (there are so many varieties).

One of the early divers who worked with Pete in those years is a case example. His name is Donald G. Geddes III. As he himself was kind enough to write to me much later<sup>8</sup>, he considered Pete “his mentor” in the early days of marine archaeology.

His involvement with Pete goes back to the early 1950s when (I am now quoting him):

*“I moved to Washington DC, to attend George Washington University. I met him at a lecture he was giving. He was showing underwater scenes of the HMS LOOE... I was immediately startled as some of my Rollins College friends had been diving there with me in early 1949. We had been on that very wreck-site. I recalled jumping up from my seat and saying: ‘My God, that’s my wreck’. Mendel stopped speaking, came over to me, waved away a guard who became alarmed at my outburst and said: ‘We’ll talk after I finish’. Thus began a long friendship and I became quite involved with Pete, Ed Link, Art Mc Kee and others.”*

That Pete was a good mentor, is probably reflected in the fact that diver Geddes later joined the ranks of the Institute of Nautical Archaeology (founded by George Bass at Texas A & M University, College Station, Texas) where he spent thirty-eight years as a INA Board Member and participated with George in

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7 The “pillars” and waves on the coin’s reverse were the “pillars of Hercules”, symbolizing the Strait of Gibraltar. The motto “Plus ultra” on a scroll reminded everyone that it had been the Spanish kings, who had discovered and conquered a whole new world beyond what had always been the end of the world for the ancients. It is the scroll joining the two columns that became the symbol of the modern American dollar.

8 As I was writing this biography, in March 2013.



the exploration of many Ancient World and New World shipwrecks.<sup>9</sup> Donald Geddes eventually became Chairman of the INA, a post from which he recently retired. Donald Geddes is now 82 years old (March 2013) and I can't resist quoting the last lines of his latest letter:

*"Pete was a fascinating character with a razor-sharp mind, a volatile temperament and a wild sense of humor. He should have been cloned – they don't make many men like that anymore".*

In those, the early years of his underwater explorations off the Florida Keys, Pete, also dived with his friend Art McKee on a wreck that he identified as HMS WINCHESTER. The WINCHESTER, an English man-of-war of sixty guns had set out from Jamaica in 1695 as part of a homeward bound convoy sailing through what were still largely Spanish waters. She didn't go further than the Florida Keys for that is where she struck a reef and went down. The recovered items provided detailed information concerning everyday life aboard but did not give any clue about the manner of her death. On this occasion again, Pete, completing information gathered under the sea with information gathered from ancient archives, managed to answer the question. Much later, in the British Admiralty Records, in what was still at the time the Public Record Office, he found the log of the ship for the year 1695. It had been transferred to another ship at the last moment and was ultimately returned to England. It ended the day after she met her end. The cause of the loss of the ship was as simple as dreadful: scurvy. The captain, in a shaky writing, explained that he had been forced by Admiralty orders to continue his voyage whilst his crew was practically dying for lack of the citrus food that could have been obtained ashore. When the WINCHESTER struck the reef, she was virtually adrift among shoal waters with a largely incapacitated crew. The final irony of the story was supplied by an artifact recovered from the wreck by Art: a Royal Navy lime juicer.

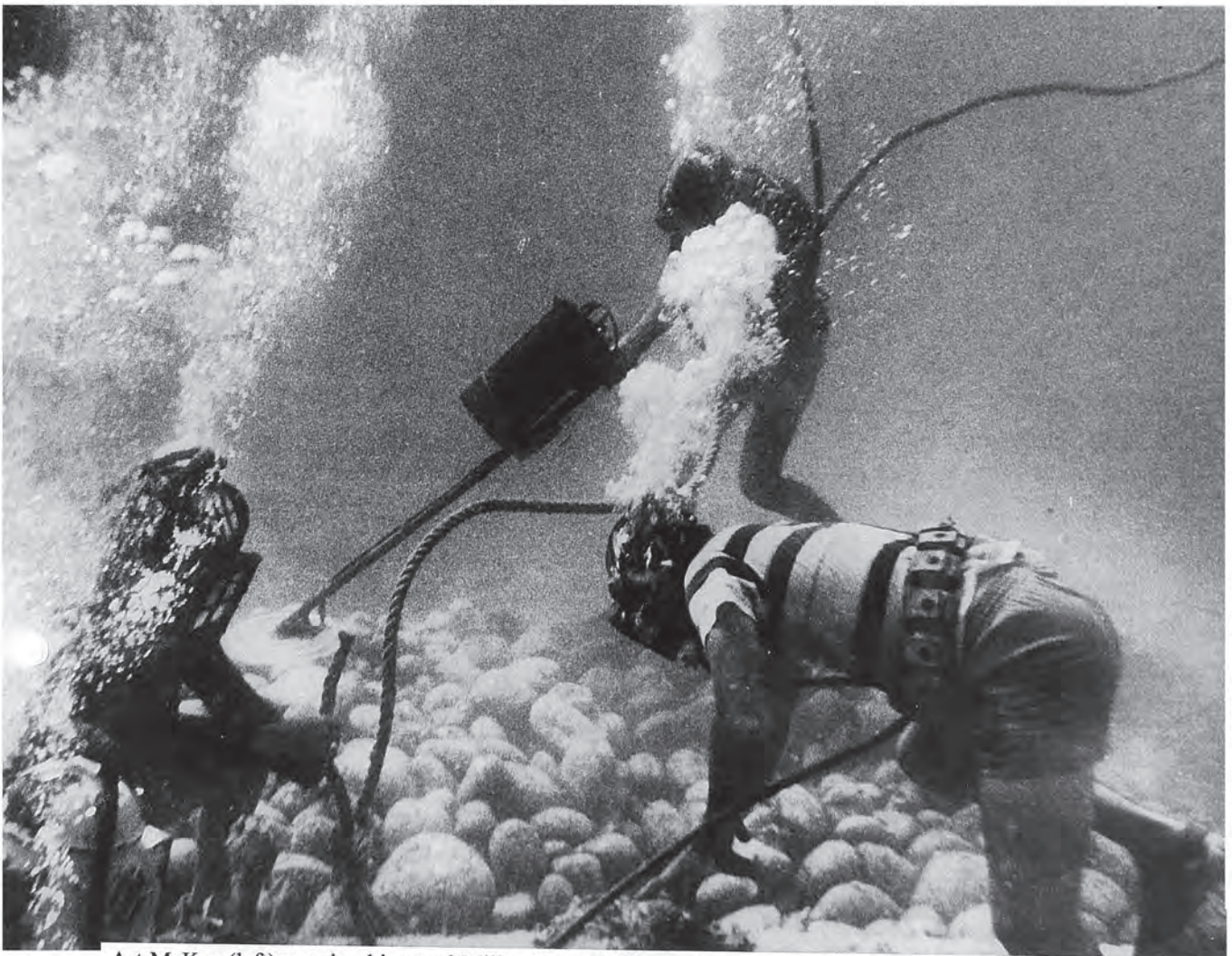
It is in the same period that I first met Pete, board SEA DIVER I remember, in the company of Art McKee, and later at the home of common friends in Florida, namely at Bob Marx's place. Pete was a strongly built man, who occupied the space in such a way that he invariably ended up being the center of the company's attention. His strong, virile voice helped of course to first catch the attention of everyone around but the stories he used to tell and his abrasive sense of humor that could be at times – to the delight of the ladies present – extremely non conformist, guaranteed him continuing success with any audience.

The publication, in the "Smithsonian Miscellaneous Collection", in 1955, of his first paper *The Last Cruise of H.M.S. Looe*, brought him and the new discipline he was pioneering, the respectful attention of the academic world and the interested attention of the treasure hunters. His personal papers and the SI archives show that he now begins to receive almost every day mail queries from amateur divers, who have just discovered a cannon or some artifacts on a wreck off Ireland and want to be told that they have found a Spanish Armada wreck or, in the North Sea, the wreck of John Paul Jones's 40 guns ship, the BON-HOMME RICHARD or, off Miami Beach, the richest capitana galleon yet in the Western Hemisphere or, in California, a returning Manila galleon in and how many million dollars worth of gold and silver were on board exactly? Although he tends to discourage his correspondents (*"Oh, but mind that the Spaniards*

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9 George F. Bass, Ph.D., is today the Chairman Emeritus of the Institute of Nautical Archaeology, the non-profit organization he helped found in 1973. The INA is generally recognized as the leading nautical archaeology group worldwide. Dr. Bass, who started scientifically practicing underwater archaeology in the 1960's, some ten years after Mendel Peterson had begun his own pioneering excavations in Florida, has been specializing in the underwater study of the most ancient wrecks known – mostly in the waters of Turkey – including a wreck from the Bronze Age. Just as Mendel Peterson, who had immediately understood the importance of collaborating with treasure hunters in Florida – the people who did actually find wrecks (not a job that the archaeologists anywhere ever succeeded to do) – George Bass became familiar with the local hard-hat sponge-divers who, generation after generation, had discovered most of the ancient wrecks lying on the shores of the Mediterranean down to a depth of 200ft or so. This wisdom has been imitated by some other archaeologists (namely by Australian archaeologists) but it is a wisdom which seems nowadays to be more and more lost to the ethically correct prejudices of the day with, much too often, tragic results for science.





Art McKee (left) wearing his usual Miller-Dunn shallow water diving helmet with Mendel Peterson and Ed Link (wearing Desco triangular full face mask with an air hose connected to an air compressor). Ed is using a very early, Navy supplied metal detector. The divers are studying one of Art's Spanish galleon sites off Eastern Florida.

(Photo G. Crile Jr., early 1950s)



*and their Indian divers were very good at salvage at the time...”) he answers all queries in detail with obvious interest, often asking for further information in order to enrich his notebooks. In short, he is becoming the American treasure hunter’s trusted guru.*

It is also in the early or mid-1950’s that Pete began to try and persuade his boss at the Smithsonian that the Institution badly needed to create what he was then calling an “Office of Underwater Exploration”.

A first project (undated) was discussed with the higher authorities at the SI. It was the opinion of Mr. Ewers at the time *“that your project as presented in your attached prospectus was written some time ago and requires a complete re-writing as of the present into more concise form to include what has been accomplished in the interim”*. His boss, also suggested that the rewriting would begin by a brief statement of the proposal, followed by justifications, namely:

*“1. The important contributions underwater exploration can make to history through the story of dated materials of early date etc.; 2. the role assumed by the Smithsonian Institution in establishing scientific methods of underwater exploration and 3, a brief summary of our accomplishments to the present.”*

Pete was further advised that an exposition of the proposed expanded program should follow for field and laboratory work and a budget for the program to include personal, additional space, travel and field investigations. Potential sources for financing the latter should be indicated.<sup>10</sup>

Next recommendations: *“copies of some of the letters attesting to the value of the program may be attached.”* A final piece of fatherly advice from the writer of the memorandum to his green, younger colleague terminated the memo: *“It is important to present this program in the most effective manner, with an eye constantly on the effect of the proposal on the reader for whom it is intended”*.

Pete’s new version of the proposal plodded along for some time around “The Castle” – this after all was something quite unheard of in academic circles – but eventually a fine and healthy “Department of Underwater Archaeology” was born to the Smithsonian Institution and it grew up over the years in strength and in wisdom.

There were however preliminary precautions to be taken and I cannot resist in quoting Donald Geddes when he tells about Pete’s “common training in scuba diving” in the pressure tanks of the Experimental Diving Unit on the banks of the Anacostia river in the Navy Yard of Washington. (I have mentioned already these “training sessions” as they were lightly told by his daughter LaNelle).

Donald Geddes and Pete had become by then close collaborators. Donald had been researching the details of a number of treasure wrecks and the two men had combined their efforts. So it was decided that Donald would be part of the next summer diving program on board Ed Link’s SEA DIVER. This was in late 1952.

Then, as Donald Geddes writes:

*“James Wetmore, who was then head of Smithsonian, was all in favor of the efforts but he expressed serious reservations about safety and possible liability. Thus Pete and I were forced to go to the Anacostia Naval Station to sit in a tank of water under air pressure, with a half dozen round thick glass portholes, where they simulated various depth levels in the training of Navy ‘hard-hat’ or helmet divers. Both of us were fitted with Desco full*

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10 It has always been the policy of the SI to heartily welcome outside financing for as many of their projects as possible. In fact, the early underwater excavations of Mendel Peterson, were financed mostly by Ed Link and/or the *National Geographic*



*face masks, each with an air hose and attached to an exterior air compressor and we sat in this huge tank with two heavy divers in helmets and rubber suits. We went through a test of compression, then decompression, and finally we exited this over ground pressure vessel. Both Pete and I were glad to get out of it because it was terribly claustrophobic and a bit weird, looking at the Navy divers in full dress while we wore t-shirts and bathing trunks. After this experience Pete and I both went home and in the middle of the night we were awakened to learn that one of the Navy divers in the tank with us had experienced the bends and we were told the Navy was coming to get us and we would have to spend time in a recompression chamber, which we did for about four to five hours with the two men from the tank. It seems the pressure tank operator had put too much pressure into the tank and took us to an equivalent of over 120 feet when we were only to be pressurized to 65 to 70 feet. I recall after we emerged from the recompression chamber Pete muttering how Wetmore was trying his best to do us both in. At any rate, it was an unnerving experience.”*

It is in the following year, in mid-May 1953, that Donald and Pete drove together to Miami to join Ed Link on board his SEA DIVER I and dive on a number of wrecks in company with Art McKee.

Donald recalls:

*“While diving on the wreck of the INFANTE we had two scary incidents – one involved my sighting of a huge hammerhead shark while I was putting an armload of artifacts into a huge shrimp basket suspended from the SEA DIVER about a meter from the sandy ocean floor. The water was slightly murky that morning and this shark, swinging its head from side to side came towards us. I dropped everything climbed into the basket, and began shouting in my face mask to get Pete and Ed’s attention. They were both blasting sand away with the fire hose from around the INFANTE’s pile of ballast rocks and they couldn’t hear me. The shark swam by me and it was immense, about 5 meters in length.<sup>11</sup> Somehow Pete sensed its presence and he swung around with the nozzle of the hose which blew sand into the shark’s eyes. Startled, the hammerhead suddenly turned and fled. Its movement was so violent that it nearly knocked Pete and Ed over and it sent me twirling around in the basket. We all surfaced and decided not to go back down that day.*

*On another occasion Pete was blasting away with the fire hose at an area in the INFANTE’s ballast pile and Ed was behind him helping to control the hose which was kind of like wrestling with a python. At one point, Pete blasted water into a thick section of ballast stones and out bolted an immense giant grouper (also known as a jewfish). It must have weighed at least 150 kilos and it was literally the same color as the ballast, except that when it was hit with the blast of water it flushed a pink color, rushed out, flattened Pete, then sat on him. Pete lay on his back, this huge fish on top of him. Ed was knocked aside, lost his grip on the hose which began thrashing around like a wounded serpent. Realizing Pete was in distress Art and I, then Ed captured the hose and blasted the grouper off Pete. The grouper flared its fins and opened its great mouth as if to threaten us, then lifted off Pete and slowly cruised back into its cave in the ballast. We were careful to leave him alone after this incident. Afterwards Pete quipped: ‘I always suspected there was something fishy about this expedition!’”*

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\* \*

In those and in following years, Pete will travel a lot to study and photograph cannons, mortars and howitzers. His requests for photographic work from his copies of the official Smithsonian forms and the countless “Authorizations of Official Travel” forms continue to be invaluable for the biographer who painstakingly tries to follow the perpetual running around of this indefatigable man. They have allowed me to follow his travels month by month, together with the cardboard mounts of his Ektachrome color slides which all bear the date of processing (Kodachrome color slides are not so dated). But, failing these official forms (for a number of them seem to have gone astray), it is hard sometimes to exactly follow Pete

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11 Sic, in Donald’s memory...

in his almost continuous pilgrimages from fortress to museums, from mediaeval castle to naval base and from royal palace to historic sailing ship for there are periods during which he seems to be enjoying the gift of ubiquity.

At one time, so the negatives show, the cannons-chasing globe trotter is at the Quebec Museum but there is no date and then his notes on slides mounts show he is in Naples, Italy, but also at Fort George USA.

Then he is in San Juan de Puerto Rico, photographing guns at the National Guard Military Museum. He works there with an assistant. His wife? Notes on the mount of transparencies are in green ink and not in his handwriting. A slide of Fort Lucea, Jamaica, bears both his writing and someone else's on the mount (his wife again?). He is also at Cara Blanca, at Kingston, in order to take photographs at Rock Fort (his writing on several slides), at Fort Montego, in Annapolis, in Washington DC (photographs at the Gun Factory) and in Charleston, SC.

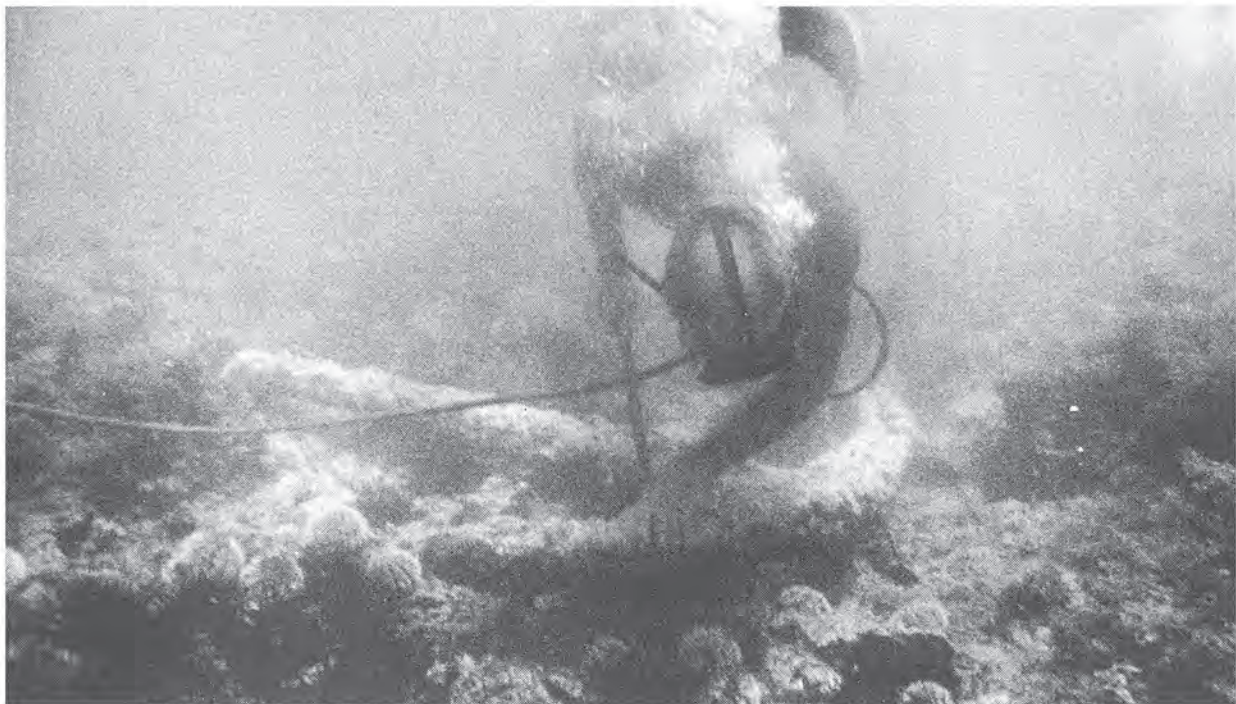
Being still the "Head Curator and Chairman of the Department of Armed Forces History, US National Museum, Smithsonian Institution", he must have spent also some of his time at the office (in wintertime preferably, no doubt) for, with his staff of sometimes up to thirty, he is responsible for the museums attractive (and famous) displays of recovered early warships and merchantmen (or parts of), of models of old sailing vessels, of guns with their appurtenances and specific tools, of miscellaneous artifacts and treasure recovered from the sea bottom, of firearms and edge arms, of cavalry items, of uniforms and hats etc. etc.

In 1955, for a period of two and a half month, Pete forgets all about ancient artillery and goes on a cruise with Ed Link, aboard SEA DIVER, on a quite different tack. Ed, whose positive mind has never allowed difficulties to refrain him in his enterprises, had decided that it would be quite exciting to retrace the real route of Columbus at the time he approached and discovered the New World, with his journal as a guide and Pete had progressively become involved in the project in parallel with his growing interest.

He had helped him to gather whatever information could be found in the US. The whole story, they concluded, was fraught with uncertainty. Columbus, in the journal of his first voyage to the west, has described the first land he set foot on in the New World as "the island known to the Indians as Guanahani", which he called San Salvador. But which island was it? In spite of a great deal of controversy as to its identity, the general consensus nowadays was that his first landfall occurred upon Watling Island. The question, however, as Pete soon found out, is far from settled. Several modern, credible, well documented theories have concluded that Columbus had first set foot on the island of Caicos, further to the south-east, whereas in another interpretation of Don Cristobal's journal by another respected naval historian, a radically different course is suggested for Columbus, through the Bahamas to Cuba. Earlier Spanish and other 19<sup>th</sup> century historians who had been first to study the available original or ancient documents had selected Grand Turk island as Columbus San Salvador. Still, other historians had decided upon Cat Island whilst one had selected Hatwood Island. Most of these "experts" however had based their theories only on the reading of Columbus journal and on a study of ancient, perfectly unreliable charts that they had compared to modern charts. Ed Link decided that with the help of Pete, he would have a fresh look at the question, not only on the base of historical documents and charts but also, and for the first time, as seen mile by mile from the sea by a seaman, on his SEA DIVER.

From the beginning, the team received the help of Captain Weems, a retired US Navy officer, and an old friend of Ed, who was recognized as n°1 in navigation and navigation systems in America. It is Captain Weems who had first suggested that it wouldn't be a bad idea, as they were at it, "*to also find the wreck of the SANTA MARIA*" (lost somewhere on the north coast of Haiti on Christmas night 1492). The idea, as Marion Link said later when telling the whole story, "*fairly took our breath away*". But Captain Weems continued explaining that rear-admiral Samuel Morison, in his book *Admiral of the Ocean Seas*, which tells





In 1955 on "Le Grand Mouton Reef" off Cap Haitien Harbour, Ed Link recovered an extremely ancient anchor, possibly lost by Columbus' SANTA MARIA in 1492.

Photo Peter Stackpole.



Ed Link delivered the "Columbus anchor" to the Prefet of Cape Haitien in the presence of the US ambassador (center).

After a thorough examination of the anchor, Mendel Peterson stated that it "unquestionable dated back to the time of Columbus and could very well have come from the Admiral's flagship".



Mendel Peterson, head curator of the Smithsonian Institution's Department of Armed Forces History, examines what may be an anchor from Christopher Columbus' flagship, the Santa Maria, which went down in 1492.

By Douglas Chevalier, Staff Photographer

his version of the Columbus voyage, claimed to have picked out the exact reef where he thinks the SANTA MARIA sank, and had indicated it on a map in the book.

Exciting as the idea was, Pete pointed out that Columbus caravel had actually never sunk but had stranded on a reef at night, from where she could not be moved again. Columbus had salvaged every reusable part from the wreck down to floatation, plus what they could get from the water filled holds, in order to build a fort on shore – he called it Navidad – where he would have to leave most of his crew, for there was no room on the NIÑA and the PINTA to return to Spain with everyone. Still, Pete said, the ballast of the SANTA MARIA could just possibly be findable, even covered in coral more than four centuries old, together with the keel, keelson and the part of the ship's bottom that the ballast would have protected from the teredo worms. And if they should really find the mound of the stone ballast, metal detectors could possibly indicate any iron object or two that might have been dropped in it and missed. One might even be optimistic enough to dream of recovering a couple of nails from the ship's bottom. Those nails would be as precious as the nails of the Holy Cross.

The story of the several months long SEA DIVER expedition on her triple quest – for a third purpose was to develop – has been told in detail by Marion Link in her book *Sea Diver*.

To make a long story short, the ballast pile of the SANTA MARIA was not found but one result of the long unsuccessful search was the discovery of what everyone agreed to call “a Columbus-type ancient anchor” (or part of it) that was found on a not too unlikely reef and officially delivered later to M. le Préfet de Cap Haitien in the presence of His Excellency USA Ambassador Davis.

Pete and Ed and everyone else knew that there is also, in the Port-au-Prince Museum another ancient anchor, found in the 18<sup>th</sup> century in Grande Rivière which is said “to have come from the SANTA MARIA”. Ancient anchors in general are difficult to date accurately. Pete carefully compared, measured and auscultated the two anchors and – allowing for one being covered with an inch and a half of rusty accretions whilst the other, found in river mud, was very well preserved – he delivered the opinion that both anchors could be of the right period, were very similar and could have come from the same ship. Later analysis, made in a US laboratory, has shown that both were actually made of a similar type of iron and at the same period. But a nagging question continued to bother Pete and Ed. The broken anchor they had recovered was not found *in situ*. It was covered with sand-based accretions and lying flat and free, in plain sight, on top of a coral reef. The explanation proposed was that it had been broken off from some coral reef at some time in the past by a fisherman, who had used it for some time as a weight for some of his fish traps before one day loosing it.

As for the search for the exact landfall of Columbus, it has been carefully summarized by the Links as follows:

*“Unless additional original material or charts should be turned up in the future, we concluded there could never be positive knowledge of Columbus exact road; but we have proved – to our own satisfaction at least – that he landed first at Caicos and from there followed a course from Mayaguana to Samana to Long Island, and from there to Crooked Island, the Ragged Islands, the Columbus Bank and Cuba.”*

Pete did not disagree with such a careful statement.

From the start, it had been also, Ed's idea to look, during the same voyage, for the remains of the NUESTRA SEÑORA DE LA CONCEPCIÓN, the richly laden Spanish almiranta lost in 1659 on the Silver Bank (north of the Republic of Santo Domingo) the very wreck that the famous 17<sup>th</sup> century salvor William Phipps had largely salvaged two hundred and sixty eight years earlier, in 1687, making his fortune with the 26 tons of silver he brought back and acquiring so the resulting full respectability.



The search for this wreck, in which Pete was not directly involved, is another story. The many weeks that SEA DIVER and its crew of friends of Ed spent on the Silver Shoals, alias the Ambrosian Bank, in the course of successive visits, did not allow them to locate any wreck that by any stretch of imagination would have looked like the lost Almiranta of 1659.

But Pete, as he was in Haiti anyway, made sure he measured, fondled and photographed all the cannons in the Port-au-Prince Museum and studied the various bronze pieces that at the time graced the city squares. Of course he also climbed (or rode, one hopes) all the way up to the “Citadelle du Roi Christophe”, near Cape Haitien, there to examine and photograph the countless big guns that never fired a shot, in the huge, absurd citadel that was never attacked because there could never be a reason to.

1955, still. The third man in the famous trio now enters the scene. He will play a leading role and the location will become Bermuda for many years. That third man is Edward Bolton Tucker, better known as “Teddy”.

The Tuckers have been in Bermuda, forever. The first colonial governor of the island, appointed in 1616, was a Capt. Daniel Tucker. He was succeeded by his brother and the Tuckers grew and multiplied ever since over the centuries.

Teddy’s father was a naval architect from the ship building yards of Harland and Wolff (in Belfast, and present in every other major harbor in the world), famous for having built the most magnificent steam powered ocean liners in their days, including, of course, the TITANIC. Teddy has wondered if the fascination he feels for the structure of ships and its study could be an inherited trait. As a child, his occupations involved paddling around on a fir log, beach combing and, as a summer job, cleaning the glasses of the exhibit tanks at the Bermuda Aquarium or going out to the reefs in the collecting boat for live specimens. More important yet, in order to collect fish or coral specimens or to inspect the moorings of the aquarium’s boat, he had the occasion to discover and get used to the then fashionable diving apparatus, a simple helmet resting on the diver’s shoulder and supplied with air from the surface by means of a man-operated two cylinder air pump. He later wrote:

*“That gave me confidence, awakened my excitement and an adventurous passion for diving that has lasted all my life... And so I also learnt to dive more or less freely, without any kind of diving suit, years before scuba was even invented. Indeed there was no turning back. Those little underwater walks with that clumsy copper helmet on my head ... were the first steps into sixty years of looking for shipwrecks and studying life forms in many of the world’s oceans”.*

In 1941, at the age of 16, Teddy went to sea as a deckhand on a four-masted schooner owned by a cousin. “I was well looked after” he recalls “and gained experience sailing the ocean”.

In 1942 he enlisted in the Royal Navy. He served on many different Naval ships and went to many foreign ports, from the Arctic to the Antarctic and saw action on the Eastern theatre. He was eventually demobilized in 1947, unscathed, in spite of having experienced “his share of bombs and torpedoes and being shot at a few times”.

He returned to Bermuda with the firm intention of making a living in and from the sea.

Which is exactly what he did, all by himself at first and then with the help of MLP and the support of the SI later.

Pete had met him briefly for the first time in 1955 in his home in Bermuda, a lovely old house on a rocky

point all surrounded by the ocean, that his father had purchased and rebuilt in 1911. He had come to see with his own eyes some incredible artifacts of which Teddy had sent him color slides, requesting identification and a date.

On a coffee table he was shown a “dazzling array”. There was of course “the Tucker Cross”, a late 16<sup>th</sup> century gold bishop’s cross studded with seven large, perfect, cabochon emeralds that probably once contained between its two separable faces an ancient relic or perhaps an Agnus Dei. Pete declared it *“the most valuable artifact ever found in the Western Hemisphere, at the time”* it became world famous when *Life Magazine* published its photograph. It was eventually stolen<sup>12</sup> at some time either from the Bermuda Maritime Museum (or when it had been transferred from the Bermuda Aquarium Museum after the entire SAN PEDRO collection was sold to the government in 1963). Later, more of the collection was stolen from the Bermuda Maritime Museum. None of the treasure has been recovered. But there were also on the table a number of gold ingots and gold bars marked with all the telltale identification marks and inscriptions of the Spanish colonial “Real Hacienda” (the fiscal administration), there were delicate gold buttons set with pink conch pearls and other jewelry and silver coins, mostly pieces of eight. All this had come from a wreck, which he had discovered in 1951, together with his brother-in-law, Bob Canton, in some shallow holes (depth 25 feet) on the western reef. He had returned to the site on a whim four years later, at which time he had found the treasure now lying on the coffee table.

Pete, when he eventually dove on the site with Teddy, for three long weeks in 1957, in order to fully identify and study the wreckage, found out that the ship’s ballast had consisted of flint stones which, in agreement with the dated coins, confirmed that the ship had been lost about 1600 at the latest for, after the invention of the flintlock musket and similar fire starting devices (which the Spaniards called the “Miquelet”), flint had become too valuable to be used as ballast. All the artifacts generally further pointed to a date in the late 16<sup>th</sup> century. Pete’s subsequent research confirmed that the wreck was the one of a Spanish nao, the SAN PEDRO that was bound from Cartagena in the Nuevo Reino de Colombia to Cadiz, in Spain, in late 1595 and never arrived.

As he later wrote: *“Even more important, I found Teddy to be an intelligent, skilful observer. The hours together underwater began a long friendship that led to our dozen or more annual archaeological dives for the Smithsonian Institution.”*

It is Pete, who first coined the formula “a time capsule of history” to describe the wreck of a sunken ship with all its interconnected, preserved contents and to underline the importance of scientifically approaching its excavation in order to be able to recover every bit of information in the capsule, an expression which has now become common place. It is Pete also, with his special knack for luminously formulated definitions that, in one of his articles, compared every shipwreck to *“a combination lock, a unique set of tumblers to be arranged in proper sequence for access to the vault of knowledge within”*. Teddy himself has dubbed ancient wrecks *“windows on history”*.

At the time he had first appraised Teddy’s treasures in 1955, Pete, had also inspected his full collection of recovered artifacts. *“There were swords”* he wrote *“and some encrusted steel breast plates and a dagger... graceful brass dividers used to chart a ship’s progress and a finely made brass case for an hour-glass, fragments of Chinese porcelain brought by the Manila galleon... leg irons for disciplining the crew or some reluctant slaves in*

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12 When Queen Elisabeth II visited Bermuda some years later Teddy Tucker was officially invited by the Bermuda Government who had purchased the treasure, to show the “Tucker Cross” to the Queen. Moments before the Queen arrived; he entered the display area and noticed, to his horror, that the cross had been replaced with a plastic replica. Scotland Yard and Interpol were alerted, but as of today the cross has not been discovered.



*the cargo. Medical instruments, Carib Indians wooden bows and a chief's club or staff of office, home souvenirs from the New World bought by some anonymous Spaniards, etc., etc."*

During eleven following summers, on the reefs of Bermuda, Teddy and Pete, aided by the latter's assistants at the Smithsonian, Alan Albright and James Mahoney with other divers, were to survey many of the one hundred or so wreck-sites of all periods located by Teddy and to test various new methods of search, underwater survey and recovery operations in between.

One of the most intriguing cases they were to investigate was a double shipwreck. It is recorded that the large store ship LA VIGA and her tender (and scout and "aviso"), the "patacha" or patach EL GALGO (the Greyhound) were part of an "Armada de la Guardia de la Carrera de las Indias" that returned to Spain in 1639, escorting a fleet of fourteen sails (which included the SANTA MARGARITA, the SAN DIEGO, the SANTA PAULA, a ship nicknamed RUBY and another LA VICTORIA) when they were lost in the dark of the night on the reefs, south-west of Bermuda and sank. The rest of the fleet, warned by the immediate firing of two cannons by the crew of LA VIGA was able to veer off and escape. According to routine procedures, the crew of LA VIGA manned the pumps, cut down the masts and threw the guns overboard. When daylight came, they recognized Bermuda and sighted their tender EL GALGO, ashore also "*half a league ahead, a stepping stone to shore*". Both ships were abandoned in good order with the interested help of the Bermudan authorities and of a swarm of wreckers, who filled their boats with everything they could pry off the ship or find in the cabins (as reported in detail in a Spanish account by the "mestre" of the VIGA). The survivors and passengers eventually were able to leave the island with the help of the governor, but without their valuables, which remained on the island, in the hands of the wreckers or of the administration officers.

Teddy Tucker had a good idea of the location of the two wrecks. In the late 1950s, he decided with Pete to identify a site he knew of, on the south-western reef, which was completely buried, with just a few ballast stones visible, in a large sand hole. A trace of large granite pebbles coming from the top of a reef in seven feet of water was leading to that sand hole.

Exploratory excavations were started with the help of an airlift (which the divers, at the time, called "a compressed air sand-gun"). Two feet below the surface of the sand, a layer of olive jar sherds appeared, with pieces of Majolica, broken pottery and the usual ship fittings. Probing deeper, they uncovered a major portion of the bottom of a ship, completely buried in the sand hole. The datable ceramics allowed Pete to determine the estimated date of the wreck: the mid-1600s.

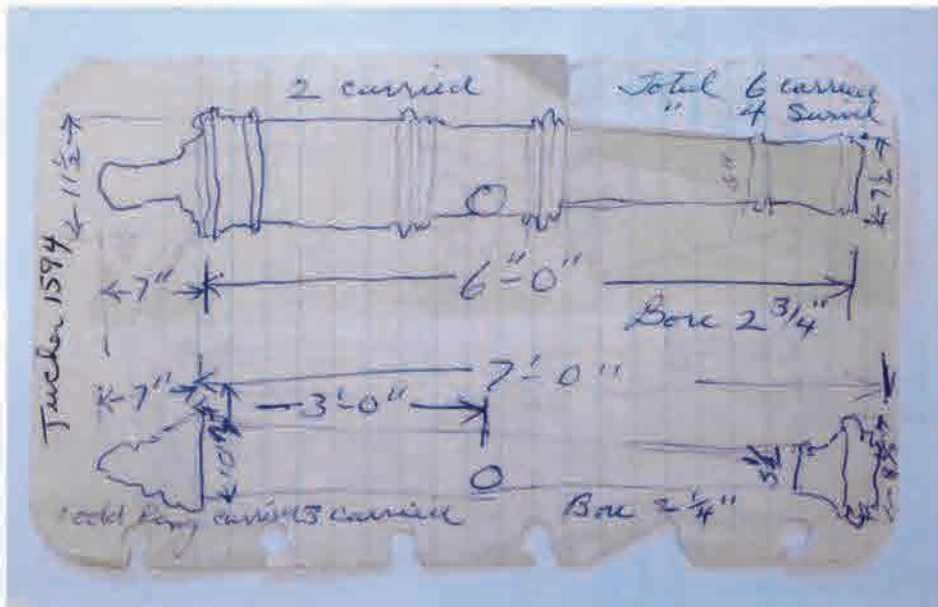
As Teddy Tucker wrote later: "*This new wreck-site was to become a major project with the involvement of the Smithsonian Institution in developing the principles of marine archaeology, perfecting the grid system and the radial arm*". Supplementary methods used for recording the wreck included photography and drawings of the structural remains.

LA VIGA had been thirty feet wide at the waterline and about a hundred feet long. From a sawed off section of her lower hull, it could be seen that she was recently built when lost. The outer hull planks had only been caulked once, so she could not be older than four or five years at the maximum. There was scant evidence of shipworm (*teredo navalis*) damage and, after the ballast was removed, the inner planking in the bilges was found to be in excellent condition, showing very little wear from shifting and/or replacement of ballast due to any careening. The dowels of treenails, on the other hand, that fastened the planks to the vessel's frame showed no evidence of extra fastening having been added at a later date. Nor was there any patching inside or outside of the hull section that was removed and, in general, no traces of wear and tear.

The complete absence of personal effects on a ship transporting seventy to one hundred people at the time



Mendel Peterson and Teddy Tucker washing a recently recovered cast iron muzzle-loader before conservation. (Courtesy T. Tucker)



The same cannon (on top) on an early sketch, made by MLP as part of his Bermuda daily field notes. It is one of the guns found in the wreckage of the naó SAN PEDRO lost in 1594 or 1595 on her way home from Spanish America and from which considerable treasure was recovered. All pieces were cast iron cannons, of the culverin and/or falconet type. Four of the recovered pieces appeared to have Spanish characteristics and were unmarked. Four seemed to be English and bore English weight marks. Various types of personal weapons and armor were found also.

of her loss was the clearest clue. No buttons or buckles, no medallions, beads or jewelry and, likewise, no eating utensils, forks, spoons, cups or personal pewter bowls or plates, all of which were normally carried on large ships of the period. The only evidence that anyone on board might have had some personal wealth (a passenger?) consisted of fragments of nine pieces of oriental porcelain and of Mediterranean type Majolica, plates and bowls. But who could tell if such pieces were the property of a passenger sailing on that fatal ship, or if they were broken items discarded in the bilge on a previous voyage.

Eventually, Pete sent a sawed off cross section of the hull to the Smithsonian, where it was preserved and used for educational projects and in an exhibit. Pete marveled at the care with which the ballast, in between the huge frames of the wreck, had been fitted with large pebbles placed on the bottom of the hull and small pebbles packed carefully in by hand, thereby fully filling the spaces between the larger stones.

In the unusually large amount of pottery that was found, he found the remains of assorted jars ranging from round squat jars as generally used in the 16<sup>th</sup> century (the so-called “olive jars”) to more elongated ones, made in Peru (the so-called “peruleras”). Large, open mouth redware jars would have been used for storing oil or water. Surely, such an assortment and quantity of containers indicated a supply ship such as LA VIGA that had been heavily loaded to accompany a large fleet. Also found were numerous barrel staves of various dimensions from eighteen to forty-eight inches in length. The largest ones were of oak, charred on the inside and would have been part of wine or water barrels. The smaller ones were made of pine and fir, probably used for sugar, grain or other dry stores. Barrels of resin still showed remains of their contents in the inside and so did small kegs or covered buckets that had contained indigo, as well as a number of chests, or fragments of chests, bearing traces of the dye.

Pete took special interest in cast iron mercury jars that were found mixed in with the ceramics and other material in the bilge for they were probably taken back to be reused. Or, perhaps, passengers or crew members had found another use for them and recycled them.

Teddy, who always had a particular interest for Majolica, was delighted to find quantities of fragments of red and yellow wares from which he identified thirty different pieces of tableware, Spanish and Portuguese, in origin. But neither pewter plates nor drinking and other vessels that were common on Spanish ships of this size for the use of officers and passengers were found. (It is unlikely that there would have been silverware on a simple supply ship). The absence of tools, of small arms and of anything easy to be taken away was also a reminder of the major salvage operations at the time of the shipwreck. As for the harquebuses and muskets of the two stranded ships, the contemporary account of the “mestre” had specified that they had all been brought ashore in good order “*with their powder flasks*”.

The stranded ships must have remained intact for a long time to mark the site and to allow the locals to fish for the jettisoned artillery. No cannons either and very few cannon balls were found. Surely the cannons of LA VIGA were not lost for everyone.

Half a league away from LA VIGA, Teddy subsequently discovered a ballast pile with many broken olive jars and salted meat bones in a position that corresponded exactly with the written account of the “mestre”. It was to turn out indeed to be part of the lost GALGO.

The GALGO had been well armed for a simple “patacha”. (Heavy cannons, twelve swivel guns and a variety of small arms for the crew, as indicated in the written account of the inquiry into her loss held in Cadiz in 1641). But no part of her artillery was to be found in her wreckage, surely the final confirmation of her identity.

From the bottom of the GALGO’s hull, a fifty foot section of the keel and a section of the portside of the



ship's bottom, seven feet wide, were exposed and studied. She was a heavily constructed ship for her size. Pete had the oak used in the construction of both ships later submitted to scientific examination and to micro-constituents analysis. A comparison was made through a similar analysis of oxides, minerals and metals present in the soil of the forests of the north coast of Spain. The conclusion suggested that the two ships might have been built in the same Biscayan shipyard.

Finally, what made the wrecks of LA VIGA and EL GALGO particularly interesting for the excavators was their close relationship. They may well have been built by the same hands, in the same shipyard or with wood from the same forest. They had sailed together and were lost together on the same mission, with complementary duties although separately. "*In the light of the contemporary accounts of the shipwreck, of the records in Bermuda and of the legal proceedings documents in Cadiz, their wreckage*" the excavators wrote as a conclusion "*actually brings to light the reality of the past*".

Except for the usual cannons photographs in the US comparatively little is known – to me, that is – of the activities of Pete, in 1956, except that he spent some time in the Turks and Caicos Islands (nothing seems to have transpired on the purpose and results of this voyage) and that he made in Port Royal, Jamaica, a first reconnaissance with Ed Link that was to prepare their joint important expedition of 1959.

The next Smithsonian-MLP expedition on the reefs of Bermuda was aimed at the remains of yet another large Spanish vessel, discovered by Teddy Tucker in 1957. An important site, it will be explored and excavated over a three year period (1958-1960) and, as a result, an authentic picture of a mixed return cargo of those days will slowly emerge that will furnish the archaeologists with, namely, new evidence of the importance of the export of simple everyday goods to the economy of the Spanish American settlements. The bulk proved to be tobacco wrapped in bundles, cochineal (the dye stuff made with the dried bodies of millions of small insects) carried in the olive jars which were at the time standard containers and indigo dye in rectangular chests (of which only the deep blue bottom remained for, as explained in one of the Peterson's publication, "*the original green color of the raw dye had been oxidized to the deep blue of the finished product by the oxygen in the sea water*"). There were also bundles of tanned leather, dyed and cut thin for the binding of books or covering of boxes and furniture, or left thick and worked into shoe soles (adults and children sizes). Small logs of *lignum vitae* were scattered over the site, the wood as sound as when it slid into the ocean. In the cargo were also a number of tortoise shells, very valuable at the time since it is from this bright, brown and yellow, partially translucent or transparent material, which commanded high price in Europe, combs, snuff boxes and spectacle frames were fashioned. Also found were Portuguese and Chinese ceramic, a large quantity of cowrie shells (well identified by Pete, as of the variety *cypraea moneta*, the small, white attractive shells native from the Indian Ocean basin) which have been used since the stone age as currency in West Africa where they are highly valued by the natives. The Spaniards at that time imported them massively from the Far East through Manila, Acapulco and Vera Cruz in order to use them in the then flourishing slave trade (at one time, just a few of them would have bought a healthy adult slave). Pete was puzzled to find, amid the coral, small billets of copper about half an ounce in weight. He assumed they served the same purpose as the cowries and were used as a form of currency in West Africa, where small ingots of the metal continue to serve as a form of currency.

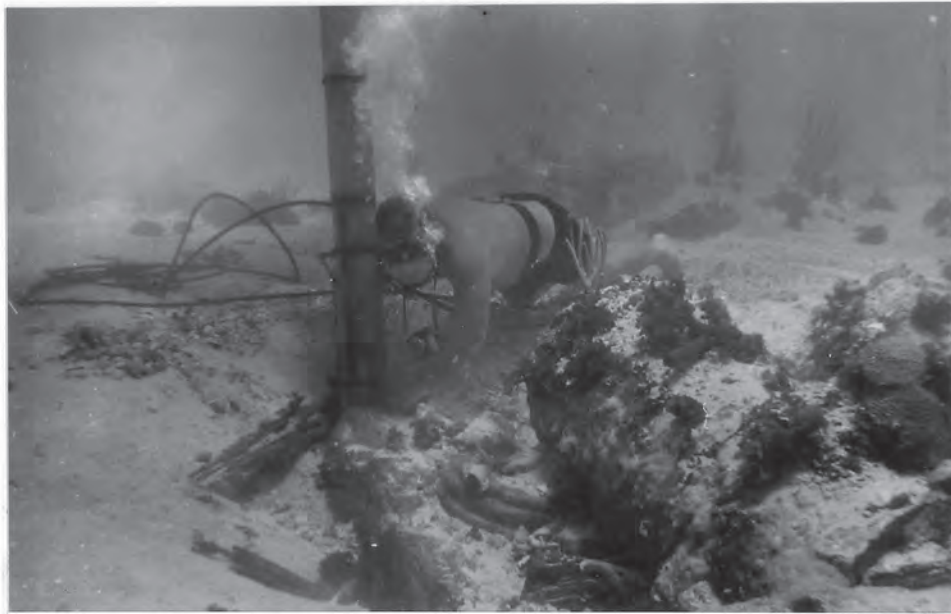
Spanish majolica and Moresque serving ware also littered the area, mixed with trade beads, combs, and crucifixes, all kinds of tools and utensils and even simple pins.

Pete was mostly interested in recording the remaining ordnance, including some of the carriage guns of the main battery and "a uniquely contrived and wired musket shot", a one of a kind projectile that Teddy Tucker suspected to be the work of an ingenious ship's armorer. Much of Teddy's diving time was devoted to excavating the keel of the vessel which, he was shocked to discover, was a laminated keel and therefore guilty of a grave anachronism since that technique was not in general use until the late 19<sup>th</sup> century whereas





Mendel Peterson sighting a musket recovered from a wreck in Bermuda. With him (l. to r.) : Robert Canton, teddy Tucker and Ed Link (Bermuda, c. 1960).



Teddy Tucker on the sand-gun or air-lift (Bermuda, c. 1960).

Photostanhs SI (above) and T. T.



Mendel Peterson studying the hull of the SAN ANTONIO (lost 1621) in Bermuda.

every indication pointed with certainty towards an early 17<sup>th</sup> century ship, probably to a Portuguese “nao de flota”.

In the end, the wrecked ship was to be definitely identified by Pete, as the SAN ANTONIO (owner: Dom Fernandino da Vera) that had set sail from Cartagena de Indias late in the summer of 1621. The ship, separated from the rest of the fleet during a storm, had run aground on the south-west reefs of Bermuda on September 13. She ran on the reef at night and remained high and dry. There were no casualties but within hours the wreck was swarming with Bermudan wreckers looting everything they could put their hands on, including any treasure they managed to find or to “obtain” from the helpless survivors. Gold in small cakes or ingots, silver in bars or in “plata labrada” (i.e. silverware and silver everyday use artifacts), coins and jewelry.

Could Teddy’s ancestors have missed part of the treasure? Teddy indicated he had checked.

Additionally to the commercial products typically exported from the New World to the old one, the wreck proved to have contained also, overlooked by the 17<sup>th</sup> century local wreckers, a cross section of the type of treasure that came at the time from Spanish America: silver pieces of eight struck in Potosi under the reign of King Phillip III, a gold ring set with three precious stones, a ruby, an emerald and a diamond, engraved inside in abbreviated Spanish with words translating as, “*Yours, now and forever*”. Two gold, crystal and pearl earrings, a set of gold buttons and a gold medallion representing “Nuestra Señora de Guadalupe”, a collection of gold finger rings set with semi-precious stones, including sardonyx and a number of gold nuggets and gold chains.

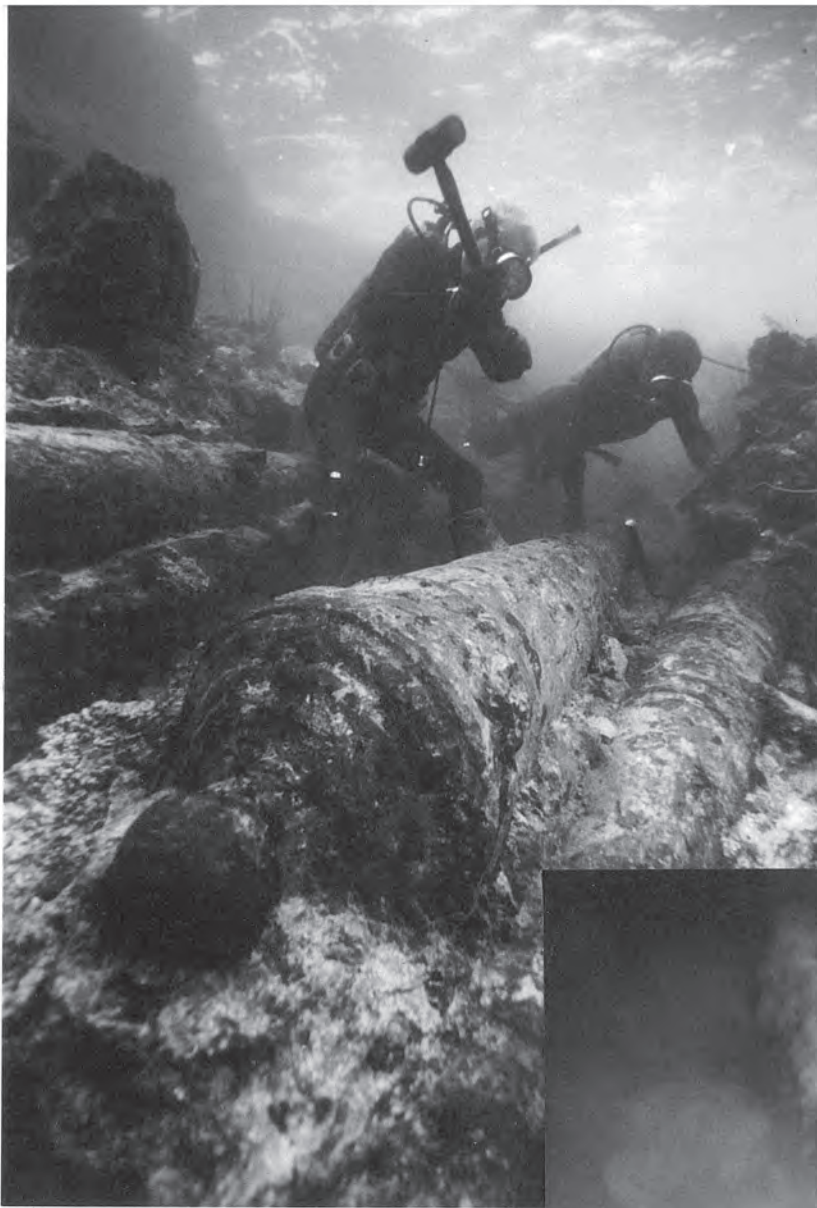
For much of the two following years, again I have lost part of Pete’s peripatetic trace. That is except for a brief photographic trip at Fort Ticonderoga, NY (and perhaps at Fort George) and for the weeks he excavated, with Teddy, the historically highly important wrecks of the SEA VENTURE, the EAGLE and the VIRGINIA MERCHANT.

The SEA VENTURE, a ship of the Virginia Company, Captain Somers, which foundered on the coast of Bermuda in 1609, led to the first settlement of that island (and, incidentally, furnished William Shakespeare with the theme for *The Tempest*). She had sailed from England with colonists and supplies for the English settlements on the coasts of Virginia and Massachusetts, direct through the dangerous waters of the North Atlantic as the English routinely did. After battering for days against adverse winds and battering seas, she finally drifted onto the Bermuda coast with, in the words of Pete, “*a hold full of water and about two hours of buoyancy left*”. By some kind of a miracle, the ship got stuck between two coral heads which held her upright, enabling the crew and the passengers to get ashore safely after the seas had subsided.

It took about a year for the crew and passengers to build boats in Bermuda and to finally reach their destination, in Virginia. But some of them remained and started a colony, who have hung on tenaciously ever since. It is from that time that Bermuda, now settled permanently, became the port of call, albeit a dangerous one, on the final leg of the journey to the coast of North America.

The wreck of the SEA VENTURE was first located in 1958 by an American diver, Edmund Downing. It yielded evidence that was considered compatible with the meager historical records on the subject of Somers’ ship, but the news of the discovery was met with controversy. In order to help settle the matter, Downing, Pete and Teddy undertook to carefully clear and measure what remained of the hull, part of which was still fastened to a long section of the keel. The general dimensions of the remains and the way the ship was built confirmed the identification along with the discovery of early 17<sup>th</sup> century pewter ware, pottery, sherds and a telltale iron gun, enough to satisfy most experts as to the ship’s identity.

The EAGLE was another supply ship of the Virginia Company, bringing to the colony her regular cargo



Hammering on iron cannons in order to break away the crust of sand and coral to reveal possible marks and inscriptions or telltale decoration.

Photo G. Crile, Jr, early 1950s



The basic “sand gun” in action to uncover the skeleton of an unidentified wreck in Bermuda. Early 1950s.



of supplies and more emigrant families. Unable to reach the entrance to Castle Harbor, on the north-east tip of Bermuda, she crashed on the coral reefs nearby and sank in relatively deep water, between two coral banks. The year was 1658.

The wreck was eventually found by Teddy in rather deep water, in between a group of sharp, barely emerging coral reefs. When it was excavated it was identified as the remains of the EAGLE. Interestingly, a large part of the cargo had consisted of wheat, sent as seeds to be planted in Virginia or Massachusetts, to feed the colonists.

The following year saw the loss of the VIRGINIA MERCHANT which had also come from England with immigrants and supplies for Virginia and, as was now the rule had repaired in Castle Harbor, Bermuda, for refreshments. Shortly after leaving the harbor, the ship was struck by a storm which threw her on the rocky south coast of the island. There she broke up, spreading on the reef her ballast, heavy cargo and the iron guns of her main battery. Incredibly, the seas carried part of the superstructure ashore. It is said that the bowsprit “*almost entered the door of a house*”. But although they were within hailing distance of the shore, most of the crew and colonists aboard died, maimed on the knife-like rocks or drowned. A dozen or so drifted into a sandy beach in a small bay and managed to save themselves.

Teddy Tucker had found in 1962, a group of large cannons lying in a hole some three hundred yards off the shore, as well as iron fittings from a ship’s rigging and tools which, from the beginning, appeared to be compatible with the wreck of the VIRGINIA MERCHANT.

In subsequent years, further explorations in which Pete always participated would furnish a complete picture of the cargo and equipment of this type of large vessels that served the English colonies in America in the middle of the 17<sup>th</sup> century. The cargoes included all the kinds of tools that were of vital importance for the emergent colony craftsmen on the fringe of an unfriendly wilderness: weapons, axes for woodsmen, blacksmith tools, hammers, moulds, pulleys and thongs, etc. Lead settings also, for window frames and small luxuries such as silverware, china, fine pottery and ivory combs for the ladies or ivory handled knives. There were quantities of lead shot, swan and duck shots, that reminded the divers of the vital importance of hunting in keeping the struggling colony fed. At the same time, cannon balls, small arms and general military supplies underlined the real dangers of attack that the colony was still facing from unfriendly savages and, further south, from hostile Spaniards. For Pete, the sherry on the archaeologist’s cake was a brass button with the caricature of the King of England, no doubt the possession of a supporter of the Commonwealth government of Cromwell, now displaced by the restoration of Charles II to the throne.

The long list of Pete’s expeditions and his obvious dedication to research and post-excavation studies may give the impression that he was a man interested only by his work. Not true, according to his family: “*he always managed to find the time to be with us*”. When Mendel Jr. once asked his wife and children “*how would you describe your husband or father or grand-father in one or two words*”, the list began with “*family-centered, good provider, generous, protective, tender, caring and fatherly*”. Mendel Jr. has shared with me an anecdote which is part of the family lore and happened at about the time this life story of his father has reached:

*“When I graduated from college and started to work, my father bought me two new suits and gave me his blessing:*

*‘Don’t take yourself too seriously,  
never loose your sense of humor,  
don’t wear your feelings on your sleeve,  
one good speech is worth a year of hard work, and,  
don’t dip your pen in company ink.’”*



As a friend and as a biographer, I have deeply meditated on such wise pieces of advice and it seems to me that they explain a lot about Pete's way of life in general and on the success of his personal and professional itineraries.

Down in Florida in the meantime (1958), wreck-hunting was becoming frantic. Another treasure hunter and friend of Peterson, Tom Gurr, had located another ship of the 1733 returning "plata flota" during a magnetometer search. She was identified as the SAN JOSE on the basis of the same 18<sup>th</sup> century Spanish navigator's chart already mentioned and Pete managed to find the time to go and assist Mr. Gurr in his salvage work. He helped to identify most of the artifacts recovered, which included gold rings, a large number of silver coins, glass amulets, pots and figurines of black ceramic ware, probably from Mexico, as well as fragments of blue and white porcelain. Most interesting to him were cast iron cannons, some of which formed part of the armament of the SAN JOSE, others being used as ballast, as well as part of the hull timbers which he carefully studied.

In 1959, Pete's new adventures will pull him away again from his beloved Bermuda. Ed Link and Pete had made a quick reconnaissance together in Port Royal, Jamaica, in 1956 and it was now to bear fruit.

The island of Jamaica had become an English colony in 1655 after Admiral Penn and General Venables were ordered by Oliver Cromwell, the Lord Protector of England, to capture bases in the West Indies from which the English could bleed the treasure routes from the Spanish Indies to Spain. A first attack on Santo Domingo was victoriously repelled by the Spanish garrison. As a second best, the English commanders decided to attack the island of Jamaica which was only lightly defended. They succeeded in capturing the capital Santiago de la Vega (now called Spanish Town) and in completely routing the few Spanish troops on the island.

Well aware that their intrusion in the Spanish West Indies did represent a threat for the whole of the Spanish Main that the Consejo de Indias and His Majesty could not tolerate, the English fortified the tip of a peninsula, which forms the southern shore of the present harbor of Kingston. There they built their settlement, using the natural defenses of the place and planting three forts around the end to cover attacks by sea. Then they put a palisade across the peninsula, cutting off the land approaches. In later years, a waterside battery was installed down the beach, commanding the channel that led to the harbor. This was done by orders of Governor Henry (Harry) Morgan, the reformed, pardoned and knighted arch-buccaneer. Under Morgan, the city now called Port Royal thrived and became the major center of operations against the Spanish trade in the West Indies and on both Americas, not only the operations of the English Navy, but worst, the repeated murderous attacks on the Spanish harbors and inland cities, and the thriving chase made by the buccaneers, at the height of their power, after the Spanish pay-ships (that carried the "situado"<sup>13</sup> to the islands) or after the mouth watering passing treasures of Peru and Mexico. The great wealth amassed by the exploits of the buccaneers, attracted merchants, craftsmen, inn keepers and prostitutes to the town in great number. Soon the place became known as "the wickedest city on earth". The activity sent the real estate prices skyrocketing. In view of the high price of land and the limited area of the town, merchants built houses of three stories all along the docks. These houses however were built on a very unstable shelving beach of sand, gravel and rotten mangrove trees.

On June 7, 1692, between 11.30 a.m. and 12 noon, disaster struck. One of the worst earthquakes in the western hemisphere dumped much of the harbor-front of the town into the sea and demolished most of the rest of the city. In two or three minutes Port Royal had been submerged or brought down and more than two thousand people, out of the five thousand population, were drowned or crushed under the ruins.

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13 The "situado" was the amount of money, usually in Mexican pieces of eight, needed according to each island's annual budget to pay the military, naval and administrative personnel and all running expenses.

Fort James and Fort Carlisle tumbled into the harbor, and only part of Fort Charles remained standing.

That is the site that, in 1956, had been explored by Ed Link and Pete, in order to determine local conditions and to make plans for a future expedition.

When they started planning, Pete, and Ed Link agreed that powerful mud digging equipment would be essential. That would call for a new salvage vessel, better equipped to handle all the specific problems encountered on this type of underwater sites. The result was to be SEA DIVER II, which Pete, described as *“the finest vessel of its type engaging in exploring historic underwater sites... She can support eight divers, has all types of electronic gear for searching underwater, can lift loads weighing up to 6 tons and offers comfortable air conditioned accommodation and she can range 7000 miles. The ship has special gear to assure ease of maneuvering and anchoring over sites to be explored. Special water jets in the bow, invented by Mr. Link<sup>14</sup>, add to the ease of handling the 164 ton vessel.”*

Designing the steel hulled SEA DIVER II from the keel to the mast tops for one sole purpose, underwater archaeological, search and excavation, building her at Quincy (Massachusetts) and equipping her took years. The vessel was launched and ready for trials in early 1959. In the same year, Ed Link resigned the Presidency of General Precision Inc., in order to devote his full time to his new passion

So, in the summer of 1959, an expedition organized and sponsored by Link, the National Geographic Society and the Smithsonian Institution assembled in Port Royal, based on SEA DIVER II. The captain is Ed Link, the purser is Marion Link, and the chief archaeologist is Mendel Peterson.

After a fuller survey of the site, Ed and Pete, decide to begin the digging behind Fort James, on some of the brick buildings indicated on old charts, next to the King's warehouse. The overburden of mud, sand, coral and debris, is 4 to 5 feet thick and it takes days to cut exploratory trenches through it. Then the archaeological level is reached and the airlift begins to uncover clay pipes, pottery, bricks, roof tiles and miscellaneous evidence of a building. It is a brick building which had a fireplace, not therefore a common home since in the tropical climate of Port Royal, cooking was done in small cookhouses separate from the dwelling. It soon became clear through the location of the fireplace and the uncovering of cooking utensils, pewter spoons, plates and platters, that the building had been one such cookhouse and, according to a pre-earthquake chart of the lots of the town, had probably belonged to the dwelling of a Mr. Littleton.

In the meantime, a team of Navy divers were going over the area with a metal detector. The first signal proved, after a short period of airlifting, to have been produced by a battered brass pot in which animal bones were found (later identified as those of a cow and a turtle). Pete observed red bricks from the interior of a fireplace and concluded that since the earthquake had struck just before noon, Mr. Littleton's chef had been cooking a beef and turtle stew in the fireplace, when the chimney collapsed, crushing the pot and its contents.

Quantities of building materials were recovered, including flat clay roof tiles, bricks, plaster fragments etc., which all confirmed the pre-earthquake descriptions of the buildings of the whole town that Pete, had gathered during the previous winter. Other sites near the Littleton house produced a collection of iron artifacts, including a steel yard with weights and a collection of iron tools, which indicated the site of a supply house or of a ship's chandler. Near the site of Fort James, the Navy team, consisting of six expert UDT men (Underwater Demolition Teams) – diving in reality more in liquid mud than in water since the silt on the bottom was stirred up by the salvage operations –, were bringing up bar shots and solid lead shots and

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14 Not quite true. Bow thrusters had equipped for some time tugs and drilling ships, but it was the first time an archaeological research vessel was equipped with such a refinement.



For many years, Mendel Peterson participated aboard SEA DIVER I (above) and SEA DIVER II, the two successive search and recovery vessels of Edwin A. Link, to the Link's expeditions off Florida and to many excavations in the Caribbean. In this photograph, SEA DIVER II is moored on the site of the sunken city of Port Royal.



A corner of a submerged building, a victim of the 1692 earthquake of Port Royal, Jamaica. It is believed it was formerly a tavern. Notice the wine bottle and the smoking pipe.

a 24-pounder iron tube, the largest gun in the defenses of Port Royal. The cannon weighed 5,000 pounds and in Peterson's opinion, was probably cast between 1660 and 1690. It bore the conventional crowned rose and the weight mark according to the English system.

On the site of the "chandler's house", the divers also turned up a wrought-iron, breech loading swivel gun, a late 15<sup>th</sup> or 16<sup>th</sup> century piece, almost an antique when the earthquake struck the town. It still must have been in service since its breech blocks were found with it.

Although a small portion only of the submerged city could be explored in the time available, the expedition recovered hundreds of objects that illustrate everyday life of the civilians and the military of Port Royal and constitutes "a valuable cross section of the material culture of an important city of the New World". But the most eloquent artifact found was a watch. A watch in a brass case with silver dials.

Inside it was signed "Paul Blondel" (a French watch maker known to have been working before 1686 in the Netherlands). On Pete's suggestion, Ed had an X-ray plate made of the face of the watch, which was covered with the usual coral and sand crust and stained with iron oxides. It revealed distinct lines where the steel hands had been. This showed the time when the watch stopped to have been seventeen minutes to twelve. Thus, the exact time of the earthquake was recorded on the timepiece of one of the victims.<sup>15</sup>

Typically, and confusingly to a point, what remains of Pete's notes show that in the same year 1959, he has visited, among other places, Cabana Fort, Havana, Chapultepec and Mexico DF, where he did photograph – guess what? – cannons and mortars.

Mexico now? Confusing? Yes and the more I progressed in my writing of Pete's biography, the more I felt the need for complete, sequential, solid, official original information.

Would the Smithsonian Institution Archives (in Washington DC) provide that? Of course, as I had expected from day one, they proved invaluable. They provided the backbone, a direction and a precise chronology to what had been up to then, I sometimes felt, a piecemeal life-story haphazardly gathered from the four points of the compass.

In the SI Archives, the wind of adventure that Pete's passage raised through the venerable Institution and that blew hard for a quarter of a century, is officially translated in administrative language as follows:

*"NATIONAL MUSEUM OF HISTORY AND TECHNOLOGY, DIVISION OF HISTORIC ARCHAEOLOGY – AGENCY HISTORY*

*The study of underwater historic archaeology at the Smithsonian was begun in 1952 by Mendel Peterson. The work was first carried out under the auspices of the Divisions of Military and Naval History. A Division of Historic Archaeology was officially established in 1969. Studies of shipwrecks in the Florida Straits, the Bahamas and the West Indies were undertaken. On Peterson's retirement in 1973 the Division was formally abolished.*

*Divisional staff consisted of Mendel Peterson, Associate Curator and Curator of the Divisions of Military and Naval History, 1948-1957; Head Curator of the Department of History, 1951-1957; Head Curator and Chairman of the Department of Armed Forces History, 1957-1969; and Curator of the Division of Historic Archaeology, 1969-1973."*

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15 The excavation of the part of the city of Port Royal that slid into the sea was continued in later years on a much large scale by Robert Marx, acting for the Government of Jamaica. Mendel Peterson has given Marx great credit for the quality of his work and the importance of his finds.



The first records I greedily went through during a week of research in the Smithsonian Archives, at their new premises of 600 Maryland Avenue, S.W., were the official papers of the divisions and departments that Pete had curated or chaired, in particular the Budget Records, the Project Records, the Annual Records, the Publications Records, the Correspondence and Memoranda, and his Biographical File. The whole was contained in fourteen big and very heavy boxes and meticulously organized. In those boxes, I found a complete list of all Pete's travels in the States and abroad, year by year and month by month, in the form of budgetary requests, subsequent grants, travel arrangements etc. Also, notes on his publications and on the lectures he delivered in the line of duty, the study of the first organization of the "Underwater Historical Archaeology Department" (yes, that suspicious new activity – or was it perhaps just a pastime? – was still placed between quotation marks), which later became the Underwater Archaeology Department, and the development, which he pioneered, of the resulting exhibits in the museum's underwater archaeology rooms.

But besides this official, SI created records and additionally to Pete's own mountains of private papers, documents and photographs that he either took with him on his retirement or constituted afterwards, I found also a large collection of his own papers that he had left in the office of the Division of Naval History, when he retired.

On February 22, 1982, nine years after his retirement, the SI Assistant Archivist writes:

*"Dear Mr. Peterson,*

*In addition to preserving administrative records, the Smithsonian Archives is also interested in documenting the careers of its administrators, historians and scientists. Our holdings include the papers of Smithsonian Secretaries, Curators, etc. These collections are as valuable and historically important as the permanent records of the Institution.*

*Upon your retirement from the Smithsonian, you left in the Division of Naval History several file drawers of research material, including correspondence, notes and photographs concerning your study of underwater exploration for your book 'History under the Sea'. The division has indicated a willingness to turn this material over to the archives. Considering your long record of valuable service to the Smithsonian as an Administrator and a Curator, we feel that your personal papers will be an important addition to our holdings.*

*In addition, we would be interested in material which you may have taken with you or have currently generated from your research. Of interest would be diaries, research notes, films and correspondence..."*

The alluded above personal papers that Pete, left in the Division of Naval History are now in the SI Archives and I have been through them with great interest. As for the material later generated from Pete's research, that was the contents of all the mountains of boxes and photo albums that I had already been through in Bermuda, thanks to Teddy Tucker's earlier initiative. It is in part from the global study of it all that the present biography has been nourished.

The part of Pete's everyday official correspondence now kept at the SI Archives in his nominal file was perhaps the most interesting to me. It is professionally organized, like the rest of the archives, and kept in perfect good order. A true pleasure for the investigator who has previously sweated and labored through the miscellaneous shoe boxes, envelopes, files, batches, bundles and wads, etc. which, as said before, hold Pete's – eh hem – "otherwise organized" correspondence in his personal archive.

To me, the correspondence Pete exchanged over many years with John S. Potter Jr. was especially interesting. The two men had met in Washington in 1960, had similar interests apparently, and Pete had endorsed John's book *The Treasure Diver's Guide*.

John had founded the “Atlantic Salvage Company Ltd.” with the sole purpose to organize an expedition that would recover the famous treasures of the Spanish galleons sunken in battle in Rande, at the tip of Vigo Bay in Galicia (northern Spain) in 1702, by a combined English-Dutch fleet.

I happen to have been, when very young, a modest shareholder of that company and one of its divers for several seasons.

John and Pete had been exchanging letters and information from 1956 to 1968. Pete had been polite enough to write (September 26, 1956): “*The area in which you are working is one of the most interesting underwater sites in the world and you should have a great deal of success in your project.*” (As a matter of fact, we did not.)

He was helping John with advice, addresses, contacts and tips and, namely, in trying to identify cannons, spikes, bar-shots and “marks” on cannon balls recovered by our team from an unidentified wreck I had come across near the Cies islands. It was a “wrong wreck”.

We were based in Bayona de Galicia by then, looking full time for the wreck of the NUESTRA SEÑORA DE MARACAIBO, a Spanish armed merchantman that had been captured by HMS MONMOUTH in Rande during the famous battle and that sank, a prize, as she was sailing out of the bay, towards England. John at the time had begun to work on his first book, *The Treasure Divers of Vigo Bay*, for which he had requested from Pete, who gladly obliged, lots of miscellaneous information and a “good, clear detailed photograph of the large silver bar” that the SI had purchased earlier from Art McKee.

John’s correspondence also refers to the visit of Pete’s friend, Edwin A. Link, in Vigo Bay, to meet his fellow wreck diver Potter as he was on his way to the ancient harbor of Cesarea in Israël. It is on that occasion that I first had the privilege to meet Ed and to hear about his early plans for saturation diving experiments. I did not loose much time in volunteering to play any part he would give me in the program. Eventually, this encounter allowed me, as the chief diver of the Man-In-Sea Project to be the first person, in 1962, off Villefranche, France, to live and work in saturation at 72 meters under the sea for about 26 hours and, in 1964, to carry (with John Lindberg, the son of Charles Lindberg) what was again the longest deepest dive ever: 2 days and 2 nights at 132 meters in and out of a “House under the Sea”, actually an inflatable dwelling anchored on the sea bottom in the Bahamas.

I was particularly amused when I discovered a letter from Edwin A. Link “*Aboard SEA DIVER, Monaco, August 31, 1962*”, to “*Dear Pete*”, that first refers to an article in the *Herald Tribune* (Foreign Edition), that told of the success of his own first dives in shallow saturation with the Link cylinder and continues: “*A young Belgian, Robert Sténuit, has volunteered to make the prolonged two-days dive at 200 feet and I believe I shall let him do it...*”

In other letters, Ed thanks the Smithsonian and Pete for their help, in particular for Pete’s “*valuable aid with the US Navy*” (the US Sixth Fleet was active at the time in the Mediterranean) thanks to which “*we received the helium, 30 bottles of it in plenty of time for our preliminary test, and now I have just received another 50 bottles...*”. In those bottles was the very helium that I was to breathe on the bottom for 26 hours and for part of my long days of desaturation on deck, still in the Link cylinder.

In another file, in the SI Archives, a collection of yellowed press clippings and carbon copies of miscellaneous correspondence on the subject of the Man-In-Sea Project revealed to me the extant of Pete’s personal interest in saturation diving. He clearly explained the reasons of such an interest in a letter dated November 20, 1962, to Pr. Lionel Casson of New York University:

*“I suppose by now you have heard of Ed’s breakthrough in deep diving techniques. We are looking to great things under water in the coming years through the use of these techniques. I feel they open up a completely new world to the investigator of historic underwater sites. Imagine what must rest at 800 to 1,000 feet in the ancient seas and in the oceans of the New World as well...”*

Yes, at the same time, his future biographer was looking forward to the same “great things under water to come in the coming years” and, yes, he was imagining very clearly “what must rest at 800 to 1,000 feet in the ancient seas and the oceans of the New World...”

History has proven both of us to be wrong. The kind of money that would have been necessary to make Pete’s and my dreams come true has been made available to the off-shore oil industry and to the Defense Department of several great powers but not to underwater archaeologists. And in any case, with all their money and perhaps wisdom, the decision makers in the off-shore oil industry have, from the start, privileged Machines-in-the-Sea and surface operated instrumentation over Man-in-the-Sea. But that is another story...

As a footnote, the long correspondence between Pete and John Potter continued in the following years as he was living in Hong-Kong and preparing the second, the revised edition (1972) of his famous *Treasure Divers Guide*. I had, years earlier, brought my modest contribution to the first edition, and John now was gathering stories of sunken treasure and information from his fellow treasure divers of all over the world to complete his forthcoming revised guide. I observed that if Pete had been, as usual, generous and helpful in his earlier correspondence, he had gradually become more reserved and, in 1968, finally declined to become involved in Potter’s new book on the ground that “*I am writing a book on the same sort myself and do not believe it would be smart to compete with myself*”. There were other reasons too, but, anyway, their friendly correspondence continued for some time, on different matters.

Back to Pete’s wanderings in the year 1959. The SI Archives told me the main reason for his trip to Mexico. Pete in fact had been invited by Pablo Bush Romero to come, assess and evaluate the large collection of archaeologically important artifacts recovered from the now famous wreck off Punta Matanzeros, Yucatan. It had been discovered two years earlier and first excavated by Bob Marx, the flamboyant American treasure hunter and adventurer and Clay Blair Jr., a journalist and author. Local rumors – they had found loads of gold bars, uncounted chests of gold coins and piles of glittering jewels (the usual in term of local rumors) – forced the Aduana, the local Customs, to stop their diving operations, recognizing in private that they were not acting illegally, but pointing out, perhaps wisely, that it was in everyone’s interest in view of the excitement of the locals against the “*malditos gringos who were shamelessly pillaging the country’s gold and national heritage*”. The major article written by Clay Blair in the *Saturday Evening Post*<sup>16</sup> had not helped.

Pablo Bush Romero, 54 was, in the words of Clay Blair “a suave Mexico city socialite... and a business tycoon”. He was a sports car amateur, a big game hunter in Africa, etc... He was very popular in the high circles of the Mexican government and was, among other things, President of CEDAM, the “Club de Exploraciones y Deportes Aquaticos de Mexico”. He did not object to being called “The Mexican answer to Capitaine Cousteau”. When Pablo Bush Romero learned of the wreck off Punta Matanzeros, he quite naturally concluded that the site was a job for Mexican nationals working under the jurisdiction of CEDAM. He petitioned the government and high-jacked the operation. In the end, Bob Marx and Clay Blair, the original discoverers of the wreck, had no choice but to join forces and work under him. The correspondence between Clay Blair and the American Ambassador in Mexico first, with the American Consul later, indicates that the interest shown in the wreck by the Smithsonian (lead by Mendel Peterson) had

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16 Clay Blair Jr., the following year, published an excellent book on the story: *Diving for Pleasure and Treasure* (Cleveland, Ohio, 1960).



been a positive factor in the final possibility of collaboration. For Clay Blair, after each of his early trips and first recoveries at Punta Matanzeros Point, had rushed to Pete's office to show him photographs of the finds, most of which he had buried in the sand near the beach. Pete, from the beginning, had underlined the great archaeological importance of the find.

The inevitable had been accepted by the discoverers and in the following years a joint Mexican-American diving team continued the excavation at Punta Matanzeros.

The excavation consisted in fact in breaking large chunks of coral from the reef and taking them to shore in order to break them in small pieces so as to reveal the very well preserved artifacts around which the coral had been growing for two centuries. The twelve thousand artifacts recovered consisted in hundreds of devotional medals, three thousand small crucifixes, three thousand buckles (twenty sizes and twelve different designs), mostly for shoes, mostly in silver or gilt brass, two thousand metal buttons, six hundred silver dipped brass spoons and forks, thirty-one pewter plates (in three sizes), intact and broken drinking glasses, metal buttons by the thousands, knife handles, two thousand beads in metal settings and a collection of rum, wine and whisky bottles.

The mirrors in the cargo were all in pieces, Mediterranean coral beads were scattered all over, and so was the pottery.

Having professionally examined and appraised the vast collection of recovered artifacts he reported:

*"Through the courtesy of Pablo Bush Romero and CEDAM, I was able to go to Mexico City and examine a complete collection of objects from the Matanzeros Wreck. That examination convinced me that this is the richest merchant ship wreck yet discovered in the Western Hemisphere. While, the ship contained little "treasure" in the classical sense of the word. It has produced a 'capsule of history' of great worth to historians of commerce and to the antiquarian... While the ship was probably British, we know that the merchant owners drew their trading cargo from Germany, France, Great Britain and, probably, from Italy. The labels and seals confirm the first three sources, while the workmanship of a cross and medals indicates an Italian origin... We can assume that the wreck was coming from Europe via Jamaica to Mexico or Cuba, for purposes of trade... According to present evidence, the ship went down in 1740. The collections taken from the site becomes a most valuable reference by which historians may accurately date similar objects found on land sites. The Matanzeros find is indeed a rich 'slice' of 18<sup>th</sup> century commercial history which enhances our knowledge of that important period."*

The ship, originally believed to have been an English merchantman in view of part of her cargo – that included many bales of English fabrics and garments found with their lead or tin maker's seals, etc – was finally identified from numerous original documents found in the Archives of the Indies in Seville. She had been in fact the "navio" NUESTRA SEÑORA DE LOS MILAGROS, alias EL MATANZERO, built in Matanzas, Cuba, hence her nickname. She was the property of the Marques de Casamadrid, Capt. Cristobal Montañó had left Cadiz in late 1740 with the Flota de Nueva España. Punta Matanzeros had thus been named after the nickname of the ship that was lost on it.

In Washington in the early 1960s, most of Pete's work and the work of all his colleagues, consisted in preparing the transfer of the Department's collections to the new building of the National Museum of American History, on Constitution Avenue, where a huge, squat, bunker-like building was nearing completion. In a letter he wrote on February 12, 1962, he, the Head Curator of the Armed Forces History, briefly describes his plans to the President of the "International Association of Arms and Military History Museums":

*"The new exhibit halls to be opened by the Department in the fall of 1963 will have 30,000 square feet of space devoted to the military and naval history of the United States. The largest exhibits in this area will illustrate a*

*chronological history of the United States Army, Navy, Marine Corps and Air Force from the earliest period to the present time.*

*The exhibition will content hundreds of original objects, prints, paintings, photographs and maps. The complete history of the development of ordnance will be illustrated in another series which will contain several hundreds of fire arms and weapons from the earliest time to the present. Another hall will be devoted to military heraldry.*

*Yet another hall will be devoted to the subject of underwater exploration and the salvage of wreck-sites of naval and merchant ships. This exhibition will also contain a short history of diving.”*

Perhaps the most important single specimen exhibited in this entire area, a tangible relic of the American War of Independence, was to be the gundelo<sup>17</sup> PHILADELPHIA. A single English 24-pound shot had sent her to the bottom of Lake Champlain on October 11, 1776, on the first day of the Battle of Valcour, lost by the outnumbered General Benedict Arnold. There she remained intact and upright for the next 159 years. This gunboat, along with a collection of 700 associated objects, had been received by the museum in 1965, by the bequest of the late colonel L. F. Hagglund of Middlebury, Vermont, the salvage expert, who had found and raised it in 1935 and displayed it since as a tourist attraction. The continental gundelo PHILADELPHIA is in reality the oldest surviving, intact, American man-of-war. The hull and decks were exceptionally well preserved in the fresh waters of the lake and safe from teredo worms and so was much of her ground tackle, mast, yards and cruise equipments, as well as the three guns and carriages of her main battery, and one of her eight swivel guns.

The last time I visited the National History Museum, the gunboat PHILADELPHIA seemed to be the most crowded exhibit and most of the week-end viewers were young to very young.

Early in 1961, Pete received a letter from Sir Arthur C. Clarke, C.B.E. The famous science-fiction writer and Oscar nominee for “2001: A Space Odyssey”, the inventor of Geostationary satellite communications, had long settled in Ceylon (Sri Lanka). He had taken up diving and, one day in 1961, as he was searching an underwater reef, part of the Great Basses Reef, (near the south-east point of the island) for a convenient location for an underwater movie he had in mind, he discovered cannons and then a wreck. The wreck turned out to be the later-to-be-so-called “TAJ MAHAL WRECK” and it had been carrying a very heavy load of silver rupees indeed.

Pete, obviously was the expert – who else? – Whom Sir Arthur did call on for help and advice and in the same year, he gladly undertook to identify the coins. These had evidently been packed in coin sacks, 250 years ago, (about 1,000 coins per sack), which were in turn packed several sacks to a wood chest. The coins were found solidly concreted together in lumps, in the shape as they had once been transported in the original coin bags that had long rotted away. The coins in the middle of the lumps were found in perfect mint condition (they all seem to have been uncirculated coins) and the outer coins proved to have one side perfectly preserved also.

Pete reviewed and assessed the recovered specie and identified the coins as Surat rupees minted during the reign of Muhammad Aurangzeb Alamgir (who ruled from 1658 to 1707, European style), better known as the “Aurangzeb period”.

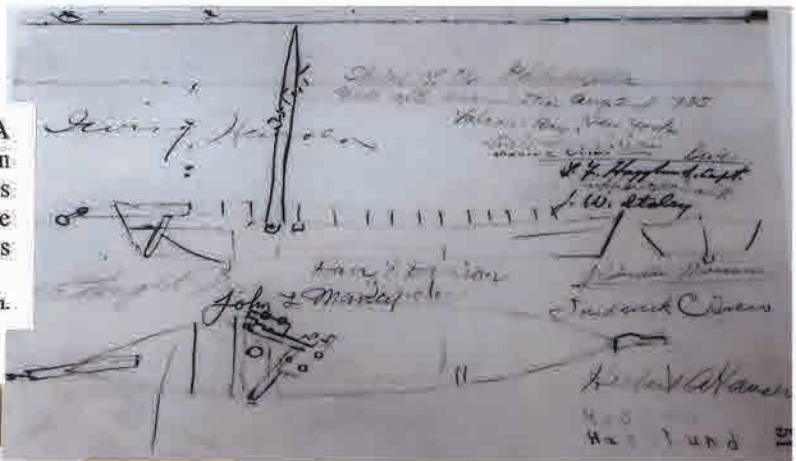
Even for Pete, identifying and assessing such exotic coins was no easy job. Aurangzeb, he discovered, had used, during his reign, forty-seven different mints and had also introduced a new style of coins. During

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17 Or gondola (sic), a gunboat.

The "gondola" or gunboat PHILADELPHIA sent to the bottom of Lake Champlain on October 11, 1776 by one English 24-pounds shot. She remained intact and upright in the fresh water of the lake for the next 159 years and was relocated and salvaged in 1935.

Photo Smithsonian Institution.



Bar shot recovered from the mouth of the Philadelphia's bow gun

A sketch made by one of the hard-hat divers of Colonel Hagglund of Vermont, the salvage expert who organized its raising in 1935.

Photo Smithsonian Institution.



Diving operations in the summer of 1935.

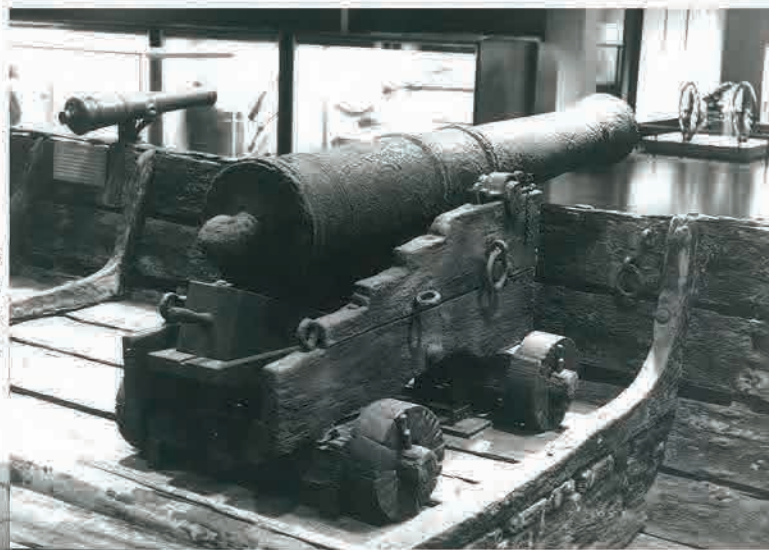


The PHILADELPHIA soon after it was salvaged. The cannons, ammunition and kitchen utensils, etc., were removed before raising.

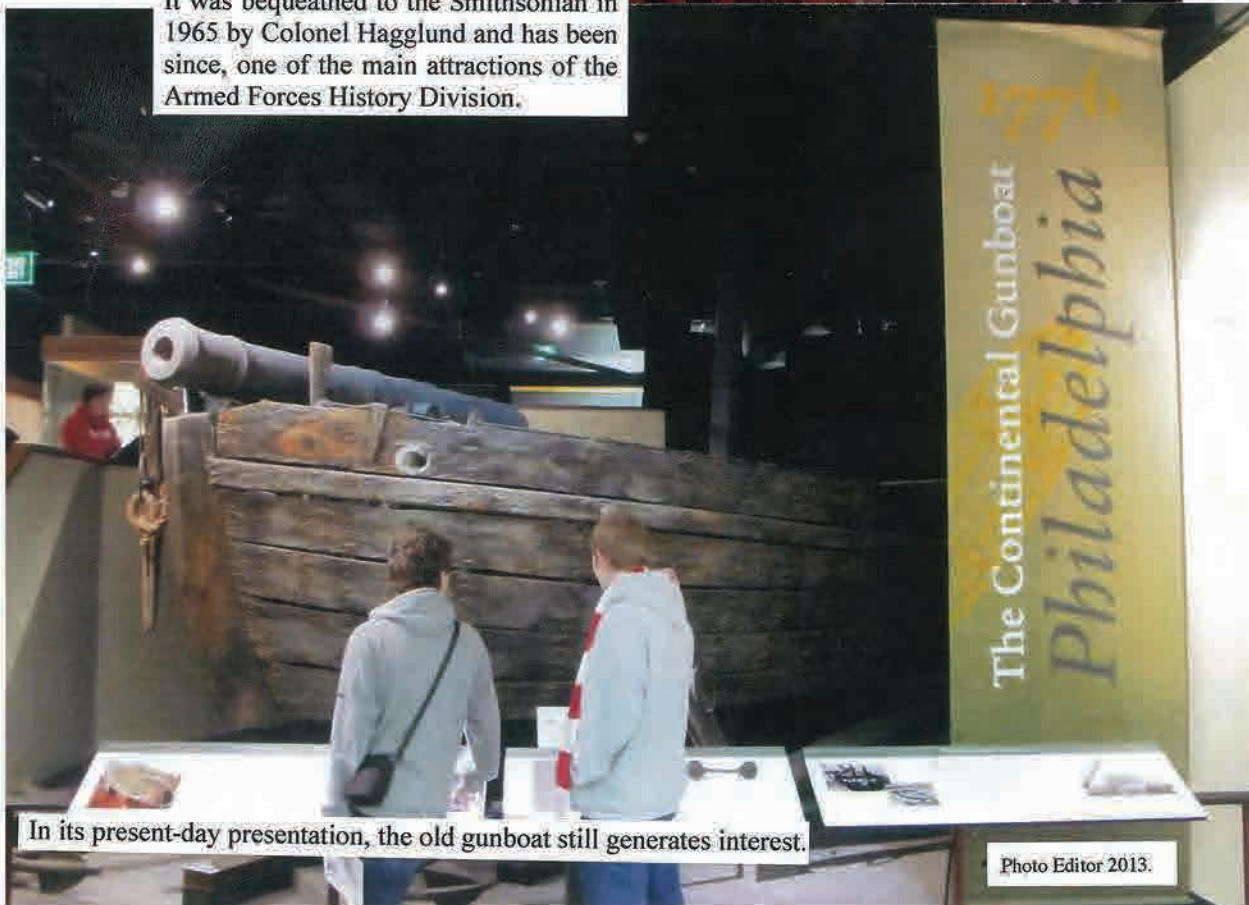
Photo Smithsonian Institution.



The original presentation of the PHILADELPHIA in the American National History Museum, which was organized, in part, by Mendel Peterson.



The PHILADELPHIA is the oldest, surviving intact American man-of-war. It was bequeathed to the Smithsonian in 1965 by Colonel Hagglund and has been since, one of the main attractions of the Armed Forces History Division.



In its present-day presentation, the old gunboat still generates interest.

Photo Editor 2013.

his 48 years on the Moghul's throne, the Surat mint alone had issued forty-six varieties of rupee coins, on which of course all inscriptions were in Arabic, and all names highly conventional and laudatory in meaning; all dates were Islamic (or AH, "after the Hegira"). At the end of the year 1961, a grateful Arthur C. Clarke presented Mendel Peterson with a fine selection of his rupees, together with a lump of 600 coins amalgamated together "in recognition of his research assistance regarding the treasure". Additionally, the Smithsonian Institution was sent a bigger lump yet, containing an estimated 1,000 silver rupees, which is described in the SI Archives as follows:

*"Accession record 239761 – December 7, 1961.*

*Donated by Mr. Arthur C. Clarke.*

*A cluster of approximately 1,000 silver rupees dated 1702, found off Great Basses Reef, Ceylon, by Mr. Mike Wilson."*

(Mike Wilson was the co-discoverer of the wreck with Arthur C. Clarke. The lump was exhibited for a long time in the Underwater Exploration Hall of the N.M.A.H.)

A final precision is perhaps necessary: the wrecked ship, a 24 guns Indian trader, is unrecorded and its belated christening as "THE TAJ MAHAL WRECK" was strictly for commercial promotional purposes, the connection being tenuous. It is Shar Jahan who, in 1628, built the Taj Mahal mausoleum for his wife Mumtaz Mahal. The said Shar Jahan was the father of Emperor Aurangzeb or, Shar Aurangzeb Alamgir, the last great Moghul Emperor under whose reign the coins of the great Basses Reef wreck had been coined. There ended the connection.

An additional refinement of the marketing yarn, worded by a later retailer, had it that these were "special" silver rupees which were being sent "to the Orient" there to purchase exotic silks, furnishings and the like for the Taj Mahal Palace... Pete always steered away from such lovely stories and was careful to keep himself retired on his own numismatic hard ground.

Annotated photographs again help to establish that, in April 1962, he visited the Mariner's Museum of Newport News, VA. It was his habit to combine several such visits in one trip and, surely, he went to other museums of the East Coast on the same occasion.

\*  
\* \*

As a biographer, I have been incredibly lucky in receiving the help and contributions of Pete's children: Mendel Jr. whom I have quoted several times already, and LaNelle. It is thanks to their irreplaceable inputs that I am able to make Pete alive, or so I hope, as a human being in flesh and blood, not only as a Curator, diver, numismatist and archaeologist but as a man who loved classical music (that he listened on WGMS-Washington The Good Music Station), that I can report his preference for reading the *Evening Star News*, specially the comic strip "Pogo", which always gave him a good laugh (it was not funny his daughter thinks), as Smokey, his black Cocker Spaniel sat next to him on the sofa, that I can hear from here – and so do my readers I hope – his bursts of loud laughter as he would read *Samuel Pepys Diary* (he loved Pepys and remarked that so much history could be learned from reading old diaries) and that I have to marvel at his having read all of Shakespeare, which, it is said, he accomplished in just a few evenings. He would read all of Sherlock Holmes or endless books about Roman and Greek coins. "I think – his daughter continues – he could comprehend a whole page at a glance, remembering everything he had read, and then tell us all about it at our next dinnertime as if he were talking about the adventures of our aunts, uncles and cousins."

On the other hand, Pete, an unconventional man, as we have had occasions to notice, was not a religious person: “*When Dad’s mother – his daughter writes – our Grandmother Peterson, came to dinner she could get him to fairly flip his lid by asking, ‘Mendel, why don’t you join the church?’ Meaning the Mormon Church. He would then go into a tirade about organized religion, any religion. He believed children should not be allowed to go to church until they were at least sixteen years old so they wouldn’t be brainwashed and warped.*”

Married life of course is a more serious; a deeply personal, enormously important part of anyone’s life and, again, it is to Pete’s daughter that I owe the following lines:

*“Dad and mother were both passionate and brilliant people. They made it through WWII and their years together at the Smithsonian. The storms would come and go. Mother fought him toe to toe. They could cut each other to ribbons with their razor sharp tongues then make up and appear to be crazy about each other. They loved, they laughed and they fought to the death of their marriage. He always loved her... Afterwards, mother carried on at the Smithsonian, never remarried, spent quality time with her children, her grandchildren, and her many friends. She died of cancer in 1971.”*

So, Pete now divorces and remarries (the dates are May 16, 1962 and August 19, 1962). His new wife is a charming little brunette by the name of “Trudy”. Trudy was born Gertrude Auvil, in McLean, Virginia. She will give him a daughter, Victoria or “Vicky” (later Victoria Peterson Weitzel of Laurel, Maryland).

#### The Cannon Hunters’ Association of SEATTLE



In the early 1960s, Mendel Peterson became member of CHAOS, joining a number of his friends, all of them members of the Club of “Cannoneers”, including Ed Link, Art McKee, the Criles, Pablo Bush Romero and Teddy Tucker. (Teddy Tucker was cannonized in early 1963 by the Great Guns of CHAOS for “his recovery of an old cannon from a historic shipwreck as featured in Life Magazine”.

CHAOS was born on April 13, 1949, when Seattle, Washington, was badly shaken by an earthquake. During the bumping, creaking and general disorder, a unique organization was born – Cannon Hunter Association of Seattle – which soon had “membership in most parts of the civilized world and in many uncivilized spots”. When the founder, Donald H. Clark, and his journalist son, Donald R. Clark, wrote on the name they selected, they found that the initials spelled “CHAOS”!

At the time Mendel joined the association, there were 1,150 members, scattered “from Heller, Kentucky, to Brekke, Norway”. Since then, CHAOS has flourished on many of the Pacific islands, including Tonga, Samoa and Pitcairn, and in Africa, Burma, Australia, South Vietnam, Honduras, Bermuda, England and Scotland, Turkey and dozens of other foreign countries.

The major activity of the members – sorry, I mean the “Cannoneers” – are proceeding to chaotic recoveries of old



cannons. When he joined, Pete learned that at that moment members had reported the “recovery” of 473 old cannons in various places around the world. In the June 1963 CHAOS Annual Report (that issue is stamped with the following note: “This edition was written in June and published in October. That’s CHAOS!) We read: “We have reasons to believe that many of these were procured by legitimate means”. The same report further assured its readers that “Although we do not dictate the morals of our members, we state emphatically that none of our Cannon Hunters are presently incarcerated in any prison, jail or penitentiary – to the best of our knowledge!”

The hierarchy in the association goes from “Great Guns” to “Head Hunters” to mere members, the “Cannoneers”. (CHAOS has always been proud to point out that as an organization they have more members in the Explorer’s Club in New York City than any other known organization.)

The headquarters of CHAOS were at Cannon House, Lawton Wood, Seattle 99, Washington (where, by the way, members – and members only – could purchase “the famous CHAOS Patch in gold and silver thread on a red velvet background”. Official occasions included “Chaotic Dinners” and occasional awards of cannonizations (for instance for recovering a fine cannon from a junkyard where it was in great danger to be melted for metal), or of CH. D. degrees, or of the Order of the Purple Lanyard by the Honor’s Committee. Private activities on the other end included “Chaotic Weddings”, involving two (only) Cannon Hunters in good standing. When such wedding ceremonies are perpetrated, they involve obviously the firing of several guns. (A modern variation in a way of the long known “Shot Gun Wedding”.)

Mendel and LaNelle had been an extremely sociable couple. They had created the tradition of a yearly event at their home in Virginia: The “Annual Meeting of the Glubbers” or Members of the Glub Club. Mendel Jr. vividly remembers his mother, an outstanding cook, “*endlessly cooking for the event*”. The event had started in the late 1950s and after Mendel and LaNelle’s divorce, the annual event was successfully continued by Trudy. There were usually 20 to 25 diving notables attending, Mendel Jr. remembers: the Tuckers, the Links, the Criles, the Albrights, the Ellis, Mel Fisher, and Dr. Carmichael from the Smithsonian wouldn’t miss one meeting.

From the annotated invitations in Pete’s records, it appears that the attendance at the meetings of 1963 and 1965 also included the top brass of the National Academy of Science (Life Science Division) and of *National Geographic* (including Mel Paine and Louis Marden), leading underwater physiologists, and at least two Admirals.

On a typical invitation card, the program of a meeting reads:

*“Meeting comes to disorder: 7:00 PM*

*Rushing the bar / Heavy to moderate drinking: 7:00-9:00 PM*

*Emergency rations: 9:00-10:00 PM*

*Rest period (illustrated): 10:00-11:00 PM*

*Bushing the Bar / Occasional bursts of conversation: 11:00-12:00 PM*

*Contingency: 12:00 PM -??????”*

At about the same period, Pete was also an eminent member of the CHAOS Association, an international society of demonstrably insane cannon lovers whose idea of fun was to gather at each other’s place or in some muddy open field in order to shoot, in great ceremony, the cannons in their collections, strictly following ancient drill and regulations and barking the right successive commands for cleaning, loading, aiming and firing each piece. A number of museum’s Curators from the UK and the continent were active members, I remember, of the club. So was Teddy Tucker.

Pete, has been working hard for the last ten years – and very methodically on this occasion, as the Mendel Peterson archives of the SI reveal – on his “Manual for Underwater Exploration”, to be titled *History under*

*the Sea*. Now, in 1965, he is ready to publish the first edition of his ground breaking book (Smithsonian Publications, n°4538). No such book had ever been written. Up to that time, as he wrote “*the serious underwater explorer would find no serious volume to which he may have turned for instruction on exploration, recovery and preservation techniques, and for identification of artifacts*”. The purpose of his book was to meet that need “*at least partially*”, he modestly wrote.

The introduction of the book is a classic and it needs to be quoted in part because it reveals so much about Pete’s personality and concerns:

*“For most of his life on this planet man has been a traveler... As simple commerce developed, he traveled land trails and ventured timorously along rivers or coastlines in search of trade. With the beginning of the ancient civilizations in the Mediterranean basin, he began to put to sea in ships and to venture to far-off lands to conduct war or to search for exotic products with which to make his life more comfortable or more interesting.*

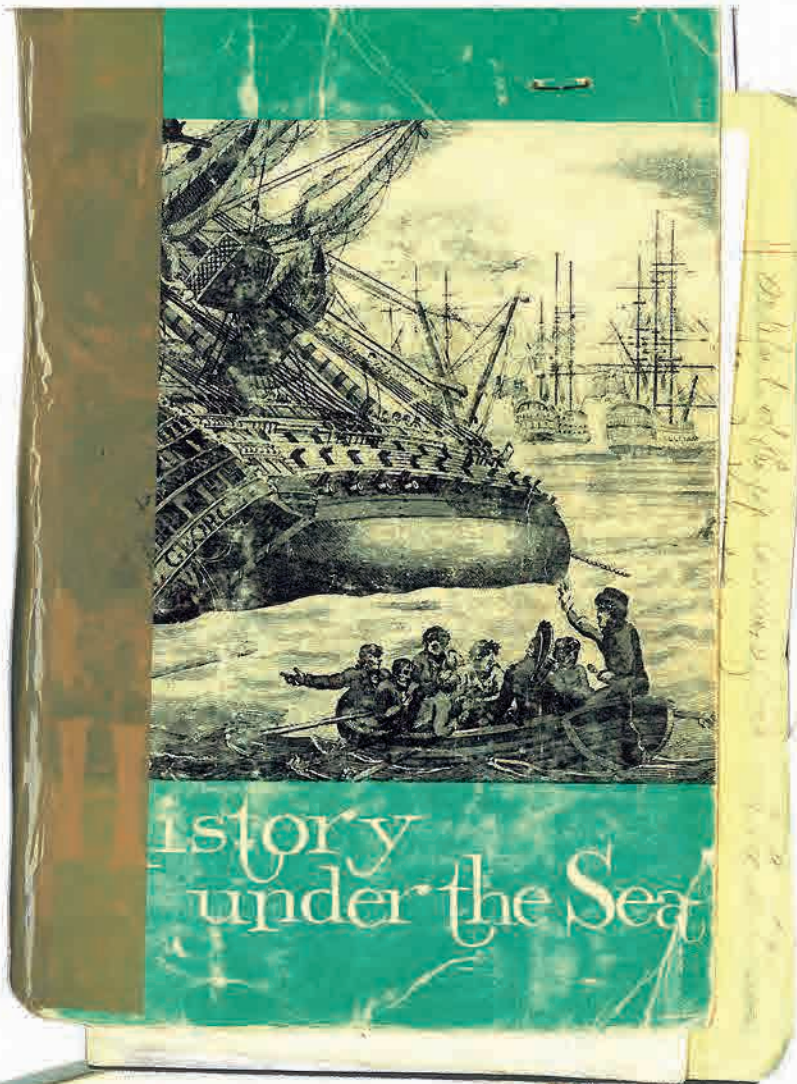
*Man is not only a traveler but is also a changer, user and destroyer. He converts the products of nature to forms which make them of utility; he uses objects and in so doing frequently breaks them, wears them out, or looses them. He attacks his enemies, looting them of their goods and destroying what he cannot carry. And because man is a changer of nature, he is the untidiest of God’s creatures. The course of his migrations across the world’s land masses may be traced in a line of broken buildings, broken tools and dishes, and the refuse of his kitchens.*

*It is indeed fortunate for the archaeologist and historian that man is such a slovenly being. Had he been neat and orderly, had he swept up his trash and burned it, and carefully ground up his broken pots to use the material for other purposes, we would be in almost complete ignorance of him. One can only speculate on the unfortunate archaeologist of 500 years hence who will be investigating a civilization which knew the use of the great incinerator that reduced all matter to a shapeless mass.*

*As man scattered his untidy remains across the continents, so did he scattered them in the shallow waters fringing those continents. When he ventured along the coasts in pursuits of trade, he exposed himself to sudden disaster by stranding or storm. From the earliest days of maritime navigation the wrecks of ships began to pile up in coastal waters and more rarely in the deep waters of the open sea when traders began to venture there. The very suddenness of such disasters has made these underwater shipwreck sites, in effect, accidental time capsules. Thus, there is deposited in the waters of the world a mass of material – dating from the earliest historical times to the present – capable of being located, recovered, identified, and preserved. Such a mass of material will give historians and archaeologists a priceless collection of objects that can be identified accurately as to period and that will in turn furnish an index to the material remains of Western man from the beginnings of his culture.*

*Until the 20<sup>th</sup> century even the shallow waters fringing the land masses of the world remained largely “lost” to archaeologists and historians. These waters now are easily accessible to divers using equipment perfected within the past 25 years.... Students now may go beneath the sea to recover the remains of ships and sunken land-sites which promise to be of the utmost importance in the study of historic archaeology and naval and commercial history.*

*Another and darker side to the picture exists. The very accessibility of these underwater sites has made them vulnerable to destruction by divers who are not informed on the techniques by which a site may be systematically explored and by which objects from it may be recovered, preserved, and identified. In the past 10 years many sites have been destroyed or poorly and improperly explored. Thousands of artifacts from them have been allowed to disintegrate. This has not, in general, been the fault of the divers but rather is owing to a lack of information which could have prevented this loss. There is no single volume to which a serious underwater explorer may turn for instruction on exploration, recovery, and preservation techniques, and for the identification of artifacts. ... It is the purpose of this book to meet that need – at least partially...”*



The personal copy of the editor, much used and consulted over the years and heavily worn today.

# HISTORY UNDER THE SEA

A Handbook for Underwater Exploration

By  
MENDEL PETERSON  
Chairman, Department of Armed Forces History  
Museum of History and Technology  
Smithsonian Institution

To Robert Stewart with  
all good wishes for  
continuing success underwater  
Mendel Peterson  
"Bele"  
10/12/69

SMITHSONIAN INSTITUTION PRESS  
CITY OF WASHINGTON

1967 edition.

To Robert Stewart  
with very best wishes  
Mendel Peterson



Partially? In actual fact, incomplete as it had to be, the book opened the eyes of a generation of wreck divers and, today, nearly half a century later, there is hardly a word to be changed.

The carefully illustrated text deals with all aspects of the underwater exploration and the archaeology of ancient ships. It tells of the search techniques, the recording techniques, the condition of underwater sites, the recovery techniques, the preservation and conservation of organic and non organic materials recovered from the sea, the ways of identifying a shipwreck site through the internal evidence, of its cannons mainly, but also of its coins, the ship's fittings, the hull sheeting, the nails, the ceramic material, the smoking pipes, the glass bottles and other objects, the wood of the hull, the treenails and the ballast. Most of it is the result of his own personal experience over the years and, additionally, he gives advice on how and where to obtain whatever external evidence may exist. His bibliography also was at the time a godsend for amateurs, professionals and academic divers and historians alike.

*History under the Sea* was, in a way, in part, the embryo of the magnum opus of Mendel Peterson, the "Encyclopedia" that he never could publish, but being short and much wider in scope it was necessarily superficial.

As a result anyway, Pete is now enthroned as the greatest expert around on wreck artifacts, particularly on coins and on cannons identification.

The book went through a number of successive re-editions and the archives of the Department of Armed Forces History of the SI are, literally, replete with letters of divers and historians, who inquire desperately about the often out-of-print book.

*History under the Sea* was dedicated "To Edwin A. Link, inventor and underwater pioneer, who's financial support and kindly guidance have made possible the experience upon which this publication is based". I, myself, am the proud owner of several, kindly inscribed, much worn out and annotated successive editions.

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In 1965 also, as *History Under the Sea* was published, and beginning selling briskly, the matter of publishing Pete's work on the marks and illustrations on artillery pieces arose as the next publication project.

An exchange of memorandums (April 28 to May 14) between a number of colleagues and bosses of Pete, clearly explains the position of each one.

In early April, Pete has sent an early draft of his incomplete work on artillery to John S. Lea, who is in charge of publications at the US National Museum (that is in fact at the Smithsonian). The same John Lea then sends a memorandum to two colleagues, who are one way or another involved in the decision making process, a Mr. Bedini and a Mr. Pineau. The date is April 28, 1965, the subject:

"Acceptance of *Art on Artillery* for Publication as a Bulletin of the U.S. National Museum".

(At the time, such was the title chosen by Pete for the mammoth work which he later came to title *An Encyclopaedia of Marks* [or he sometimes wrote "of Marking" or "of Markings"] and *Decoration on muzzle-loading Artillery Pieces*.)

John Lea begins by giving his personal opinion as the would-be in-house publisher of the work he has perused:

"It is at once evident that Mr. Peterson has put a great amount of work into *Art on Artillery*. Nevertheless, in his Introduction he calls it a preliminary report, and he tells me that it represents his review of only part of the

*collections available in museums here and abroad. To complete this task, he estimates, will take several years. If this work is, as I believe, worthy of Smithsonian publication, it is worth whatever further time and effort is necessary to make it a definitive monograph – one that will immediately be accepted as an essential and respected research tool for the historian and collector. The author should be highly commended for the thoughtful effort already expended, but more importantly, he should be encouraged and assisted in every possible way to complete it expeditiously.*

*The following analysis accepts the present text for what it is – a first draft – and is intended only to indicate the extent and direction of the work needed to complete Art on Artillery...*

John Lea then switches to the practical matters involved:

*“... the text itself is not complete... lacking are the necessary front matter, descriptive introduction for some sections and legends for many of the plates... additional foot noting also needed... plates reproducible in their present condition but their arrangement can be considerably improved...”, etc.*

The following lines might have, I suspect, sounded ominous to Pete, to whom a carbon copy was sent:

*“When the book designer has worked out the pages size and arrangement, the individual photos can then be turned over to a professional lay out artist for sizing, cropping and mounting. Only in this way can a truly professional book design be obtained.”*

Surely, these lines must have sent shivers down the spine of Pete who didn't care much, if at all, to produce a pretty book, who most certainly didn't think much of “book designers” or of “professional lay out artists and stylists”, and who knew that he was the only one able to sensibly size, crop and mount the photographs that he had selected with great care and no doubt after many hesitations. Obviously, what Pete wanted was a serious book, an informative, useful manual, a teaching tool and not a posh coffee-table conversation piece.

In the next paragraph, the author of the memorandum raises the flag:

*“... In preparing the final draft, every effort should be made to develop in text and illustrations any Smithsonian connections to the subject. None are at present evident.”*

This was the easy part. It sufficed to point out that it was the SI who had paid for a good part of the project from the beginning and would continue to finance more work on it, that the Institution had showed its usual foresight again in the occasion, as well as its wideness of mind in selecting the field of research that it allowed his collaborators to specialize in etc., etc. All that would have been absolutely true.

But then came another disquieting note:

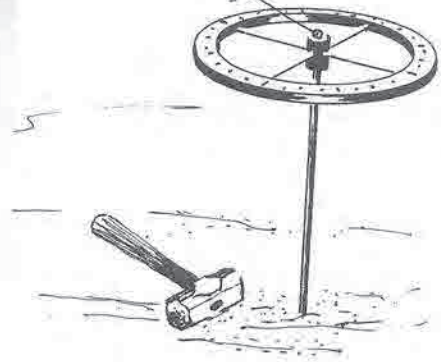
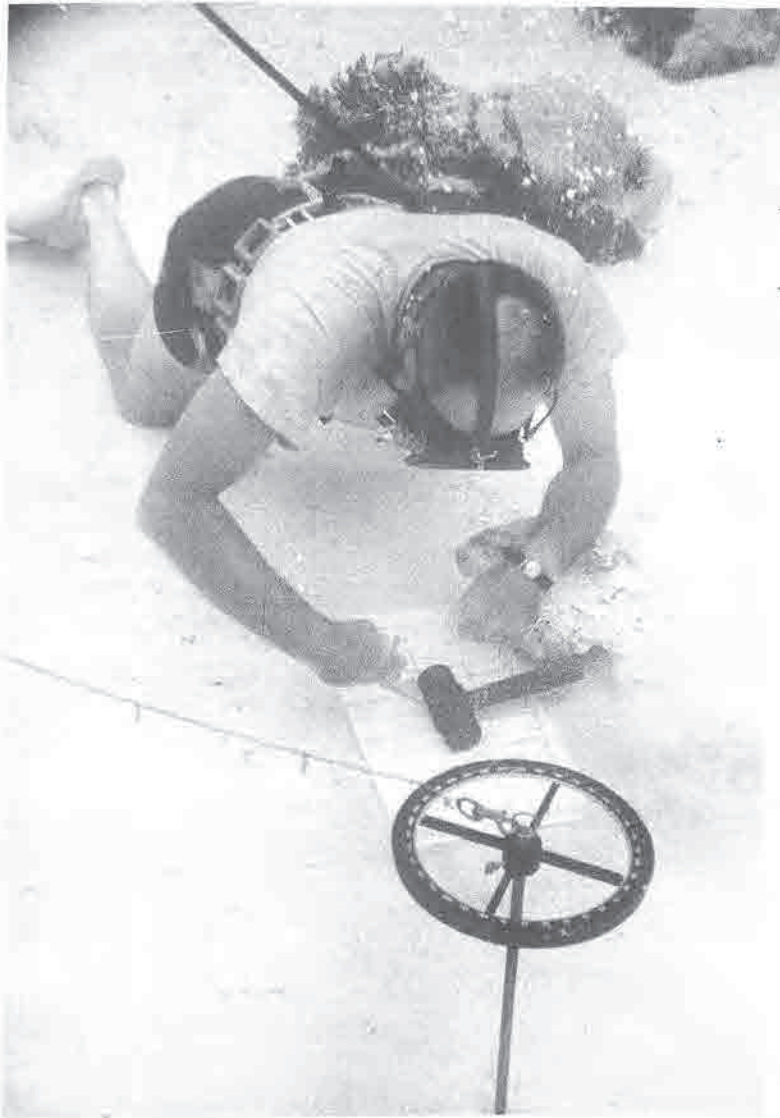
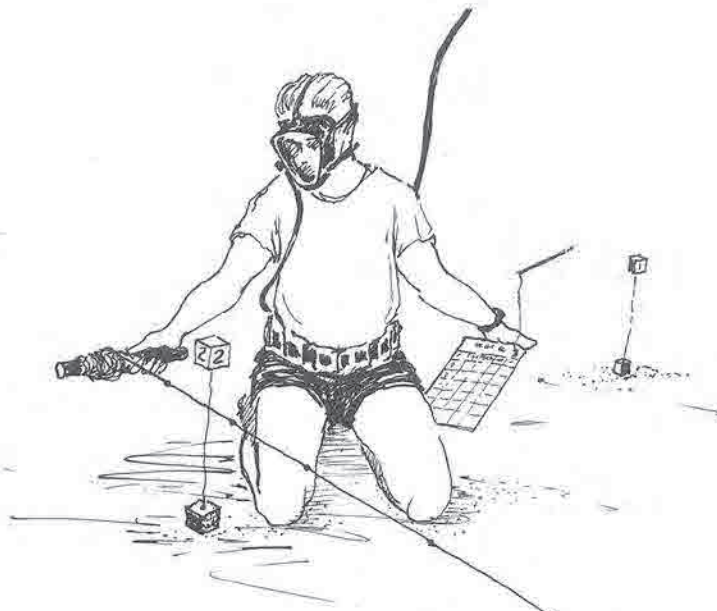
*“Before the final typing of the edited manuscript... E & P [?] should have an opportunity to review it again for design considerations...”*

After which the last lines of the memo certainly brought solace to Pete,:

*“This work is representative of the sort of publication we are uniquely equipped to prepare and publish. With your office and ours cooperating to help the author get his research into print, we should have a book that will reflect credit on all concerned particularly Mr. Peterson, who has worked so long and against such odds to get the manuscript to its present state of completion.”*

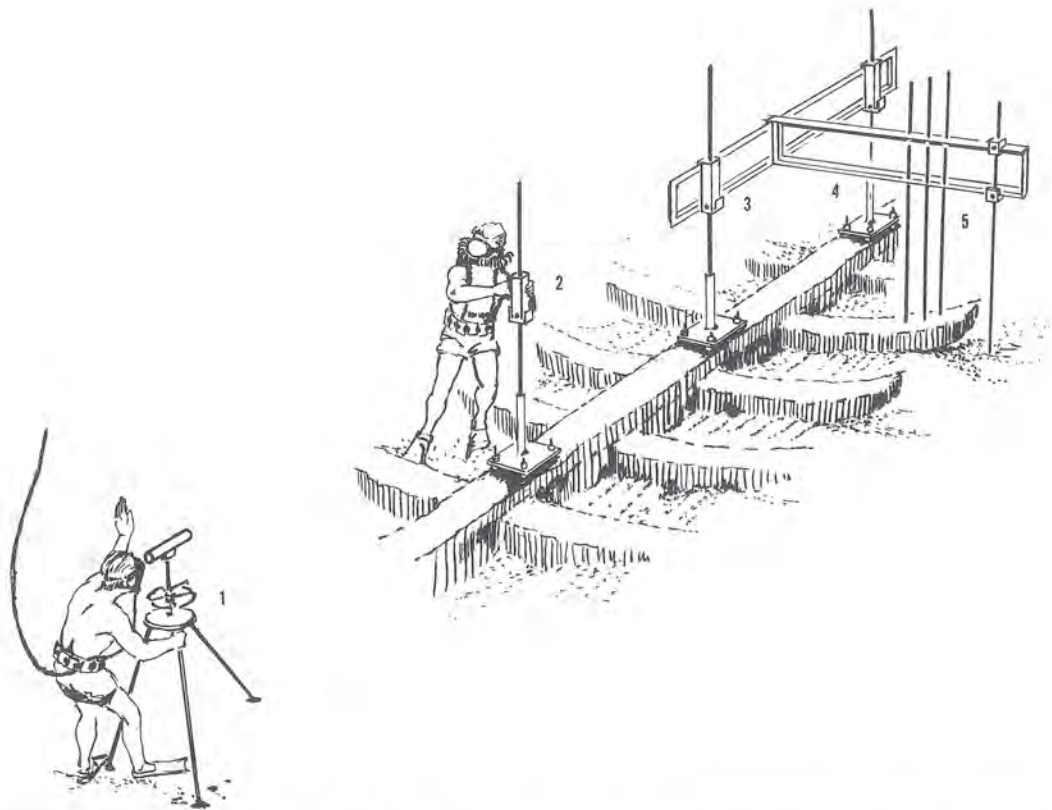
A number of behind-the-scene conversations – of which I have found no trace – no doubt took place and Pete, surely said what he had to say in his usual direct way. One echo of it is to be found in a “Memo Routing Slip” dated May 10, 1965, signed Roger Pineau, and sent to Mr. Bedini and Mr. Ewers:

*“I agree with Lea comments and would like to have your views since Pete is edgy about this and might be given to dropping it entirely. The work has high potential, could be authoritative.”*

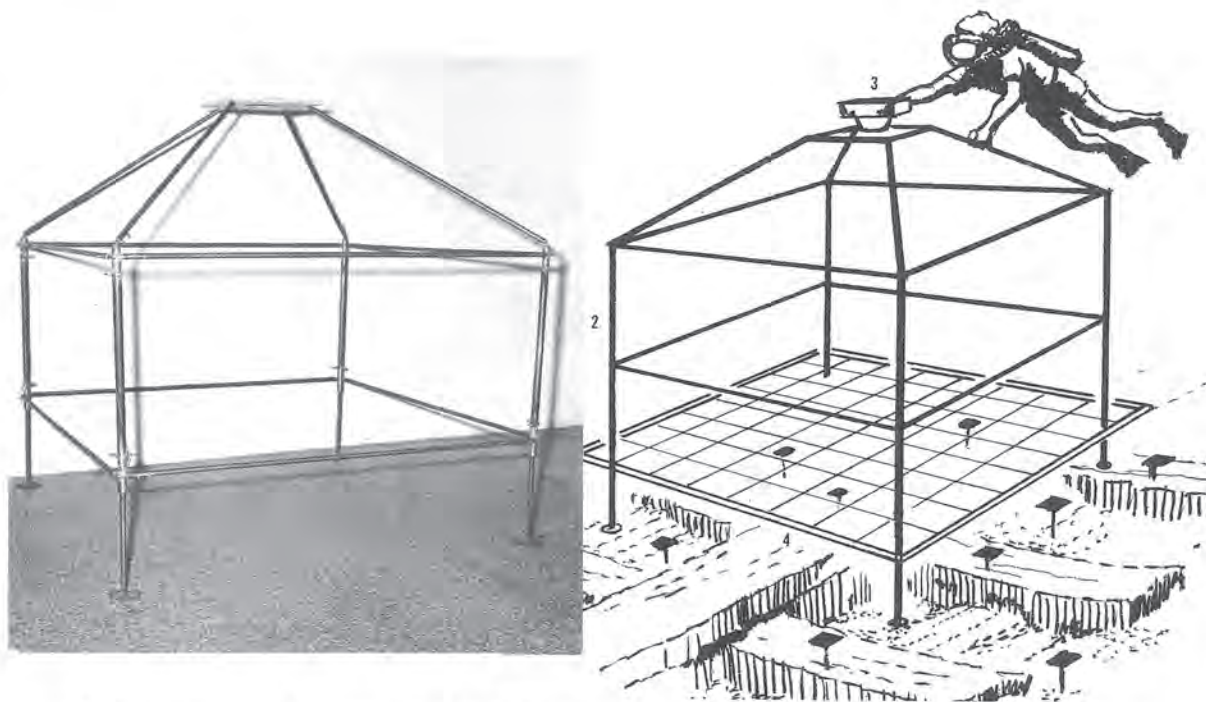


Surveying an underwater site, Mendel Peterson measures the distance and bearing from the datum point to a buoy which marks a "hot spot" previously found by the underwater metal detector. (Drawing by James Mahoney. From Mendel Peterson's book *History under the Sea*, Washington D.C., 1954)





Surveying underwater sites with the early techniques pioneered by Mendel Peterson. Plotting devices involved 1) a sighting device which establishes theoretical plane, 2) a movable clamp which holds the cantilever frame, 3) a cantilever frame, 4) a rack that carries measuring rods and 5) the measuring rods for plotting in elevation. (Drawings by James Mahoney. From Mendel Peterson's book *History under the Sea*, Washington D.C., 1954)



An early camera stand pioneered by Mendel Peterson, with a wide angle lens camera mounted at the top. Shots of the wreck-site are made through a grid of piano wire. A composite of individual shots becomes a mosaic from which the plan of the site may be drawn. (Drawings by James Mahoney. From Mendel Peterson's book *History under the Sea*, Washington D.C., 1954)

This Editor has no doubt about the origin of the “edginess” of Pete when reading in the above mentioned memorandum about the part that it was planned to reserve to the initiatives of “the book designer” or to “a professional lay out artist” and plans for “sizing, cropping and mounting” photographs that he had been very careful to size, crop and mount himself. Obviously, Pete did not care much about design and considered that his own lay-out was good enough. It is not difficult to guess that if Pete was “edgy”, an euphemism, no doubt, and threatened “to drop the project entirely”, it is because he realized that any attempt to modify the Large Green Albums as he had so carefully prepared them, could only be a scientific disaster and a source for innumerable mistakes.

The next memorandum, dated May 14, was written by John C. Ewers, to Mr. Silvio Bedini and Mr. Roger Pineau. (Although his exact position in the authority ladder in SI is not known by this Editor, it appears that John Ewers was very much to be the decider in the case.)

*“Subject: Mr. Peterson’s Manuscript Art on Artillery.*

*The important thing for us to determine is whether or not the research Mr. Peterson has done to date represents a contribution to its field which would be valuable reference work for students of Armed Forces History. If so, it would not be necessary for us to wait another “several years” to complete a comprehensive and definitive monogram – years during which students would be denied access to the work already completed by this pioneer effort.*

*If the “several years” were no more than one year, I would agree with Mr. Lea that we should wait for the definitive work”.*

Of course, the “several years” were to be much “more than one year”. The research, by then, had been going on in America and in Europe for thirteen years and it was still funded for 2 more years. (And as a matter of fact, when those two more years were up, an additional five years of research were to be funded in 1967).

John Ewers then goes on:

*“I do think that should we go ahead with the publication of the work done to date, the manuscript should be rounded out in detail as a Mr. Lea has suggested...” and he ends up: “The introduction could be rewritten to tell more about the basis for this monograph, the collections that were studied, etc., as well as to indicate the need for further study in the field.”*

There is no doubt that Pete clearly and strongly indicated indeed the need for further study in the field.

The end of the discussion is not to be found in the SI records or in Pete’s own files, but the fact is that the project to print a nice looking, well designed, prettily laid out brief summary of what had been planned from the beginning as an exhaustive encyclopaedic scientific work, was dropped for the time being.

More perhaps than writing, Pete, a master communicator, had always visibly enjoyed lecturing. He often spoke at the Explorer’s Club in New York, at the Washington Club in Washington DC, at Adult Education Programs and at History and/or Underwater Archaeology conventions everywhere. His favorite subjects, with *ad hoc* variations, were the stories of the past that ancient coins can tell so well, in confidence, to the curious numismatist, and the revealing tales told by naval guns, or by most wreck artifacts, to the open-eared diving archaeologist. Simple starting... points, from where he quite naturally developed in clear, precise and simple words a living picture of a whole period of history and, most important to him, of the people who lived in it.

The people! Pete’s words and writings have often brought to my mind the often quoted words of Sir Mortimer Wheeler, the late great English archaeologist: “*Archaeologists do not make holes in the ground looking for old stones, what they are after is man*”. *Mutatis mutandis*, the two men had the same motto.



*The Regents and The Secretary of the  
Smithsonian Institution*

*together with the*

*Naval Historical Foundation*

*cordially invite you to a lecture*

*Study of Naval Ordnance on Sunken Ships  
16th to 19th Centuries*

*by*

*Commander Mendel L. Peterson, USNR*

*on Friday evening, December 16, 1966*

*at 8 o'clock*

*Auditorium, Museum of History and Technology*

*Constitution Avenue at 14th Street, NW.*

*This card admits bearer and guests*

Mendel Peterson was an enthusiastic lecturer. A great communicator, he knew how to share his enthusiasm with the "overflow crowds" that his talks always drew.



In his early years with the SI, Mendel Peterson received an award from Dr Leonard Carmichael, Secretary of Smithsonian. With him his family: His first wife, LaNelle Walker-Peterson, their son Mendel Jr and their daughter LaNelle (today LaNelle Peterson-Spence).



In the American History Museum of the Smithsonian Institution, the artillery pieces — here in the “Independence War” and “Civil War” rooms (east wing) — have remained a major attraction since first organized by Mendel Peterson when he was Curator of the Armed Forces History Department.



A French cannon, a bronze 4-pounder, given to America by the Marquis de Lafayette at the beginning of the Independence War. (“Price of Freedom” exhibition.)



A US Army model 1841 cannon, a 6-pounder. It probably saw service in the Mexican War but would have been retired soon after the start of the Civil War. (Also in the “Price of Freedom” part of the east wing and organized by Mendel Peterson, as Curator of Armed Forces History, at the time the present building was known as the “new building”.)

Pete, spoke without notes, showing lots of color slides, and his audiences were invariably delighted with his unconventional personality, his enthusiasm and his crazy brand of humor. Actually, he once lectured on the subject of “Humor in the American Revolution” (at the 7<sup>th</sup> International Conference on Underwater Archaeology, Philadelphia, 1976). “*People enjoyed his ‘machine gun fire’ delivery of the facts and his ability to make events of the past seem like current village life. He could tell a story about an ancient battle, arms waving, eyes bulging and voice rising that made you want to run for cover*” (daughter LaNelle).

In the US, as the SI’s Annual Records show, he delivered an average of two official Smithsonian Lectures a month, in the line of duty, and he was always literally drawing crowds. One example is a lecture he delivered in 1966, at the Smithsonian. In the presentation of the speaker (he was co-presented by the Naval Historical Foundation), the official program read:

*“Study of naval ordnance on sunken ships.*

In his presentation, Mr. Peterson will succinctly present the history of early marine salvage and illustrate the evolution of techniques in underwater archaeology currently employed in locating and recovering naval weaponry from shipwreck sites.”

The subject was news to many and reservations were pouring in but red lights were blinking all over the Smithsonian as internal memos flew between organizers and stewards in preparation for the massive attendance expected.

Example:

*“Memorandum December 1, 1966*

*Subject: Lecture by Mendel L. Peterson December 16, 1966 MHT.*

*Dr. Lundeberg<sup>18</sup> thinks there may be an overflow crowd for Mr. Peterson’s speech at 8:00 on Friday, December 16, in the auditorium of the MHT. Therefore we will have to set up in B-1048 with Mr. Peterson’s voice amplified and also the buzzer to change the slides. There will be a duplicate set of slides to be shown in B-1048. Please, set the room up for as many as it can hold, with yellow and orange chairs.”*

Outside the US also, Pete, is now becoming one of the star guest-speakers at the conventions, symposia and conferences of the most important military associations, archaeological or historical societies, diving clubs, federations and confederations. I have had on several occasions the pleasure to meet him again, in Europe, in such reunions, to listen to his always remarked speeches and to exchange with him stories of – wrecks, treasure and cannons at the bar until the wee hours of the night.

I remember in particular a convention of the British Subaqua Club in London, where we both were speaking and where he was to deliver, as the star speaker, an evening address before a black-tie banquet attended by the cream of the world’s diving community’s VIPs. He was to be introduced, in traditional British fashion, by a tall, pompous, wide shouldered Master of Ceremonies, resplendent in his gold covered, fancy red uniform. Stiff as a sergeant at arms, the Master of Ceremonies loudly announced, in an exemplary Oxford-like accent and articulating every syllable to perfection, “*the evening address by the next speaker, Mr. Peter Mendelson*”. The roar he got from Pete, literally crushed the poor man to dwarf size. As for the talk that followed, it was typical Peterson. Pete was always “talking big” and straight “in senatorial tones”<sup>19</sup> and his English hosts, being experts in the field, were absolutely delighted indeed by his highly particular brand of humor.

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18 Pete’s boss.

19 His son dixit.

In the following winters, his notes show how his ever deepening interest for the study of cannons, their inscriptions, their many telltale marks and their decoration is turning to obsession. He sees cannons as perhaps the best building material for those who write maritime history. His personal researches in naval history and underwater archaeology take him more and more often to the dust of the naval archives and to the maritime museums of Europe with their specialized libraries. He increasingly sees the history of artillery not only as an invaluable key for the dating and identifying of newly discovered, ancient wrecks but also as a passkey for the understanding of the hidden side of the geopolitics of the half last millennium. The firepower of the artillery of a nation's armies is a major component of History being made and it can be scientifically measured!

The artifacts fished up by his treasure hunters friends of Florida begin to appear at auction. With his Hall of Underwater Explorations exhibits in mind, Pete purchases for the Smithsonian a representative sampling of Kip Wagner's finds on a 1715 wreck. The Press had dubbed Kip's recovered material "The greatest cache of sunken Spanish Treasure ever found off the Atlantic coast". Pete's selection (at the Parke-Bernet sale of February 4, 1967), included two plumb lines, forks and spoons, gold ingots, a golden chain, gold coins and a silver cannula nozzle.

But come summer and Pete heads back to Bermuda, where he now begins to trail around a borrowed magnetometer, an instrument that Teddy never trusted too much. He prefers his locally developed technique which consists in being towed behind a boat at the end of a rope and watching the bottom until you see some sign of a wreck or sometimes the telltale hollow, the "cradle" left into the coral on the top of the reef, one or several hundred years ago, by the hull of a ship that has been stranded on it for some days and that the next high tide or gale has refloated or pulled away either to be pushed inside of the outer reef, there to stay for ever, or to be pushed back and lost in deeper water (or else, in very rare cases, to sail again, all pumps manned).

The two men had called the magnetometer "the great sniffer" and with it, they found the WARWICK site in 1966, as well as, later, several 19<sup>th</sup> century wrecks. The WARWICK was an English barque owned by the Earl of Warwick that had brought Governor Butler to the island with a miscellaneous cargo of supplies. She was wrecked during a gale, in Castle Harbour in November 1619. The first two days of digging in the silt of the harbor brought up timber fragments and Pete could determine that half of the hull was lying beneath them. By measuring that half, they were able to reconstruct on paper the whole vessel.

The WARWICK was extensively excavated later and some of its cargo and remains are now on show at the Bermuda Underwater Exploration Institute's Museum in Hamilton, part of one of the largest collections of carefully documented shipwreck's artifacts on display in the world.

In 1966 also, Pete, learned of a site, off Highborn Key in the Exumas (a chain of islands 30 miles south-east of Nassau, Bahamas), where spear-fishermen had noticed unusual shapes on the 25 feet deep bottom, had found a cluster of encrusted cannons and an anchor. Pete joined them and on that occasion he officially advised the Permanent Secretary of the Bahamas on the right procedures and equipment and reassured him that *"It is my intention to be present at the beginning of the operation and at least one more time during its progress"*.

In 1967, with Teddy's boat, he joined the team that had continued to work the site for three months in the late winter and spring and brought up ship's fittings, two bombards and a dozen of long iron swivel guns, breech loaders complete with their breech blocks. No other artillery or tools or ship fitting or personal belongings or portable artifacts were found. Two anchors were found 300 feet away and seaward of the wreck and Pete concluded that the ship probably began sinking at anchor and was cleaned out before going down. The remaining traces of timber allowed him to sketch a sharp prowed 200 ton ship, built light for speed, but heavily armed nevertheless (the position of the two bombards on the bottom indicated they



were bow-chasers). A typical example, he summarized, of an early pirate or privateer ship sailing and lost some time between 1550 and 1580.

A wreck that never was identified, but brought to Mendel Peterson and Teddy Tucker the surprise of their life, first appeared in the form a few ballast rocks on the face of a coral head, found by the usual, favorite method of Teddy: towing two divers behind his small boat on the likeliest parts of a shallow reef. It smelled of a buried wreck.

Excavations of the site were conducted in two stages, first with Teddy's and his friends' limited financial and technical means, and, later, with the funding and full support of the Smithsonian Institution, on a wider scale.

Shortly after discovering the ballast rocks, Teddy started to pump sand in the deep gullet between two coral heads where his experience was telling him that the wreck, if there really was one, should be waiting for him. On the second day of digging, he uncovered part of the ballast pile. A fine pewter tankard was sitting on top of it and from that time on, the ship was known as the "TANKARD WRECK".

Before displacing the pile of ballast under which, he was satisfied, the remains of the ship had to be found, and he began by digging a trench around the outside of the pile, down to the hardpan. His objective was twofold: To check if any artifact could have been lost between the reef where the ship has first hit and her final resting place, and also to clear a space for the material that would eventually have to be lifted off the wreck before the hull structure could be examined. Little was found, except broken ceramics and pieces of ground wood, obviously the result of the ship being pounded on the reef when aground. All artifacts and fragments were found mixed in with the top layers of the ballast pile "as if they had been churned in a cement mixer". Fired bricks were found grouped together, suggesting the position of the ships stove or firebox. But next came a large number of unusual, half round stucco tiles with small holes drilled at each of their four corners. Some still had twists of brass wire threaded through the holes. Then, as they dug to uncover a wooden section that was still fairly intact with more of these tiles wired together through the wooden structure, it became clear that what they had found was one half of the roof of some sort of deck house, most likely of the galley. So, the unusual tiles were not part of the cargo.

The artifacts delivered by the wreck in the following weeks and months dated it back to the mid-17<sup>th</sup> century. So, for instance, were the many clay pipes or fragments which were a perfect match with other smoking pipes he had found on a number of English ships of the mid-17<sup>th</sup> century. Pete and Teddy were surprised to find large quantities of Majolica which was not familiar to them. With their distinctive design, consisting of a feather motif, a shell and a spider web, composed of mechanical lines all connecting with one other, they were later identified as having been made in Santo Domingo, the only New World Majolica that was considered worthy of being taken back to Europe. So, Teddy understood why the decoration of this Majolica had employed pigments and colors unlike those he knew from European, Spanish or Portuguese ceramics.

More common pieces of heavy green glazed cups, mugs and plates of the type known as "Iberian green glaze" were easily, if not precisely datable: early 16<sup>th</sup> century until late 19<sup>th</sup> century. There were fragments of Venetian glass, mostly from perfume phials or for pharmaceuticals and bowls or dishes and decanters. Venetian glass, valuable at the time, indicated that there was on the returning ship at least one important and wealthy passenger. Was the refined tableware his? It included thirty-six different plates, cups, saucers and bowls of Chinese porcelain, soap stone carvings and fragments of jade. And also the remains of a very complete collection of shells from all shores of the Atlantic and Pacific Oceans that were uncovered?

No "treasure" was found on the wreck if one excepts small gold disks about the size of a thumb nail, which

puzzled Pete and Teddy for thirty years until they were identified as “pressure nuggets” or flakes of gold that had been naturally squeezed between boulders moved by flooding rivers or streams in Central America. The Indians of the region where these nuggets came from treasured them as sacred objects of religious significance. They fitted with all other Indian objects recovered on the wreck-site: stone axe heads, arrow heads, spear points and some small still mysterious rectangular pieces of flat polished granite.

Teddy’s and Pete’s main interest as ever was the history of the ship herself and the way she had been built. When they were able to inspect the perfectly cleared cross section of the hull, on the inside and in part from underneath, a number of surprises greeted them. First, there were deep axe cuts in the large frames of the topsides of the ship, which indicated that after the shipwreck the Bermudians had removed the outer planking to get at the main frames and chop out the iron drift pins and nails for their iron contents (really valuable in Bermuda since there was no other source then of metal and imports were expensive). This indicated that the topsides of the ship had been out of the water for a considerable amount of time and were accessible before she broke apart.

But the real surprises were several features about the hull that seemed as unusual to Teddy as they seemed strange to Pete. The builders had used very few nails; the planks were mostly fastened with wooden tree-nails. Also, the ship was built of soft wood, almost solely of pine and fir, with only the laminated keelson in oak. Strangely, it appeared that the peculiar construction of the ship would indicate that she had been built in separate sections that were later assembled. This was unheard of again. And the ship had been built with, actually, an absolutely flat bottom.

The overall design, as Teddy mentioned to me later, seemed completely unsuitable for any type of sailing ship yet known to him. It seemed that she would have been entirely incapable of sailing to windward or even broadside to the wind.<sup>20</sup> Such a hard to believe kind of ship building, he had never seen before, even on drawings. She was of extremely heavy construction though, sheathed – against ice? – from the turn of her bilge to about two feet above the waterline, and there was evidence of many internal cross bracings, indicated by tapered slots chiseled out of the top of her keelson.

As more and more interesting features of her extraordinary hull were unfolded, Pete, who had already concluded that she was simply too big and too bulky to have been constructed in the New World, decided to have a micro-constituents analysis of the wood made.

The results of the micro-constituents analysis (which can be compared to “the DNA of the wood”) revealed to Pete that it had come from the north of the Baltic Sea, meaning at the time from Sweden. During that period there was an embargo, he knew, on the use of oak in merchant ships. Only royal ships were built of oak. The confirmation came when they found a plank next to the keelson which had been left unfastened to allow for the cleaning of the ship’s bilge and for letting the bilge water run freely to the pump well, that was marked with the letters “HIIN”, an archaic Swedish word translated as “removable”. But except for that, none of the many artifacts recovered could tell them where the ship was from, where she was heading, who was traveling on board or how she was wrecked, not to mention her name.

All these features of the hull were carefully drawn by a Smithsonian Institution colleague and friend of Mendel Peterson, Peter Copeland, and they show indeed a surprisingly, unheard of type of a hull. (Some of these drawings were published in Teddy’s fascinating self-biographical book *Treasure!*).

If only there had been cannons to help identifying her, Pete kept repeating, but these were probably the

20 If she had had lateral, wing-like, pivoting external “side-keels” – that could be lowered down and raised up at will –, as featured on so many flat bottomed Dutch boats, there remained no trace of them or of their attachment points on the gunwalls (Editor).





Swivel gun with breech-blocks and miscellaneous pieces of rigging from the Highborne Cay wreck in the Exuma islands, Bahamas (1966 and 1967 excavations under the guidance of Mendel Peterson).  
Photo MLP



Some of the bombards and swivel guns recovered from the same wreck.

Photo courtesy T. Tucker



Two wrought-iron bombards, with their breech-block, recovered from the same unidentified wreck.

Photo courtesy T. Tucker.



first objects salvaged by the Bermudans after the ship was wrecked. Neither were there any small arms or tools left, no personal effect, no clue about her owner, just conflicting echoes of many places: timbers from Sweden, firewood that had grown in southern Cuba, in Hispaniola and Puerto Rico, artifacts from France, Spain, Portuguese, China and South America, all of which added more veils to the ship's identity.

The excavations were temporary halted but Pete, was approached in 1970 by a group of educators who were thinking of using wreck-sites as scientific platforms on which to train college and university staff in the teaching of marine archaeology. First-choice sites would be well preserved wrecks dating from the days before ship building plans were in use, that is to say before the mid-17<sup>th</sup> century.

Pete recommended that the Smithsonian should fund an initial grant for a six weeks expedition in the summer of 1972 (it was to develop eventually into a three years project after he had "retired"). Fourteen students and staff started to work under the guidance of Mendel Peterson as director, his colleague Peter Copeland as exhibits artist, photographer Peter Stackpole and Alan Albright, also from the Smithsonian and with two more divers. Teddy Tucker, on his diving boat, was supplying tanks, compressors and the excavating equipment.

The first year project was highly successful. The students learned all about the radial arm, a device that Pete had developed to precisely locate on a plan the scattered remains of a wreck, and of the grid system of measurement.

But when the last of the three seasons of work of the second stage of the excavation ended, the situation was still that Pete and Teddy knew with certainty where the ship had been built and where she was coming from when lost but nothing else, no indication in particular why she was wrecked. Strangely enough, there is no reference at all to that particular shipwreck in the otherwise reasonably complete Bermuda official archives. To her identity there was no clue.

The TANKARD WRECK was left gathering dust again in the "Unsolved Mysteries of the Sea category" until, in January 1990, forty-four years after its discovery, Teddy happened to attend a "Symposium of the Sea" at the Soviet Academy of Science in Moscow. As he was talking with some of the world's leading marine scientists, he met the director of the shipyard of Turku, Finland. In the middle of a conversation about various methods of ship building past and present, he mentioned his work on the TANKARD WRECK and the unusual method of construction that had been used. The Finnish ship builder immediately recognized the method and told him that the ship had been built on the ice during the winter months, as it was easier then to fell the nearby timbers and cheaper to build the ship nearby. The keel would be put on thick ice blocks taken from the same frozen river or creek, and the framing built, and then the keelson was put into place, section by section, and the framing and the outer planking. Ships, he believed, were built in sections, first the middle section and then the bow and stern later. When assembled, the ship was caulked and painted, and ready to float when the spring and warm weather would begin to gradually melt the ice, lowering the ship gently down to the water level of the river or creek. No shipyard necessary, no launching structures and no fuss. The ship was ready to be masted and the sails fitted.

The philosophical conclusion of Teddy was that: *"The learning process never ends. Just as you think you have gleaned all the information there is available, new details emerge that add to what you have already acquired"*.

Back to chronology. The year 1967 had seen the grand opening to the public at the National History Museum of the Hall of Underwater Exploration, the long time project and brain child of Pete. As summarized in the Annual Report of the Department of Armed Forces History: *"the hall discusses the exploration of historic underwater sites in the Western hemisphere, including trade routes, Spanish-American treasure, the history of diving, modern methods of diving, locating wrecks, surveying, measuring and recovery techniques."*

*Collections of objects from sites dating from 1595 to 1838 are displayed. The use of diving techniques in the other disciplines and new deep diving research is presented in photographs and models.”*

It is unfortunate that I have not been able to find any photographs of Pete’s now extinct Hall of Underwater Exploration.

In late 1967, Pete’s post-excavation research and his long term program of photographic study of ancient cannons take him to Europe again. An (already mentioned) “Authorization of official travel”, dated 10/10/67 allows him to go:

*“To London, England, to study and research documents in the Public Record Office and Archives, pertaining to wreck-sites in the Bahamas and Bermuda, to visit museums and collections in England, including the Woolwich Artillery Museum, where a survey will be made, measuring and photographing all artillery specimens in the Woolwich collections.”*

He is “to depart on October 15 and to return on November 20”. The activity is “chargeable to National Geographic Funds”.

His preparatory notes contain a list of places to go and things to do and Curators or experts to meet that includes seven army, maritime or historical museums – he has forgotten none – and, additionally to the Public Record Office, all the specialized maritime libraries of the UK.

He will send batches of negatives to the SI Photo-Lab in Washington from London, Woolwich, Southampton and Salisbury. His personal archives also keep a request by Alan Albright for photographic processing at the Lab (six rolls taken in Woolwich at that time). Albright, a Smithsonian aide and a friend, was thus traveling and working with him at the time as his assistant.

The next adventure of Pete – we are now in 1968 – was atypical and, to me, surprising. It had, I believe, no connection with the Smithsonian.

It was a reconnaissance trip to Lake Guatavita, in Cundinamarca, the high plateau around Bogotá (capital of the Republic of Colombia), that is a trip to the sacred lake of the Golden One, the famous “el Dorado”, the cacique and Lord of Bacata (the name was hispanized later in Bogotá). Such an expedition was surprising because Pete, surely, must have known the complete story as everyone else did in treasure circles and as I knew it myself, years earlier, when I went to have a swim in the same laguna of Guatavita (I have fond remembrances of the delightful perfume of the water-lilies that blossom on the surface of the lake).

The Guatavita story has been told in detail by several reliable chroniclers of the conquest of what was to become the Nuevo Reino de Granada, and its early history.

Juan Rodrigues Freile:

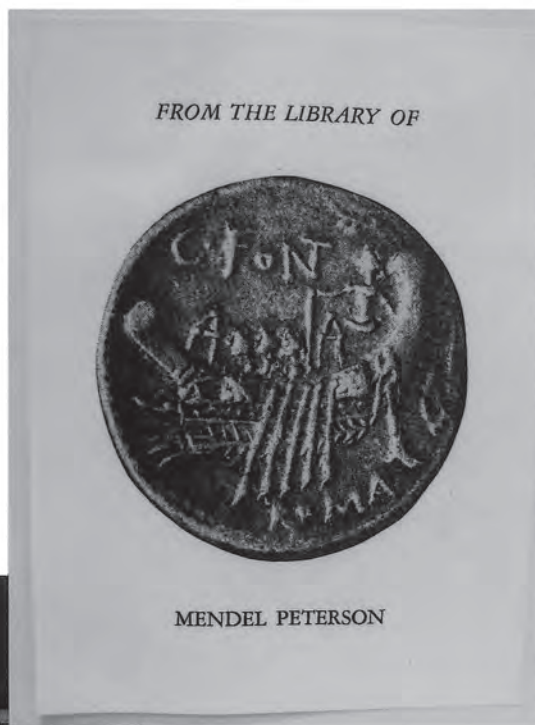
*“I was born in this city of Santa Fé de Bogotá seventy years ago. My parents were among the first conquistadors who settled in this new Kingdom of Granada. Among my many friends was a Don Juan, cacique and Lord of Guatavita, the very nephew of the one that the conquistadors found on the throne at the time they arrived in these parts. He told me what follows: ‘The heir and successor to the caciquate had to be his maternal nephew, he had to fast for six years in a designated cave, during which time he couldn’t have any contact with women or eat meat or salt or garlic, or see the sun. He could leave the cave only during the night. After such a fast, the first trip he was allowed to do was to go to the laguna of Guatavita there to make his offerings and a sacrifice to the devil, whom he worshipped as his Lord and God.’*



The ex-libris of Mendel Peterson, inspired by his two main interests: numismatics and naval archaeology.

Mendel Peterson left the Navy in 1948 but remained in the US Navy Reserve where he reached eventually the grade of Commander.

Photo courtesy Mendel Peterson Jr.



April 22, 1972. Mendel Peterson, then Curator of the National Museum of American History, Division of Historic Archaeology, guides National Associates (of the SI) members on tour of the Underwater Archaeology exhibit. This tour was a part of the three days "Week-end at the Smithsonian Program" attended by 56 National Associates members.



*The ceremony that took place then consisted in this: a large raft was built with rattan and rush. Four braseros were put in it, in which a quantity of “moque” (which is the incense of those people) was burnt with many types of perfumes. All around the laguna were countless Indians, men and women, wearing lots of plumes, pendants and gold crowns. So much incense was burning all around that the smoke would obscure the light of day. Then they would undress the heir to the caciquate, and once he was stark naked, they proceeded to anoint him with a sticky type of earth and to throw on his body so much gold dust that he would be fully covered with this metal. He then boarded the balsa and a big pile of gold and emeralds was placed at his feet so he could offer them to his god. Four caciques, the most important of his subjects, would board the balsa with him, all covered in plums, gold, crowns, bracelets, pendants and ear rings, all of it in gold. They were naked also and everyone was bringing an offering. When the balsa would proceed away from the bank, music rose and immense vociferations would rise from the crowds which filled mounts and valleys, until such time as the raft had reached the exact center of the laguna. A flag was waved. Silence was immediate. The golden Indian then made his offering by throwing in the water all the gold he had at his feet and the other caciques who had accompanied him did the same with their own pile of gold. It is from that ceremony by which the new Lord was consecrated, that was born the name “Eldorado” which has cost so many lives and so many fortunes...”*

Another chronicler, Padre Pedro Simon, wrote:

*“They would offer to the lake of Guatavita gold, jewels, food and many things in the course of the following ceremony: they would take two ropes which could cross the lake and having crossed them, the place where they would meet allowed them to know the exact center of the lake. That is where the chief would go on raft with the persons, who make the offerings and that is where they threw their offerings.”*

Still another chronicler, Father Zamora, mentions the same ceremony in about the same terms and so do several compilers, including Antonio de Herrera, who adds:

*“The way they bury their dead consists in throwing them into the water in some very big lakes. If the dead Indian is a man of high quality, the body is put in a gold coffin and in the coffin they put, with the body, as much gold and emeralds that will fit and they throw the coffin in those lakes in the deepest part.”*

And Fernandez de Oviedo:

*“In Bogotá they bury the head cacique, the Lord of the Lords, by throwing him in a great lake, with the golden coffin in which they put him”*

and, a little further:

*“They open the belly of the dead man to take out the bowels, and then they fill the space with gold disks and precious stones... The body is put in a gold coffin which they call ‘cataure’ and they bring it to the lakes which they consider as sacred places. Once there, they throw in the depths the defunct and, after him, all the gold and the precious stones, and all the jewels he had owned.”*

Surely, Pete had read all that and more and surely he knew that the Guatavita story was not unique, for there were at least five such sacred lakes in Cundinamarca only, including the laguna of Guasca “which they call now of Martos since he tried to recover from it the great sanctuary and the great treasure which it contained, so they say, but his cupidity resulted only in him spending huge amounts of money and he was not the only one for he has had many successors... Another one was the laguna de Tausaca, which also holds a great treasure for, they say, it contains two solid gold caimans, not to mention the other jewels and sacred statuettes and many have been the greedy ones who wanted to have a taste of it. But the lake is deep and the bottom very uneven. The fifth sanctuary was the laguna of Ubacue which they call today the laguna of Cariega because, so they say, he lost his life trying to extract the gold it hides and he has today no lack of competitors of his.”

Well aware of all that, Pete had read also, no doubt, the following pages of *El Carnero Bogotano*, the 17<sup>th</sup> century chronicle of Juan Rodrigues Freile already quoted in part:

*“... In all those lagunas it has always been said that there is much gold and in particular in the lake of Guatavita where there is a huge treasure. For that reason, Antonio Sepulveda entered into contract with the Majesty*

*of Philip II to dry out this laguna and it is in that process that he made the first drying up, of which the trace is still quite visible today. And I may say that only from the edges of the laguna where the water level had been lowered, he had taken at the time gold for well over twelve thousand pesos. Some time later, he wanted to continue draining the lake but he couldn't do it and he finally died poor and very tired. I have known him well and I have helped to bury him in the church of Guatavita.*

*Many others also have tried and have had to abandon because it is an endless task. The laguna is extremely deep and much silted up and it would take a lot of people to do the work and huge amounts of money."*

I personally had been careful, by the way, at the time I was interested in the matter, to check in the contemporary records if the reported twelve thousand pesos worth of gold, jewels, tunjos and babbles had really been found. Yes, they had. The accounts of the "Real Hacienda" are clear; the King actually was paid his full royal fifth, the "real quinto" of the gold recovered from the laguna of Guatavita.

But still another thing that Pete definitely had known before traveling to the sacred lake (the later written story mentions "stories of hardening mud") was that in the 19<sup>th</sup> century, a foreign commercial company had again drained the laguna and found next to nothing because as soon as the mud had been exposed to the air it had dried up and become as hard as concrete. And that was not at or near the very bottom but on the upper levels of the sloping sides of the lake.

I knew that too because I had made the same basic inquiries, years earlier, taking advantage of a professional stay in Bogotá (National Library, National Historical Archives and Records of the Bogotá mint). That is when I had taken a Sunday off and gone – by bus and afterwards on a pleasant stroll – all the way to the laguna, where I had a refreshing bath. So, what was Pete doing in Guatavita knowing all he knew?

He was there in fact with old friends of him, John and Mary Ellis, another couple of these wealthy "holiday treasure hunters" who gravitated around him and whose motto was "For treasure or pleasure". They, I suspect, had enticed him to join them in such an adventure. A nephew of his, by the name of Terry Kneebone, had also accompanied Pete, as a bodyguard and, presumably, as a sherpa, for they would have to carry to the water's edge two inflatable kayaks, bunches of solid planks and lots of rope to build a raft and also (judging from the photographs) wet suits and a "hookah-type" (surface supplied) breathing apparatus that must have required some kind of an air pump.

The story of this "expedition" has been very briefly written down later by the Ellis in a humoristic manner. The results were:

*"The famous Pete,... plunged into zero visibility and groped about for sacrificial offerings and we got back with no loot but lots of nice memories".*

Perhaps I, as an editor, should have included this episode in a separate chapter to be titled "Pete's jolly holidays" or else "Pete's most secret dreams".

By 1970, diving activities had taken such an extent in the official duties of Smithsonian Institution employees (mostly Pete's assistants, not only Alan Albright but a number of underwater photographers and/or draughtsmen) that it had become necessary to edict the "Smithsonian Institution Diving Regulations". Pete, I suspect, supervised it all for the rules were kept reasonable. At the time also, the Smithsonian was routinely purchasing tanks, regulators and wetsuits and had arranged for a formal training course for his unprepared employees through the "Oceanography and Limnology Program". Pete, however, must have found it difficult to refrain from a smile when preparing some footnotes to the regulations, one of them having it that "employees diving below 20 ft on a given day shall be entitled to hazardous duty pay for that day". And perhaps also on the day when a "Smithsonian Diving Committee" was constituted.



Laguna of Guatavita.

An engraving in Humboldt's *Voyages*. Notice the sacred steps on the left from where the high priests did conduct the offerings ceremony. Also the cut and channel made in the reign of Philip II by local treasure hunter Antonio Sepulveda who managed to lower the level of the water enough to pick up 12,000 pesos worth of gold, tunjos, offerings and emeralds, but never managed to reach the bottom of the lake. The reality of the ceremony of "el Dorado" is attested also by documents and by a number of small golden models (found in various sacred lagunas of Cundinamarca) that show a raft with a dozen or so rowers with the local cacique and priests well adorned.



1968. MLP dives in the waters of the sacred lake of Guatavita (Colombia) on a makeshift raft and, judging from the photograph on the left, with a hookah-type breathing apparatus. The visibility was nil and so were the results.



It is in 1970 also that he resolves to take a sabbatical year in order to continue his non-stop travels all through Europe, visiting war museums, army museums, artillery museums, naval museums and historical museums and, underway, researching the story of “his” wrecks in the various National or Navy Archives.

He prepares his travels well. He writes around to friends and acquaintances in England for advice. He needs to rent a nice little cottage, outside of London but not far, so Trudy will not be too bored, and close to a good school for Vicky, who is now 7. The family crosses the Atlantic in the autumn – a pleasant crossing over on the QUEEN ELIZABETH (September 16 to September 22) – and, from Southampton, travels and settles in Surrey.

From England, Pete sent a surprising letter to his friend Pr Richard R. Fagen, of Stanford University, part of which seems confidential, although the letter is not so marked. The missive is dated October 26, 1970, and reads in part:

*“I am over here on a sabbatical working on three books and several papers relating to underwater exploration. I’ll be back in August or early September, 1971 and then just 1 1/2 years after that I plan to retire and go it alone. You’ll be getting a nice little engraved announcement saying I am available as a consultant on matters relating to underwater exploration, grilled lobsters and the good life in general. Meanwhile, I hope we can get together and bat the breeze about our mutual interests...”*

The most important of the books he is working on in London is *A History of Seafaring based on Underwater Archaeology* (George Bass general Editor, London, 1972) to which he contributed a major chapter titled “Traders and Privateers across the Atlantic: 1492-1733”. The London Publishers, Thames and Hudson, are then in the midst of preparing publication. But the letter is surprising because it contains the first mention of his plans for early retirement. After all, he was only 52. As for his interest in “the good life” in general, it will come to no one as a surprise. (The part about the grilled lobsters refers to a paper just sent to him by Pr Fagen on the subject of the Cuban lobster industry.)

Mendel is a family man at heart we learn from another letter: “... In 1969, I bought a car on the continent and traveled the highways for five weeks.” He has no intention however to do tourism in England, not driving on the wrong side of the road with his family.

In February of 1971, he has about finished his research in the UK. From his rented cottage of Breamwater Gardens at Ham, Richmond, Surrey, he writes to his boss and friend, Dr. Philip Lundeborg (head of the Division of Naval History, at the MHT) to keep him informed of his progress:

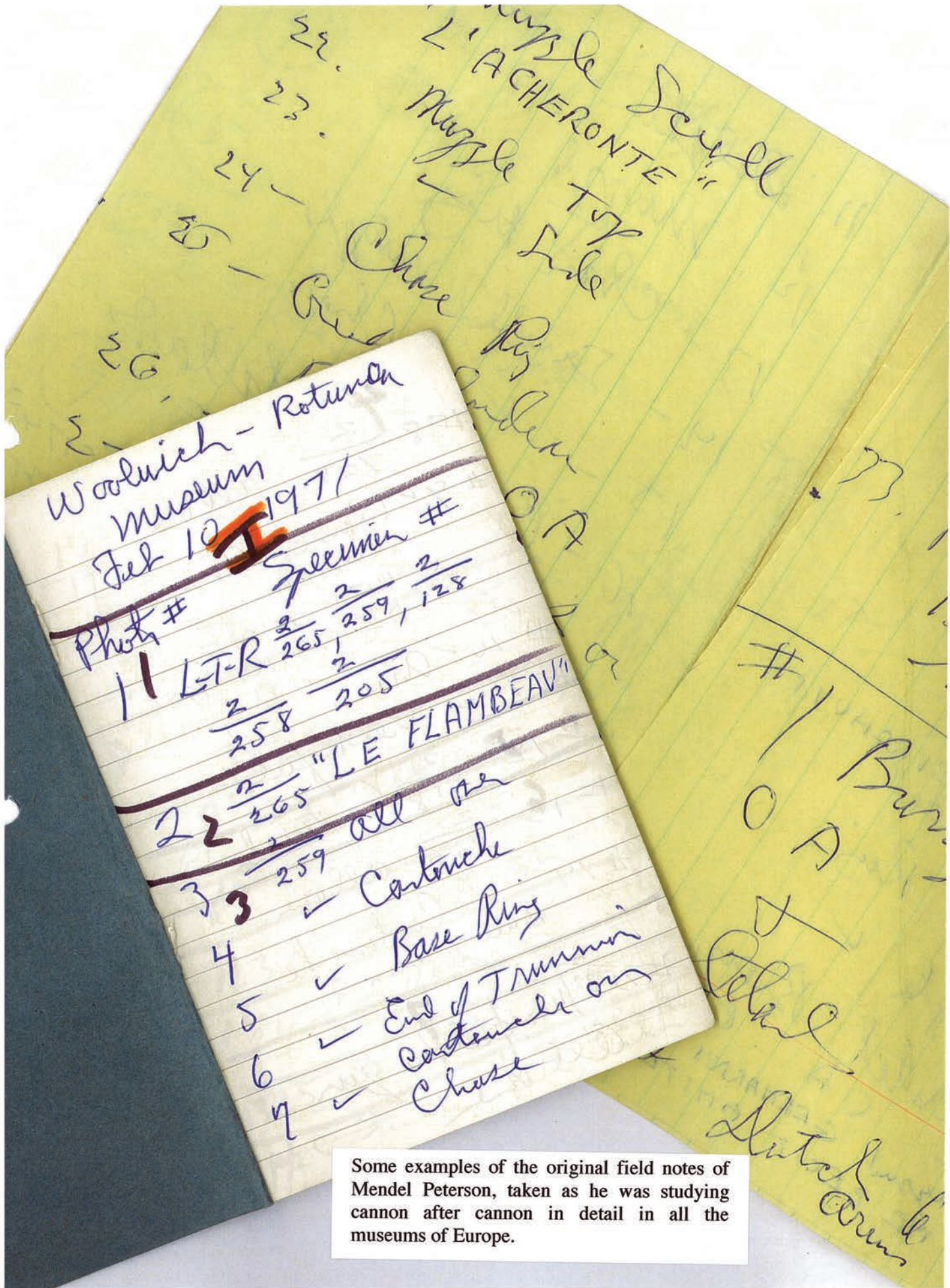
*“Things are going well... finding a lot of good material. A lot on iron founding and cannon at the Library of the Science Museum... same at the Naval Library. I am hitting the Library of the Royal Artillery Institution and went through the Scott Collection at the Royal Institute of the Royal Architects finding many good things...”*

*We went to Edinburgh about January 1 and after thirty-five years I finally saw ‘Mons Meg’<sup>21</sup>. I performed a photographic and measuring ritual which seemed to amaze the visitors to the castle. I explained that I belong to a rare sect, who worships iron cannons of the 15<sup>th</sup> century...”*

Reading Pete’s correspondence, by the way, often shows how dangerously contagious his sense of humor could be. The assistant-editor of *National Geographic*, his friend Bill Graves, writes to: “The Right Reverend Mendel Peterson, S.J.”. He addresses him as “Your Holiness”, reports that he is referred to as “the greatest living (sic) authority” and finishes his letters with a private joke: “Yours in the dearest design of industry”. The line is by Shakespeare, of course – as my learned daughter and assistant-editor immediately

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21 A famous iron bombard of the 15<sup>th</sup> century, one of the biggest and earliest ones known.



Some examples of the original field notes of Mendel Peterson, taken as he was studying cannon after cannon in detail in all the museums of Europe.



Torre del oro (Interior)

LOCATION Seville PHOTO NO. \_\_\_\_\_

LOCAL NUMBER \_\_\_\_\_

EXAM NUMBER \_\_\_\_\_

METAL Bronze Ring Tail Saker

BORE 4 1/2

PERIOD Philip IV

MEASUREMENTS

LENGTHS:

A. 5 1/2 inches

B. 1

C. C+A - 6 7/8

D. \_\_\_\_\_

E. 20

F. 11 1/2

G. 3 1/4

H. 3 1/4

I. 37 1/4

J. 7 1/4

K. 3 3/4

DIAMETERS:

Total 95 1/2

1. \_\_\_\_\_ inches

2. 14 1/8 9. 11 1/2

3. 13 10. 4 3/8 - 3 3/4

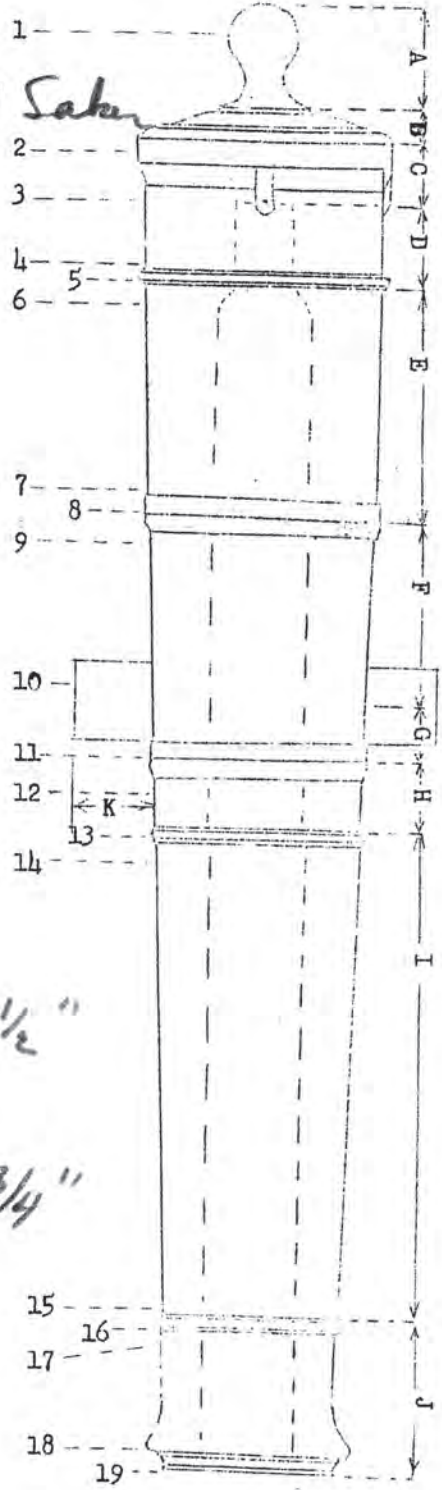
4. 13 11. 11 3/8

5. 13 12. 9 3/4

6. 12 7/8 13. 10 1/2

7. 12 1/4 14. 9 3/4

8. 12 3/8 15. 8 5/8



(OVER)





pointed out – and out of *Loves Labours Lost*, Act 4, Scene 1, where it ends a very moving, intercepted love letter sent by Don Adriano de Armado to his fairer than fair adored flame. “Thine in the dearest design of industry” would be worded today: “Yours in the tendrest assiduity to serve you”.

His colleague and friend Alan Albright writes that he has just recommended him to a colleague as “An expert on ancient cannons, on coins, and on other things better left unsaid”. A letter from Peter Stackpole (the great underwater photographer who worked with him in Bermuda) concludes on a letter ending consisting in two anthology level sentences that are, regrettably, unquotable in these pages.

Parenthesis closed, in February, Pete, Trudy and Victoria leave England for Portugal where his first visit will be for the Lisbon Museu da Artilharia.

It is one of the very richest artillery museums of Europe, has the best organized exhibition spaces and, above all, it remains delightfully anchored in nineteenth century museological tradition. It is one of my favorite museums.

At the end of April, Pete, arrives in Turin, in Northern Italy, for further performances of his photographic and measuring rituals. From his scribbled personal notes, dated April 29, 1971, we get a fascinating glimpse on the way he was preparing his photo-sessions, when allowed to, in order to obtain the best possible photographs of his beloved guns, all-over views and close-ups of all marks or decoration or particular features.

He has written ahead to a Dr. Rafaelli and has been in touch before his arrival with the General Director who is General Pietro Roggiere and he has obtained the authorizations to make his photographs using either flash or flood lights (and yes, he may plug in all museum rooms). He is authorized to use talcum powder to make the inscriptions and engravings more readable and has promised to clean up afterwards. He is authorized to bring with him a ladder – so he will not photograph his shoes or be obliged to use a wide angle lens that would cause barrel-like deformations to the tubes – and yes, he may leave it in the museum overnight. He will start on the afternoon of April 29 and plans to be working for at least two days (result: 435 photographs). (He also makes a note that he must send a batch of his books and scientific publications to General Roggiere at his private address.)

Obtaining such collaboration from the Keepers or Directors of most museums is not always easy and it tells a lot about Mendel’s already international reputation that he was permitted to work the way he did.

Later in the course of the same year (1971), we find him working in Venice and in Rome, in Naples in May and in Munich in June. At some time (?) he is in Salzburg, in Heidelberg, in Amsterdam, in Hoorn and in Brussels. Then in Zurich, in Basle and Geneva (where photographs show him relaxing with his wife during a cruise on the lake) and afterwards in Bern and after that in Nice, France (more photographs of a smiling Mrs. Peterson and of young Victoria!) Later notes of his, now in the file, dated July 26 indicate his presence in Oslo at the Akershus Fortress. Then, in August, he is laboriously photographing a selection of the cannons (I later counted 530 of them) of the “Heeresgeschichtliches Museum” in Vienna (23 rolls of films) and, later in the same month, he is at work in Seville, Spain (dated photographs of the Torre del Oro) and probably, in Madrid.

He is back in the US at the end of the year. His position in the Smithsonian Institution has become “Curator of the Division of Historic Archaeology”. Administrative documents tell us that his office is room n°4601 in the NMHT building (National Museum of History and Technology) and his phone number 5124. But he doesn’t spend too much of his time in the office for his field notes demonstrate that he has been shooting several films in the late part of the year in White Park, Florida, and some more, God alone knows where. And in the middle of all that, he also managed to find the time to do his Naval reserve duty, which he enjoyed, until he reached the rank of Captain and finally retired from the Navy.





Photographed by Mendel Peterson in 1971, the retrieved wreck of the VASA, just after the first conservation treatment, in her first temporary museum, the "Vasa Varvet".

Above: View from the bow.

Below: View from the stern castle.



Three knight-heads and one of the original carriages.



In the later years of his career at the Smithsonian, Mendel Peterson was involved on two occasions in inspecting and identifying quite another kind of historical treasures: sunken artifacts from the days of “les voyageurs”, drowned cargo lost by Frenchmen in Canada along the beds of mainland rivers and streams. The 18<sup>th</sup> and 19<sup>th</sup> century trappers and fur traders had been driving their heavily loaded freight canoes far into the Canadian wilderness and many met with disaster, usually in rapids. In the mid-1970s, Pete, was invited by the Toronto’s Royal Ontario Museum and the Minnesota Historical Society in St. Paul to inspect what he called “fascinating samples of cheap trade goods for which the Indians of North America once bartered away their furs and, eventually, their lands”. The artifacts, recovered at the bottom of the rivers, included nested brass cooking kettles with removable handles for easy stacking, axe heads, tools and knives, wire snares and miscellaneous traps for the use of the trappers or mirrors, etc., for bartering with the Indians and, as well as, of course, a good supply of flintlock, muskets with ball shot destined to the hostile Indians and bird shot to fill the cooking pot.

For the year 1972, a project of a trip to Florida, announced in a letter, is all we know about his voyages or his expeditions. It must be remembered here that the five years extension of 1967 to the original, fifteen years long allowed funding for his cannon research, worldwide traveling included, is coming to an end.

In 1973, after twenty-five years with the Smithsonian, Pete, retires. His last official photographic trip has been to St. John, New Brunswick, apparently to fill a last hole in his magnum opus.

So, now that he was retiring, would the SI Archives give me the answer to the question I had been asking myself for a long time?

Why was his magnum opus – that the SI had enthusiastically supported for twenty years and that was finally done or nearly completed – not published by Smithsonian?

I have found no official Smithsonian document and no line written by Pete that precisely answers that question but, in my well informed opinion, several reasons may be guessed at.

Administratively, the first step for a would-be Smithsonian author who wishes to have one of his books published by Smithsonian Publications (as were Pete’s early papers and his book *History under the Sea*) is to pass the judgment of an informal evaluation committee that has to decide whether the book’s interest, quality and originality warrant the publishing effort. The answer of the committee of course could only have been fully positive. It so was already in 1965, eight years earlier, when Pete, had submitted what he then called “A preliminary report” on his *Art on Artillery* book, which later became his *Encyclopaedia of Markings and Decoration on Artillery*.

The next step for the Smithsonian was to secure the funds for the actual publication, either from outside (from private or corporate, or academic sponsors) or to allocate part of the next year’s budget to it. This was never done.

If one replaces oneself in the year 1973 that is at a time when publishing meant printing on paper, one will understand that the sheer size of the publication project may well have frightened away from the start whoever was responsible for the final say.

Publishing Mendel Peterson’s *Encyclopedia of Marks and Decorations on Muzzle-loading Cannons* would have meant printing, for the so-called “Large Green Albums”<sup>22</sup> over 15 bound volumes, each the size of the Washington DC plus Metropolitan-Area telephone book (white pages and yellow pages together) and

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22 See explanations and comments about the albums in following chapters.

illustrated with probably over 8,000 photographs altogether. Plus about as many volumes for the so-called “Small Green Albums”. The resulting publication would have covered some four meters on the library shelves of whoever would have bought it and it would have weighed more than several dead donkeys. Imagining the many editing problems, the printing, the binding, the storage and the distribution of such a mammoth publication may well have terrified the decision makers at the top. Today, fifty years later, the situation as we all know has changed radically. It would perhaps remain economically out of the question to print Pete’s encyclopaedia on paper, but a digital publication of it, on disk or on-line, is no frightening prospect anymore.

But then, could not the possibility exist that there were also other reasons. Reasons perhaps having to do with in-house politics? A document, a letter in fact, written about thirty years later by Pete’s boss and friend Philip Lundeberg, suggests that possibility.

What exactly happened at the Smithsonian just before and shortly after Mendel Peterson’s retirement at the Department of Armed Forces History is not clear. What is clear is that, immediately after his departure, his brain-child and most personal achievement, the Underwater Exploration Hall in the National Museum of American History, was closed down. Why exactly? Neither his personal records nor the files in the SI Archives explain why. Neither is it explained why the Department of Underwater Archaeology which he had wanted for many years and created and animated, was equally suppressed<sup>23</sup>. Had Mendel’s personality taken too much air in the institution for too many years? Were smaller people suddenly relieved and from then on trying to also breathe? No tangible evidence exists. From the records, no “suspect” can be identified today but isn’t the spirit of revenge ever present in the corporate and institutional world and isn’t history full of that sort of things?

Whatever the case, it is made clear by his activities when retired that, after the Smithsonian authorities had either decided or “regretfully concluded” that the results of Mendel Peterson’s “great amount of work”, in spite of having been judged “worthy of Smithsonian publication” and called “a valuable reference work” would not be published by the Smithsonian, Pete decided to temporarily turn the page. For if that is what he did, he let it transpire in his later correspondence (1979) that he still “*hoped to publish*” his Encyclopaedia.

Once “retired”, Pete seems to have begun to work harder than ever.

In 1973 and 1974, Pete and I co-authored a book published by the Special Publication Division of the National Geographic Society. The title: *Undersea Treasures*. Pete wrote two chapters, I wrote two that was half the book and half the illustrations. For him, it was but a hors-d’oeuvre after which he concentrated on finishing his major book *The Funnel of Gold. The Trails of the Spanish Treasure Fleets*. It was published in 1975, by Little Brown, in Boston. A serious book and at the same time an entertaining tale, it was and will remain a sum of all aspects of his subject. Reviewers and readers loved it. It had great success in the USA and in the English speaking world.

In the meantime, Pete was called upon to appraise and help divide the collection of artifacts and treasure that Robert Marx and his associate, the oceanographer Willard Bascom, had recovered in 1972, from the Spanish almiranta galleon NUESTRA SEÑORA DE LAS MARAVILLAS, lost on the Gran Bahamas Bank in 1656. “*Disagreements over salvaging procedures (as Pete, explains in the prudent terms that befit a man in his position) and over custody of the valuables brought a suspension of the lease that Marx’s company, Sea Finders Inc., had obtained from the Bahamian Government*”. There were also “disagreements” between

23 In later years a new “Diving for History” programme was reinvented at the SI. Since then, members of the staff of the National Museum of American History have been since making hundreds of dives every summer in order to study and record wrecks sunken in American waters. The high quality of their work certainly is a tribute to Mendel Peterson’s memory. Their work on the wreck of the INDIANA, sunken in Lake Superior in 1858 (see photographs) is but one example.

divers and a succession of groups and companies that had been working the site. In April 1974, after two years of discussions, Peterson was called upon. “*During several visits to Nassau*” he writes “*I sat in the vaults of the Royal Bank of Canada and examined a ton or so of treasure: Silver bars weighing up to 90 pounds, gold and silver coins, some with unique markings, silver utensils and a variety of ship fittings. With another season or two of excavating the MARAVILLAS will be recognized I think as the most valuable wreck ever found.*” Further excavations indeed by other groups – one with the help of this editor – have demonstrated the wisdom of his prediction.

Year after year, in the process of calendaring the professional and personal activities of Pete, after his retirement, this biographer has come across all the major underwater finds of his lifetime, with few exceptions, as he continues to be consulted from all over the world on everything found underwater and Pete carefully assembles and keeps for his personal documentation all the news that reach his ears (or desk) concerning every new underwater discovery.

In 1975, Pete, was asked to take the direction of the complete excavation of an unidentified wreck that had been discovered by chance the previous year, not far from Walker’s Kay, in the northern Bahamas, by a lobster fisherman named Rick Magers. Magers had noticed “a dark-shadowy mass” on the sandy seafloor around which there was a surprising number of turtles, jacks, barracudas, rays and other kinds of fish. The depth was thirty feet.

He came back with a friend and scuba equipment. His friend dived and came up reporting that he had seen “a big pile of pipes down there, all piled up on top of each others, with a lot of rocks”. Magers put on a tank, dived and found himself, as he recalls, “staring into the coral encrusted muzzle of an ancient cannon... Piled over each other in a big mass about ten feet high was a mass of old guns”.

Subsequent dives showed that there was nothing else visible in a hundred feet radius around the center of the cannons pile (except a lonely iron anchor with a mahogany stock, half sunk into the sand, found three hundred yards south-west from the wreck). Had the ship must sunk intact? Without breaking up in the process? It seemed so and furthermore, the site appeared undisturbed.

When the two fishermen-divers set to work with an airlift, they rapidly uncovered, beneath the sand, parts of a massive ship’s hull, including wooden hull sheeting coated with hair or fiber and pitch. Majolica was found and fragments of rough ceramic. Under the pile of guns – that was measured to be eighty feet long by thirty feet wide and stood about ten feet off the seafloor – were the remains of a large old ship.

Magers contacted the owner of a luxury fishing resort at nearby Walker’s Kay, Robert Abplanalp, asking for funds and equipment to start a serious search of the site. Rick then inquired around for the best possible expert in the field of underwater archaeology and was immediately directed to a certain Mendel Peterson. The salvage boat AVENTURA of Fort Lauderdale, Florida (a battered old shrimper), skipper Reg Vaughn, was chartered and, in December 1975, the full survey of the wreck-site began.

Under Pete’s direction some preliminary work had already been done from an island fishing yacht, the SEA LION. Peter Copeland, an outstanding underwater draughtsman and an old friend and colleague of Pete, at the Smithsonian had joined him and, under Pete’s direction, went down and produced a series of precise perspective drawings of the piled up cannons. When completed, the five separate, original sketches were assembled in the form of a five foot long drawing, showing forty-one guns interspersed between ballast rocks, encrusted together with coral. Most of the guns were neatly lying in a row, and often head to tail.

Pete was eager to bring up a number of the cannons in order to examine them, clean them from their rust and coral accretions and read the kind of clues that cannons had so often revealed to him. As soon as the



drawings were finished, double-checked and confirmed by a photographic mosaic, Pete had several guns of different calibers raised from various parts of the wreck and placed on the deck of the AVENTURA. He first removed the coral crust from the trunnions, the button and the top of the breech of each gun, searching for identifying markings or decoration? There was none. No weight marks, no date mark, no maker's mark and no coat of arms. This was not really unexpected, iron guns of the time, as he well knew, are seldom marked. He carefully measured the bore, the length and all characteristic parts of the cannons, examining the base ring and the molding lines at the breech and determined that the cannons – the larger one being a 18-pounder, the smaller ones of various sizes – were typical of a 18<sup>th</sup> century warship. He established that the taper of the trunnions of some of the cannons, which were offset, and also the mould marks and the shape of the cascable indicated guns made in the middle or late middle 17<sup>th</sup> century, possibly Dutch, or Swede, or Dane. He pointed out also that Spanish ships could of course have carried guns made in the Netherlands, in England or in Scandinavia. Eventually, Pete and Copeland dived on all the cannons on the wreck that were accessible in the pile and beat the coral crust from their trunnions, in search of telltale marks. But few cannons proved accessible to their hammer and these were not marked at all.

An early conclusion which Pete, prepared from the list of evidences gathered, read that the wreck was “*that of a large warship forty-five to fifty-five guns, of period c. 1650-1690, probably not English*” (since large English warships of this period carried iron ballast). “*The unmarked iron guns, the redware, the Majolica, the fragments of tortoise shell, the cochineal and the stone ballast are*”, he wrote, “*typically Spanish but, alas, could be of another nationality*”.

A “mailbox”, was brought in, i.e. a funnel-like metallic contraption attached behind the ship's propeller at a steep angle so as to deflect downwards the full stream of the screw. The mailbox can blow deep holes or trenches in a sandy or soft ocean floor and, when carefully used, can do so without damaging too much fragile artifacts. More iron fittings were uncovered; pieces of redware, of olive jars and other containers, of serving platters and cooking pots, and more ships timbers and a number of rectangular yellow bricks such as would have been used to line a floor of a galley. A clay pipe stem bore marks that brought it to the 17<sup>th</sup> century. Many of the fragments of Hispanic Majolica in white and blue patterns that were found were of the type produced in Santo Domingo in the 17<sup>th</sup> and 18<sup>th</sup> centuries. There were fragments of Chinese porcelain and at least one intact olive jar. Iron ships fittings were spread all over and, surprisingly, rectangular “galley bricks” were found at each end of the wreck-site, making Pete wonder if they had been put to more purposes aboard than merely lining the galley and the oven.

With two salvage vessels now on the site, the AVENTURA and EL TORO, almost all the guns were raised in order to uncover the whole lower hull area of the wreck for detailed study. It immediately appeared that the ship had been burnt out considerably inside. Burn marks on the butt of the mainmast indicated that fire had been deliberately set to inside her whilst she was still afloat, probably by her own crew for, had she been in a sinking condition, Pete theorized, the fire could never have burnt so deep in her hull.

When he had finished cleaning and examined twenty-one cannons that had been brought ashore, Pete obtained, from all his cleaning work, one inscription only that seemed to be a number 57 on the base ring of one of the 18-pounders. But the remainder of the base ring and breech of this particular gun had been badly damaged by the fire, the iron reduced almost to graphite, the best evidence so far of burning.

Theories on the date, nationality, and identity of the lost ship and of the circumstances of her loss flourished from all parts. Bob Abplanalp had invited to Walker's Kay some of the most famous treasure divers in America to view his laudable efforts. Mel Fisher and his wife Dolores, Robert Marx, Arthur McKee, successively arrived at Walkers to give their opinion in conference with Peterson. All agreed with him that the clues were pointing to a Spanish ship of the late 17<sup>th</sup> or early 18<sup>th</sup> century. But what was particularly intriguing was the absence in the recovered fragments and artifacts of any evidence of standing or running

rigging (no block sheaves, no block chocks or iron straps, no deadeyes, no fairleads or fragments of line), as well as the absence of any personal items such as buttons, buckles, knives, candlesticks, shoe soles, combs, etc., and the absence of tableware, such as knives, forks, spoons, cups, bowls and dishes. No clay pipes either, or only broken fragments and, more puzzling yet than anything else, no bronze or brass items at all and no coins.

The consensus was that the wreck, surely, had been abandoned in good order and salvaged in its own time. The key to the mystery was finally provided by Dr. Eugene Lyon, an American researcher who had been working for years at the Archivo General de Indias in Sevilla and in the Archivo General de Simancas. On the request of Bob Abplanalp, in the summer of 1976, Eugene Lyon began a systematic research in the Spanish records and eventually provided the answer to the mystery. The lost ship had been Spanish, yes, a naval frigate of about 400 tons, the SAN JUAN EVANGELISTA, Captain Don Juan Alverto de Insola that had sailed from Cadiz to the New World in 1712 and cruised in the West Indies for two years on her watchdog mission. She had left Havana on October 24, 1714, bound for Puerto Rico, Santo Domingo and various military posts in the Windward Islands, carrying over three hundred thousand silver pesos, the “situado” to be delivered to the various garrisons in those places. When sailing she was carrying eleven of her guns mounted in carriages, both 8 and 12-pounders, and carrying another fifty-seven guns (8, 12 and 18-pounders) in her hold as ballast. There were three hundred people aboard, including crew, soldiers and passengers. On November 4, 1714, the SAN JUAN EVANGELISTA was battered by a violent southern storm, lost her rudder, her three masts and her bowsprit and was blown through an opening inside of the reefs that surround the little Bahama Bank. The captain anchored his paralyzed ship in the shallow water where he had been pushed, near a sandbank, “six leagues from land”. He then sent the ship’s longboat to Havana, under the orders of the chief-officer who bore with him two letters to the governor, one from the captain of the ship, the other from the “mestre”. The letters were outlining the predicament of the vessel and requested urgent help. Perhaps to make sure that assistance would be promptly sent from Havana, the captain did not fail to mention the three hundred thousand pesos of treasure carried aboard the vessel. A fleet of six shallow draft vessels almost immediately left Havana for the northern Bahamas. In command of the little fleet was a Captain Luis Perdomo, who after long conferences with Captain de Insola, agreed that the ship could not be saved and that the largest part of the cannons, the ones used as ballast, were not worth saving. The treasure was saved, then as much of the ship’s equipment as possible, and the relief vessels sailed back to Havana with the full crew, abandoning the SAN JUAN EVANGELISTA where she was.

Eugene Lyon was “*sufficiently convinced that the wreck... was indeed the one of the SAN JUAN EVANGELISTA burned and sunk after having been salvaged in the year 1715*”.

The dreams of treasure of Bob Abplanalp and of the divers had been blown away but Abplanalp, in a very elegant and rare gesture, felt “*that the swarms of fish and turtles that had lived in the cannon pile when the wreck was found had been dispossessed and that now that we have satisfied our curiosity, we owe it to the marine life of the area to restore their home to them.*” Except fourteen of the cannons – which had been cleaned and were being preserved to be later remounted in reconstructed naval carriages and exhibited on the island next to a recovered anchor and selected objects – all the guns were returned to the wreck-site.

As an ABC TV crew was filming the last sequence of the operation, the guns were put back into the sea and, later, carefully replaced, as far as possible, in their original positions.

Years later, when I had myself the occasion to dive on that remarkable site, the sea had retaken full possession of the wreck and it looked as undisturbed as if I had been the first discoverer. The turtles were there, huge all of them, and looking very old, the back of their shell reddened and eroded by the rust of the big iron cannons under which they were sheltering.

Back again to Bermuda, where the longer lasting archaeological excavations that Mendel Peterson and Teddy Tucker ever carried together on a single wreck-site had been going on over a period of seven seasons. That wreck had been discovered in 1983 by diving friends of Teddy. The ship was soon identified as the UNION, a French ship under the command of a Captain Michel Bressinot, lost at night on a Bermuda reef in November 1776, while en route from Cap François, Haiti, to Dunkirk in France. She was a cargo carrying passenger ship, loaded at the time with coffee, huge quantities of mahogany boards, all cut to a length of eight feet (for the furniture trade), lignum vitae, indigo and miscellaneous merchandises.

The hull appeared to have been some one hundred and thirty feet long and probably twenty-eight feet wide, as they could estimate after having pumped about 4,000 cubic yards of sand out of the pocket and lowered the level around the wreck by seven feet. Lighter parts of the cargo had spread widely around. Among the debris were numerous buttons, beads and small pewter crucifixes of European design, probably trade goods shipped from Europe and being returned, not having been disposed of in the New World. Also scattered along was a large quantity of pewter utensils, mostly tableware. But the most interesting part of the inventory in the eyes of Pete and Teddy were some five hundred wooden artifacts ranging from small drinking cups to wood hammock spreaders and many other items, as well as over a hundred items of rigging equipment which had not belonged the ship's own rigging but were transported in the hold and in pristine condition. The ship's cannons were found under the sand, as well as a completely intact, perfectly preserved gun carriage, the only intact gun carriage that Teddy ever saw during his diving career.

With so many hundreds of wooden artifacts, tools and rigging parts, the preservation and conservation problems that arose were unprecedented for Teddy. Following the advice and guidance of Pete, he had set a "wet lab" in his warehouse and ended up having thirty-eight large plastic tanks around, complete with fresh running water. When the excavations were terminated, in 1990, the collection, one of the most important of its kind yet discovered and of unique interest for Bermuda seafaring history, was offered to the then director of the Bermuda Maritime Museum. The director declined to accept the collection for, he said, "*its conservation would be too expensive*". In due course, the artifacts were officially released to Teddy Tucker and the problems and costs of conservation became his. When informed, Dr. Margaret Rule (the archaeologist that directed the excavation and raising of the MARY ROSE, the flagship of King Henry VIII which sank in 1545) immediately offered to solve the difficulty by putting the full resources of the Conservation Laboratory of the Mary Rose Trust in Portsmouth, England, at his disposal for the conservation of the whole collection. After a long period of treatment in Portsmouth, the collection was returned to Bermuda. The preservation and restoration process was a huge success and so had been the locally made conservation of all ferrous and non ferrous objects.

It is at the same time that the impulse to establish in Bermuda a Museum and Research Center aiming at educating the public about the ocean and to present, explain and encourage oceanic research, began to take form. The Bermuda Underwater Exploration Institute (BUEI) opened its doors in July 1997. Teddy is a Founding Trustee of the Institute which is in great part his brain-child. The BUEI, a not-for-profit entity, which is affiliated with other research centers, museums and educational facilities internationally, has received worldwide recognition. It is managed by trustees and international advisors<sup>24</sup>, all experts in their various fields. Its official mission is "*To advance the understanding, appreciation and knowledge of the ocean and to encourage the protection and preservation of the marine environment*".

From day one, the collection of the artifacts from the UNION has been one of the major attractions of the BUEI Museum, together with Pete and Teddy's finds from many other shipwrecks.

In 1977, Pete, wrote the leading article of the December issue of *National Geographic* (Vol. 152, n°6). In it, he evokes a number of his underwater discoveries during his long career and shows their importance for

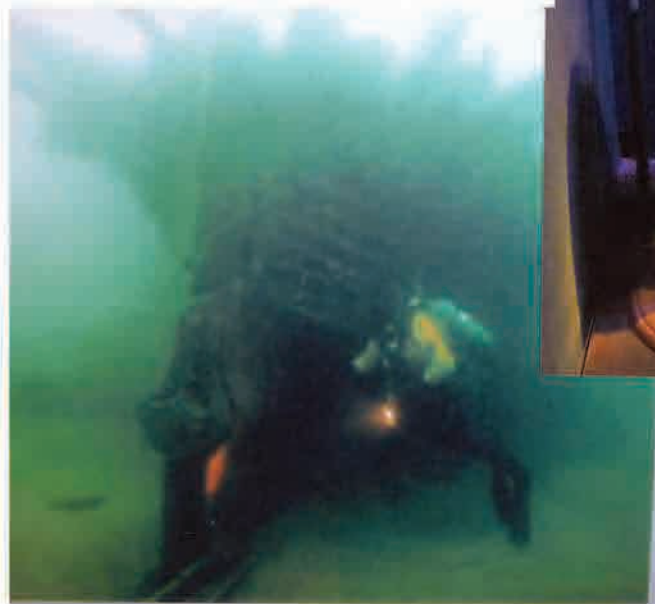
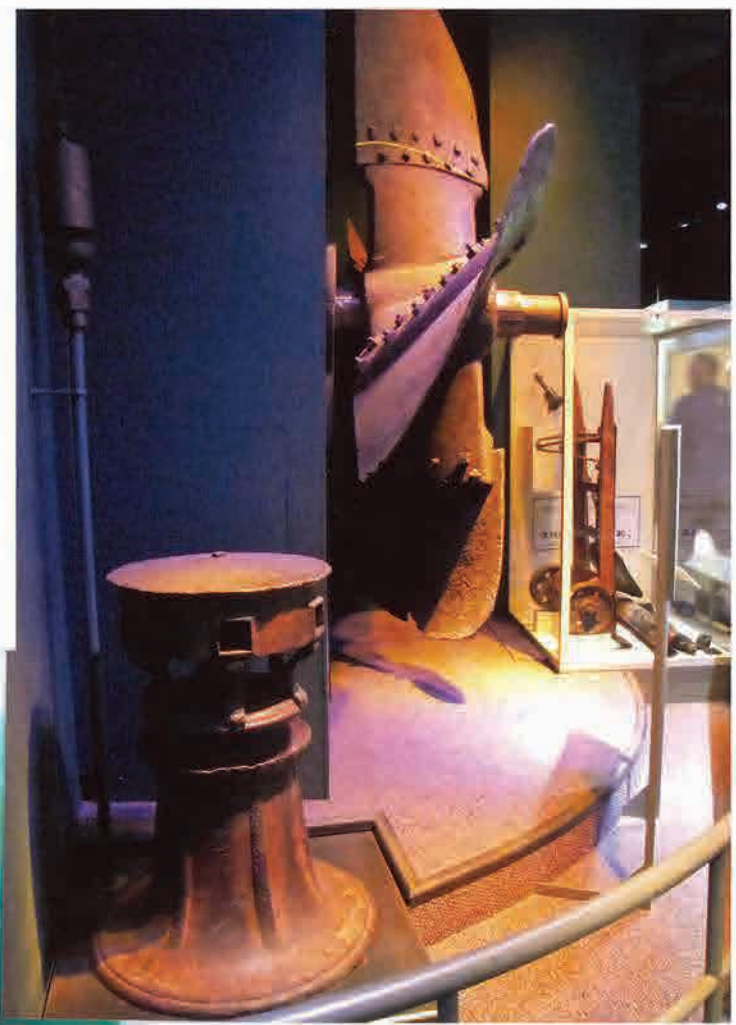


Some of the cannons of the wreck of the SAN JUAN EVANGELISTA, brought up for close examination in search for clues, in an attempt to identify the wreck which later turned out to be the remains of the Spanish naval frigate SAN JUAN EVANGELISTA.



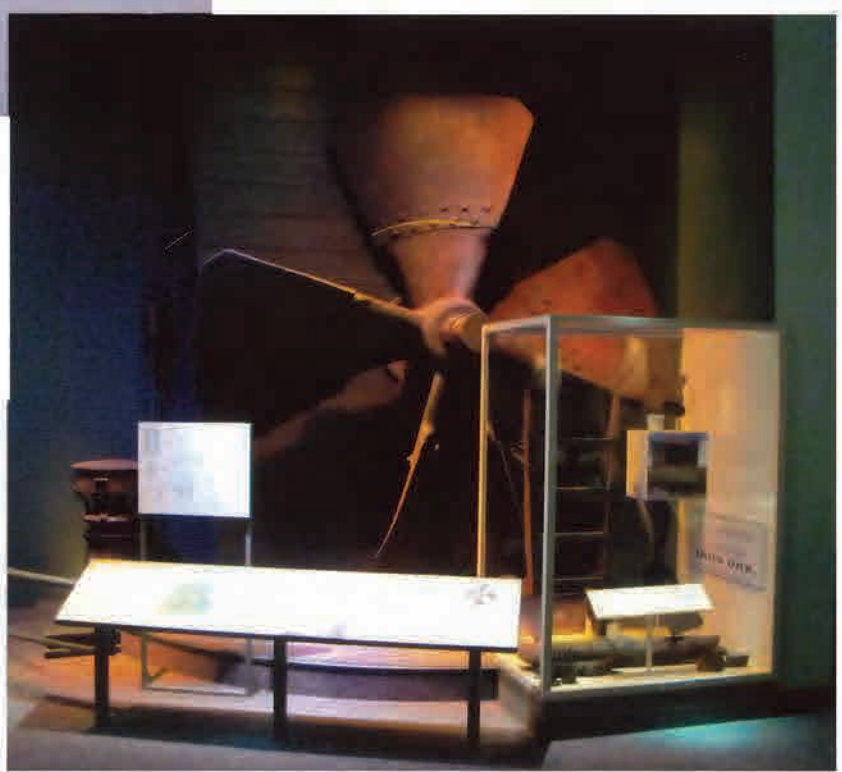


After the eclipse consecutive to Mendel Peterson's retirement in 1973, underwater archaeological research was restarted at the Smithsonian. One example of the achievements of the staff of the National Museum of American History in the field is their remarkable work at the bottom of Lake Superior on the wreck of the steamship INDIANA. Their underwater survey in 120 ft of depth (water temperature 2° Celsius) has helped explaining the circumstances of the loss of the steamship and of her cargo of iron ore.



**Diving for History**  
From 1991 to 1993, Museum staff made 211 dives in 120 feet of 34-degree water to recover artifacts and study the *Indiana*.  
Photograph by Paul F. Johnston, Smithsonian Institution

The remarkable artifacts recovered (the propeller, the capstan, the bell and a collection of tools) vividly evokes the drama for the visitors. (Exhibits: part of the "Stories for maritime America" display cases in the "Working the Lakes" part of the Underwater Archaeology room in the east wing of the museum.)



our knowledge of what he called (he had a knack for coining such evocative expressions) “the Reach for the New World”. The text of this long article was necessarily popular but the illustrations were outstanding and so was the large size folding map that supplemented that issue. Titled “Colonization and Trade in the New World”, it traces and comments the historic routes of the galleons and the principal ports of Spanish America and, on the reverse side, depicts a Spanish armed nao both above and below decks, with her cargo and contents. The map (for which he was Principal Consultant) remains an outstanding introduction to the subject.

One point that Pete, insisted in making in this long article is how often throughout his career he has been struck by a singular tragedy: “the wholesale loss of original native treasures from the New World. (He was referring to the long ago “vandalism of the Spaniards who deliberately converted what we look at today as priceless historical and artistic relics into units of currency for a supposedly more civilized world”.) He particularly lamented what he calls “one of the greatest losses undoubtedly occurred when Cortez men melted down much of the royal treasure of the Aztec emperor Montezuma in 1520, objects which to them, at the time, were devoid of any cultural value and, part of which, to the horror of the Friars in the Cortez gang, could even have been idols of the wrong gods adored by these savages.

The notion of retirement is a relative notion. In 1978, on the day of his sixtieth anniversary, Mendel Peterson is diving on an 18<sup>th</sup> century Spanish wreck off the coast of Hispaniola (the eastern part, which is now called the Dominican Republic) and, typically, in July and August he is shooting 3 rolls (at least) of Kodachrome slides at the Istanbul “Cannon Factory”.

One thing at a time.

In Santo Domingo, he had joined a team of divers led by Tracy Bowden on the salvage vessel HICKORY as an advisor to his company, Caribe Salvage SA. The company has obtained an excavation permit from the Dominican government that involves a fair repartition of the recovered artifacts between the State and the salvors (that is with the exception of any unique object of exceptional cultural value which would go straight to the Santo Domingo Museum). Pete’s mission here is double: to identify, evaluate and appraise the finds and, on the other hand, to advise the divers on excavation techniques and on preservation.

The target here was two big Spanish ships lost near Samana Bay while on their way from Spain to Vera Cruz via Havana. For Pete it is a great occasion to study, for once, not the wreck of another ship bringing colonial products and treasure from Tierra Firme, New Spain or the West Indies to Spain, but on the contrary ships bringing from the mother country all that was necessary for the colonies industry and for the well being of their Spanish inhabitants.

The targeted ships were named the NOSSA SEÑORA DE GUADALUPE and the CONDE DE TOLosa. Both had repaired at Puerto Rico for fresh food and water and were on their way to Havana in the night of August 24, 1724, sailing off the north coast of the present day Dominican Republic, when they were struck by a hurricane and thrown on the reefs at the eastern entrance to Samana Bay. Of the TOLosa’s six hundred souls, mostly passengers with their families, fewer than forty people managed to jump in the ship’s boats and everyone else perished but seven sailors who miraculously survived for thirty-two days, perched on the maintop of one of the masts that had remained standing above the fully submerged hull. As for the GUADALUPE, a bigger, more strongly built ship, her timbers held as she ran onto a reef and for the next two days, until the storm abated. So five hundred and fifty people out of the six hundred and fifty passengers and crew could be ferried ashore in the ship’s pinnace and boats.

For different reasons, Pete and Captain Bowden – who had found the two wrecks after long magnetometer



searches – were greatly interested in the main cargo, a total of four hundred tons of mercury, or quicksilver. Mercury was necessary to the Spanish silver and gold mine operators, as vitally important for the amalgamation of gold and silver from the crushed mineral in the refineries of Mexico and Peru. Four hundred tons of quicksilver were enough to supply the royal mines for a full year. Pete was curious to find out how the Spaniards were carrying mercury at sea in the 18<sup>th</sup> century. Mercury is an extremely heavy type of cargo, which is irretrievable when spilt. The Spaniards, the Dutch, the English had tried all kinds of containers when exporting the valuable liquid to the Americas or to India (where the mines of the Moghul were another hungry market) but no really satisfactory container, in fact, was to be devised until specially made squarish steel bottles were successfully experimented much later.

It turned out that, just as in some drawings he had found, the Spaniards had packed their mercury in small leather sacks, secured at the top with thongs and stored singly in small wooden casks or in wooden boxes.

The divers looked at the cargo of mercury differently: intrinsically, it was worth at the time about three million dollars. They could not recover it however. The leather bags and the boxes had not survived the centuries, the heavy but very fluid liquid metal had seeped or percolated through the containers, the ship's bottom and finally through the sand and the dead coral. Having examined and sounded the sea floor, looking but in vain alas for a hypothetical nice, providential layer of solid bedrock, conveniently hollow in shape, not far below the sand and coral on which the mercury could be lying like in a pool, just waiting to be pumped out. In the end, Captain Bowden agreed with Pete, no, there was no chance to find or to recover the cargo since, yes, it was irretrievably scattered and lost.

But there was to be a compensation, later for the missing main cargo: a dazzling treasure and valuable exquisite artifacts.

The CONDE DE TOLOSA yielded exactly the kind of cargo that Peterson was anxious to see, the countless utensils, artifacts and babbles that the Spanish colonists were taking with them or expecting in Mexico to grace their life overseas. It had always been Mendel Peterson's view *"that human detail was an important key to history"*. *"Through their own possessions"* he felt, *"some splendid and others ordinary, those who left the comfort of a familiar world for the challenge of an unknown one, offer unique insight into a momentous chapter in our past"*.

When he wrote this, his daughter LaNelle wonders, was he possibly thinking of his ancestor George Soule, another such adventurer who arrived on American soil in Plymouth, Massachusetts, on the MAYFLOWER in 1620?

On the GUADALUPE, which was found first and on which the divers kept working for over a year whilst Pete, alternated between the wreck-site and work in the Casas Reales Museum in Santo Domingo, studying and appraising the collection of artifacts, the flow of historical finds and treasures never slowed down. Additionally to the lost mercury, the GUADALUPE had carried a huge cargo of iron ship fittings in her hold. These, Pete understood at once, were destined for the construction of a large vessel, probably in Cuba, where the local mahogany allowed the Spaniards, which had by then practically destroyed their own forests at home, to build excellent, everlasting ships, for the thick grain of the heavy West Indies mahogany discourages the teredo worms.

To Pete of course, the most valuable part of the GUADALUPE contents was the detailed painting that its contents produced of 18<sup>th</sup> century colonial life. The variety of goods astonished him. After all, this was sent to a supposedly frontier society, but the goods included gold jewelry and coins, buttons, crockery, silver and pewter flatware, polished jars, scissors with brass handles, Delftware, a bracket clock made by the renowned London firm of Windmills, beautifully crafted and beautifully preserved, brass and silver lanterns and a quantity of religious medals, virtually everything to be found in a fashionable European

household of the period. He was thrilled in particular by the exquisite quality of the more than 400 crystal drinking glasses that were recovered intact, most of them engraved. There were shot glasses, tumblers, wine bottles, decanters and jugs. “Made in Bohemia” he decided or “made in Germany” and further engraved with typical German hunting scenes or else with the distinctly Chinese patterns that were frequently copied from the Chinese porcelain that reached the Old World via the Manila galleon across the Pacific and then by transshipment overland through Mexico to the Atlantic trade. The style was familiar to the New World colonists. Of course, he pointed out to the divers, more than a half of the GUADALUPE’S cargo was smuggled goods, since they were not of Spanish origin, but that was no surprise to anyone. Such laws were at the time safely winked at.

More than the elegant tableware, plates, silver knives (the blades missing), forks and spoons, fine crockery and silver candlesticks, one item in particular retained his attention for its social significance. He called it, in an article that he wrote for *National Geographic* about the excavations (Vol. 156, n°6, December 1979), “*a dandy’s delight*”. The object was an ivory cane handle, plain looking but containing a second, smaller jewel inlaid handle, he found out, that nested neatly in the larger one and, as he wrote, “*out of the covetous side of street ruffians*”.

Now to Istanbul.

The trip, in July and August of the same year 1978, was a combined family cruise (Pete, Trudy and Miss Vicky) through the Greek islands and a photographic session at the Istanbul “Cannon Factory”. An amusing story later written by his daughter and illustrated with her photographs of her father disguised as a short-sighted Zeus for the last night party reveals how playful and young at heart he had remained. (The photographs of the Istanbul cannons will be found with the LGA’s DVD.)

Return to Santo Domingo.

Having worked on the GUADALUPE for over a year and produced a precise scale diagram of the wreck, overseen and approved by Peterson, the divers moved on and began a search for the other wreck, the CONDE DE TOLOSA, which their magnetometer eventually found for them seven and a half miles away.

The search took time. It was helped by the historical research of Jack Haskins, an old friend of Pete’s, in the Archivo General de Indias in Sevilla and, at last, in June 1977, a clear magnetic anomaly caused by the TOLOSA’s massive cannons revealed her whereabouts. On that wreck again, which they believed to be the TOLOSA but, in the early weeks, without definite proof, they recovered pewter ware, glassware and pottery. Then, the final proof was uncovered by the airlift among the sanded up timbers of the wreck in the form of a small cask. Tracy Bowden carefully vacuumed away the sand inside and, at the bottom; he found a last remaining crescent of small silvery globules.

The artifacts recovered from that second wreck were also, mostly, passenger’s property, some similar to the objects found on the GUADALUPE, others exceptional, such as an instrument fashioned of ivory plates, a pocket calculator, that consisted of a vertical sundial, an horizontal sundial and a compass. The instrument, dating from the 16<sup>th</sup> century, was at the time already an antique.

Pete had had few occasions to dive on the wreck of the GUADALUPE but he spent much of his time in 1978 diving on the TOLOSA, studying and drawing her hull, which by then had been fully exposed by the work of the divers, the anchors and her artillery. Thirty-three of the heavy iron cannons that she had carried were visible inside the hull or close by. There were boxes of hand grenades also and a collection of miscellaneous heavy ammunition.

He also found out that one of the two massive sheet anchors was still aboard when the ship was lost. The crew of the TOLOSA had put one of the two anchors over the side during the night of the storm but the coral reef had soon “eaten” the cable. Why did they not use the second one?

Countless clay jars were recovered, ranging from the small ever present olive jar to the huge oil jars. Other such containers had contained water, wine or pine-pitch.

Diving day after day on the wreck of the TOLOSA, Pete watched the divers uncovering with the airlift impressive finds of ceramics and glassware, brass and pewter implements (including a chamber-pot) and the occasional coins or piece of jewelry. Among the jewelry were a number of religious and chivalry emblems: a quadrifoiled delicate gold cross indicated the presence aboard of a member of the Holy Inquisition. A gold medallion bearing the portrait of the Virgin Mary and the caption “Mater Salvatoris” was encircled with large lacelike filigree. An adoration scene, one of four hundred brass and bronze religious medals that littered the wreck had been struck in Italy. Pete knew that such cheap medals were to be distributed to parishioners and to new converts in the West Indies. A small bronze crucifix, a pendant, was fitted with a rear compartment to serve as a reliquary. The rarest of the sacred items were the extremely rare seals of two bullae bearing the name “Innocentius XIII Papa”, the Pope who had sent his two directives to his bishops overseas.

There was aboard, among the passengers, a Doña Antonia Franco, for her name was found inscribed inside of an otherwise plain silver bracelet, but the name of the richest man on board, apparently, has not yet been established. That man had been a Knight of Santiago for along his riches – that were found grouped together in the last days of the excavation – was a gold medallion bearing the Cross of that Order, framed by twenty-four diamonds and a simpler gold, heart shaped medallion bearing a plainer version of the Cross of Santiago. A superb brooch, which may have belonged to his wife, was encrusted with thirty-seven fine diamonds and a small cross of hers, a pendant, was decorated with eight emeralds and twenty-two diamonds. The still nameless wife of the Knight whose life was taken by the 1724 hurricane, was also the owner of a most magnificent pearl necklace, or necklaces, for the divers of Caribe Salvage recovered in the same small area about one thousand intact beautifully selected round pearls, some of them white, some others gray or black, but all pierced, which must have constituted, in the lady’s personal casket, the most magnificent jewel or jewels.

This was in 1979. At the end of the same year, Pete, will be instrumental in keeping in the United States, a truly unique 16<sup>th</sup> century cannon that was in great danger of leaving the country for the UK. That story is worth being told in detail for two different reasons.

This gem of a gun happens to have been brought back from the Philippines by American troops in the 19<sup>th</sup> century. (In what circumstances was this piece, a falcon, “obtained” by the Spaniards and taken to their Philippines establishment is a much written about question that remained unanswered.) With the advent of the Spanish American War in any case, the US Army had occupied most of these islands. During the Philippines insurrection of 1899-1902, the US Army and the US Marine Corps were on Samar to root out the Filipino Insurrectionists. It was reportedly a bloody, vicious war, marked by atrocities committed by both sides. In October 1901, two companies of Marines retaliated on one of the worst attacks and, during that particular operation, the cannon was captured from an insurrectionist strong-hold by a company of the Eleventh Infantry Regiment. The Eleventh Infantry also took the church’s bells (that were recognized guilty of having rung as the signal for the revolt) and the whole was sent back to the United States where it had remained unnoticed to this day, exhibited on the parade ground of the Francis E. Warren Air Force Base in Wyoming.





Iron cannons from the wreck of the CONDE DE TOLOSA, lost in 1724 on the north coast of the Dominican Republic. The cast iron muzzle-loaders were recovered during the 1978 excavations under the archaeological supervision of Mendel Peterson. The TOLOSA was lost near her consort, the NUESTRA SEÑORA DE GUADALUPE. Both ships were bringing from Spain cargos of mercury, miscellaneous foodstuffs and all kinds of luxury goods for the use of the Spanish colonists. Neither ship was a treasure ship; still, the officers and the wealthy passengers had been taking with them a fair amount of exquisite gold jewelry, richly inlaid with diamonds and emeralds, as well as pearl necklaces, etc.

Photo MLP.

gun founder's family. The falcon was "rediscovered" in 1979 by experts of the Office of Air Force History, its rarity was recognized, precautions were suddenly taken to bring it inside, away from rain and shine, and to submit it to some conservation treatment, although it was in a very good state of preservation. Army historians came to inspect the piece and photographs were sent to the Master of the Armories in the Tower of London for final advice. The answer of the Deputy Master confirmed the uniqueness of the piece: *"The inscription on your cannon reads 'Robert Owyne made thys favcon Anno DNI 1557', in other words, 'Robert Owen made this falcon in Anno Domini 1557'. Robert Owen was one of three brothers who lived near London, casting bronze cannons from about 1530 to the end of the 16<sup>th</sup> century... A falcon was normally 7 ft long, of 2 1/2 – 2 3/4 in caliber... I know of no historical event which could account for its presence on the island of Samar. Your cannon is of particular interest to us in England and in the Armories as it bears the monogram 'MR', Maria Regina, for Queen Mary. I can think of no other example of a cannon bearing her monogram, which leads me to suggest that while I appreciate its significance to you as a regimental trophy, we would find it an even more honored place in the Tower of London, next to a cannon of her husband's making (Philip of Spain). Needless to say a gift would be handsomely acknowledged and would form a memorial in itself..."*

H.L.B.... Deputy Master of the Armories."

The story then turns into an epistolary confrontation between three generals, shall we call them General X, General Y and General Z. General X, who always has had the cannon under his command, has decided that *"it should be sent to where it belongs, that is to England"*. However, he writes in his correspondence with another General, the commanding officer of another army base near Washington (General Y) that he wishes to do that *"without the top guys in Washington being involved"*. In clear, a little personal glory here would be welcome. General Y is not so sure. He takes advice at the best possible address: he writes Mendel Peterson and mentions his doubts about the matter:

*"Dear Mr. Peterson,*

*... [On the basis of] the enclosed slides... and copies of correspondence with my recommendation for its disposition, would you be willing to write a brief analysis of the authenticity of the cannon and a recommendation as of its disposition for my use?*

*Sincerely...*

Major General US Air Force, Chief Office of Air Force History."

In the enclosed copies of correspondence, the Major General Y, writing to General Z, gives a brief outline of the facts and states:

*"The cannon is genuine... It is the only 16<sup>th</sup> century cannon in existence in the United States and probably in North America. The British... have numerous 16<sup>th</sup> century cannons. For this fact, I recommend the cannon not be given to the British."*

And further on:

*"I think that the Air Force Museum, if the cannon were given to them, would probably loan the piece to the Smithsonian Institution... They would be delighted to have this cannon, which would become the corner stone of their exhibit of 16<sup>th</sup> and 17<sup>th</sup> century exploration and discovery.*

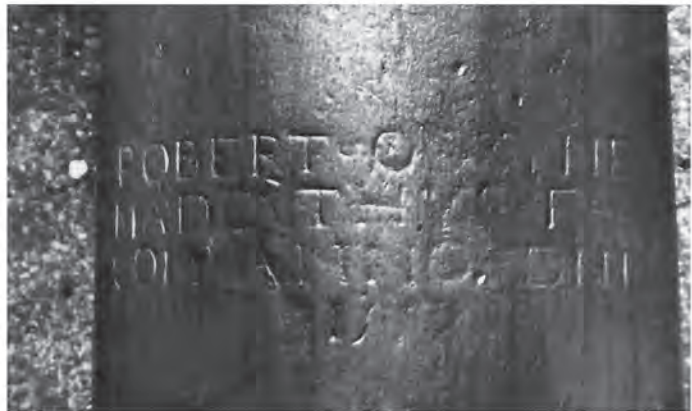
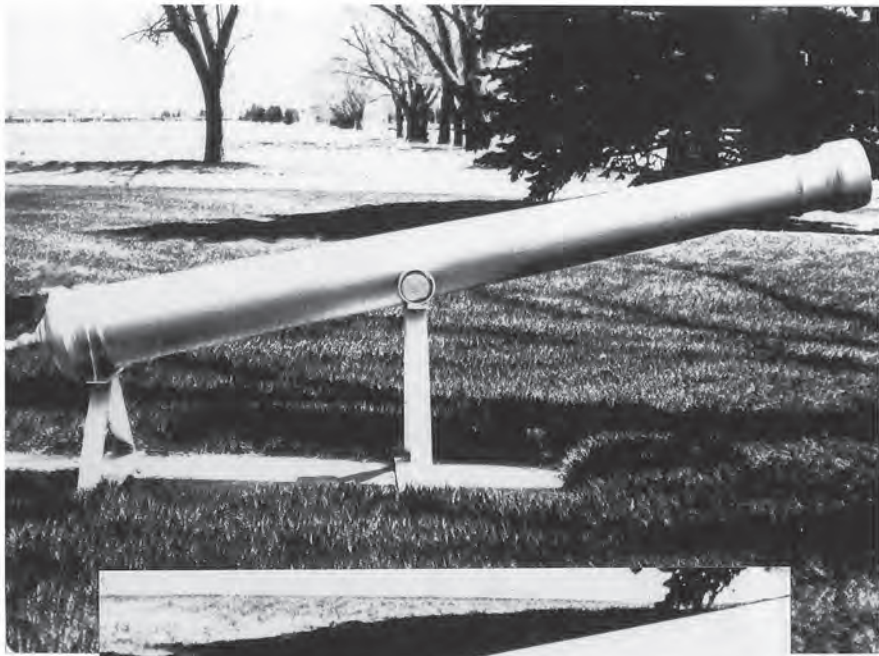
*In short, this is a one-of-a-kind historical treasure, unique to this country, and would be, if given to the British, one among many other treasures in Great-Britain. Kept in this country it will be a boost into the image of strategic air command and a supporter and preserver of our cultural heritage.*

*P.S.: I have kept the 'bureaucrats' out of the loop. How can I assist you?"*

Having examined the slides and read the above letter, Pete, not surprisingly answers:

*"The Robert Owen Falcon is the only one I know which has Queen Mary cypher. The piece certainly is unique. I can see why the Tower of London would like to have the piece, however I would like to see it remain in this country. They have pieces by Owen but as far as I know, there are no others in the U.S."*





In 1979, Mendel Peterson used his influence to successfully prevent an unique bronze muzzle-loading falcon — “rediscovered” on an Air Force base in Wyoming — being sent to England. The piece was cast in 1557 by the famous English gun-founder Robert Owen. The initials “MR” identify it as having been cast under the reign of Queen Mary (Mary Tudor). It is the only one in the world so marked. It bears the Tudor Rose and the inscription: “ROBERT OWENE MADE THYS FAUCON ano DNI 1557”. The marks (or scratches?) on the trunnion face remain un-deciphered. It is remarkably well preserved. (The purple color of the photographs is typical of the old Ektachrome dyes, which did not stand the test of time.)

Photo US Army.



And then, in the second paragraph of the same letter, Mendel unexpectedly opens his heart to General Y – the second reason why this anecdote has been told in so much detail – and writes:

*“For the past 28 years I have been researching the markings on bronze and iron cannon and have examined every major collection in the world with the exception of Leningrad. The Owen piece is one of the most desirable I have seen. I have collected some 4000 photographs of marks and all-over shots and am taking the liberty of adding the shots of the Owens piece to my files. One day, if I ever get some clerical help, I hope to publish an encyclopaedia of markings and decoration on muzzle-loading artillery. With my life-long interest in old artillery you can see why I believe the Owens piece should remain in this country where we have no other example of his work.”*

The piece has remained in the US (see photograph).

Editor’s comment: The figure of 4,000 photographs is puzzling. Even if Pete was thinking only of the cream of the cream, of a mere selection of the photographs he wanted to publish, there would have been many times more. Has he forgotten a digit before the 4 of 4,000?

\*  
\* \*

Winter after winter Pete, always an avid collector, continues to amass coins and 18<sup>th</sup> century English furniture. *“He also amassed a fine antique bottle collection, antique pottery, pre-Columbian figurines, Bronze Age weapons, 17<sup>th</sup> and 18<sup>th</sup> century nautical paintings and antique prints. He had a wider and varied interest, considering himself not the owner but rather the custodian of his collections, valuing things for their beauty and craftsmanship and their connection to the past. Some time after 1978 or so, he opened a small shop in an antique co-operative in Alexandria, Virginia. This endeavor afforded him the opportunity to deal in ancient coins, meet other collectors, add to his collections, and to have exciting exchanges with others who were interested in gaining knowledge...”* (His daughter, LaNelle)

And clearly, retired or not, Pete’s obsessive (and contagious) passion for ancient cannons, for all the messages they can deliver to divers and historians and for the joy they give to whomever beholds their superb decoration, that passion continues to burn and over the years his still camera continues to click. *“To him – his daughter LaNelle writes – the decoration on cannons was far superior to that on any fine jewelry”*.

In 1980, he is back in Paris shooting color slides in the “Musée de l’Armée” at the Invalides. These slides, I suspect, were made for one of his minor pet projects: a coffee-table book on the subject of “Cannons as works of art” which he never completed.

In 1983, Pete, is hired as a consultant for the “Deep Quest Recovery Project” of Inner Ocean Services Inc., a Houston based company the president of which has become deeply interested in treasure-hunting. First and foremost, that recovery project (pending a hoped-for contract with the local government) concerned the wreck of the famous SAN JOSE, in the waters of the Republic of Colombia.

The galleon SAN JOSE (64 guns) was the capitana of the combined 1708 returning flota of Tierra Firme and Honduras. She blew up in the night of June 8, 1708, during a battle against an English squadron under Commodore Wager and sank. The wreck is laying on a reportedly 250 meters deep bottom, some 19 miles south of Cartagena de Indias, near Isla de Baru. The warship had taken aboard in Portobelo (Panama) a treasure of gold and silver in the form of bars and specie, the present value of which has been estimated by some would-be salvors – not by Pete! – at the most astronomic fantasy figures (the whimsical amount of 10 billion dollars (sic) has been quoted in print!) As of this day and in spite of occasional wild rumors, the treasure is still in the bottom, the Colombian authorities having proven in the circumstances to be as “difficult” when talking contracts as their reputation has always suggested.

But the project soon seemed to extend to other wrecks on the coasts of the same country and, on paper at least, to the lake of Guatavita (yes, again, the gold of El Dorado, of the Golden One, and that surely brought memories to him!) Pete, originally hired as a consultant in charge of coordinating the research, advising on such things as conservation, on-board laboratories, salvage vessels and the like, was soon asked to recommend alternative rich targets to be listed on the company's ambitious search and recovery program.

The locations he obligingly suggested in a preliminary document as "theatre of diving operations" were widely spread: The Turks and Caicos islands, Jamaica, Bahamas, the Florida Straits, the Caiman island, Central America (in general!), the northern coast of South America, the reefs of the Caribbean Sea, Mexico, the Philippines islands, the Mariana islands etc. It was part of his job also to recommend for each theatre of operation the most promising historical sources and the location of the archive repositories most likely to contain information that could lead them to the wrecks.

I have found however no indication at all of any successful recovery in any of his several cardboard filing cabinets full of copies of correspondence, brochures and miscellaneous documents that Pete, had – for once – carefully filed in that period with the label "Deep Quest Recovery".

Pete, now seems to be involved in any major underwater discovery made anywhere in the world, either as a researcher, an Excavation's Director or consultant, or as "the eminent expert".

In 1985, he advises Duncan Mathewson, the Archaeological Director to Mel Fisher's company "Treasure Salvors Inc". Mel has finally found the wreck of the Spanish galleon NUESTRA SEÑORA DE ATOCHA after a twenty years long search, half of it on the wrong side of Florida. The ATOCHA was the 20 guns almiranta of the returning combined Tierra Firme Flota and Armada de la Guardia de la Carrera de las Indias (28 sails all together). She was lost in a full hurricane together with the SANTA MARGARITA on the night of September 5, 1622. The treasure of the ATOCHA was monumental, fabulous, dream-like (Mel had always been, and very aptly so, nicknamed "the dream weaver").

Pete appears, from his correspondence, to have been mostly interested in the gun carriages of the ship, some of which had been recovered almost intact and were to be reconstructed by Duncan under his guidance. But who could have been unimpressed by the hundreds of thousands of silver coins, the thousands and thousands of gold coins, the tons of big silver bars and the dozens and dozens of gold bars, gold chains, gold crosses studded with emeralds, by the engraved gold cups and gold plates, by the silver church vessels and the bucketfuls of loose emeralds that kept coming to light every day?

Pete continued to assist the group when they found the SANTA MAGARITA, lost nearby. His files keep as to this day yellowed press clipping reporting on the auction at Christie's New York of June 1988 where Mel Fisher and various of his investors decided to test the market by selling just 400 of the hundreds of thousands of artifacts his divers had recovered, the bids that reached the auction room, by museums and collectors from all over the world, were over 2.9 million dollars.

In 1989 Pete's daughter LaNelle and her husband Gerry traveled to Bermuda with him to visit Teddy and Edna Tucker at their home at King's Point: "*We spent one whole day on Teddy's boat recording Dad and Teddy as they recalled their days of diving and discovery. It was a perfect day engaging with our dear old friends in storytelling and laughter. Dad took his last dive on that same day at age seventy-one years.*"

When Pete, retired, he continued to lecture widely. In the words of his son: "*Dad has always loved giving speeches and being center stage*". Now he often lectures aboard cruise ships, sailing to Brazil via the Caribbean, occasionally to Panama and once at least to South Africa. He apparently enjoyed life aboard very much. He had always had, as his friends could soon notice, a keen eye for the ladies and a constant appetite for all the good things in life in general. His son also describes him as "*foody*". Could that have

been the reasons? In any case he will become a popular figure on the circuits. The big blue boxes in his personal papers that are filled with the notes and inquiries he made in preparation for his talks (that usually concerned the history of the places the cruise ship would visit) attest that he took his lecturing aboard as seriously as everything he ever did professionally.

Perhaps, his son later wondered, perhaps he was too good a lecturer for the jolly holiday makers in his audiences.

Mendel Jr.: *“I know Dad always wanted to teach and enflame excitement in history... he found a few kindred spirits at his [cruises] lectures. However, I don't believe most passengers cared. Dad did not suffer fools lightly and I know at one point, after several voyages, he gave it up in frustration with a lot of sparks flying on the last cruise.”*

But the years that are going by leave their mark on all of us. Illness had not spared Pete, and its progresses can perhaps be seen in the evolution of his handwriting, which becomes shaky and harder and harder for me to read. Pete's handwriting, as said already, was never an example for the class to begin with. It could be fairly good when he calmly sat down, to write a nice dedication to me for instance on the first page of his books and articles, or to carefully pen captions for his photographs albums but his writing was always messy when he scribbled notes and measurements in a hurry, during his photographic sessions, on any odd piece of paper he could find around.

Undaunted, Pete keeps writing serious papers for specialized journals and he continues also to work as a consultant in his field. In 1994 for instance, it is in Nicaragua that he is called. He is to verify if the recently discovered remnants of a ship that sank on Roncador Reef, 260 miles east of Nicaragua, are, or are not, the wreckage of the famed USS KEARSARGE (which, under the orders of Capt. Winslow, sank the even more famous Confederate privateer-raider, the ALABAMA, captain Semmes, in 1864, after a fierce artillery battle off Cherbourg, France). Yes, the wreck was the KEARSARGE'S.

Age takes it unavoidable toll on his body. He tires more easily but the years seem unable to slow down his mind or to dampen his spirit and year after year, in the process of calendaring his professional and personal activities, this biographer has in fact reviewed all the major underwater finds of the period, without exceptions apparently. For Pete, continues to be consulted from all over the world on every cannon, cannon ball or ship's nail found under the seven seas and, ever the foreseeing squirrel, carefully continues to store and keep for his files every bit of information that reaches him.

July 1997. Pete has open-heart surgery (four by-passes) after a near collapse, his first time ever in a hospital at age 79. After his recovery, he spent his 80<sup>th</sup> birthday March 8, 1998 in Santa Barbara, California, with family and friends. *“On the occasion – his daughter remembers – he presented gold coins from his collection to all in attendance, speaking of each coin with his passionate sharing of history laced with his particular sharp humor and spirited presence”.*

Pete and Trudy live in Virginia. His children regularly fly from Utah or from California to come and be with him a few days. He has six grandchildren and seven great-grandchildren.

*“In the fall of 1999 – his daughter writes – he was diagnosed with cancer... He was put on chemotherapy and underwent successful surgery during the summer of 2000... I would visit and Pete Jr. would visit. We would talk about Dad's childhood. Teddy and Edna would visit and reminisce about their adventures. They always brought joy and laughter and Dad would rally for a while.”*

MLP Jr. much enjoyed the long talks he had with his father – whose memory was sharp as ever – when visiting him in his last years:





Mendel Peterson in his later years.  
Photo by Osborne.

MLP will not be remembered only as the “father” and pioneer of undersea archaeology in the Americas, but also as an enthusiast museum man. As former Head of the Department of History of the old “Museum of History and Technology” of the Smithsonian Institution and, later, as Chairman of the Department of Armed Forces History, he is credited to having “played a major role in formulating the philosophy under which both the exhibition policy and the research functions of the nation’s new Historical Museum have been developed”. He possessed a sophisticated and highly practical insight into the design and management of museum exhibitions and did use this knowledge in a pioneering role, introducing modern exhibit techniques to the Arts and Industries building of the Smithsonian.

*“One day, in November 2000, I asked him to tell me about the fondest recollections he had of his expedition to Antarctica. At one point Dad sat back and said: ‘I remember standing on the flying bridge in the spray as we plunged through the ice. I have Danish blood and a love for the open sea.’”*

It seems that, after his retirement, Pete had chosen to keep at a distance from the Smithsonian and, as far I could find out, he never commented the possible reasons.

Now, belatedly, what happened in this institution after his departure is alluded to in a letter dated “1 March 2002”, received from his old friend and former boss Philip Lundeberg.

The first part of the letter deals with the Oral History Archives of the SI, to the one sidedness, in Lundeberg’s opinion, of the choice of interviewees and of the perspective of their recorded views. The letter reminds Pete how, in the mid-fifties, he was on the pioneering brain-storming committee charged with developing the formal justification of the future MHT.<sup>25</sup> Dr. Lundeberg had listened to the five volumes of interviews of F.A.T. (not a friend, clearly, of him or of Pete):

*“T... Indicated that you represented the History side of the house, while [he] took charge of Science and Technology in subsequent deliberations.”* (Refers to 1955)

Phil Lundeberg’s letter continues:

*“In the last three years there have been a couple of articles on the early years of MHT, written almost entirely from the perspective of the historians of Sciences and Technology.”*

The letter then reminds him of the internal dissensions inside of the Smithsonian organization and how W.W. was “*run out of MHT*” by B.M. and how in consequence, W.W. is missing from the SI Oral History interviews and how the memory of H.C., their late friend, has also been erased.

So, was then Mendel Peterson on the loosing side, the side of History, at the time he retired from Smithsonian? And were there perhaps traces of hidden jealousy? Too many voyages to sunny islands or to swinging Paris or to romantic Vienna? Or just too much success and too much prestige? And could that explain, in part, why his “Encyclopaedia of Decoration and Marks on ancient Artillery Pieces” was never published by the SI? Or why, immediately after his departure, his brain-child, the Hall of Underwater Exploration, disappeared?

Dr. Lundeberg in any case was obviously on the same side as Pete for he further writes:

*“This is quite relevant to current efforts to overhaul the current American History Museum which seems to be going from bad to worst. For the sake of longtime perspective, I plan to give an Oral History Interview with the idea of indicating the role that Armed Forces History had in the early years of the museum. I hope that history, if not the current befuddled administrators and consultants,<sup>26</sup> will get some idea of why you and F... conceived that our national history does indeed include the history of our Armed Forces... Meanwhile, Eleanor and I wish you and Trudy smooth sailing as we all navigate the ‘Golden Years’. Cheers. Phil.”*

On Wednesday July 30, 2003, surrounded by his family, Mendel Peterson died at his home in McLean, Virginia, from heart failure.

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25 The then future Museum of History and Technology which was to be formed and to succeed to the old Art and Industries Smithsonian Museum, aside from the various Museums of Arts and of the Museum of Aviation History. The Armed Forces History Department, which was to be formed later and curated by Pete, was to be part of the National American History Museum, itself part of the M.H.T.

26 The letter is not marked “confidential” or “personal”.

According to the long obituary published in the *Washington Post*, he had heart disease, diabetes and cancer. Surely, with his life-long passion for shipwrecks combined with his sharp sense of humor, Pete must have fully appreciated the cold self-diagnostic of General De Gaulle watching with severity the slow decay of his body in the very last years of his life: “*La vieillesse est un naufrage*”, “*Old age is a shipwreck*”.

Mendel Peterson was buried at Arlington National Cemetery on September 4, 2003.<sup>27</sup>

– Editor



ARLINGTON NATIONAL CEMETERY. Section 69. Grave 4132.

For their invaluable contribution in helping me to assemble precise, true information concerning Pete’s life and for correcting inaccuracies in my early drafts, I am greatly indebted to Mendel Peterson’s lifelong friends, Edna and Teddy Tucker and to Mendel’s family: Mendel Lazear Peterson Jr. and LaNelle Spence. The books and articles by my late patron Ed Link and by his wife Marion have been one of my most trusted sources also, as well as Teddy’s monumental book “Treasure”! The first hand memories of Donald Geddes have brought lively, amusing touches in the story. As for my basic sources of information in general they have been, of course, all the published and unpublished writings and private correspondence by Pete himself, including his hardly readable field notes plus the rich Peterson archives and the records of the Departments of which he was the Curator, now kept at the Smithsonian Institution Archives in Washington, DC, (where Ellen Alers was extremely helpful). My vivid personal memories of our meetings over the years have completed the picture.

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27 Where his wife, Trudy, joined him in 2007.



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## THE FILMOGRAPHY OF MENDEL PETERSON

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Most of the films shot by Mendel L. Peterson (MLP) or under his guidance concern early underwater archaeological excavations in the waters of Bermuda, often on the vessel of Teddy Tucker, or in the waters of the Caribbean (Haiti, Jamaica), the Bahamas and Florida, often on board SEA DIVER I, the Research Vessel of the late Edwin A. Link.

These films have been created for the Armed Forces History Department (founded by MLP), a division now extinct of the National Museum of American History, Smithsonian Institution, Washington DC. They constitute today, the “Smithsonian Underwater Archaeology Film Collection”.

The collection consists of approximately fifty reels of black and white 16mm film (a volume of approximately 4 cubic feet). The films are on reels, some in cans.

There are also two short colour films dealing, more specifically, with conservation of ancient, sea water soaked artefacts.

Most of the films in the collection have been made in the 1960's, when MLP was “Curator of Underwater Archaeology in the Division of Armed Forces History”.

There is some footage that was made for a project sponsored by the Explorers Guild and it includes the negative of and a complete film narrated by MLP.

Finding aids, consist of a preliminary inventory of the reels.

The films have been transferred (in June 1987) from the Division of Armed Forces History of the Smithsonian Institution, to their present location in the Archives Center of the Smithsonian Institution, National Museum of American History.

Parties interested in the films – or in the SI Archives in general – should call ahead: 202-633-5902 for an appointment with the Keeper of the collection, or send a facsimile message to: 202-633-927, or e-mail: [alarse@si.edu](mailto:alarse@si.edu).

The address is:

The Smithsonian Institution Archives  
Capital Gallery Building  
600 Maryland Av., SW  
Suite 3000 – 3<sup>rd</sup> Floor  
Washington DC 20024  
USA



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## ULTIMA RATIO REGUM (The Last Argument of the Kings)

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“Cannons literally point to a wreck-site...”

When he wrote these words, very early in his career, at a time he was mostly interested in the wrecks of ships of the colonial period, lost in the waters of the Americas, Mendel Peterson was focusing on his own early reasons for forming plans to study every cannon or mortar exhibited in all Army or Naval museums in the world.

For cannons do not point only to a wreck-site, they point also to the identity of the wreck and to its history.

And too much more.

Often, cannons are the only visible evidence that a wreck exists. Once it is discovered, it is the cannons again that help salvors or archaeologists to establish the size, type and approximate date of the ship. Of course, there are today other ways of identifying and dating, sometimes more precisely, a just discovered wreck. But at the time Peterson began his underwater career, the chronological typology of glass bottles, of smoking pipes and of other datable artefacts was not what it has become, for he, himself, was to be largely responsible for establishing and publishing that kind of information.

More important yet, such objects are usually found either broken in many pieces and eroded by the sand or, if intact, at the very bottom of cracks in the rocks, deep under a layer of sand, or mud that will take weeks to remove. Cannons, on the contrary, are usually on top of the pile and easily recovered for examination by whoever can understand the marks and clues.

Of course, coins can be the other prime informers, since they are always either dated or easily datable and the “key coin” sets once and for all, a *terminus ad quem*. But again, it is invariably the case that the coins are either embedded in hard-as-rock accretions, or deeply buried in sand or mud, or stuck deep in some crack or crevice, so that they are found in the last days only of the excavation and after weeks or months of digging and searching on, possibly, the wrong wreck.

Or else, the alternative case is that the coins, if unprotected on a sandy bottom, will turn out to be completely corroded, erased and made unreadable for having been shuffled around as dead leaves in the wind, during several centuries of perpetual heavy surf and occasional strong gales.

But cannons – naval guns or field guns – as Mendel soon understood, have an immensely wider historical significance. They are more than tellers of wreck stories, they can tell us a lot also about History, in general and that is why, for a good thirty years, Mendel Peterson learned the finer points of their language.

It is our cannons that made our history. Charles de Gaulle wrote: “L’Histoire de la France s’est faite par l’épée” but he was a poet and what he really meant was “The History of France was made by the cannon”. (Cannons that in his military philosophy of the time and as explained in his early books should have been on the turrets of the tanks of the armoured divisions that he had tirelessly and unsuccessfully advocated in the years before WWII.)

Cannon are “Ultima Ratio Regum”, “The Last Argument of the Kings”, the argument that settles it all, between enemy rulers or between commercially competing nations after everything else has failed: Diplomacy, bribery and negotiations, influence and shoulders swaying, threats and ultimatums.

And what could tell History better than the instrument that made it?





“THE LAST ARGUMENT OF THE KINGS”  
on French pieces, from the reign of Louis XIV until the Revolution (1789).



“THE LAST ARGUMENT OF THE KING”  
on artillery pieces of King Frederik II of Prussia (1740-1786), above his monogram and crown.



“THE LAST ARGUMENT OF THE KINGS”  
on the cannons of the Dukes of Savoy, sometimes Kings of Sardinia (17<sup>th</sup>-18<sup>th</sup> century).

**ORIGIN AND HISTORY OF THE  
MENDEL L. PETERSON**

**ENCYCLOPAEDIA OF ARTILLERY**

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A WORD OF ADVICE

The following pages ARE NOT required reading for the casual reader or for the diving archaeologist intent only on identifying, quickly, a just discovered naval cannon. Neither are these pages immediately required reading for the serious student or expert. The purpose of the following pages, in the name again of the all-important respect of the sources, is to leave a permanent trace of the way the Mendel L. Peterson's (MLP's) archives were physically "conditioned" at the time they reached this Editor's hands in Bermuda.

That way, it must be pointed out, is not necessarily the exact way, in which MLP had organized his archives in his own office or library, before they had to be moved from Virginia, USA, to Bermuda. Unavoidably, any complicated removal process creates disturbances. Neither is it, perhaps, the way he would have wished them to remain permanently organized after his days.

Furthermore, the physical arrangement of the MLP's archives upon their arrival and as described in the pages hereafter, has had to be considerably modified by this Editor in the process of preparing the documents for publication.

The following pages in conclusion will provide some trace at least of the general, early organization of MLP's archives as chosen by him – with the restrictions as explained above. This is done, as one does, for the benefit of any editor or exegete of the future, who would wish to proceed to a deeper, more thorough study of the material, in view of a "reinterpretation" of the MLP's archives.

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The reader will find in the biography of Mendel Peterson, the story of the genesis of the very idea to produce an Encyclopaedia or illustrated dictionary of the marks and decoration that can be found on a cannon. Originally, as we have seen, the purpose was to identify a newly discovered wreck by way of identifying its cannons through their peculiar inscriptions, symbols and decoration, etc. But very soon, as we have seen also, the importance of cannons, as informants has grown exponentially in MLP's mind as he was realizing that artillery is also one of the best indicators of the forces that caused History to be what it has been in the whole world, during the age of artillery.

For those, who have not yet read the biography, it should be briefly explained also that the MLP's Encyclopaedia is the quintessence of the Mendel Peterson's archives, which themselves are the product of the life-long interest of a brilliant and enterprising scholar for artillery history. The artillery of the "ships of force" (or armed vessels) as found on the wrecks of such ships (at a time where every merchant ship of importance had to be armed like a warship), was his favorite subject. Not being an office man, but rather an adventurer, MLP became one of the very first diving archaeologists.

In early 1980, Mendel Peterson wrote:



“For the past 28 years I have been researching the markings<sup>28</sup> on bronze and iron cannons and have examined every major collection in the world, with the exception of Leningrad... I have collected some 4,000 photographs of marks and all-over shots... one day, if I ever have some clerical help; I hope to publish an Encyclopaedia of marking and decoration on muzzle loading artillery...”

Mendel never saw his hopes realized, but his friends have realized his hopes, as a tribute to his memory.

What we shall call “The Peterson archives and notes” are but a part of the information resulting from his fifty years (and more) of study of marks and decoration on cannons and mortars, etc., they are the part that he constituted at his home from the beginning and the part that he took away with him when he left his Smithsonian office. There remains in the archives of the Smithsonian Institution in Washington, DC a comparably voluminous amount of material, which however, is less directly concerned with the history of artillery and more generally referring to all the other artefacts that can be found on a wreck and that could help to identify it, as well as, naturally, with his administrative work as a Museum Department Curator. The Editor, obviously, has made use of all documents contained in both sources.

When first brought to my scrutiny in Hamilton, Bermuda, the material, which constitutes today the “Peterson archives and notes” had been packed for transportation from Virginia, USA, in 23 cardboard boxes (sizes from large to extra-large) and various types of other packages.

The boxes contained the following raw material:

- A large number of green cloth-bound, loose-leaf albums of captioned black and white photographs.
- A number of gray cardboard filing cabinets containing file cards with or without a photograph, and/or photographs pasted on captioned envelopes.
- Field notes and lists of rolls of negatives with a systematic reference system linking each roll with a batch of photographs.
- Countless more loose photographs, often with their negative and a number of duplicates, as well as hundreds of loose color slides.
- A number of large, yellow Kodak photo-printing paper boxes (reused) containing a number of loose and/or carefully prepared series of photographs. These were apparently prepared in view of publication.
- Numerous books on the subject of ancient artillery and catalogues of artillery, naval and military museums.
- Miscellaneous documents, some having little connection with artillery.
- Etc.

Generally speaking, the state of conservation of the photographs and the documents was very good. There was no damage due to water or dampness, with very few exceptions, and no damage at all due to rodents, worms, etc. The photographs are all of good, publishable quality, and sharp (with very few exceptions).

The first action taken by the Editor was to refrain from any hasty attempt at reclassification or at putting some kind of order in what appeared at first sight to be in disorder. On the contrary, the Editor’s main concern was to respect his sources and to maintain, as far as at all possible, the original organization and classification (or apparent lack of it) of the documents as decided for reasons of his own by the person

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28 Mendel Peterson appears to have used indiscriminately the words “marking” and “mark”. This Editor prefers to call “marking” the process during which “marks” are made on any material support such as cannons, or on any abstract notion, etc.;



who produced and/or gathered and organized them. One exception was the reclassification of some obviously misplaced items, such as books and/or groups of photographs, which were quite obviously put in the wrong box, at the time of the last packing for the removal, in order to take advantage of the last available space. The Editor, has thought himself authorized, to group in special boxes, previously scattered books on ancient artillery, complete sets of photographs and photocopies (texts and plates) of a number of extremely rare, hard to find treaties of artillery. As well as combining, a fine collection of catalogues of museums and of artillery collections, which were previously spread haphazardly, obviously, as a result of the latest move of the archives.

Finally, a small number of documents totally unrelated to artillery, underwater archaeology, or history have been extracted and put aside.

## THE CONTENTS OF THE MLP ARCHIVES AND NOTES

The contents, which are hereafter described in some detail, were found to include the following types of documents in the following type of presentation, temporarily filed, packed, or wrapped, as explained:

The so-called “Large Green Albums” (LGAs)

- These are 16 green cloth, bound cardboard albums about 4 to 8 cm thick and 22 x 27cm, containing black and white photographs of artillery pieces. In most cases photographs are captioned and dated, with either summary or, sometimes, detailed notes and comments.
- The photographs were made in or gathered in some 20 countries and show the collections of over 52 museums, fortresses, forts, barracks, public places, squares, ramparts, etc.
- The photographs show all or, probably, most of the significant cannons at each location, regardless of their country of origin. They consist in overall shots and close-ups of any mark, decoration or peculiar detail, which could constitute a clue to the identification of the piece.
- MLP obviously, wherever he went, took great care to enable the future reader of his work to locate the guns in the place where they were on display.
- The photographs are of small size (6 x 6 to 9 x 12cm.) and glued to the removable pages (with three perforations), which are made of a light cardboard.
- There are from 80 to 150 photos or more in each album. There are also pages with only notes and descriptions of some other cannons with the mention in that case: “no photograph”.

The photographs in the green albums constitute a pictorial inventory of the collections that existed in the following countries, at the time MLP visited the museums<sup>29</sup> :

BOX 1– USA<sup>30</sup>

- USA NORTH (1 vol.) – The volume appears complete.
- USA SOUTH (1 vol.) – As above.
- WEST POINT + NEWBERRY (1 vol.) – As above. The reasons why these two collections are separate from the above category are unclear. The original distinction has been maintained.
- WASHINGTON DC (2 vol.) – As above. These two volumes contain original field notes that have been used to complete or double check the captions.
- CANADA (1 vol.) – As above.

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29 In the present description, the albums of photographs are not presented in any particular order but as they have been packed for transportation before delivery to Bermuda.

30 As explained above, the photographs in this album show not only cannons made in America or used by the American Army or Navy, but guns of all provenances now kept in the area.



Mendel Peterson's so-called "Large Green Albums" or LGAs. These albums constitute an unprecedented, illustrated thesaurus of information on ancient artillery. They contain a vast amount of knowledge that had never been made available elsewhere in any one location or in organized grouped form and it is no longer accessible to the specialist or to the public, since most of the museums visited, fifty to twenty years ago, by Mendel Peterson no longer exist or have made other choices in the selection of the artefacts they display. These albums are irreplaceable historical documents.

- WEST INDIES + MEXICO (1 vol.) – These two collections are in all respect unconnected. They seem to have been put together in one volume to make full use of a folder's space. They have been, exceptionally, separated in two volumes by this Editor.
- WEST INDIES (1 vol.) – Under this title are photographs from Haiti (black and white photographs + color postcards), a rather large number of photographs, which are made all the more valuable because many of those cannons, no longer exist. The metal value of the bronze being what it is and Haiti being what it is, the bronze cannons that were once in public squares and some at least of the cannons of the Citadel of King Christophe, are no more.
- CUBA (1 vol.) – Black and white photographs mostly, from the Castle of El Morro and the local museum.
- JAMAICA (1 vol.) – Black and white photographs, often with much detailed notes concerning the origin of the pieces. Includes detailed information concerning the provenance of a number of cannons, which have been recovered from known or unknown wrecks.
- MEXICO (1 vol.) – Some white and black photographs.
- BAHAMAS + JAMAICA (2 vol.) – For the sake of simplification, the series of photographs, showing the guns currently in Jamaica, have been moved by this Editor to the West Indies volume. The photographs of the Bahamas part of this volume come with a number of negatives.

## BOX 2

- SWITZERLAND
  - Geneva + Basle (1 vol.) – Contains also, original field notes and negatives.
  - Zurich (1 vol.) – As above.
  - Bern (1 vol.) – As above.
- GERMANY
  - Munich + Nuremberg (1 vol.) – Contains also, field notes and negatives.
- DENMARK
  - Copenhagen (3 vol.) – Vol. 1 as above. Vol. 2, as above. Vol. 3 contains: nil.
- NORWAY
  - Oslo (1 vol.) – Contains also, notes and negatives.
- SWEDEN
  - Stockholm<sup>31</sup> (3 vol.) – Vol. 1: Army Museum. Contains photographs, but, no notes or negatives. Vol. 2: Army Museum. Contains notes and negatives. Vol. 3: Maritime Museum. Contains notes and negatives.

## BOX 3

- UK
  - Woolwich (3 vol.) – Under this title are all the photographs taken in the “Rotunda Museum” and on the nearby grounds in the open. Vol. 1: Black and white photographs, postcards, etc., also, 136 contact prints from 35mm negatives and some 100 black and white photographs without captions, notes or negatives. Vol. 2: Photographs without notes or negatives. Vol. 3: Contains field notes.
  - Tower of London (2 vol.) – Vol. 1: Contains no notes or negatives. Vol. 2: As above.
  - England + Scotland (1 vol.) – Contains also, field notes and spare prints. Under the title “England and Scotland” were only photographs apparently coming from mostly other UK collections.
- FRANCE
  - Paris “Hotel des Invalides” (1 vol.) – Contains no field notes or negatives. The MLP volume

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31 There are also a number of separately organized photographs and documents concerning the wreck of the VASA and its artillery.



on the cannons in France appears to be the weakest of them all. Indeed it contains no photographs of any of the main naval museums of France: The Musées de la Marine of Paris, Brest, Rochefort-sur-Mer and Toulon (+ in MLP's days the one in Bordeaux). There are only a few photographs of cannons in Nice (at the Bellanda Tower or "Tour des Ponchettes").

- BELGIUM
  - Brussels (1 vol.) – Photographs from the former "Musée de la Porte de Hal" and the "Musée de l'Armée (Musées Royaux du Cinquantenaire)". Contains notes and negatives.
- ITALY
  - Venice (1 vol.) – Navy Museum + Museo Correr. Contains also, field notes and negatives.

#### BOX 4

- ITALY (continuation of BOX 3)
  - Turin (formerly in Savoy) (2 vol.) – Most photographs from the "Museo Nazionale d'Artigleria". Contains photographs + black and white postcards. Vol. 1: contains notes and negatives. Vol. 2: As above.
  - Rome - A few disorganized photographs, some pasted, no captions, no notes, no negatives.
  - Naples – As above.
- SPAIN
  - Barcelona (1 vol.) – Contains also, negatives and field notes.
  - Madrid (2 vol.) – Vol. 1: "Museo del Ejercito Español". Contains, no negatives or field notes. Vol. 2: "Museo del Ejercito Español". As above.
- PORTUGAL
  - Lisbon "Museo Militar" (4 vol.) – Vol. 1: Contains also field notes. Vol. 2: Contains, no field notes or negatives. Vol. 3: As above. Vol. 4: The captions are completed by the pages extracted from the then museum catalogue and pasted next to the corresponding photographs.
  - Lisbon Marine Museum (sic for the Belem Marine Museum) + The St John Castle (1 vol.) – Contains negatives + field notes.

#### BOX 4 BIS

- AUSTRIA
  - Vienna - The numerous photographs from Austria, in fact from Vienna only, are of exceptional interest. The photographs are not organized and pasted in an album, contrary to most other cases, but they are well ordered and ready to be pasted in an album.

Also 3 large yellow Kodak boxes referred to hereafter as "yellow boxes". The collection here consists of thousands of excellent black and white photographs of great interest + the corresponding rolls of negatives, some of which are identified on the back with a letter and a number referring to the rolls of negatives. Unfortunately there are no field notes to otherwise explain the correlation system. There is no catalogue of the museum.

#### BOX 4 TER (Contains more green albums)

- ALBUM 1 - HEAVY ORDNANCE GREAT GUNS - Contains nothing of the sort in spite of the title. Contains photographs of miscellaneous ordinary cannons, carriages, etc.
- ALBUM 2 - Contains a collection of original pages of *The Illustrated London News* (19<sup>th</sup> century). These have been selected for the plates, being engravings with miscellaneous military and/or artillery related subjects.
- ALBUM 3 – More pages of *The Illustrated London News* + photocopies and notes on miscellaneous army related subjects.
- ALBUM 4 – A number of photographs + captions and notes from the Venice Arsenal, the

Brussels “Porte de Hal” Museum, from Basle, from the Paris “Musée des Invalides”, etc. These photographs have been possibly selected and made ready to be used to complete existing albums (?)

- ALBUM 5 – More original pages from *The Illustrated London News*, also from the *Graphic* (both 19<sup>th</sup> century), artillery and army related subjects.
- ALBUM 6.1 - Contains photographs, correspondence and miscellaneous illustration material concerning bar-shot and sliding short, chain-shot and the like.
- ALBUM 6.2 - As above + a number of loose notes, illustrations and photos related sometimes to the above subjects.
- ALBUM 7 – CANTON “MALPAS SITE” (refers to a wreck located in Bermuda, by the Bermudian divers, Donald Canton and Brian Malpas) BERMUDA 1577. GUNS – Contains a series of photographs not clearly identified.
- ALBUM 8 – CAPTAIN COOK’S CANNONS – This concerns the guns of the ENDAVOUR lost on Great Barrier Reef, Australia. It consists of photographs, correspondence, explanatory notes and a résumé of the history of the discovery of the wreck.
- ALBUM 9 – This album should have been filed next to the other Italian museums, Naples and Museo St. Martin. It contains photographs, envelopes + field notes and negatives.
- ALBUM 10 – Contains photographs of plates of the *Grande Encyclopédie* concerning gun founding.
- ALBUM 11 – FOUNDERS AND FOUNDRIES – Contains *inter alia* a list of gun founders (typed), 14<sup>th</sup> to 19<sup>th</sup> century, worldwide. This would appear to be an original compilation, but there are also photocopies of a number of published books on the subject of gun foundries and gun casting.

#### BOX 5

- THE NETHERLANDS
  - Amsterdam (1 vol.) – Contains uncaptioned photographs with cryptic references in the back; no field notes or negatives.
  - Leiden (1 vol.) – Contains, next to the photographs, a large amount of field notes and negatives.
- ITALY (Continuation of).

The following green albums do not contain any more geographically arranged collections of photographs of cannons, but refer to miscellaneous collections or miscellaneous subjects:

- N°1<sup>32</sup> - Miscellaneous collections of photographs of guns and gun marks (not in a green album, but in a white box) – Contains numerous photographs, drawings, photographs and engravings and/or scale drawings of miscellaneous types of guns of miscellaneous provenances. Also, notes on British gun founders and especially on their marks and correspondence (1933-1968) on the subjects with various experts and/or retired officers. Also, contains notes on the French guns at Annapolis.
- N°2 – This and all following numbers of BOX 5 refer to green albums - Green folder marked “MISCELLANEOUS 2” not otherwise numbered or titled. Also, contains more illustrations and photographs from the *Graphic* referring to artillery.
- GUN FOUNDERS – The so titled green album is the first one of a series of similar folders and brown boxes concerning gun founders and gun founding in general and mostly the bronze gun foundry of the Board of Ordnance of the Royal Navy at Woolwich near London. This is a massive series, which contains over 1,200 pages of carefully selected extracts of the “*Minutes of the Board of Ordnance Woolwich*”. These minutes reflect the everyday activities of

the members of the Royal Navy Board of Ordnance at Woolwich and in particular the events concerned with the gun foundry and the daily activities of the members of the Board of Trade, in connection with gun founding.<sup>33</sup>

BOX 5 contains also miscellaneous documents and correspondence on various aspects of the same subject:

- N°4 Part 2 – MINUTES OF THE BOARD OF ORDNANCE, WOOLWICH 1775-1786 – Contains, namely, a list of 32 Royal Navy ships and copies of correspondence relating to their armament. Important and original information.
- N°5 – As above with lists of the same ships corresponding to the same period. In great part, a duplicate of the above.
- N°6 – Refers to various subjects - Contains copies of correspondence and also of several articles or papers, research notes and copies of the “*Calendar of State Papers*” for the same period. Very much unorganized.

#### BOX 6

This box contains 7 thick brown cardboard folders (5 to 6cm.) containing numerous photocopies or copies of the daily records and correspondence of the Board of Ordnance (Minutes, 1772 to 1783).

#### BOX 7

Contains 3 more brown light cardboard boxes filled with hundreds of pages of more copies of more entries from the daily records of the Board of Ordnance (the Minutes of the BO) for the last quarter of the 18<sup>th</sup> century.

The same box also contains a number of smaller size (14 x 23cm.) green albums of photographs (no connection with the BO) on the following subjects as originally titled. These are what we shall call the “Small Green Albums” or SGAs<sup>34</sup>. They concern:

- CANNON MARKING – Being inscriptions or devices with date and sometimes mention of the name and nationality of the cannon’s founder. Mostly close-up photos. This seems to be classified according to the various features considered as means of the identification of the cannons on which they appear.
- CANNON WEIGHT MARKS – BARREL NUMBERS.
- CANNON MARKS – COATS OF ARMS.
- CANNON DATE MARKS – Classified on this occasion by nationality.
- CANNON BREECH AND MUZZLE PROFILES.
- CANNON SPECIAL DECORATIVE EFFECTS.
- CANNONS LETTERS AND INSCRIPTIONS ON GUNS.
- MISCELLANEOUS – The complete, original chapter “*Fonderie des Canons*” with the 25 plates and their captions, the explanations and the general introduction from “*L’Encyclopédie ou Dictionnaire Raisonné des Arts et des Métiers*” of Denis Diderot. These are actually original pages torn from an original copy of the original “*Encyclopédie*”.
- A REPORT ON THE EXCAVATION OF PORT ROYAL JAMAICA – Refers to the work of Ed Link to which MLP was closely associated.

#### BOX 8

Contains a very valuable collection of catalogues of military, naval and artillery museums.

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33 The eventual publication on Internet of this important mass of selected information is being considered for the future.

34 These SGAs are of the greatest interest since they indicate how MLP was actually planning to one day publish his Encyclopaedia of Cannon marks, etc., as a specific tool for cannon identification to be used by students and researchers.



## BOX 9

- TURIN (1 big yellow Kodak box) – Contains about 200 black and white photographs carefully marked and related to the corresponding negatives. Same correlation apparently used also on field notes to relate photographs to field notes.
- LISBON (1 big yellow Kodak box) – As above. Several hundred photographs, details of guns and miscellaneous artillery related subjects.
- COPENHAGEN (1 big yellow Kodak box) – As above.

## BOX 10

- WOOLWICH GUNS (2 big yellow Kodak boxes).
- TOWER OF LONDON GUNS (2 big yellow Kodak boxes).
- GUNS IN VARIOUS PLACES + miscellaneous related subjects (1 big yellow Kodak box).
- SYMBOLS ON GUNS, INSCRIPTIONS ON GUNS, MISCELLANEOUS FEATURES USEABLE FOR IDENTIFICATION (1 grey cardboard filing box hereafter to be called “grey box”) - Contains photographs.
- COPENHAGEN. CONTACT PRINTS (1 grey box) - A mass of loose photographs some taped together and marked.
- NUMERALS MADRID (1 grey box) – All the photographs inside the box actually loose, scattered, unmarked and of difficult identification since they are totally un-referenced. It appears however that these may be in part or mostly duplicates of photographs, which are identified in other places (?).
- 2 brown Manila envelopes, one marked ILLUSTRATIONS (sic) containing each, hundreds of 6 x 9cm. photographs unmarked or un-referenced.
- 2 more large brown Manila envelopes containing photographs of one or several of SEA DIVER I's expeditions and showing Ed and Marion Link in action in Haiti, on the Silver Shoals, in the Florida Keys and apparently at Port Royal, Jamaica (early 1950s). More of the same showing Ed and Marion link, their sons, the SEA DIVER, the place where they worked, other divers, underwater operations with diving gear of the time and metal detectors, as well as some recovered guns or artefacts. With some short-hand written identification marks by Marion Link.
- CONTACT COPENHAGEN. LAST SHOTS (another Manila envelope) - Contains photos and prints. Some prints however from the TOWER OF LONDON(?)
- STOCKHOLM. (1 grey box, a card filing box used here for its original purpose) – Contains prints and negatives. Several hundred photographs, contents, as per label.
- MOULDINGS (OF IRON GUNS) AND OTHER IDENTIFYING MARKS (another similar grey box) – Contains index cards and/or envelopes with photographs pasted on the cover, referring to the subject. About 80 photos in well identified envelopes.
- FISHES OF Pa (1894) (another Manila envelope) – Contains in fact photographs of all kinds of guns and artillery-related subjects, mostly un-referenced or referenced under a code yet to be understood.

## BOX 11

- VENICE. (1 envelope) – Contains several dozens of photographs (9 x 12cm.) not identified or referenced.
  - Some loose, completely estranged field notes.
  - A grey box not labeled – Contains well organized and identified photographs on various aspects of gun identification (examples of guns inscribed with their metal composition for instance, or with their own name or the owner's name, or the motto of the owner, etc.). Also many filing cards, cards prepared with descriptions of guns identifiable particularity but no photographs attached. NB: This box is organized as the true filing box, which it is.

- About 100 large size Manila envelopes with a photo pasted on the cover and containing prints, duplicates and/or negatives. The references are both to places or museums for which there already exists a “finished” album such as Haiti, Mexico, etc. and on the other hand, places like Rome or Naples for instance, for which, no album had been made by MLP.
- Groups of photographs carefully clipped together, which appear to be prepared pages for forthcoming albums for places as Monaco, Rome, Florence and Salzburg, many being planned additions to existing albums (probably the case of Woolwich) or prepared photographs that have been in the end eliminated.
- An envelope with about 100 photographs from Paris.
- An envelope with photographs of cannon small scale models. (There are other series of photographs of small scale cannon models, including one from the Museo Correr in Venice.)
- Hundreds of Woolwich negatives + duplicated prints (a large Kodak box).

#### BOX 12 (Miscellaneous box)

- Contains a bit of everything, including prepared pages for albums of various places, countless loose photographs and/or color slides, mostly un-referenced, tracings of marks, drawings, correspondence, miscellaneous notes, inquiries made and/or received, photographs identified as from Leiden, Basle, Oslo, etc. Also, numerous excellent photographs of plates (engravings), or of un-referenced ancient treaties on artillery.
- Filing cards with descriptions of cannons but without photographs or concerning individual gun founders or gun founding companies (1 grey box).
- Clipped or bundled and identified photographs of guns at Southampton, Nice, Monaco, Oslo, etc. (1 grey box).
- Filing cards and no photos, concerns exclusively guns that are dated (1 grey box).<sup>35</sup>
- EVOLUTION OF NAVAL ARTILLERY (1 reused brown box) – Slides from, apparently, a lecture. Includes some tracings, etc. of marks on canons with notes.
- About 600 color slides (1 red box) – The colors well preserved<sup>36</sup>, all well described, concerning naval artillery.
- SHIPS SUNKEN OR LOST IN THE GREAT LAKES (Canada/USA) (1 grey box) – An alphabetical cardboard file of well-organized filing cards. This piece of work seems to be carefully done and looks impressive. Its originality or accuracy has not been checked. May be a copy of some existing list (?)
- TUBE PROFILES OF BRONZE CANNONS (1 grey box) - An important collection of photographs, all clearly described, dated and identified. The profile of the tube is considered here, as one of the first important features of any yet to be identified piece of artillery.

#### BOX 13

- ART ON ARTILLERY- The manuscript of an unpublished book by MLP (2 blue boxes) - This book project seems to be one of the other interests of Peterson: The decoration on cannons not seen any more, as an identification tool, but as an art form. It is apparently a final draft.
- A bit of everything (1 blue box) - Color slides + black and white photographs, prepared album pages, notes, photocopies of all possible kinds of documents concerning all possible aspects of artillery and small arms. The slides are precisely identified and referenced. The photographs are not.
- Miscellaneous papers, notes, correspondence, etc. (1 blue box) – Concerns all aspects of artillery.

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35 Very useful.

36 It is well known that the Kodachrome color slides keep their original colors for a very long time whereas the Ektachrome color slides do not and become purple after a few years.

- Some 600 color slides well described and identified (1 red box) – Concerns naval artillery (might have been prepared for a lecture or a series of lectures?)

#### BOX 14

- The 18 x 24cm. excellent photographs of apparently all the plates of the excellent Treaty ARTIGLERIA VENETA, Venice, 1779. (1 Kodak yellow box)
- A number of photographs of Indian made bronze mortars (well referenced).
- Dozens of loose or bundled, but un-referenced photographs of miscellaneous cannons or mortars, ancient and/or 19<sup>th</sup> century.
- “GUN MARKS, FILMS AND PRINTS TO BE SORTED” (1 Kodak yellow box) – Contains in fact 41 large Manila envelopes with only black and white 35mm. negatives, the provenance of which is indicated. The provenance is from everywhere, including some of the cities to which the ready albums are devoted.
- A large number of 9 x 12cm. photographs of a trip to Spain (1 Kodak yellow box) – Includes a personal voyage, Madrid to Bilbao. Photographs are of guns, fortresses and/or of tourist interest only.
- Miscellaneous photographs of guns with details of same.
- 300 more photographs not identified and some marked MARINER’S MUSEUM.
- Photographs of artefacts recovered from the wreck, L’HERMINIE.
- A group of field notes and photos marked NAPLES.
- A number of important photos of gunner’s tools.
- 2 small Kodak 35mm., cylindrical metal negative boxes marked, MADRID AND ANNAPOLIS, but empty.
- An important letter by MLP to Major John W. Huston (already referred to) containing important information on an extremely rare English gun, perhaps the oldest identified gun known in American collections (the Owen’s gun).

#### BOX 15

- A number of original pages taken from *The Illustrated London News* and the *Graphic*, all featuring plates with artillery or military subjects.
- A publication (illustrated) on THE BURMESE GUNS FROM MANDALAY (anecdotic but interesting).
- NEGATIVES + “PHOTOS TO SORT” (1 Kodak yellow box) – Contains in fact a number of negatives and black and white photos, clearly identified and referenced, from all over the world, as well as some field notes referring to the same. The same box contains also, Turin negatives.
- A large number of 9 x 12cm. photographs, some bundled and identified, others not.
- Some color photographs of details of marks and decoration of guns.
- An additional large number of A4 Manila envelopes (as in BOX 11) with photos posted on the cover and negatives and duplicates inside.
- Miscellaneous letters and field notes relative to guns, with photos.
- A carbon copy of an alphabetical list of GUN FOUNDERS 14<sup>TH</sup>-15<sup>TH</sup> CENTURIES, which may possibly be, in parts, just a copy of the already mentioned similar list.

#### BOX 16

- TUBE PROFILES OF IRON GUNS, OF SWIVEL GUNS, OF MORTARS AND OF HOWITZERS + DETAILS OF TRUNNIONS AND CARRIAGES (1 grey box) - Numerous envelopes with descriptive inscriptions and photographs inside, as well as many envelopes so inscribed, but empty. A box well organized, but the work left unfinished. The missing photographs are possibly to be found in some of the other, disorganized bundles...





Some of the so-called Mendel Peterson “Small Green Albums” or SGAs.

These albums constitute his actual “Encyclopaedia of marks and decoration on ancient artillery.” They are based on the results of his thirty years of research in most of the museums of the world (as recorded in the LGAs, which were actually the raw material for the SGAs). They contain a systematic list of all the clues (marks, decoration, particularities, etc.), which an underwater archaeologist, who has discovered a new wreck or a historian, who is interested, from one view point or another in the history of artillery and in general in the nations firepower – with its universal political consequences – will be able to rapidly identify any piece of ancient artillery. These albums constitute a unique tool for research.

They have now been completed, updated and indexed by the Editor.

- FOUNDER'S MARKS – INSCRIPTIONS (1 grey box) – Some system of organized information as above in large size Manila envelopes. It is a well-organized filing box; the work here is well advanced. Half of the inscriptions relate to the subject on the label, but there is also another alphabetical, filing of PROOF MARKS AND INSPECTOR'S MARKS (bronze + iron) and another titled FOUNDER'S MARKS AND SIGNATURES (bronze). These refer to all countries indistinctively. There are some empty envelopes, but many descriptive filing cards are already prepared although not associated to an envelope.
- NUMBERS (1 grey box) – System of filing as above. This box contains sub-categories, such as DATES (iron and bronze), RATE MARKS, CALIBRE MARKS, POUNDAGE, also RANGE MARKS, TUBES (OR BATTERY) NUMBERS, SERIAL NUMBERS, and finally OTHER NUMBERS. This work has been interrupted while in progress, since there are many filing cards not yet related to any photos.

#### BOX 17

- Hundreds of 6 x 9cm. black and white photos (1 green box) – Well organized, referenced and the subject clearly described with the provenance: TOWER OF LONDON, ANNAPOLIS, WP (for West Point presumably), COPENHAGEN and MADRID.
- BADGES AND COATS OF ARMS (1 green box) – Contains large Manila envelopes, with photographs of coats of arms of Kings and Princes, badges of officials, government bodies coats of arms (alphabetically ordered), etc. There are no empty envelopes here, indicating that this part of the work was well advanced or nearly finished.
- DECORATION, HANDLES, CASCABLES (1 green box) – very well organized. Contents as per the label and referring to both iron and bronze artillery. However, other subjects include vents (i.e. touch-holes). Contains a carbon copy of a list of GUN FOUNDERS.
- A number of small, flat color slides Kodak boxes (1 light blue box) – The slides, which are Kodachrome, are well conserved, the colors bright as new and have not turned purplish, as most of the Ektachrome do. They are of guns from St. Augustine, Florida, marked 1781, from Salt Lake City, and from Quebec and Louisbourg, Canada.
- Photographs marked CANNONS CHAS. S.C. 1981.
- 5 loose slides well identified (US and Canada cannons).
- A few black and white 9 x 12cm. photographs, many of them being duplicates, and negatives of miscellaneous guns in some museums.
- A roll and black and white negatives marked FROM MARCO.<sup>37</sup>

#### BOX 18

- About 300 medium size Manila envelopes 13 x 18cm. (1 large yellow box) – Some are prepared and labeled but still empty the others contain photographs of details for identification of cannons. In this case all photographs are carefully identified and referenced on their envelope. There are all types of marks, inscriptions, decoration, parts of the canon, etc., with the provenance of the gun and its date. Very valuable information.
- C. 250 envelopes as above (1 large yellow box) – Contain more of the same.
- Labelled “CANNON PHOTOS. MISCELLANEOUS. TO SORT” (1 large yellow box) – c. 100 similar envelopes containing more of the same, but also a few envelopes marked “TO IDENTIFY”, but bearing the origin of the photographed guns.

#### BOX 19

- PHOTOS UNDERWATER OBJECTS, ETC. “TO SORT” (1 yellow box) – Contains hundreds of photos of artefacts, many of which are duplicates. Some photographs bear the name

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37 Marco Marin was at one time hired by MLP as a photographer. In 1973, he sent a postcard from Florence.

of the wreck on which the artefacts have been found. Example: SAN ANTONIO + Some bundles identified as HARRY COX. COPPER POINT SITE PLUS TREASURE SITE C 1550<sup>38</sup> + A series of high quality reproductions in small format photographs of underwater operations on various wrecks excavated by Mel Fisher, Teddy Tucker or at Port Royal, etc., also a number of artefacts from the same origin, also many duplicates and captioned photos from a wreck museum (?)<sup>39</sup>. Two photographs of Edwin Link. Some photos marked NATIONAL MUSEUM of Port Royal. Loose photographs, some summarily identified as MADRID. Several batches of photos showing iron guns and objects being treated for conservation. A number of 6 x 6cm. negatives on miscellaneous subjects. Not all photographs in this box are related to artillery.

- CANON MARKS PHOTOS (1 large yellow box) – Contains another 200 well identified envelopes with photos inside.
- “TO SORT” (1 large yellow box) – Means in this case that the photographs concerned are to be sorted between named series of identification material such as cascables, coats of arms, touch-holes, numbers, etc., all of which subjects are represented in the box. Probably some planned addenda to the SGAs.

#### BOX 20

SAN JOSE PROJECT (1 blue plastic filing cabinet box) – Contains 8 blue sub-files with correspondence, etc., concerning the Deep Quest Project, also files concerning tools, conservation, the Colombian government policy concerning wreck-hunters, diver’s orientation, objects recognition, etc. Also a *National Geographic* article by George Bass, et al., titled NEW TOOLS FOR UNDERWATER ARCHAEOLOGY (1968). Also a collection of documents concerning the battle of May 28, 1708 between Cdr. Wager squadron and the Spanish galleon SAN JOSE (with flota) off Cartagena.

#### BOX 21

SAN JOSE PROJECT (another blue plastic filing cabinet box) – Contains general information and documentation on some 40 wrecks “still to be found”, dating from the 17<sup>th</sup> to the 19<sup>th</sup> century. Also some shipwrecks narratives and photographs of wreck artefacts of the 19<sup>th</sup> century that are not identified (some photographs bear the mention “Bertrand”?).

#### BOX 22

More books, papers and photocopies of ancient treaties on artillery, etc. Also of books about conservation of iron, about metallurgy, as it refers to gun founding, etc. To be part of a future MLP’s library.

#### BOX 23

As above. Contains books the subjects of which are not related to artillery but to other interests of MLP, including identification of all artefacts from wrecks, even artefacts not related to artillery, such as bottles and the like. Subjects also include the anchors of the SANTA MARIA (the lost caravel of Christopher Columbus), reports on excavations at Port Royal, the conservation of iron, the iron industry in general, etc. To be included in a future MLP’s library.

Final comment on the MLP’s archives:

Having made a first inventory of the contents of Mendel Peterson’s archives, as above described and having glanced, briefly, while doing so, at some of the documents that constitute the archives, it was my opinion as a would-be Editor (at the time), that the work of Mendel Peterson was of high quality, high scientific-historical value and consequently of considerable importance.

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38 Harry Cox is a famous Bermudian treasure hunter.

39 Probably McKee’s museum in the Florida Keys.



The main reason being that the whole of it, globally, constitutes an unprecedented and invaluable thesaurus of reliable information not made available elsewhere previously in any one location or in grouped published form.

My personal conclusion was that the work of MLP absolutely needed to be published that such a publication would result in the creation of a new, very useful research tool for a wide range of investigators and that such a research tool would be a fitting monument to the memory of a remarkable man and his passion.

## ART AND TECHNIQUES OF CASTING IRON OR BRONZE ORDNANCE PIECES (14<sup>TH</sup> – 18<sup>TH</sup> CENTURY)

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The following pages were written by Mendel Peterson as part of the introduction of the first draft of his *Encyclopaedia*, which at the time (1965-1966) still went by the title of *Art on Artillery*. It is this very text that he would have used, with only possibly minor modifications, had he had the opportunity to publish his magnum opus in his life-time. Hence its belated publication today:

“As a background to the study of tube marks and decorations, it is useful to understand how guns were cast. The production of such an elaborate piece of bronze, often with intricate handles and cascabel rings attached, involved the highest skills of the founder. The actual methods, by which, such masses of metal were cast and finished may be surmised from illustrated works on the subject, which appeared in the seventeenth and eighteenth centuries.

They furnish fine detail on all phases of the process. Other earlier accounts describe methods, which prove that these processes were the accumulated experience of the previous centuries and that the earlier methods were similar in principle if not in detail.

The first step in the casting of the gun was the preparation of the materials for making the pattern. The clay, both for the pattern and the mold, was selected for fine texture and body. In a manuscript by a Greek, Kritoboulos, dated 1467<sup>40</sup> the proper type of clay is described:

*“They take a quantity of very fat clay, the purest and lightest possible, which they make plastic by kneading it for several days. The mass is knit together and prevented from breaking by the intermixture of linen, hemp and other shreds and the whole worked up and well mixed in such a manner as to make one tough and compact mass”.*

By the late eighteenth century, Monge<sup>41</sup> described the mixture used for the pattern and the mold as mixture of clay, hair, and horse dung. In the eighteenth century, and probably earlier, the pattern was prepared by winding a tapered core of wood with ropes of straw. Over this was smeared the mixture of clay, while the core was revolved. This process was repeated until the pattern had been built up to sufficient diameter. The moldings of the piece were formed by holding against the revolving cylinder of clay a strickle board of the sort used by workers in ornamental plaster. The pattern was then dried to hardness over a fire. The other details such as coats of arms, floral ornaments and other ornaments in relief were formed of wax or clay and added to the tube pattern.<sup>42</sup> The trunnions of clay or wood, and a cascabel form of clay or wood, were fastened in place with pins and the forms of the “dolphins” or handles in wax were added.<sup>43</sup>

This pattern was painted with a mixture of black lead or hog fat to prevent the mold from sticking and thus facilitate the removal, after the mold had set. The pattern was then covered to a depth of several inches with the same type clay and fiber mixture. This was rammed on until the whole of the pattern except the

40 Translated by Dr Detier for Major General Lefroy and printed in *Arch. Jour.*, Vol. XXV, quoted by Ffoulkes, *The Gun Founders of England*, p. 13.

41 Monge Gaspard, *Description de l'Art de Fabriquer des Canons*, Paris, 1795.

42 Patterns were also made from wood; this must have been true in the earlier period when the cross section of the piece was polygonal or fluted.

43 It is also possible that the hollow form for the handle was secured lightly to the tube and permitted to remain in the mold when the tube form had been withdrawn.

tip of the muzzle was covered. The mold for the cascabel was generally made separately. The mold was then reinforced with bands of iron wound around and run lengthwise of the outside and hooked at the center line of the mold. After the mold was firm, the wooden spindle inside the pattern was removed. The hay and clay form were removed piecemeal and the mold for the cascabel and gun handles were attached on, then the entire mold was slowly dried over a smoldering fire. It was, of course, extremely important that every trace of moisture be removed from the mold otherwise it could explode with great violence when the metal was poured into it.<sup>44</sup>

A group of molds, two, four or perhaps six or more, the number being determined by the production requirements and capacity of the furnace, were set endwise into a pit with the muzzle end uppermost. Around the molds earth and brick were securely packed to furnish additional strength to the molds. When the molten metal was at the proper temperature and was thoroughly alloyed, iron plugs in the bottom of the furnace receptacle were pulled and the metal was run into the molds. The metal was usually run to the top of a reservoir over the muzzle to provide weight to assure that the interstices of the mold would be filled and to provide an area where bubbles and dross could gather outside the gun itself. After the metal had set and cooled, the molds were dug out and removed from the pit and opened. The extra metal which projected from the muzzle, called the “gunhead”, was then sawed or chiseled off and the piece was ready for boring.

Until the eighteenth century guns were cast around a core which was inserted in the mold and held at the breech end by iron pins. When the piece had cooled, the pins were cut and the core removed. Pieces of this period, often show these pins imbedded in the tube forward of the vent ring in the first reinforce. Brass tubes of this type, which have been recovered from sea water, have holes where the iron pins were destroyed by electrolysis. Pieces cast on a core were reamed out to complete the bore. By the first half of the eighteenth century it became evident that a better tube would result if the gun could be cast solid and then bored out. The invention is usually attributed to Maritz, a Swiss gun founder. Foulkes mentions that boring tools were known earlier and that solid casting and boring might have been practiced by Fuller in England as early as 1713. Starker suggests an even earlier date. As the boring engines were perfected the practice became general throughout Western Europe. In 1747, the British government ordered all guns cast solid and bored and soon after it became standard practice. The earlier boring mills consisted of a frame in which the gun was suspended vertically, muzzle down. The boring tool was turned by horse or water power and bit into the gun as it was lowered onto the tool. Horizontal boring mills using water power were later developed, Monge even suggesting that they be mounted on a barge anchored in a fast river, so the current could turn the water wheels.<sup>45</sup>

After boring or reaming, the vent was drilled and the tube was minutely inspected internally to reveal any defects in the casting. This was accomplished by using the “searchers”, long tools with small metal “feelers” which were run down the bore to the end of the chamber. If a rough spot were found, another tool was pushed in to take a wax impression of the defect to determine its extent. The piece also was inspected visually using a lamp, a candle, or mirror to light the bore. Norton describes the process in the seventeenth century:

*“That done, then may he with a common search upon a staff, having two or three round Pease poynted springs that bear out, unlesse they be forced close put into the concaue Cillinder vnto the bottome, all along to examine her within whether there be any flawes, crackes, hony-combes, pynne-holes, sinders, or other faults may bee*

44 A case in point was the disaster of the Moorfields foundry in England, May 10, 1716; several distinguished persons had assembled on invitation to see guns cast from trophies captured by the Duke of Marlborough during the War of the Spanish Succession. When the metal was run in, moisture in the molds caused them to explode killing several of the officials and seriously wounding many of the distinguished guests.

45 Norton illustrates a horizontal mill but this was strictly speaking a reamer for cleaning bores cast on a core.



*therein most easily discerned; or else in close weather or roomes, a Wax or other Candle lighted, being fastened upon the end of a Cane, Staffe, or halfe Pyke, her faults may bee spyed, if the same bee put into her hollow Cillinder, and carefully looked for all along, the Gunners eye being therefore employed diligently at the mouth of the Peece.*<sup>46</sup>

After passing the visual inspection of the bore, the piece was ready for proof. This consisted in firing it with increasing loads up to a prescribed limit and rapid firing over a period of time. After the test firing, the bore was again minutely inspected to determine if any damage had occurred. When the piece passed this proof, it usually was given a proof mark and was ready for finishing.

Using files, chisels, punches, burnishers, and engraving tools, skilled craftsmen finished the moldings, handles, coats of arms and other ornamentation. In the finishing, the piece assumed its real beauty as an example of metal sculpture and the skill in finishing the piece determined the final quality of its ornamentation.

Thus completed, the piece was normally signed by the foundry master, usually on the base ring. It might also bear the name of the officials of ordnance or the princely owner. In the case of royal tubes, a cipher or coat of arms with inscription was almost always included. Finally the piece was weighed and the weight indicated on the end of one of the trunnions with graver chisel or dies.”

## INTRODUCTION

This report is the result of a continuing study which is an outgrowth of the underwater exploration activities of the Division of Naval History. Almost every shipwreck site dating before 1800 will be marked by sand or mud-encrusted guns. Frequently such guns are the only visible remains of a wreck and often the only, or principal means of establishing the period and nationality of the ship. For this reason a comprehensive knowledge of the marks which such guns carry and of the evolution of shapes of the pieces is of the greatest importance to the underwater explorer. Such knowledge is also of interest and use to historians and antiquarians who are concerned with the care and study of early guns ashore. This study was originally planned to include only those tubes which one could expect to find on shipwreck sites. As it progressed it was decided to include in it discussions of the marks to be found on land artillery and a discussion on the decoration of tubes in general.

It is hoped that the information contained in this paper will prove to be useful in identifying bronze and iron tubes of the muzzle-loading era. The study of collections and single examples of muzzle-loading tubes will continue and, it is hoped, will result in the publication of a more comprehensive work on the

subject, a work to which this paper should be considered a preliminary report.

Since the invention of artillery the gun has been regarded as a choice prize to bring home from the wars. The capture of the enemy's heavy guns not only removed a serious threat to the captors in battle but provided them with handsome, enduring, useful and valuable trophies. During the period from the early sixteenth century to the middle of the nineteenth the best guns were of bronze, often beautifully ornamented and costing a king's ransom. These pieces are often real works of art showing elaborate sculptures and reliefs which reflect the best in design of the period. Today these prizes are to be found scattered over the Continent in those places where Europeans have fought, or in lands which they colonized or occupied. Along with them are to be found the utilitarian pieces of cast iron which often carry interesting and historically important marks. The older European military museums generally have large collections of bronze guns. Unfortunately, these collections seldom contain large numbers of the less beautiful but historically important iron tubes. Many of these have been destroyed to salvage the iron in them or were never saved in the first place since they were not considered works of



art and could not compare to bronze tubes as objects of beauty. The Royal Danish Arsenal Museum is one notable exception. Here is preserved an extensive collection of cast iron tubes used in the Danish army and navy or captured by those forces.

In addition to the great collections of guns in European museums, there are substantial collections in ~~o~~ther areas. In North America the largest groups of bronze tubes are held by the Museum of the Military Academy at West Point and the Museum of the Naval Academy, Annapolis. Other collections of various degrees of importance will be found in military and naval installations, in the national and state parks, in museums both private and public, and as ornaments at battle memorials and cemeteries.

Most of the bronze and iron tubes which have survived carry marks which are useful in identification. These vary from the complete signature of the maker with date and place of manufacture which marks many bronze tubes, to a single initial with which some of the iron tubes are signed. All the pieces, of course, display characteristic profiles which may be of use in suggesting nationality and period of manufacture when no marks are to be found.

The earliest tubes were built up of iron staves running parallel to the bore

that era.

From the earliest times guns no doubt were cast. This unquestionably is true of small bronze pieces and probably true of smaller iron pieces. Sometimes a single gun will combine both techniques; for example, the "Bodiam" mortar in the Rotunda Museum, Woolwich. This piece, dating from the late fourteenth or early fifteenth century, is of cast iron with reinforcing wrought iron bands. (1)

As early as the middle of the fifteenth century great bronze bombards were being cast in the Near East, the great guns used in the last siege of Constantinople being prime examples. Later in that century, large fine bronze pieces were being cast for the Knights of Malta and on the Continent. The Flemings seem to have produced some of the earliest bronze pieces carrying on the tradition which was established in the earliest days of artillery when they not only made most of the guns but furnished the artillerymen as well, frequently under contract. The bronze pieces were much more efficient than the breech-loading wrought iron tube. They were stronger, more accurate, and had greater range. They were also vastly more expensive and only the wealthiest of princes could own them.

While wrought iron tubes were seldom marked and never decorated, bronze tubes

quickly became vehicles for artistic expression. Those pieces dating from the last decade of the fifteenth century and the early years of the sixteenth have simple but elegant lines. Often the tube is polygonal or fluted, the two styles combined in a single piece. The muzzles and cascabels of these pieces are almost architectural in design. As the second decade of the century wore on, more elaborate decorations were introduced. The cascabel became a lion's mask with a ring through the mouth to hold the breeching tackle, or the base of a flower, with the stem curved into a ring while muzzles often became dragons' mouths. These were favorite forms but variations are unlimited. Sculpture was introduced and we find such incongruous decorations as a pair of lovers embracing to form the handles of a tube, or niches along the chase of an enormous bronze fortress piece holding figures of saints. In other cases beautiful flowers and vines entwine about a tube as if it were a trellis in a peaceful garden rather than an engine <sup>of violence.</sup> ~~to destroy.~~ Elaborate and intricate moldings appeared to decorate the muzzles, breeches and the areas about the trunnions, and the trunnions themselves are found to contain medallions or foliage adapted to the circular field which sometimes bears a date or the cypher of a prince.



princes

Since kings and lesser ~~nobles~~ almost always owned the artillery in this period, the bronze pieces usually bear their arms, the national arms, or the royal or princely cyphers usually on the top of the tube anywhere between the base ring and the muzzle bell; in some instances several shields appearing on the same piece. The evolution of the bronze gun into an artistic piece led the finest craftsmen into the art of gun founding and, like any artist, they signed their work with pride.

*(add note on location of signature)*

As a background to the study of tube marks and decorations, it is useful to understand how guns were cast. The production of such an elaborate piece of bronze, often with intricate handles and cascabel rings attached, involved the highest skills of the founder. The actual methods by which such masses of metal were cast and finished may be surmised from illustrated works on the subject which appeared in the seventeenth and eighteenth centuries.

They furnish fine detail on all phases of the processes. Other earlier accounts describe methods which prove that these processes were the accumulated experience of the previous centuries and that the earlier methods were similar in principle if not in detail.

The first step in the casting of the gun was the preparation of the materials for making the pattern. The clay, both for the pattern and the mold, was selected for fine texture and body. In a manuscript by a Greek, Kritoboulos, dated 1467 <sup>(1)</sup> the proper type of clay is described:

"They take a quantity of very fat clay, the purest and lightest possible, which they make plastic by kneading it for several days. The mass is knit together and prevented from breaking by the intermixture of linen, hemp and other shreds and the whole worked up and well mixed in such a manner as to make one tough and compact mass."

(1) Translated by Dr. Detier for Major General Lefroy and printed in Arch. Jour. Vol XXV, quoted from Ffoulkes, The Gun Founders of England, p. 13

By the late eighteenth century, Monge <sup>(2)</sup> described the mixture used for the pattern and the mold as a mixture of clay, hair, and horse dung. In the eighteenth century, and probably earlier, the pattern was prepared by winding a tapered core of wood with ropes of straw. Over this was smeared the mixture of clay while the <sup>(Plate —)</sup> core was revolved. This process was repeated until the pattern had been built up to sufficient diameter. (Plate I) The moldings of the piece were formed by holding against the revolving cylinder of clay a strickle board of the sort used by workers in ornamental plaster. (Plates II, III) The pattern was then dried to hardness over a fire. The other details such as coats of arms, floral ornaments, and other ornaments in relief were formed of wax or clay and added to the tube pattern. (Plates IV, V) <sup>(3)</sup> The trunnions of clay or wood, and a cascabel form of clay or wood, were fastened in place with pins and the forms of the "dolphins" <sup>(4)</sup> or handles in wax were added.

(2) Monge, Gaspard Description De L'Art De Fabriquer Les Canons, Paris 1795.

(3) Patterns were also made from wood, this <sup>must have been</sup> ~~was especially~~ true in the earlier period when the cross section of the piece was polygonal or fluted.

(4) It is also possible that the hollow form for the handle was secured lightly to the tube and permitted to remain in the mold when the tube form had been withdrawn.



This pattern<sup>n</sup> was painted with a mixture of black lead or hog fat to prevent the mold from sticking to it and thus facilitate the removal of the ~~pattern~~<sup>it</sup> after the mold had set. The pattern was then covered to a depth of several inches with the same type clay and fiber mixture. This was rammed on until the whole of the pattern except the tip of the muzzle was covered. The mold for the cascabel was generally made separately. The mold was then reinforced with bands of iron wound around and run lengthwise of the outside and hooked at the center line of the mold. (Plates VI, VII) After the mold was firm ~~it was opened and~~ the wooden spindle inside the pattern was removed. ~~The halves of the mold and the mold for the cascabel were then hooked together with the reinforcing iron bands and the entire mold was slowly~~ <sup>The bay and clay form were removed piece meal and the mold for the cascabel <sup>and guns</sup> <sup>hook</sup> were <sup>hooked</sup> <sup>together</sup> or then the entire mold was slowly</sup> dried over a smoldering fire. (Plate VIII) It was, of course, extremely important that every trace of moisture be removed from the mold otherwise it could explode with great violence when the metal was run into it. (1)

(1) A case in point was the disaster at the Moorfields foundry in England, May 10, 1716; several distinguished persons had assembled on invitation to see guns cast from trophies captured by the Duke of Marlborough during the War of the Spanish Succession. When the metal was run in, moisture in the molds caused them to explode killing several of the officials and seriously wounding many of the distinguished guests.

*A case in point of iron flint molds illustrated in Monroe*

A group of molds, two, four or perhaps six or more, the number being determined by the production requirements and capacity of the furnace, were set endwise into a pit with the muzzle end uppermost. Around the molds earth and brick were securely packed to furnish additional strength to the molds. When the molten metal was at the proper temperature and was thoroughly alloyed, iron plugs in the bottom of the furnace receptacle were pulled and the metal was run into the molds. (Plate IX)

The metal was usually run to the top of a reservoir over the muzzle to provide weight to assure that the interstices of the mold would be filled and to provide an area where bubbles and dross could gather outside the gun itself. After the metal had set and cooled, the molds were dug out and removed from the pit and opened. The extra metal which projected from the muzzle, called the "gunhead" (Plate X) was then sawed or chiseled off and the piece was ready for boring.

Until the eighteenth century guns were cast around a core which was inserted in the mold and held at the breech end by iron pins. When the piece had cooled, the pins were cut and the core removed. (Plate II) Pieces of this period often show these pins imbedded in the tube forward of the vent ring in the first reinforce. Brass tubes of this type which have been recovered from sea water have



holes where the iron pins were destroyed by electrolysis. Pieces cast on a core were reamed out to complete the bore. (Plate XI) By the first half of the eighteenth century it became evident that a better tube would result if the gun could be cast solid and then bored out. The invention is usually attributed to Maritz, a Swiss gun founder. Ffoulkes mentions that boring tools were known earlier and that solid casting and boring might have been practiced by Fuller in England as early as 1713. Straker suggests an even earlier date. <sup>(1)</sup> As the boring engines were perfected the practice became general throughout western Europe. In 1747 the British government ordered all guns cast solid and bored and soon after it became standard practice. The earlier boring mills consisted of a frame in which the gun was suspended vertically muzzle down. The boring tool was turned by horse or water power and bit into the gun as it was lowered onto the tool. (Plate XII) Horizontal boring mills using water power were later developed, Monge even suggesting that they be mounted on a barge anchored in a fast river so that the current could turn the water wheels. <sup>(2)</sup> (Plate XIII)

(1) Straker, Wealden Iron p.

(2) Norton illustrates a horizontal mill but this was strictly speaking a reamer for cleaning bores cast on a core.



After boring or reaming the vent was drilled (Plate XIV) and the tube was minutely inspected internally to reveal any defects in the casting. This was accomplished by using the "searchers", long tools with small metal "feelers" which were run down the bore to the end of the chamber. If a rough spot were found, another tool was pushed in to take a wax impression of the defect to determine its extent. The piece also was inspected visually using a lamp, a candle, or mirror to light the bore. Norton describes the process in the Seventeenth Century:

"That done, then may he with a common search upon a staff, having two or three round Pease poynted springs that bear out, unlesse they be forced close put into the concaue Cillinder vnto the bottome, all along to examine her within whether there be any <sup>fl</sup>awes, crackes, hony-combes, pynne-holes, sinders, or other faults may bee therein most easily discerned; or else in close weather or roomes, a Wax or other Candle lighted, being fastned upon the end of a Cane, Staffe, or halfe Pyke, her faults may bee spyed, if the same bee put into her hollow Cillinder, and carefully looked for all along, the Gunners eye being

therefore employed diligently at the mouth of the Peece." (1)

After passing the visual inspection of the bore, the piece was ready for proof. This consisted in firing it with increasing loads up to a prescribed limit and rapid firing over a period of time. After the test firing, the bore was again minutely inspected to determine if any damage had occurred. When the piece passed this proof, it usually was given a proof mark and was ready for finishing. (2)

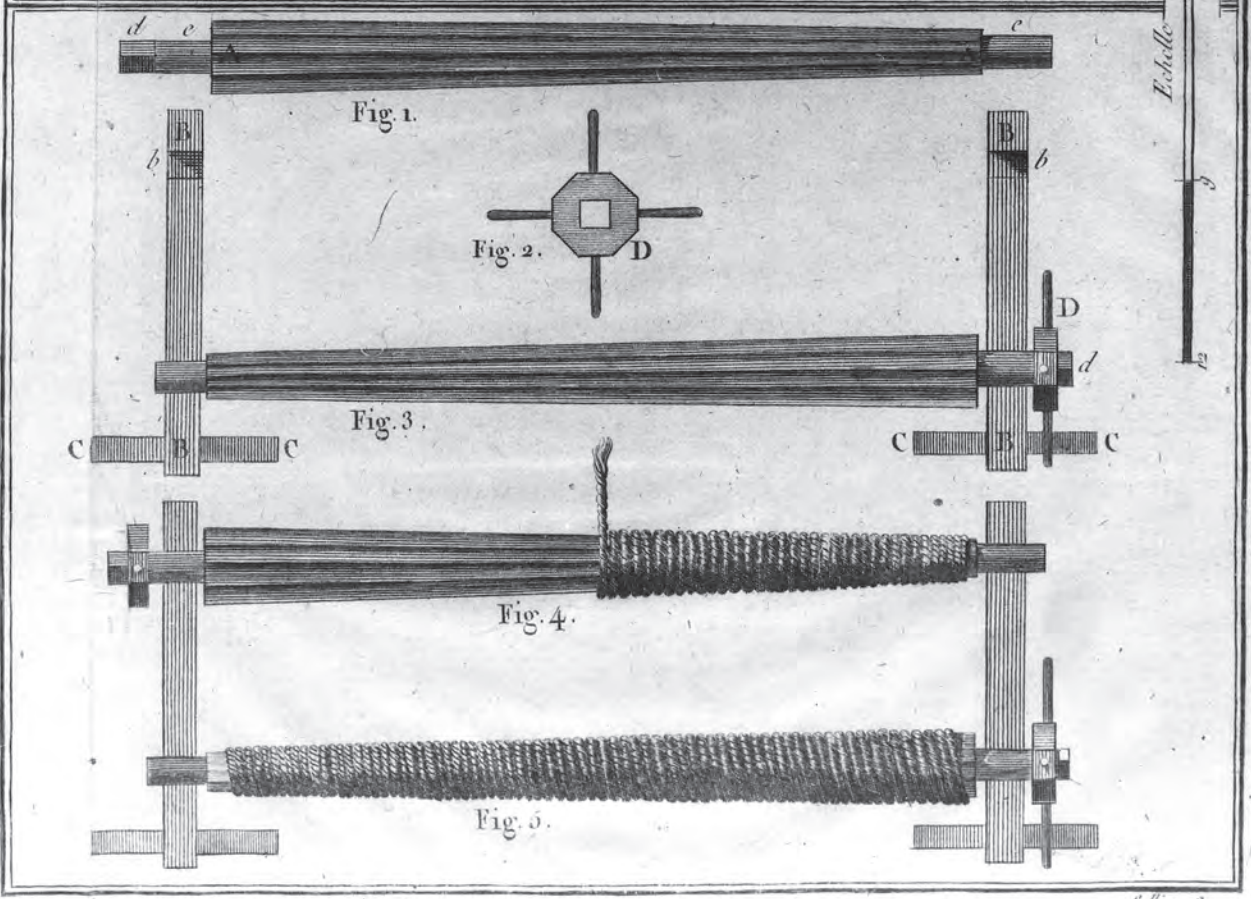
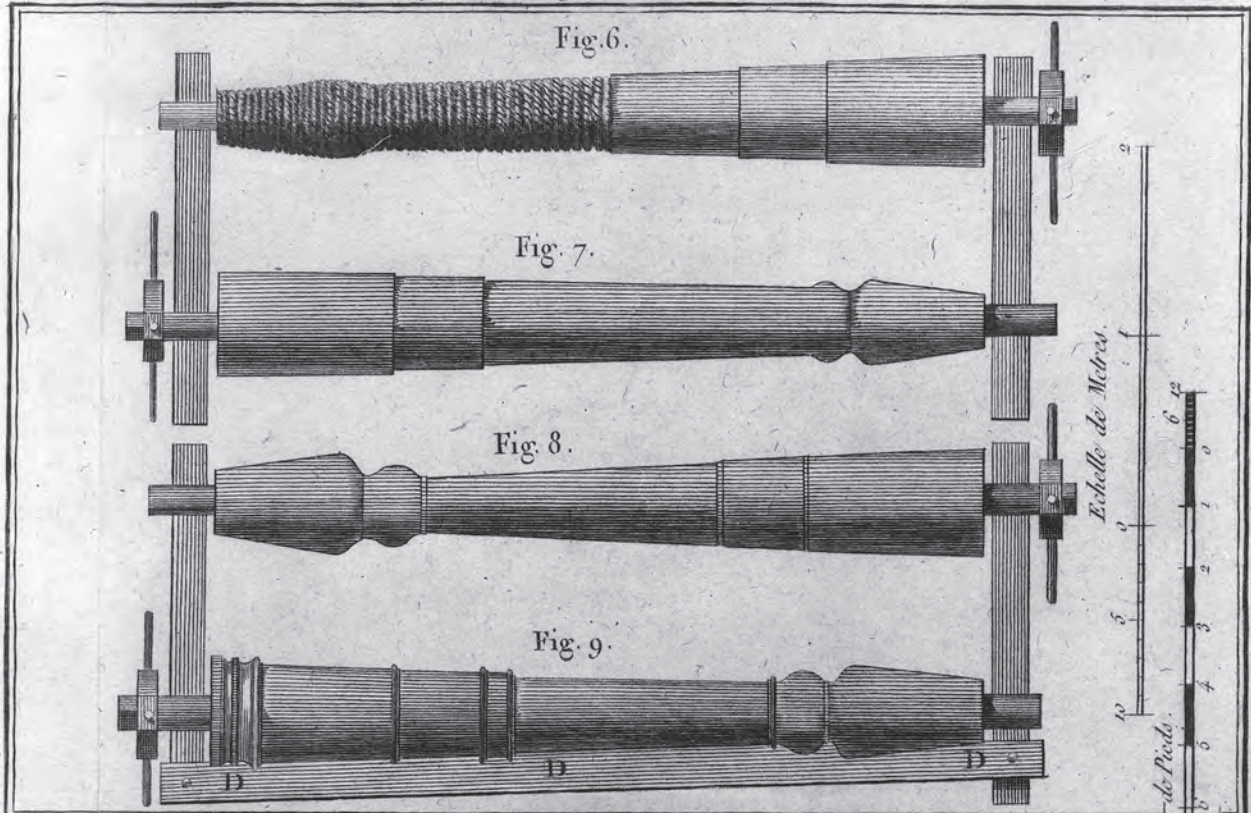
Using files, chisels, punches, burnishers, and engraving tools, skilled craftsmen finished the moldings, handles, coats of arms and other ornamentation. In the finishing, the piece assumed its real beauty as an example of metal sculpture and the skill in finishing the piece determined the final quality of its ornamentation. (Plate XV)

Thus completed, the piece was normally signed by the foundry master, usually on the base ring. It might also bear the names of the officials of ordnance or the princely owner. In the case of royal tubes, a cypher or coat of arms with inscription was almost always included. Finally the piece was weighed and the weight indicated usually on the end of one of the trunnions with graver ~~or~~ chisel <sup>or dies</sup> (Plate XVI)

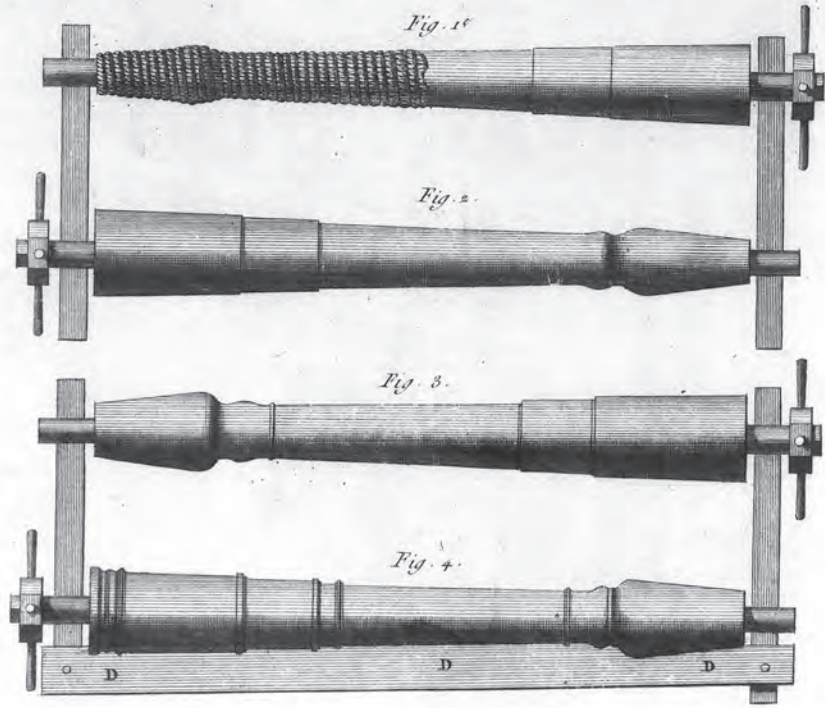
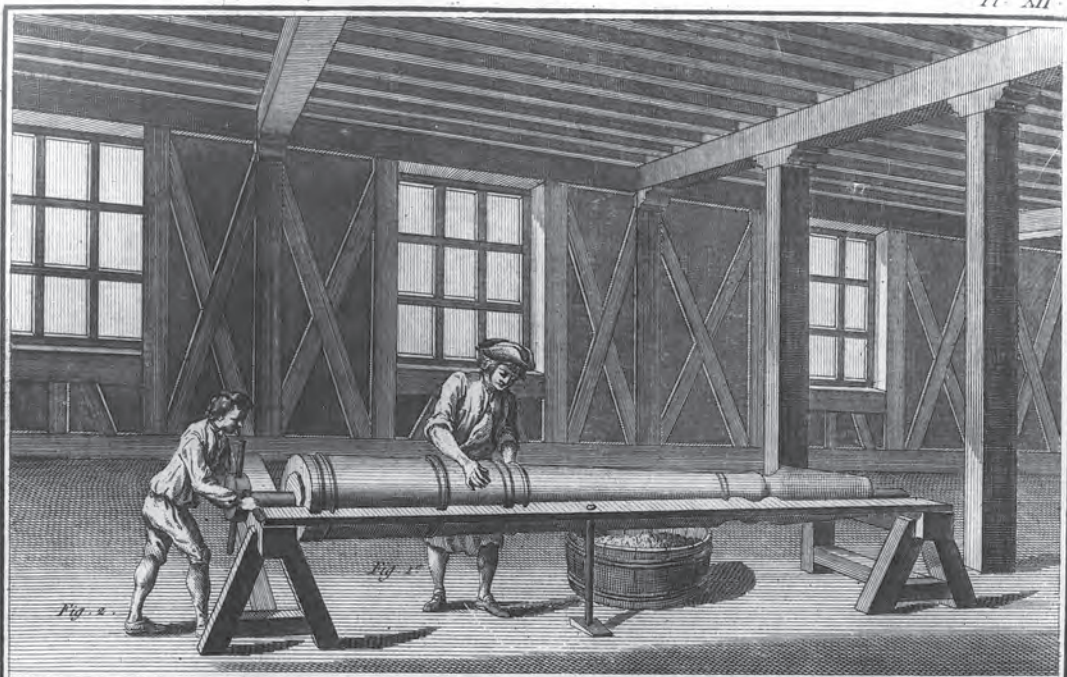
(1) Norton, The Gunner, 1628, pp. 74-75.

(2) By the early 19th century the water proof had been developed. See p. following.









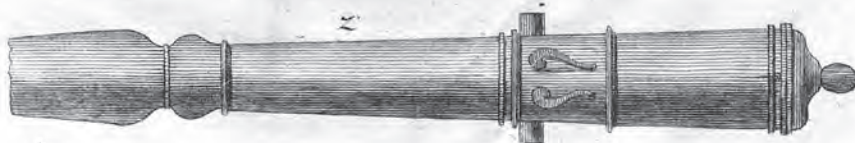
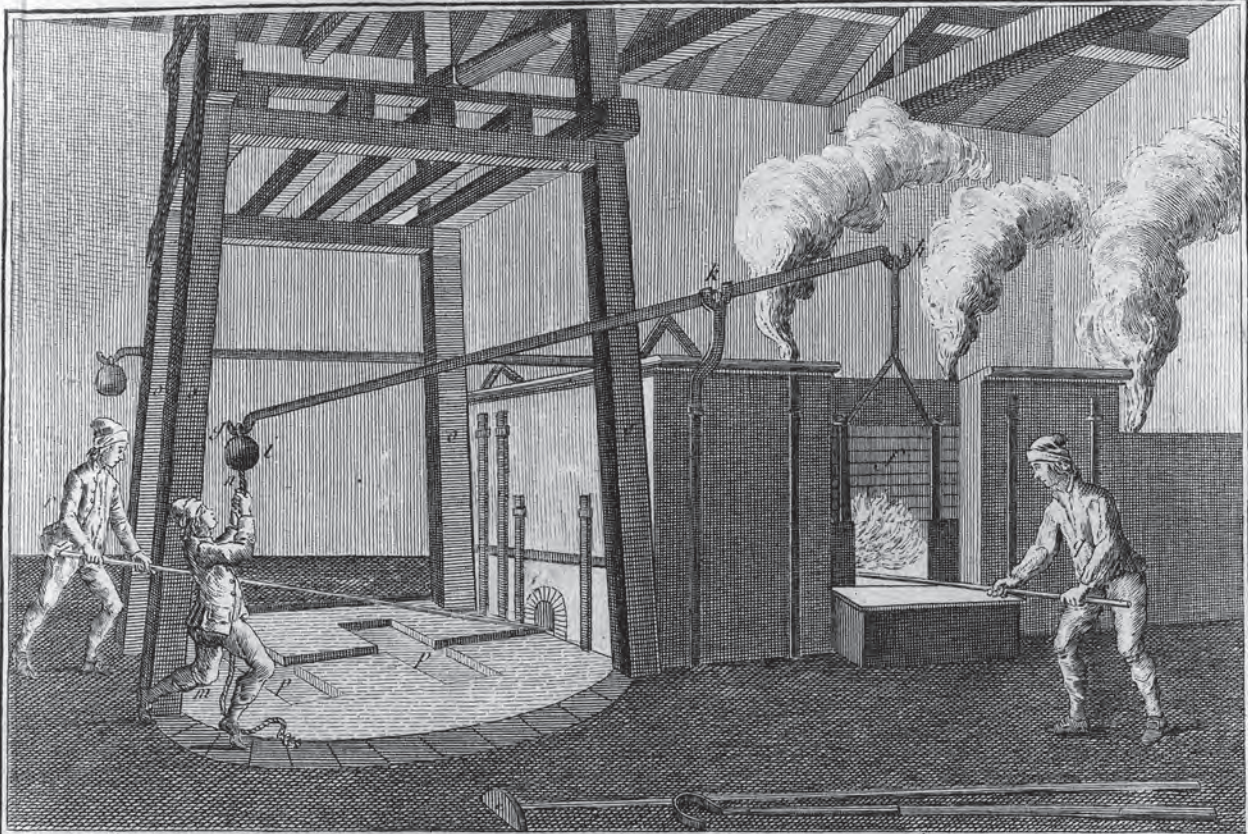
*Benard del.*

*Benard fecit.*

# Fonte des Canons,

*l'Opération de coucher la Terre sur les Nattes et de la fermer à l'Echantillon.*





Del. par M.



Fig. 8.

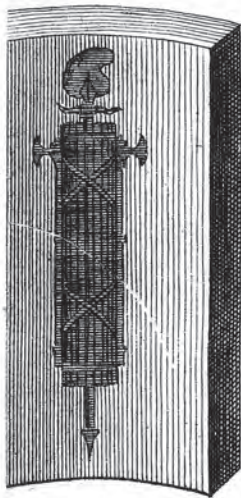


Fig. 6.

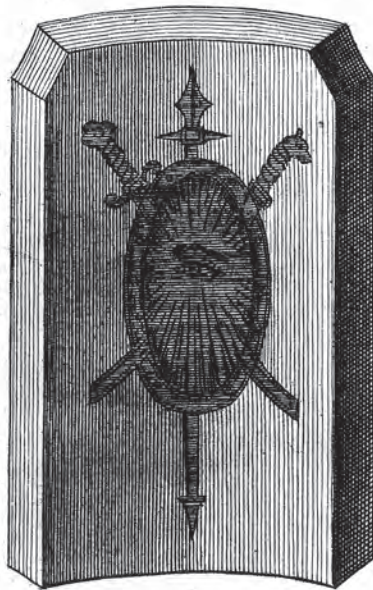


Fig. 4.



Fig. 5.

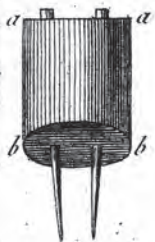
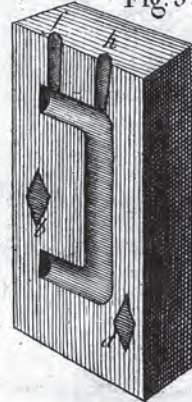


Fig. 7.

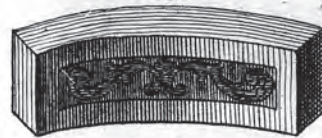


Fig. 3.

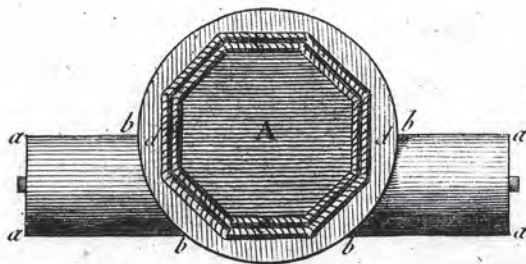
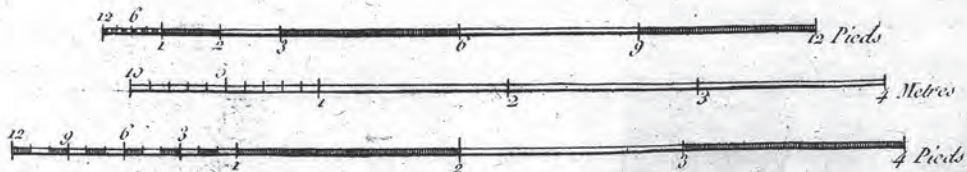
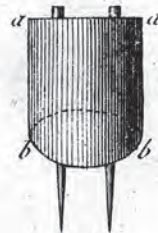


Fig. 2.



Seller Sc.



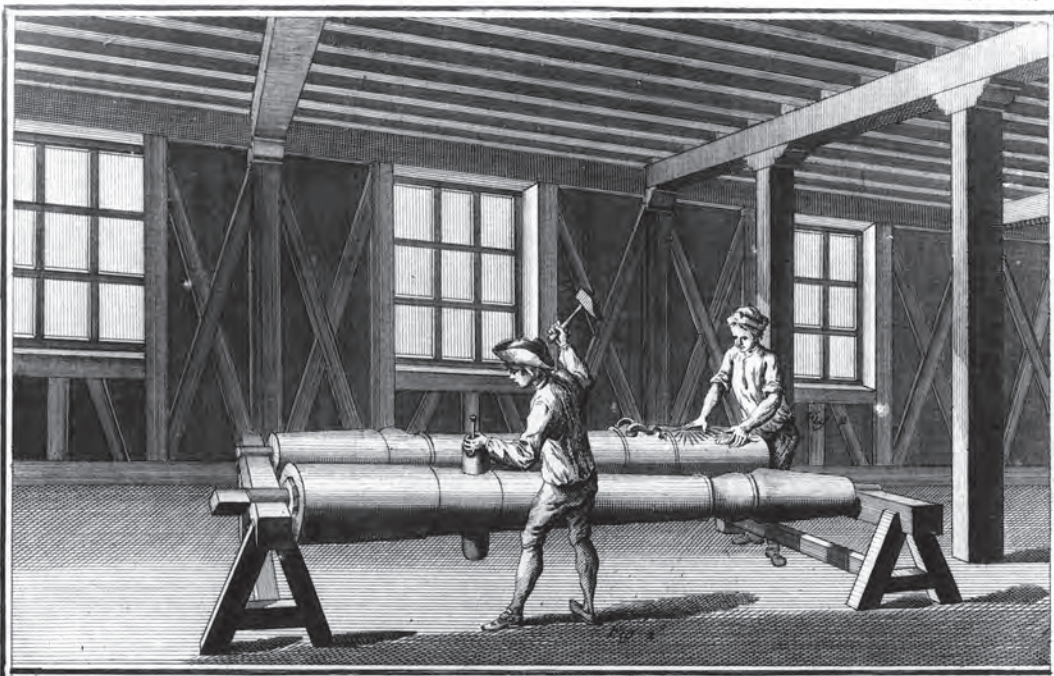


Fig. 2.



Fig. 1.

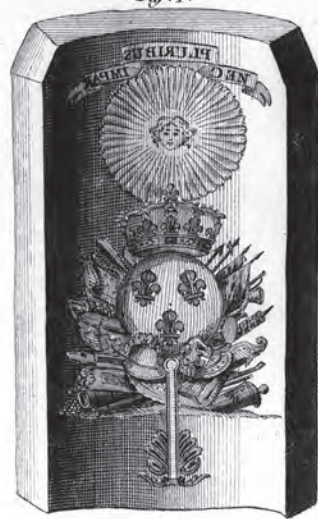


Fig. 3.



Fig. 4.



Fig. 5.



Fig. 6.



Fig.

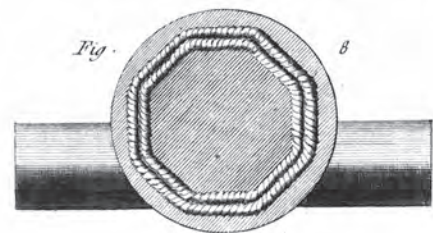


Fig. 7.



Benard fecit

Benard fecit

# Fonte des Canons

*L'opération de poser les Tourillons et les Ornementes et les Mouldes des Ornementes*



Moulage en terre

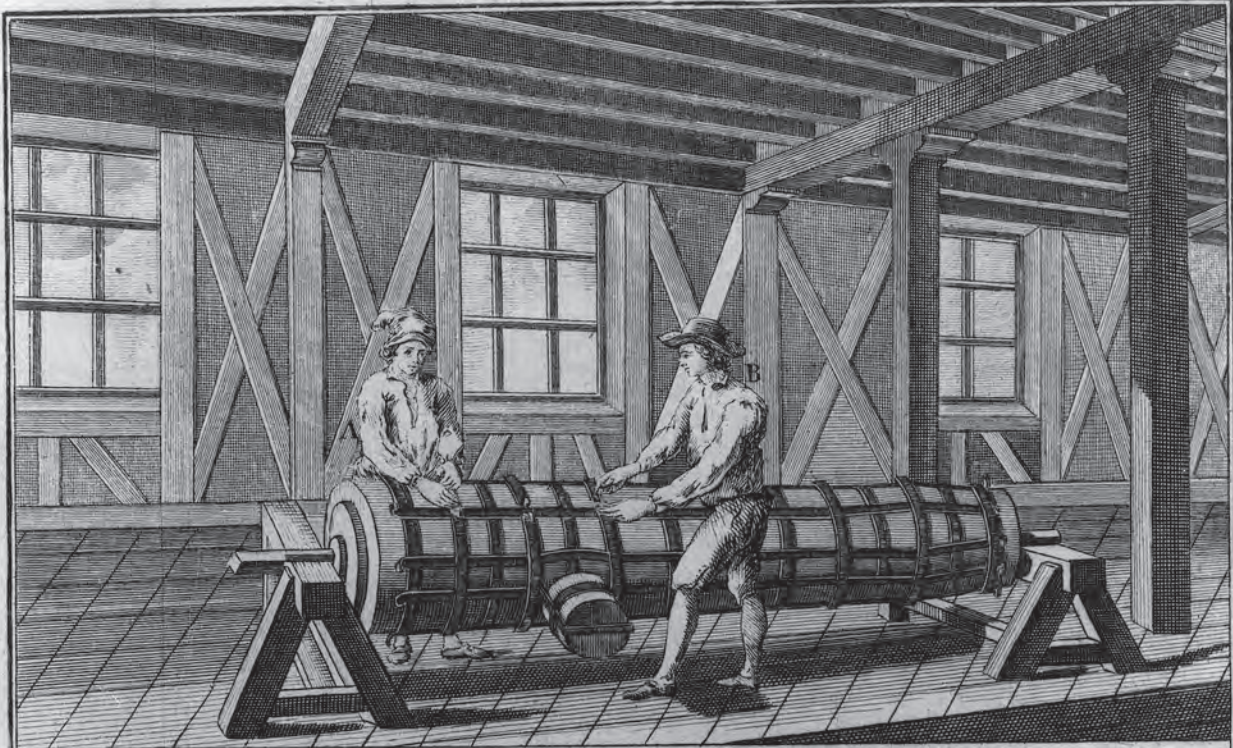


Fig. 1.

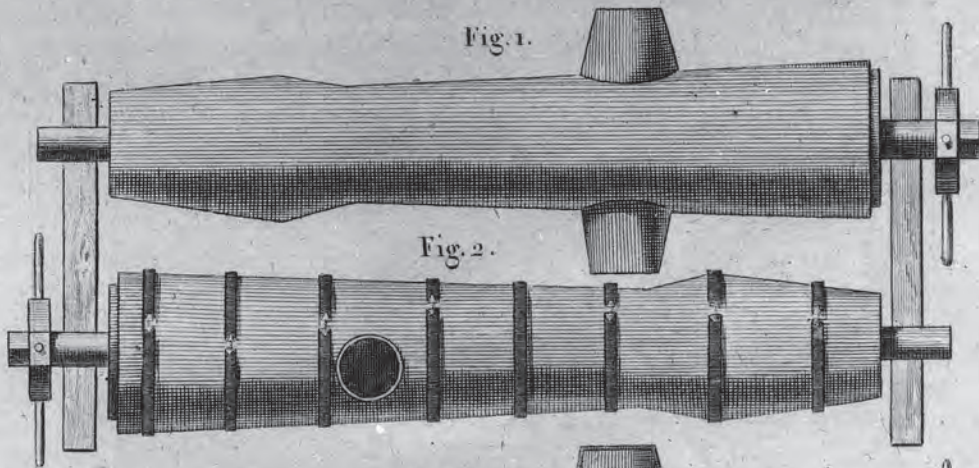


Fig. 2.

Fig. 3.

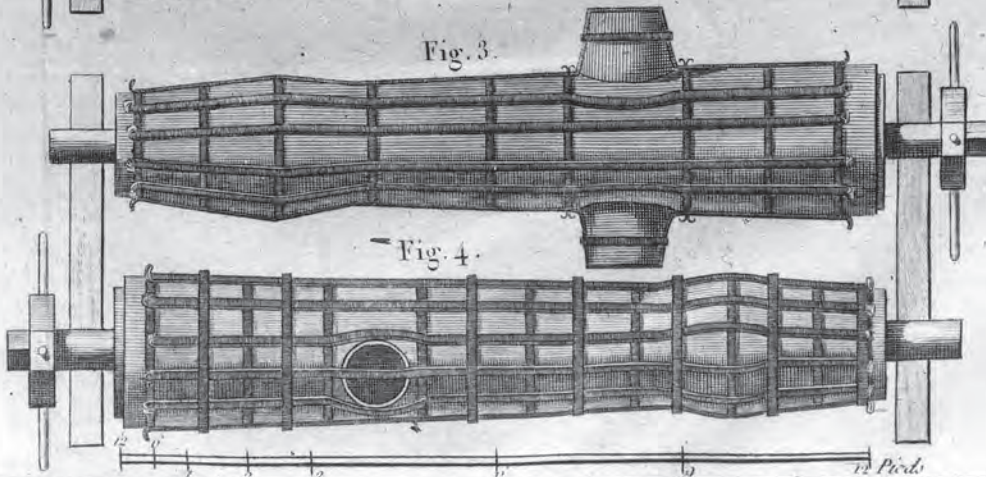


Fig. 4.

2 Metres

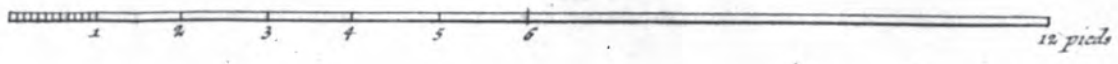
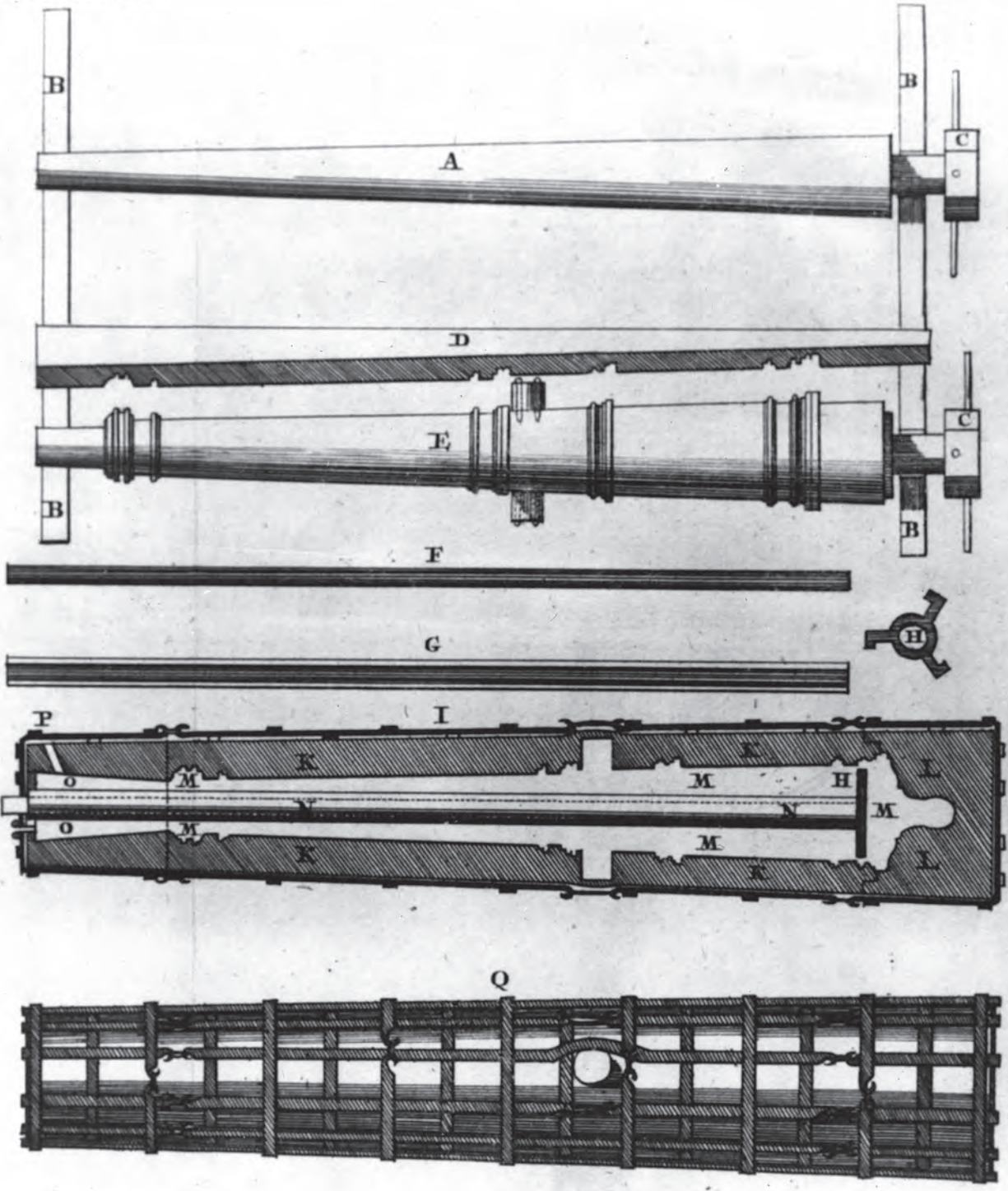
12 Pieds

Seller & Co.



To. 2. Pl. 137.

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ST. REMY



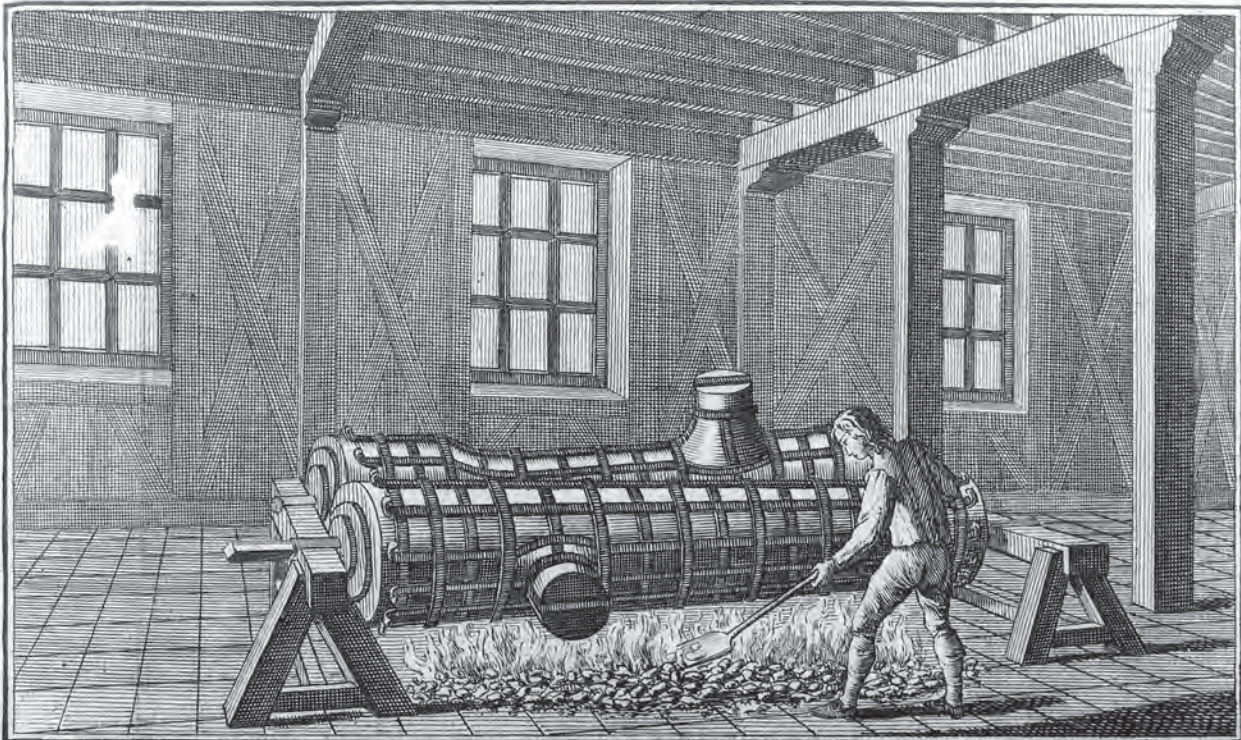


Fig. 3.

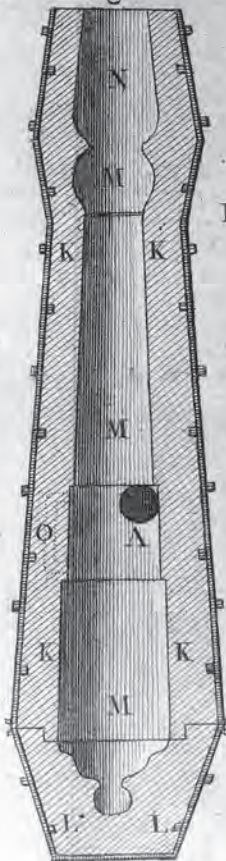


Fig. relative à la vignette de la Pl. XXI.

Fig. 7.

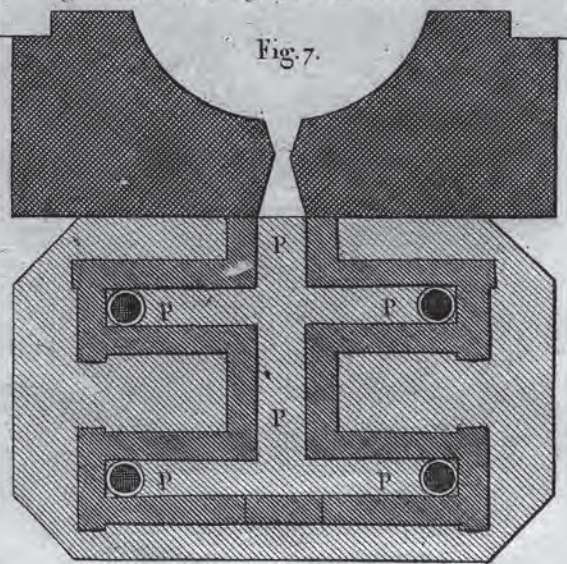


Fig. 4.



Fig. 6.



Fig. 5.



Fig. 1.

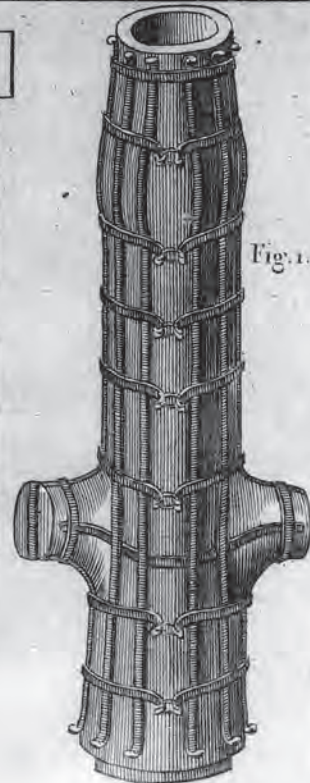
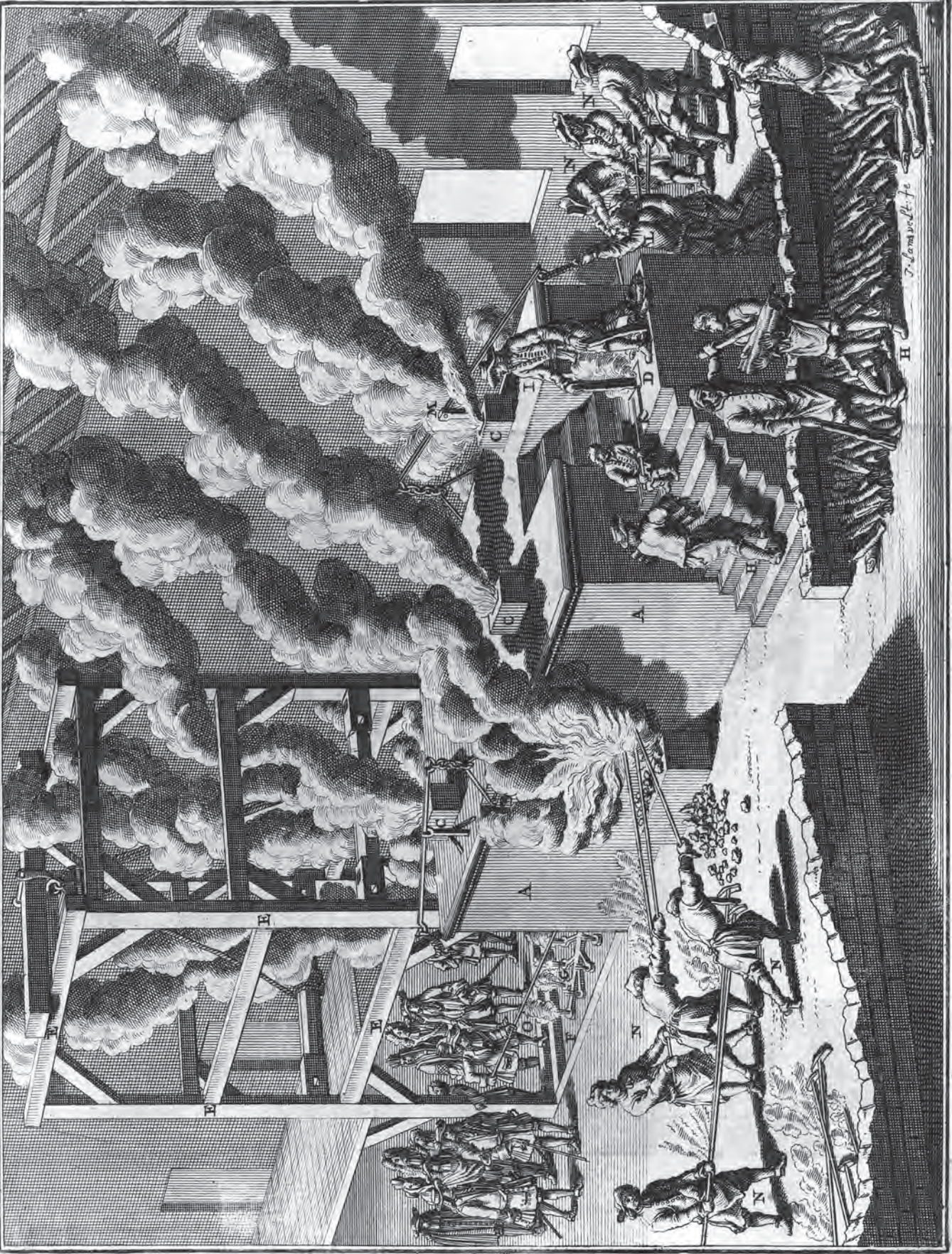


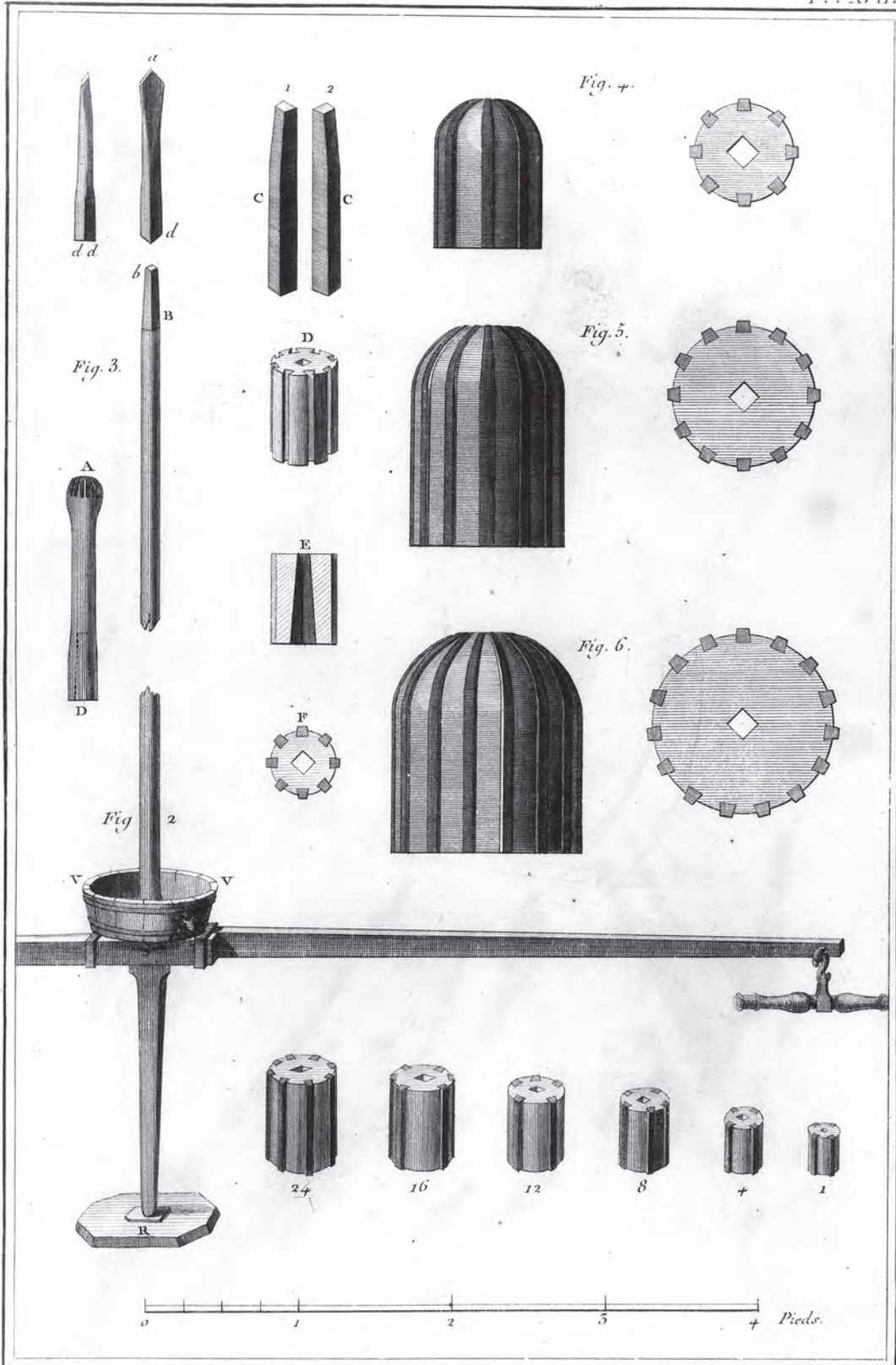
Fig. 2.











Goussier del.

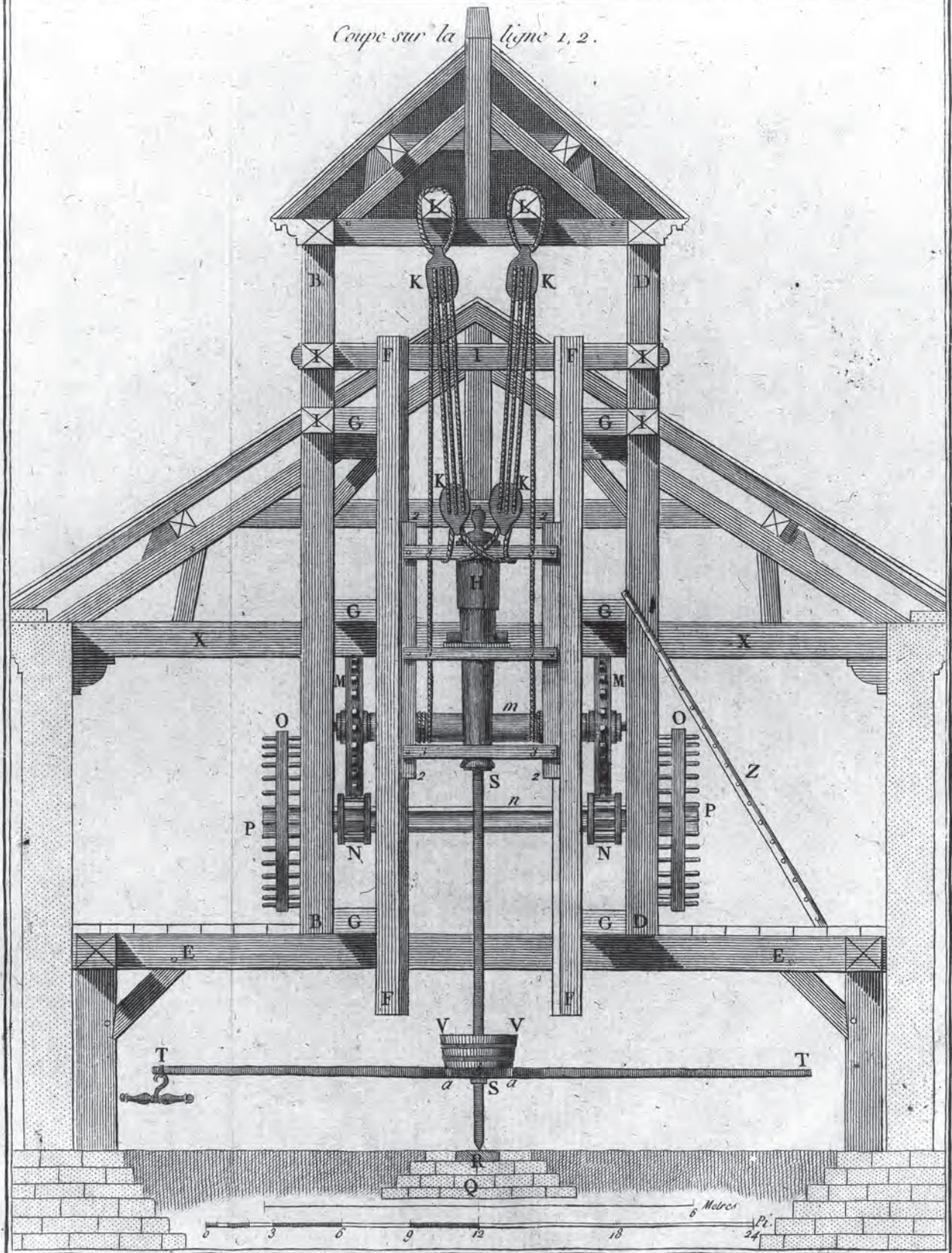
Bonard fecit.

Fonte des Canons, suite et Developemens de l'alézoir.



Forerie verticale

Coupe sur la ligne 1, 2.

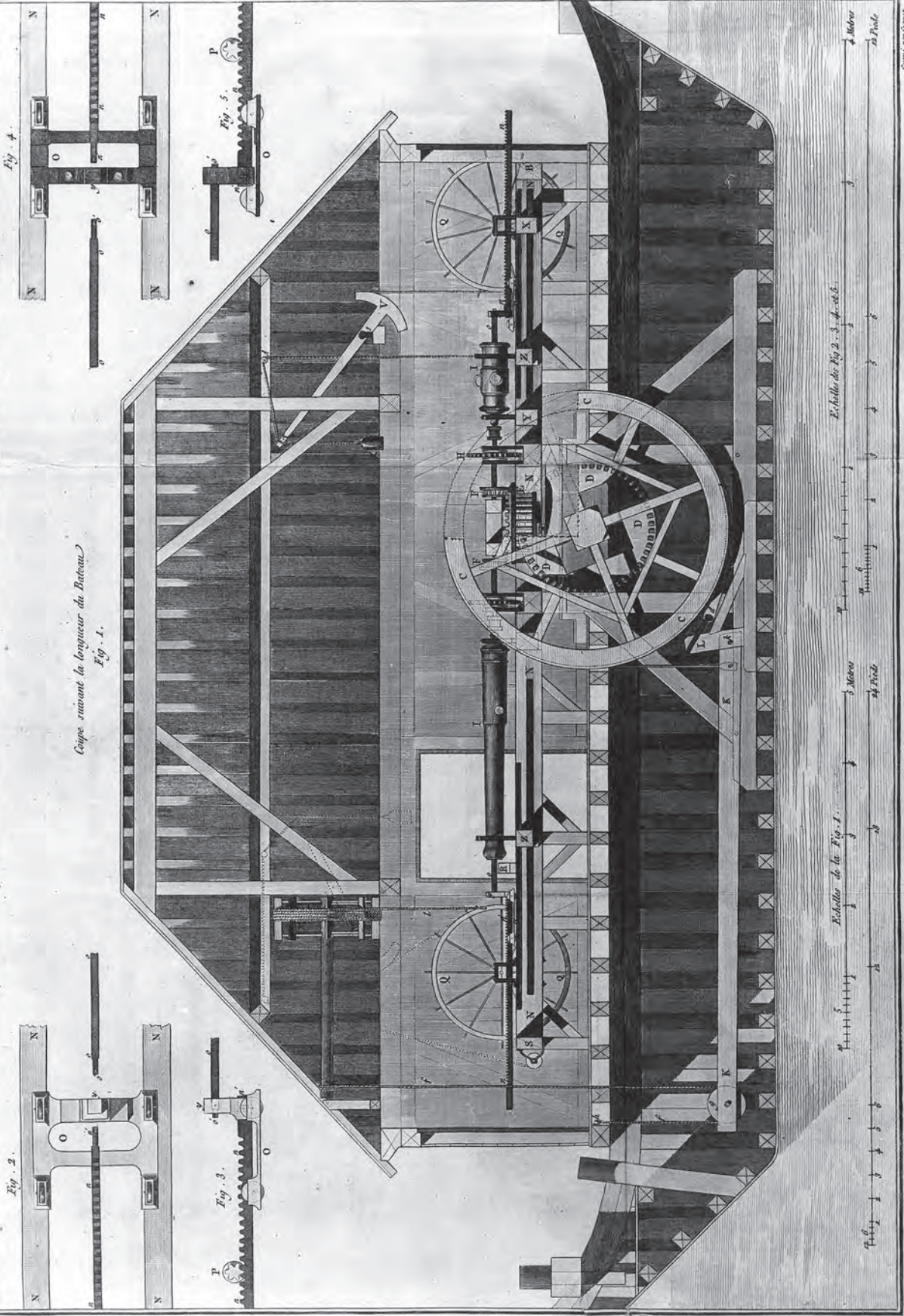


MONGE

Sellar Sc.



*Nouvelle forerie horizontale sur Bateau*



*Coupe suivant la longueur du Bateau*  
Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

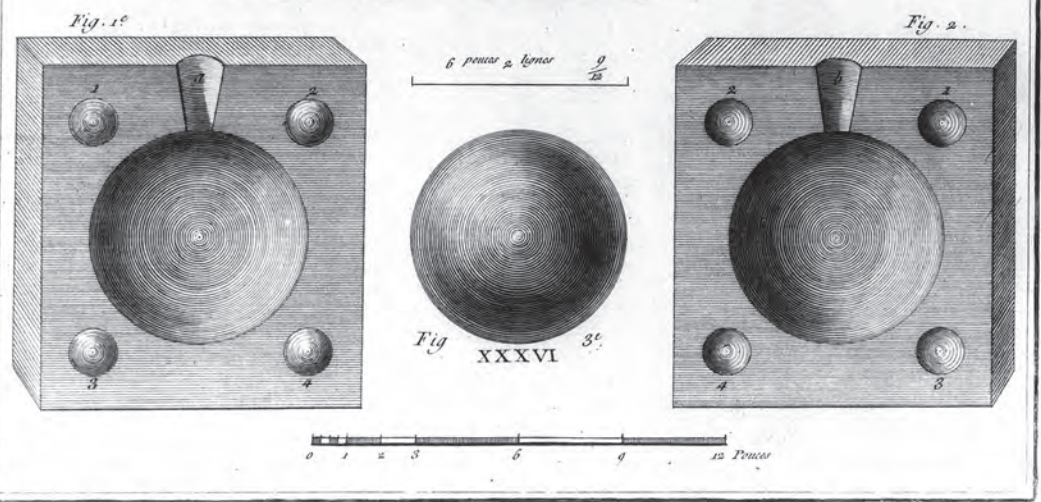
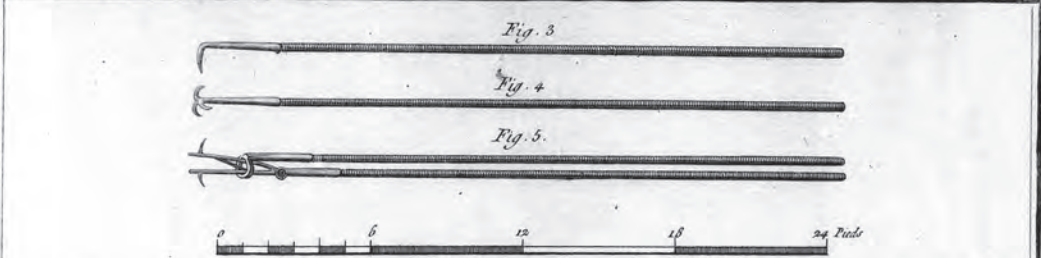
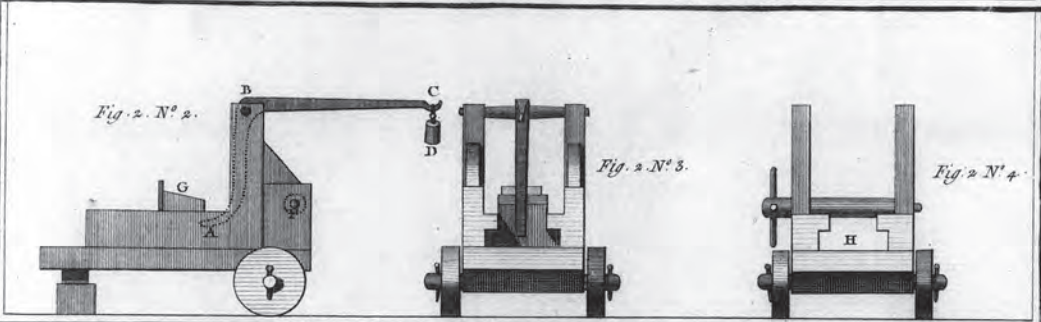
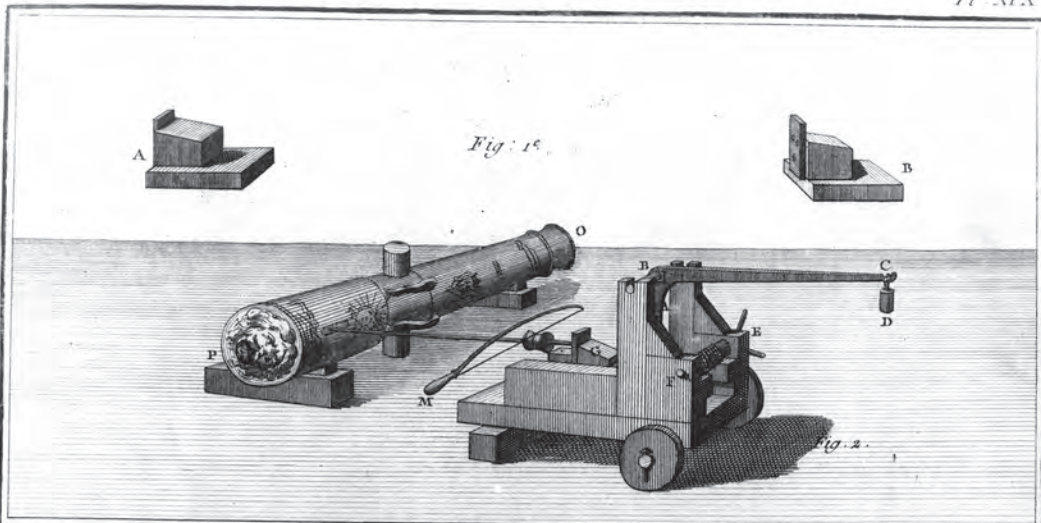
Echelle de la Fig. 1.

Echelle de Fig. 2, 3, 4, et 5.

Mètre  
Toise

Mètre  
Toise





Benard fecit

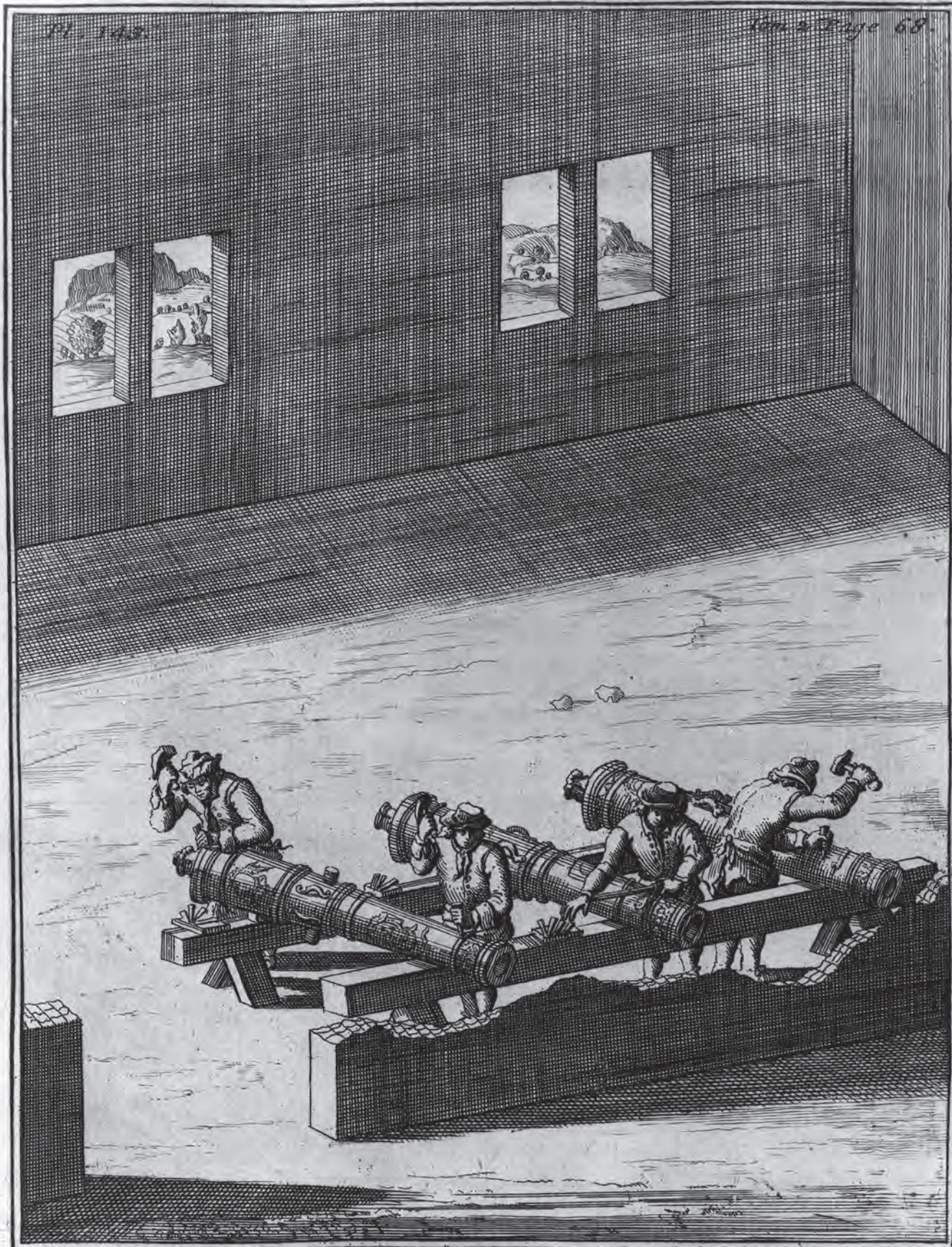
Benard fecit

Fonte Des Canons. Basculle pour percer les luneres.  
 crochets et Chat, Moule pour fondre les Boulets de 36<sup>l</sup>



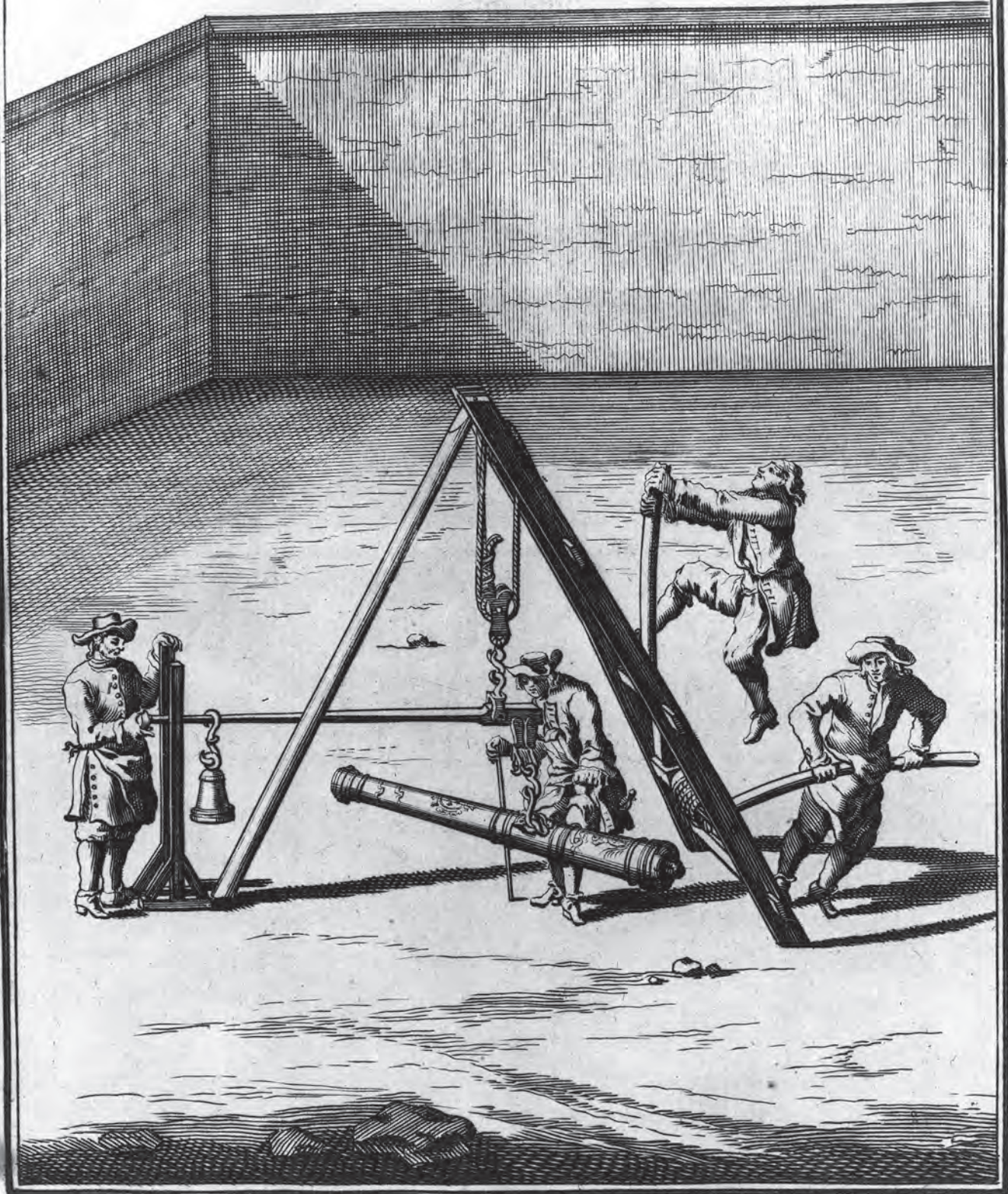
Pl. 103

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ST. REMY





ST. Remy



## ARTILLERY

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The word “artillery” is or should be generally defined as: “the means or art of hurling offensive missiles too heavy to be thrown by hand to a distant target”. Early “ingenious machines” were in use in the 8<sup>th</sup> century BC on the walls of Jerusalem, so the Scriptures say. These, which probably obtained their power from twisted ropes made of hair, hide or sinew, were the predecessors of the “ballistas” (which were in fact very large cross-bows – spanned with a windlass or a screw jack – mounted on a massive tripod) and fired arrows, darts or stones, the predecessors, also, the catapult that could throw huge stones (up to fifty kilos or more) five hundred yards away, in a high arc, as a modern mortar would do, to strike the enemy behind his fortifications, during the Middle Ages. The catapult evolved into the “trebuchet”, which now worked on the seesaw principle (weights up to several tonnes on the short arm, to swing the long throwing arm) and no longer on the spring system.

These early machines continued to be used in Western Europe for half a century, next to the appearing modern “artillery”, consisting in “*non-personal offensive weapons in which gas pressure derived from the combustion of a propellant charge ejects a missile*” (definition by O.F. G. Hogg). The propellant now is, of course, black powder.<sup>47</sup>

In these pages, the word “artillery” is used only in this, the second, restricted sense.

It is generally admitted that the explosive mixture, we call black powder or gun powder (a finely ground mix of saltpeter, charcoal and sulphur) was invented by the Chinese who used it mainly for festive fireworks. It was brought to the knowledge of the Europeans via the Arabs, sometime around the Crusades, perhaps about 1250 and the Europeans were the first to understand how to – or perhaps to wish to – exploit the motive power of the black powder in guns<sup>48</sup> and the like.

Contemporary documents and chronicles indicate that guns, in Western Europe, were occasionally used as early as the 12<sup>th</sup> century (at Saragosa, by the attacking Moors in 1118) and certainly in the 13<sup>th</sup> century and all over the Reconquista, by the Spaniards (from the siege of Cordoba in 1280 on).

In England, the *Grafton's Chronicles* mention the first use of cannons in the field during the reign of Henry III (1216-1272) and it is well known that artillery played a major role during the Hundred Years War (between France and England), when it came into general use. Guns at the time were laid directly on the ground, with muzzles elevated by mounding the earth. Precise aiming was not attempted on the battlefield, the effect of very early artillery in battle being mostly psychological. There are examples of well-trained companies of archers or veteran footmen disbanding and running away at the first shot of a deafening, smoking gun. Early bombards, however, were quite useful in a siege, when systematically used to bring down fortifications.

In Northern Europe, at the same time, cannons were in use on land (earliest indication 1360) and on board ships (battle in the Sound in 1362 between the Danes and a Lübeck fleet).

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47 For full details concerning the history of the artillery, the reader is referred to the specialized bibliography in the Annexed Documents at the end of this volume. The reader will do well to begin his further studies by perusing Albert Manucy's *Artillery Through the Ages* and Oliver F. G. Hogg's *English Artillery 1326-1716*, two simply presented, excellent first readings on the subject (neither author however seems to be much preoccupied with the marks and decoration on cannons).

48 For a long time, artillery pieces would be called in general “guns”, the word “cannon” describing only one particular type of gun.



The earliest known representation of a piece of ordnance in England is an “iron pot” or “fire pot” found in the lower margin of a page of an illuminated manuscript of Walter de Milemete<sup>49</sup> dated 1326. That early piece of artillery, apparently made of iron, is shaped like a vase and the gunner, holding what appears to be a red hot iron stick, is about to prime the charge. The piece is loaded with a bolt or dart, the shaft of which is probably carefully wrapped in leather to be kept solidly in place until the firing of the piece. It is aimed at the door of a fortification.

In Italy, a detail (lower left) of a *chiaroscuro fresco* in the cloister of the San Leonardo monastery of Lecceto (near Sienna) very clearly shows a large bombard on its massive stock, demolishing a wall of a besieged castle. It was painted – and paid to Paolo del Mastero Neri – in the year 1343. The bombard is raised at an angle of 45° in a mortar-like fashion.

In France, perhaps the earliest representation of an artillery piece is a short bombard, apparently a muzzle-loader (?), fixed to a comparatively massive base that has a swiveling elevation system (Ms *Le Champion des Dames*, Library of Burgundy, 14<sup>th</sup> century). The earliest representation of a French wheeled piece of ordnance on a carriage may be a detail of the *Chronicles of St. Denis*, 14<sup>th</sup> century (Sloane Mss 2433 at the BM) showing a three foot long muzzle loading tube, and a detail of another illustrated, anonymous 14<sup>th</sup> century manuscript, featuring a short, massive breech-loading bombard on a heavy wooden carriage with plain wheels.

As for naval guns, one of the clearest drawings (not the very earliest one,) of a permanently artillery-armed ship of force, shows, about 1485, three large pieces mounted in the waist on each side (there are no port-holes). There were very light pieces also (haquebusses) in the fighting top on the mainmast and also archers, and more archers and men at arms on the bow castle and on the stern castle (Ms *The Pageant of Richard Beauchamp*, Cotton Mss, BM). Port-holes begin to appear in the naval iconography around 1480-1490.

\*  
\* \*

In most West European countries, the earliest method of manufacture fell in two parts: The era of the wrought-iron guns and the era of the cast guns, during which guns were first traditionally cast in iron and, later on, in bronze (which at the time was called “brass”). Such “eras” were not clearly defined and the old method of gun manufacturing survived everywhere for a long time, next to the new one.

The first wrought-iron guns were the bombards. Their method of construction was simple. Any village smith, who had access to a forge, a big hammer, a mandrill, some iron and supplies of water for quenching his metal, could build a bombard. The technique was not unlike barrel-making.

The mandrill could be a tree trunk of convenient size. Rods of wrought-iron were bound very closely round its circumference and over these, passed a series of white hot rings, which would hold the iron bars in a vice-like grip when shrunk onto the rods by chilling. The closer the rings, the stronger the cannon. The resulting tube was of course open at both ends. It was not known at the time how to make a barrel without a mandrill and it was necessary, therefore that a chamber portion should be forged out of solid iron with a tapered end to fit the breech part and a simple locking system, plus a wedge. Interstices did often remain between the longitudinal forged rods and these in order to obtain greater airtightness would then be filled by pouring melted lead.

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49 Milemete, an English scholar, wrote for the young Prince Edward, later King Edward III, a sort of treatise of Kingship titled *De Nobilitatibus, Sapientis et Prudentis Regnum*. The “pot de fer” illumination unfortunately is not commented or captioned and bears no direct relation to the text.

Breech-loading guns had several movable chambers, which could be prepared ahead of the battle (i.e. filled with gun powder and wadded and primed with fine powder) so that the gun could fire as often and as rapidly as the heating of the tube would allow.

By the middle of the 15<sup>th</sup> century, the average bombard would have efficiently tossed a two pound shot to no more than 70 meters, in the general direction of the enemy or of the door of a castle. Some so-called bombards, comparable to a shortened arquebus, were still smaller and lighter and could be hand-carried. The “gunner”, of course, would need to rest his weapon on some solid support for firing or to stick its stock in the ground.

By contrast, giant bombards were built, some of which have survived up to this day. The giant bombard known by the name of “Dulle Griet”, (“Mad Meg”) now in Ghent, built in 1382, has a calibre of 25 inches and fired a 700 pound granite ball. The equally famous “Mons Meg” now in Edinburgh Castle threw a 19.5 inch iron ball, 1,400 yards or a stone ball, 1.5 miles.

Some of the most formidable bombards that ever were made were used by the Turks at the siege of Constantinople in 1453. One of such monsters weighed 19 tonnes and shot a 300 kilo stone ball, at the walls of the fortified city, seven times a day. It served its purpose well: Constantinople was taken and since that date a piece of Europe remains occupied by the Turks.

In Asia, the record seems to belong to the “Malik-e-Maidan” or the “King of the Battlefield”, 4.40 meters long and claimed to weigh 55 metric tonnes, cast in bronze in the 17<sup>th</sup> century in Ahmadnagar. It took ten elephants and 400 bullocks to haul it 240 kilometers to Bijapur (in Karnataka, West-Central-India) where it still stands today atop of a city bastion. Its decorated muzzle shows a lion clenching an elephant in his teeth. The blast of that monstrous piece was so loud, so say some accounts of the time that the gunners had to jump into a nearby pool of water after lighting the fuse in order to protect their eardrums.

And the absolute largest caliber bombard on record appears to be the so-called “great mortar of Moscow”. It was built around 1525, had a calibre of 91.5 centimetres and was 5.4 metres long. Its stone projectiles weighed a tonne.

Such huge pieces were of limited use on account of their weight and the difficulty and time necessary to transport them. Once in action, they would destroy the castle of any Baron, who had rebelled against his Prince. That is until the old time, high-built, stone strongholds gave way to the earthwork protected fortifications of the Renaissance in which cannon balls would simply sink without effect. At that time, the huge bombards became obsolete and were replaced by much lighter mortars, which could shoot explosive or firing devices above the fortifications and into the heart of the castle or city.

During the 14<sup>th</sup> century, gun casting in iron or in “gunmetal” (meaning any alloy of copper with either tin or zinc and lead, etc.) appeared and slowly replaced gun forging.

The cannon makers now, were no longer smiths, but mostly bell founders. So, standardization remained a totally unknown notion and each cannon manufacturer continued to produce pieces at his whim. The first sort of system that was introduced into the industry appeared in Tudor times and was limited to the calibres of the pieces which, of course, whether the shot be made of stone or of iron, determined the required weight of the shot, which determined the class of the gun.

By its very nature, gun founding, as a method of manufacture, necessarily produced muzzle-loading pieces with all their drawbacks, mainly for sea.

It is not until the late 17<sup>th</sup> or early 18<sup>th</sup> century that true standardization became the rule in the casting

of artillery. At the same time, the first permanent corps of artillerymen was formed in France and England, replacing the small units of non-military, sometimes hired “artists”, which followed the armies in earlier times.

In France, it is in the second half of the 17<sup>th</sup> century that the marquis de Louvois (1641-1691) introduced drastic reforms in the artillery and in the army. The new “bouches à feu” of the Keller brothers, gun founders, which he had masterminded became the “classic French cannons” from 1666 on. Vauban owed them his greatest victories.

The first, fully organized “Corps d’Artillerie” appeared in France under Louis XIV, at the same time as the French “Systèmes”,<sup>50</sup> which were to finally bring such efficient order, method and standardization in France that all the nations of Europe quickly imitated them, to begin with Savoy, Prussia, and Denmark. They were the “Système Vallière” from 1732 on, reformed by the “Système Gribeauval” from 1764 on and, by the “Système Valée” (1825 and 1831).

In Spain, the French “Systèmes” were exported and imposed, exactly as they were, by the first Bourbon, Phillip V (1700-1746).<sup>51</sup>

In England, the first corps of artillery, which soon took over everything concerned with gun making and artillery tactics was authorized by Royal warrant, in 1716. It was at the time, a regimental establishment of two companies; it was and has been called ever since “The Royal Artillery”.<sup>52</sup>

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50 For full details of the various French “Systèmes”, see the Editor’s album for the “Musée des Invalides” in Paris, France.

51 See Editor’s album for the “Museo del Ejército” Toledo.

52 See Editor’s album for the “Tower” and for Woolwich.



## WHO WAS WHAT? THE TYPOLOGY THE TERMINOLOGY

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The terminology of ancient artillery is confused and so riddled with discrepancies that it is nearly impossible, until the 18<sup>th</sup> century, to make sense of the vocabulary. This is true even within one single language if one reads correspondence or treaties written in different provinces of a single country, or in different centuries. The difficulty is compounded by the fact that the same is true for most contemporary units of weights and lengths (even, again, within one same country) which, should they have been more or less standardized, could have helped to clarify the definitions.

General confusion or at best imprecision is found to a comparable degree if one attempts to study the typology of the most ancient artillery pieces. Few of the cannons that were once designated by the same name in one particular language were really similar and never identical. The reason is simple: Very early wrought-iron artillery pieces were made by village blacksmiths that followed their own idea of what a cannon should be. Later, when it was the Lord or the “Seigneur” or the Master of Artillery, who decided on calibres, on thickness of the tube etc., everyone had his own idea again. When guns began to be cast, not wrought, anymore, nothing changed. Church bells and statue founders began to cast iron or bronze cannons as they, the experts in matters of foundry, thought best. So the cannons, continued to reflect the whims of the founder or, later, the personal ideas of the customer. And furthermore, the moulds served once only.

It is only in the 18<sup>th</sup> century, when royal authority imposed some general administrative unity on army and navy all over Europe, when permanent armies became the rule in Europe and when artillery corps was formed, as distinct from the various infantry corps (each had its own cannons) and from the cavalry, that uniformity and standardization were introduced. The advantages were obvious: Same calibres for same sizes of cannon balls and/or projectiles to be cast and transported, same quality of black powder, in same diameter cartridges, same carriages with same spare parts, same gunnery tools, same artillery drill, etc.

For identical reasons, most guns until the 18<sup>th</sup> century (except the very large and heavy siege guns and mortars, the “fortress pieces”) were made indifferently for field artillery or naval artillery. In France and the Mediterranean countries, an exception was the specific, lighter artillery made for the galleys.

An additional contribution to the imbroglio has been supplied by some museum curators who, when writing the catalogue of their collection of guns or the individual notices posted on the support of each exhibited piece, have tended to name the piece according to their own idea rather than quoting – when known – the original name of the cannon as known in its place of origin and period.

In such a situation there is only one sensible, useful way of describing a piece of artillery that is to mention the ratio between its calibre and the length of its tube (measured, usually but not always, from the tip of the last muzzle moulding to the base ring). The system is not precise but it allows one to describe some “families” of artillery pieces. The culverin family for instance includes (or should include) only pieces that are 26 to 36 calibres long, in the cannon family, a piece is or should be 18 to 24 calibres long and in the perrier family, it should be 16 calibres or less. It is also the case for mortars.

Comparable pieces which are not members of the immediate family are described by the same name with a modifier. “Extraordinary” will mean a member of the family which is longer than most (the case happens

most often in the culverin family). On the other hand, a “bastard” cannon would have a calibre almost but not quite within the theoretical range and usually would be shorter. So a culverin could be either a “bastard culverin”, too short for its calibre, or an “extraordinary culverin”, longer than it should. The same would apply to a cannon, etc.

The classification of guns by only the weight of their shot, which appeared in the 17<sup>th</sup> century, became general only after the first quarter of the 18<sup>th</sup> century, in England at least. It gives obviously a partial definition only of an artillery piece.

Since establishing a precise table of correspondence with the hope of being able to reliably name a Spanish piece for example in other European languages, would be a nearly impossible task, this Editor has only attempted:

1. To trace in prudent words and schematic drawings a very general outline of the main families and types of artillery pieces made and used in Europe until the 19<sup>th</sup> century.
2. To outline, for the three main European countries that were deeply involved both in land wars and in sea warfare during the age of artillery, a fully un-guaranteed cross-chronological list of approximate equivalences (with comments when necessary).

This editor is well aware of the shortcomings of the list and table and anticipatively apologizes to the reader.

## A PROPOSED, COMPARATIVE ORDNANCE TYPOLOGY (SIMPLIFIED TRI-LINGUAL)<sup>1</sup>

Each piece of ordnance type hereafter mentioned is identified by its corresponding ratio (or R.) being the number of calibres in the length of the tube (length as measured from the edge of the muzzle, the face, to the back of the base ring) and/or by the weight of its shot in pounds (stone shots for bombards and all “pedreros”, iron shots, most often, for other pieces). Ratios and weights of shot are a general average between existing conflicting sources, when possible. A number of cases defy any meaningful average calculation, see notes.

The table hereafter is incomplete, open to endless controversy and to be treated with reserve. The chronology is approximate; the switch from wrought iron to cast iron to bronze was progressive, the old techniques survived everywhere for a long time, next to the new ways.

England	France	Spain
<b>From c. 1350 to c. 1500 (wrought-iron guns at first, cast iron pieces later on)</b> <i>For direct firing</i>		
Bombard (in 14 <sup>th</sup> century)	Veuglaire	Bombarda
Bombard <sup>1</sup> (any calibre, any length)	Bombarde Lombarde	Bombarda
Cannon royal or Carthoun or Curtowe or Curtall: 48 to 60 pounder	Courtaut	Curtalde
3/4 Cannon: 36 pounder		
1/2 Carthoun: 24 pounder	1/2 Courtaut	1/2 Curtalde
		Bombardeta
Patterero	Pierrier	Pedredo
Organ gun: A piece with 2 or more tubes. Came in many different calibres and lengths.	Ribaudequin	Cañon de organo Ribadoquin <sup>3</sup>
Blow gun	Sarbacane	Cerbatana
Minion: 6 pounder	Emerillon	Esmeril
Falcon <sup>2</sup>	Faucon	Falcon
Falconet: R.48. 1.5 pounder	Fauconneau Falconet	Falconete
– 1 to 3 pounder		Pasavolante
Robinet: 1 pounder		
Culverin: R.28. 18 pounder	Coulevrine	Culebrina
1/2 Culverin: R.32. 9 pounder	1/2 Coulevrine	1/2 Culebrina
<i>For indirect firing</i>		
Bombard	Bombarde	Bombarda
	Bombarde- mortier	Bombarda mortero
	Mortier-pierrier	Mortero pedrero

1 After Hogg and a number of English, French, Spanish and other sources, ancient and modern.



<b>From c. 1500 to c. 1600 (bronze, brass or any copper alloy, being “gunmetal”)</b> <i>For direct firing</i>		
Basiliske <sup>3</sup>	Basilic	Basilico
Culverin: R.28. 20 pounder	Culeuvrine	Culebrina
Demi-culverin or Verse: R.30. 10 pounder	1/2 Coulevrine	1/2 Culebrina or Verso (Berço)
Saker or Sacre: R.36. 6 pounder	1/3 de Coulevrine	1/3 Culebrina or Sacre
Quarter culverin: 5 pounder	1/4 de Coulevrine	1/4 Culebrina
Double curtowe or courtaut: 80 pounder	Double courtaut	Double curtalde
Curtowe or Courtaut: 50 pounder	Courtaut	Curtalde
<i>For indirect firing</i>		
Mortar	Mortier	Mortero

<b>17th century (mostly bronze pieces)</b> <i>For direct firing</i>		
Cannon royal: R.12		
Cannon: R.16	Canon	Cañon
Demi-cannon: R.20	1/2 Canon	1/2 Cañon
1/3 Cannon(?): R.15	1/3 Canon	1/3 Cañon
Cannon-perrier: 8 pounder	Canon pierrier	1/4 Cañon or Pedrero
Serpentine <sup>4</sup>	Serpentine	1/8 Cañon or Serpiente
		Sacabuche
Robinet: 1 pounder.		
Minion or Sakeret: R.30. 8 pounder	Minión	Minion
Saker or Sacre: R.36	Sacre	Sacro
<i>For indirect firing</i>		
Mortar	Mortier	Mortero

<b>18th century (bronze)</b> <i>For direct firing</i>		
The Age of “the Systems”. Precise characteristics of each calibre imposed by a succession of Royal Ordnances (France, Denmark, UK, Austria, etc.)	In France for example, after the “canon classique français” (2 <sup>nd</sup> half of the 17 <sup>th</sup> century) came in succession the “Système Vallière”, “Système Gribeauval”, “Système Valée”. See Editor’s Album for the “Musée de l’Armée at the Hôtel des Invalides”, Paris, France. <sup>5</sup> In Spain, all new pieces were cast in a standardized, mandatory way following the French “Systèmes” imported by the first Bourbon, Philip V.	
Carronade (at the end of the 18 <sup>th</sup> century)	Caronade	Carronada

<i>For indirect firing</i>		
Mortars of standardized calibres		
Mortar	Mortier	Mortero
Hanging mortar	Mortier suspendu	Mortero de horquilla
Trunnion mortar	Mortier à tourillon	Mortero de muñones
Foot mortar	Mortier à semelle (or à talon)	Mortero de placa
Howitzer	Obusier	Obús

**(Footnotes)**

1 Mediaeval bombards came in all sizes. Some could be carried by two men; exceptional ones did weigh up to 19 tonnes. Their ratio would be about 2 or 8 or 10 or 15 or whatever. These pieces could be called anything from 10-pounders to 300-pounders.

<sup>3</sup> In Spanish, the word “ribadoquin” can also designate a smaller or medium size normal gun (gun with one tube).

2 <sup>4</sup> A particularly vague name for an ill-defined type of gun. The ratio could have been anything from 26 to 42 and the weight of the shot anything from 2.5 to 6lb.

3 Another unclassifiable gun. The reported ratio of so-called basilisks or “basilicos” could vary from 14 to 63, their shots from 10 to ?lbs.

4 Came under the most different sizes and calibres. Known ratios from 18 to 48(!). Shots from 1 to 4 pounds or more.

5 See also, passim, the LGAs and EAs for Copenhagen, Vienna and London.

## SIMPLIFIED TERMINOLOGY OF ARTILLERY PIECES

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In alphabetic order

**Name in English** – Name in French – *Name in Spanish*  
Definition

**Amusette** – Amusette – *Amusetta*

A very light field-gun (derisively so named as it was capable only of “amusing” the enemy).

**Apostle** – No reliably correct translation extant – *No reliably correct translation extant*

A piece in use in the early 16th century, a 20 pounder (shots of iron).

**Base** – No reliably correct translation extant – *No reliably correct translation extant*

A short light wrought-iron cannon, from the period 1400-1600.

**Basilic or Basiliske** – Basilic – *Basilico*

A long and big bronze cannon, the type and caliber of which vary following the countries and the periods.

**Bastard** – Bâtard – *Bastardo*

An adjective that applies to a gun that is not in full conformity with the standards of its type. Example: A “bastard culverin” would have a lower than conventional “ratio” (number of calibres in length of tube).

**Blow gun** – Sarbacane – *Cerbatana*

An aptly named long and very thin piece.

**Blunderbuss** – Tromblon – *No reliably correct translation extant*

A short musket of wide bore with expanded muzzle to scatter shot, bullets, or slugs at close range.

**Bombard** – Bombarde – *Bombarda*

The earliest kind of gun, of various lengths and calibres (most often from 3cm. to 20cm.), originally throwing a stone ball. Some exceptional bombards used in the 15th century could propel stone balls weighing from 200 to 500 pounds. They were fired at high angles and, in consequence of the slow burning of the powder of the time; the balls projected by the bombard had little velocity and poor accuracy. The very first bombards were made of wood banded with wrought-iron, then of sheet-iron strengthened by hoops and brazing, both techniques being rather the exception. The typical bombard of the 14th and 15th centuries were made of longitudinal cast iron bars, connected together and/or welded together and hooped, like the staves of a cask.

**Bow-chase(r)** – Canon de chasse – *Pieza de caza*

A gun placed at the bow of a vessel. Used when chasing another vessel.

**Brass** – Laiton or “Cuivre jaune” – *Latón*

Or “yellow copper”. An alloy made of red copper (mostly) and zinc (33%), used to make modern cartridges. The word is sometimes used in a general way in the “artilleristic” lingua franca to describe any copper based alloy; it is in that case synonymous to “gunmetal”. The word brass was used in the 16th and 17th centuries to designate bronze.



**Breech-loader** (or BL) – Canon à boîte or Canon à chargement par la culasse – *Cañon de retrocarga*

A type of weapon loaded through its open breech, by means of a separate “powder chamber” or “breech-block” that was inserted and locked and further secured in place with a wedge, right after the shot has been introduced (also by the breech end). In the 15th-16th century and mostly wrought-iron pieces.

**Bronze** – Bronze – *Bronce*

An alloy made of red metals and later copper (mostly) and tin, used (since the 16th century) to cast durable, solid cannons. Sometimes, mistakenly referred to as Brass.

**Camelete** – Camelet (Petit chameau) – *Camelete*

A Portuguese bronze gun, a muzzle-loader, firing stone shots of 10 to 13 pounds.

**Camelo** – Chameau – *Camelo*

A Portuguese bronze gun, a muzzle-loader, firing shots of 18 to 24 pounds. The tube sometimes decorated with a stylized camel.

**Cannon** – Canon – *Cañon*

A general name for large pieces of ordnance, as distinguished from those pieces that can be hand carried. Also the name of a particular type of gun (different in various countries and periods, but always a big gun).

**Cannon perrier** – Canon pierrier – *Cañon pedrero*

A generic name for a number of bastard pieces (16th century).

**Carronade** – Caronade – *Carronada*

A short range, howitzer-like gun firing iron shots that appeared, in the last years of the 18th century. Mostly naval pieces. It is a short piece with a wide muzzle. Its bore has no chamber. The trunnions are often replaced by an iron thimble making corpse with the cannon. There is often a screw-like elevation device. The carronades are: 8, 12, 18, 24, 30 or 36-pounders (also 42 for the English carronades). In the 19th century, on board ships or on a fort, they were usually made part of a rotating base.

The name comes from “Carron”, the Scottish village where the first carronade foundry, the Carron Company, was settled, in the late 18th century.

**Cast iron** – Fonte – *Hierro fundido*

A hard, brittle, impure form of iron, obtained by re-melting pig-iron with limestone. It was un-bendable, but strong and rugged. Cast iron was used in the production of artillery weapons and of projectiles.

**Chase gun** – Canon de chasse – *Pieza de caza*

See Bow-chaser.

**Culverin** – Couleuvrine – *Culebrina*

A kind of long, thin cannon used in the 16th and 17th centuries. It is defined in theory (as all guns are) by the ratio between the size of its bore or calibre and the length of its tube. The ratio must be about 30 calibres. It can be either a breech-loader or a muzzle-loader, in bronze or in iron. It fires light or medium size iron shots, a great distance and with greater precision than shorter pieces.

**Curtowe or Carthoun or Curtall** – Courtaut – *Curtalde*

A large, short, heavy muzzle-loader cannon of the 15th and 16th centuries (36 or 48-pounders).

**No reliably correct translation extant** – Espingole – *No reliably correct translation extant*

This word, that once designated, principally, a small swivel gun, has been so misused by the uninformed, as to have become totally meaningless. It has been and is being used – in literature only – to describe any type of small piece of ordnance.

**Falcon** – Faucon – *Falcón*

A small light cannon in use from the 15th to the 17th century.

**Falconet** – Fauconnet or Falconet or Fauconneau – *Falconete*

A short light cannon of small calibre (1 or 2 pounder usually).

**Flanker** – No reliably correct translation extant – *No reliably correct translation extant*

An uncommon mid-16th century piece. Characteristics are unknown today.

**Foot mortar** – Mortier à semelle or à talon or à plaque – *No reliably correct translation extant*

An iron or bronze mortar cast in one solid piece, with its massive flat base or support (no trunnions, no own elevation device, the “built-in” elevation being 45°).

**Gun** – Canon – *Cañon*

A firearm in general. In its limited, “artilleristic” sense: A non-personal weapon, being any ordnance piece or “bouche à feu” or “pieza” that is long and shoots projectiles with a high muzzle velocity, on a near horizontal trajectory.

**Gunmetal** – No reliably correct translation extant – *No reliably correct translation extant*

See Brass.

**Hanging mortar** – Mortier suspendu – *No reliably correct translation extant*

A mortar with trunnions placed on the chase reinforce. The said trunnions were held in a “bed”, somewhat comparable to a cannon’s carriage. The piece could be made to pivot vertically for the adjustment of the wanted trajectory of the shot.

**Howitzer** – Obusier – *Obús*

A short piece with a large powder chamber, intermediate between the cannon and the mortar. Howitzers were lighter and fired shells at higher elevations with smaller powder charges than guns of the same calibre, but had shorter ranges.

**Iron** – Fer – *Hierro*

Metal used in the manufacturing of projectiles and cannon tubes, as well as certain carriages (19th century). Iron, for tube manufacturing, was less expensive than bronze and was more capable of sustaining heavy siege firing with larger charges of powder. Conversely, iron was heavier and less tenacious than bronze.

**Minion or Sakeret** – No reliably correct translation extant – *Minion*

Small bronze or iron gun, belonging to the culverin family, usually shooting iron shots of 3 to 4 pounds.

**Mortar** – Mortier – *Mortero*

A very short piece used for high, curved trajectory firing that comes in many sizes and calibres. The mortar uses a small powder charge. The powder chamber of a mortar was specially designed to concentrate the charge in a small area, so the projectile could receive as much of the explosion’s propulsive strength as possible. Mortars would shoot stone balls, solid iron shots, or incendiary devices above fortress walls, also

bombs the fuse of which would be set so as to explode while still high in the air and to rain fragments down on the enemy soldiers. (See also Foot mortar, Hanging mortar and Trunnion mortar.)

**Murtherer** – No reliably correct translation extant – *No reliably correct translation extant*

A generic name for any small anti-personal (land or naval) gun, usually a swivel gun that is or can be loaded with scattering shot, shrapnel or red hot nails, etc. Comes in various sizes.

**Muzzle-loader** (or ML) – Canon à chargement par la gueule – *Cañon de carga por la boca*

A cannon in which the powder charge (or later the cartridge), the shot and the tampion are to be introduced by the muzzle. Most cast cannons were muzzle-loaders.

**Novemburgh** – No reliably correct translation extant – *No reliably correct translation extant*

A little known ordnance piece of the early 16th century, probably a 20 pounder (iron shot).

**Organ gun** – No reliably correct translation extant – *No reliably correct translation extant*

See Ribauldequin.

**Patterero** – Pierrier – *Pedrero*

In a general sense, any gun shooting only or mostly stone balls or, if used as a specific term, the type of stone-throwing gun that happened to be used at the time in that particular country to shoot stone shots.

**Pounder** – Calibre exprimé en “livres de balle” – *Calibre designado por el peso en libras de la bala*

An adjective that qualifies a gun that discharges a shot of a specified weight in pounds (e.g. a 6 pounder).

**Ribauldequin** – Ribaudequin – *Ribadoquin*

Also known as a rabauld, ribault, ribaudkin, or organ gun. Was a mediaeval and later contraption made with many small caliber iron barrels set up flat, parallel, in a circle, or sometimes in a fan-like manner, on a common carriage or platform, which, when fired, were somewhat akin to a modern machine gun. When the weapon was fired in a volley, it created a shower of iron or lead shots. Organ guns were employed, specifically, during the early 15th century, and continued serving, mostly, as defensive anti-personnel gun. Similarly, there have been, until the 18th century, heavier pieces that consisted in two or three medium-size cannon tubes cast together and mounted on a common carriage. The tubes could be fired separately or together.

**Robinet** – No reliably correct translation extant – *No reliably correct translation extant*

A small piece, often a half-pounder, calibre: 2.5cm. and weighing some 130 kilos only.

**Saker** – Sacre – *Sacro*

A long cannon close to the culverin family, but ill-defined over the centuries and locally. A muzzle-loader. May have been firing iron shots of widely different weights and may have had widely different ratios.

**Serpentine** – Serpentine – *Serpiente*

A long, small calibre, cast iron or bronze gun. Used from the 15th to the 17th century, of various shapes and dimensions. Usually a muzzle-loader.

**Shrimp** – No reliably correct translation extant – *No reliably correct translation extant*

An uncommon mid-16th century piece. Characteristics are unknown today.

**Sling** – No reliably correct translation extant – *No reliably correct translation extant*

An uncommon name, for an ill-defined piece of ordnance (mid-16th century).



**Steel** – Acier – *Acero*

A metal composed of iron alloyed with various small percentages of carbon. Steel was categorized as hard, medium, or soft, according to its carbon content and it could be alloyed with other metals to produce variations in hardness, strength and malleability. Steel has a finer grain than cast iron and makes stronger, lighter cannons.

**Sternpiece** – Canon de retraite – *Guarda timon*

A gun placed at the stern of a vessel, usually one on each side of the rudder. Used when being pursued by another vessel.

**Suspended mortar** – See Hanging mortar.

**Swivel gun** – Pierrier à fourche or à chandelier – *Pedrero de horquilla or, later, Cañon de horquilla*

A small anti-personal cannon, in use either on a ship or on a fortified entrenchment, in iron or bronze, a 1/2 or 1 pounder usually that was mounted on an iron pivot with swivel on which it could easily be pointed in all directions. The pivot was itself fixed in the hull of the ship or on the bow. In use from the 15th to the 18th century. At the beginning, fired mostly stone shots, hence its name in French and Spanish. The system was occasionally generalized for heavier guns in the 17th and 18th centuries.

**True** – Vrai – *Legitimo*

An adjective that designates a type of gun exactly corresponding to its theoretical characteristics, mostly the exact ratio, length to calibre. Example: “a true culverin” with a ratio of 30.

**Trunnion mortar** – Mortier à tourillons bas – *Mortero de horquilla*

A mortar having its trunnions at the bottom of the powder chamber or under it, and the trunnions engaged on a flat, separated bed where the piece swivels for range adjustment.

**Verse** – Berce (?) – *Verso or Berço*

Another vague and changing name, for a light or medium size piece, often an intermediary between the culverin and the saker.

**No reliably correct translation extant** – Veuglaire – *No reliably correct translation extant*

A 14th century type of bombard, a short and strongly built breech-loader (ratio about 5).

## PARTS OF A CANNON

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### **Name in English – Name in French – *Name in Spanish*** **Definition**

**Apron** – Platine, Tablier – *Planchada*

A piece of sheet lead used to cover the vent of a cannon as a protection against the elements. It was later replaced by the vent cover.

**Astragal** – Astragale – *Astragalo*

The small convex moulding (sometimes cut into the form of a string) used in the ornamental work of the cannon tube. It was usually connected with a fillet or flat moulding.

**Backsight** – Viseur – *Honedadura de apuntar*

The hindmost sight on a cannon.

**Barrel** – Tube du canon – *Cañon*

The tube of a gun.

**Bed** – Coussin or Chevet or Semelle – *Almohada*

The support for an early wrought-iron cannon (14<sup>th</sup> to 16<sup>th</sup> century) made of a hollowed out oak trunk. Also, if square and made of either thick, solid wood or heavy metal, the base or support for a mortar.

**Bore** – Âme – *Anima*

The bore includes all the drilled out portion of the tube including the chamber (if there is one), the conical or spherical surface connecting the chamber to the cylinder and the cylinder itself.

The bore diameter is measured at the muzzle from wall to wall in a smoothbore tube and from land to land in a rifled tube.

The bore length is the entire length measurement inside the tube including the powder chamber, if any.

**Breech** – Culasse – *Culata*

In general, the rear part of a gun. In the ancient breech-loaders, it consisted in a separate, interchangeable breech block containing the powder and a tampon. In a muzzle-loader it was, precisely, the section from the rear of the base ring to the vent.

**Breech block** – No reliably correct translation extant – *No reliably correct translation extant*

See Powder chamber.

**Breech button** – Bouton de culasse – *Cascabel*

See Button or Grape or Knob.

**Breeching** – Brague – *Braga*

The breeching of a gun or carronade is a strong rope by which the recoil of the piece is checked at such a point that the muzzle is brought wholly within the port-hole, where the gunners can sponge and reload it.

Also a harness adapted to the wheel-horses of gun carriages, near and off, for the purpose of facilitating the

stopping of a gun in motion. Breechings near and off, are strengthened with a lay of leather.

**Breech mouldings** – Reliefs de culasse or de la plate-bande de culasse or du cul de lampe – *Molduras de la faja de la culata*

The mouldings decorating the face of the breech of a cannon. They can be part of the representation of the same subject as the neck and knob (example: the wings of a bird).

**Bush or Bushing** – Bague or Chemise – *Camisa*

A thin cylinder of hard metal used to line the wall of the vent from the touch-hole to the powder chamber of a gun. Its purpose is to protect the wall of the vent against the damages caused by heat and explosions and so to avoid an unwanted widening of the vent hole. The bushing was sometimes added after wear and tear had appeared, as a corrective measure, or it could be stuck in place into the mould previous to casting.

**Button or Grape** – Bouton de culasse – *Cascabel*

The swelled part, at the very end of the cascable neck, at the very rear part of the breech of a gun. It was often decorated; it could be replaced by a ring or a half ring, etc. It was used to fix the ropes of the tackle used to limit the recoil, also to facilitate the handling of the pieces once dismantled.

**Calibre** – Calibre – *Calibre*

The calibre of a gun is equal to the diameter of its bore minus 1/25, i.e., minus the windage. Anciently expressed in inches, it was one of the two ways a gunner would describe his piece: “a calibre 5 culverin”. The older designation referred to the weight of the solid shot (expressed in pounds) corresponding to it: “a 6 pounder”.

**Cascable** – Cul de lampe – *Faja de la culata*

That part of the cannon tube in the rear of the base ring. It was composed of the mouldings of the breech, the neck and the knob.

**Chase of a gun** – Volée d'un canon – *Balada*

Conventionally (and for pieces made that way) the section of the tube, which extends from the second reinforce to the muzzle.

**Chase ring** – Moulure de volée – *Faja de la caña*

Moulding at the rear end of the chase. In bronze guns the chase ring was often replaced with an astragal and fillets.

**Curve** – Courbe – *Curva*

The portion connecting the first reinforce to the chase, which features the trunnions. (It is therefore another name, not very much in use, for “second reinforce”.) It is made somewhat thicker than necessary to further resist the pressure of the powder, in order to serve as a proper point of support for the trunnions and to compensate for certain defects of metal liable to occur in the vicinity of the trunnions, arising from the unequal cooling of the different parts.

**Dolphins** – Dauphins – *Delfins* or *Asas*

Ears or handles placed at or near the center of gravity of the piece and used to assist in mounting, dismounting or handling the piece. The origin of the name is that in most early guns these handles, when present, were ornamented and cast to represent dolphins. They did appear also in various other forms, as elephant's heads and trunks, dragons, ropes, birds or other animal or human figures, etc. Plain from about the 19<sup>th</sup> century on.



**Fillet** – Filet – *Filete*

A narrow and flat architectural ring or raised band of metal on a cast cannon tube, which served as a reinforce mostly and/or decoration.

**Knob** – Bouton de culasse – *Cascabel*

See Button.

**Muzzle** – Bouche or Gueule – *Boca* or *Brocal*

The mouth, or opening, of the bore of a cannon tube and the face that surrounds it. Also the front part of the chase of a muzzle-loading gun. The muzzle opening was chamfered, or bevelled, to prevent abrasion and to facilitate loading.

**Muzzle astragal** – Astragale de volée – *Astragalo de brocal*

The decorative convex moulding on the muzzle was often between two fillets.

**Muzzle swelling** – Tulipe – *Joya*

The thicker, reinforced conical tip of the tube.

**Neck** – Collet (du bouton) – *Cuello*

The smallest part of the piece ahead of the muzzle astragal.

Also, at the other end of the gun, the narrow part, the “peduncle” of the cascabel, joining the breech mouldings to the button when any.

**Ogee** – Plate-bande – *Media-ogiva*

The short tapering part that connects two parts of the cannon of different diameters (such as between the first reinforce and the second or between the second reinforce ring and the the chase girdle, for example).

**Powder chamber** – Chambre à poudre or Boîte à poudre – *Recamara* or *Servidor*

In a breech-loader: The powder chamber or breech block is a cylindrical tankard-like container open at one end, separate from the gun and usually with a handle. It is to be locked in place and secured with a wedge before firing.

In a muzzle-loader: The chamber is the bottom part of the bore, which holds the propelling charge, especially when of different diameter than the rest of the bore. All mortars featured such a powder chamber.

**Powder pan** – Coquille de lumière, Canal de lumière or Bassinet – *Copa de fogón* or *Casoleta de fogón* or *Pulverin*

A small hollowed part around the touch-hole which was filled with additional priming powder. Often decorated in the form of a sea-shell or otherwise.

**Reinforce** – Renfort – *Refuerzo* or *Resalte*

The thickest part of the body of a gun, the breech part, the role of which was to resist the explosion of the powder. If there was more than one reinforce, the one next to the breech was called the first reinforce and the other, on both sides of the trunnions, was the second reinforce.

**Rimbase** – Embase – *Refuerzo de muñon*

The short cylinder, or shoulder, which (on some cannons) united the trunnion with the body of the cannon. Its purpose was to provide extra strength at the trunnion junction and to limit any sideways movement in the trunnion beds.

**Rose** – Bouton de culasse – *Cascabel*

See Button.

**Sight** – Mire – *Mira*

The foresight of a cannon is a cast button-like mark on the middle of the highest part of the top of the muzzle. It is the “bouton de mire” or “botón de mira”. The backsight is a slot at the center of the top of the bas-ring; it is the “visière” or “viseur” or “visera”. Both had to be in line to allow the gunner to take correct aim at his target. Not all guns had sights.

**Swivel** – Fourche – *Horquilla*

The fork-like pivoting support of a swivel-gun, the stem of which (or “chandelier”) would be stuck in the ship’s railing or in a strong vertical beam.

**Tail** – Queue or Manche – *Rabiza*

Handling bar on the hind part of a swivel-gun, used for pivoting and for setting the elevation.

**Tampion** or Tompion – Tape or Tapon or Tampon – *Corcho*

A cork or stopper, used to block the muzzle of a cannon. Usually in cork or in wood on large cannons, in iron or brass on smaller ones. Used to prevent spray, humidity, or dust getting in.

Also the wooden bottom in a grape shot or a case shot.

**Touch-hole or Vent** – Lumière – *Fogón* or *Oido del cañon*

The small-size hole pierced in the vent field of a cannon or in the back of the mobile powder chamber, which received the easily flammable priming powder or “pulverin” that once touched with a burning wick would cause the main charge to explode. The internal diameter had to be and remain very small because too much gas would otherwise escape through it and cause a misfire or lower velocity fire. A bushing was often used to that effect.

**Trunnion** – Tourillon – *Muñon*

One of the two symmetrical, short cylindrical branches of a cannon, protruding on both sides, slightly ahead of the gravity center (or point of equilibrium) with the purpose to support the piece when placed on a gun carriage in such a way that it could be swung with little effort.

**Tube** – Tube – *Tubó*

The cannon barrel. Most tubes were made of either, wrought-iron, cast iron, steel, or bronze. Exceptionally, some were made of pure copper, some of wood (a drilled through tree trunk with iron bands for reinforcement) and some in leather (with wood and/or iron reinforcements or straps).

**Vacant cylinder** – Volée – *Caña*

The part of the bore, which does not contain powder and shot.

**Vent** – No reliably correct translation extant – *No reliably correct translation extant*

See Touch-hole.

**Vent cover** – Protège-lumière – *Tapafogón*

A leather strap, with a brass or copper pin attached, fastened across the breech of the tube in order to protect the vent or touch-hole. The pin entered the vent hole to keep the strap from slipping.

Or a solid brass, protective piece hinged on a tenon, on one side of the vent and locking (or being secured) on the opposite tenon.

**Vent field** – Champ de lumière – *No reliably correct translation extant*

The section between the vent astragal of the first reinforce astragal and the ogee of the base ring.  
Or the section where the vent has been pierced (if on top of the tube).

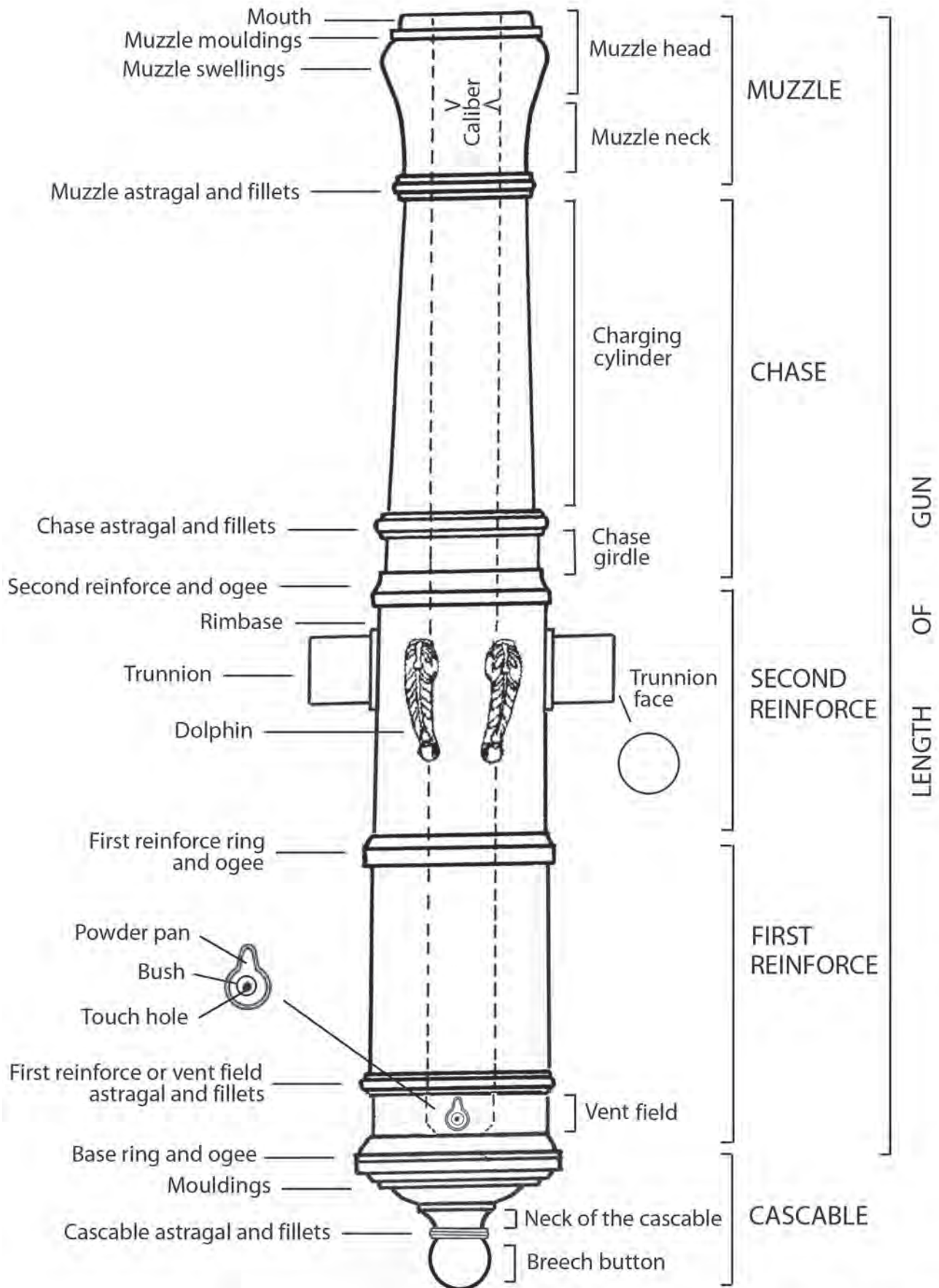
**Windage** – Vent – *Viento de las balas*

The difference between the diameter of the shot and the diameter of the bore. It was necessary to figure windage in order to make allowance for a piece becoming foul due to incrustation of rust, of black powder soot, etc., for a not perfectly round cannon ball or for the expansion of a shot by heat, etc. Reducing windage increased the accuracy of the shooting and gave a more extensive range of fire, at a risk.

The windage was generally of 1/25 of the bore diameter.



# THE PARTS OF A GUN



(Drawing M.-E. Sténuit)

## GUN CARRIAGE

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**Name in English** – Name in French – *Name in Spanish*  
Definition

**Bout of the axle-tree** – Fusée ou Museau de l'essieu – *Pezon del eje*

The end of the axle-tree of a gun carriage.

**Brackets** – Flasques – *Gualderas*

The two main pieces forming the sides of the carriage of a gun, assembled by the axle-trees and by the various cross-pieces.

**Breeching** – Brague – *Braga*

The breeching of a naval gun or carronade is a strong rope by which the recoil of the piece is checked at such a point that the muzzle is brought wholly within the port-hole, where the gunners can sponge and reload it.

Also, a harness adapted to the wheel-horses of gun carriages, near and off, for the purpose of facilitating the stopping of a gun in motion. Breechings near and off, are strengthened with leather.

**Capsquares** – Plates – bandes – *Sobremuñoneras*

Large iron strips, which embrace, contain and cover the trunnions of a cannon on the brackets of its carriage. They secure the gun to the carriage.

**Carriage or Gun carriage** – Affût (de canon) – *Cureña*

A wooden carriage, on which a gun is solidly mounted to be secured and moveable and aimed correctly.

**Casemate carriage** – Affût de casemate – *Cureña de casemata*

A traverse carriage in a fort casemate. The gun fired through an “embrasure” or loophole in the wall. (Examples: the Gribeauval battery carriage).

**Checks** – Flasques – *Gualderas*

The sides of a gun carriage, which support the trunnions. See Brackets.

**Chin bolt** – Cheville à clavette, à mentonnet – *Betica*

A type of bolt, a cotter pin, was used to secure the hinged cap squares to the top of the brackets.

**Galloper carriage** – No reliably correct translation extant – *No reliably correct translation extant*

A gun carriage for a small field piece, of which the trail forms poles for a single horse.

**Gun tackle** – Palan de retraite (ou de côté) – *No reliably correct translation extant*

The blocks and pulleys affixed to the side of the hull, by which a gun carriage is run to and from the gun port.

**Hoop** – Virole – *Virola*

A rigid, circular band of metal, placed around the bout of the axle-tree.

**Mike** – No reliably correct translation extant – *No reliably correct translation extant*

Forked gun carriage from the 1500s, in use in Denmark.

**Mortar bed** – Base de mortier – *Plancha de mortero*

A base for a land mortar (no wheels and heavy).

**Notches** – Degrés – *Escaleretas*

The “steps” on both sides of the cheeks of the carriage.

**Rope breechings** – Brague ou drague – *Braguero*

A thick and strong rope passed into the two sides of a gun carriage and fixed to the ship’s hull, on both sides of the cannon’s embrasure, in order to limit the recoil of the cannon when fired.

**Sole** – Semelle – *No reliably correct translation extant*

The bottom of the carriage (when there is a full, solid bottom, not always the case).

**Stock** – No reliably correct translation extant – *No reliably correct translation extant*

A hollowed oak trunk in which the early cannons or bombards were solidly embedded (c. 1400-1600).

**Trail** – No reliably correct translation extant – *No reliably correct translation extant*

The backward part of the gun carriage.

**Transom** – Entretoise – *Teleron, Calestrín*

Horizontal beam joining the cheeks of a gun carriage.

**Truck** – Roue – *Rueda*

The wheel of a gun carriage.

**Wedges** – Coins – *Esprezes*

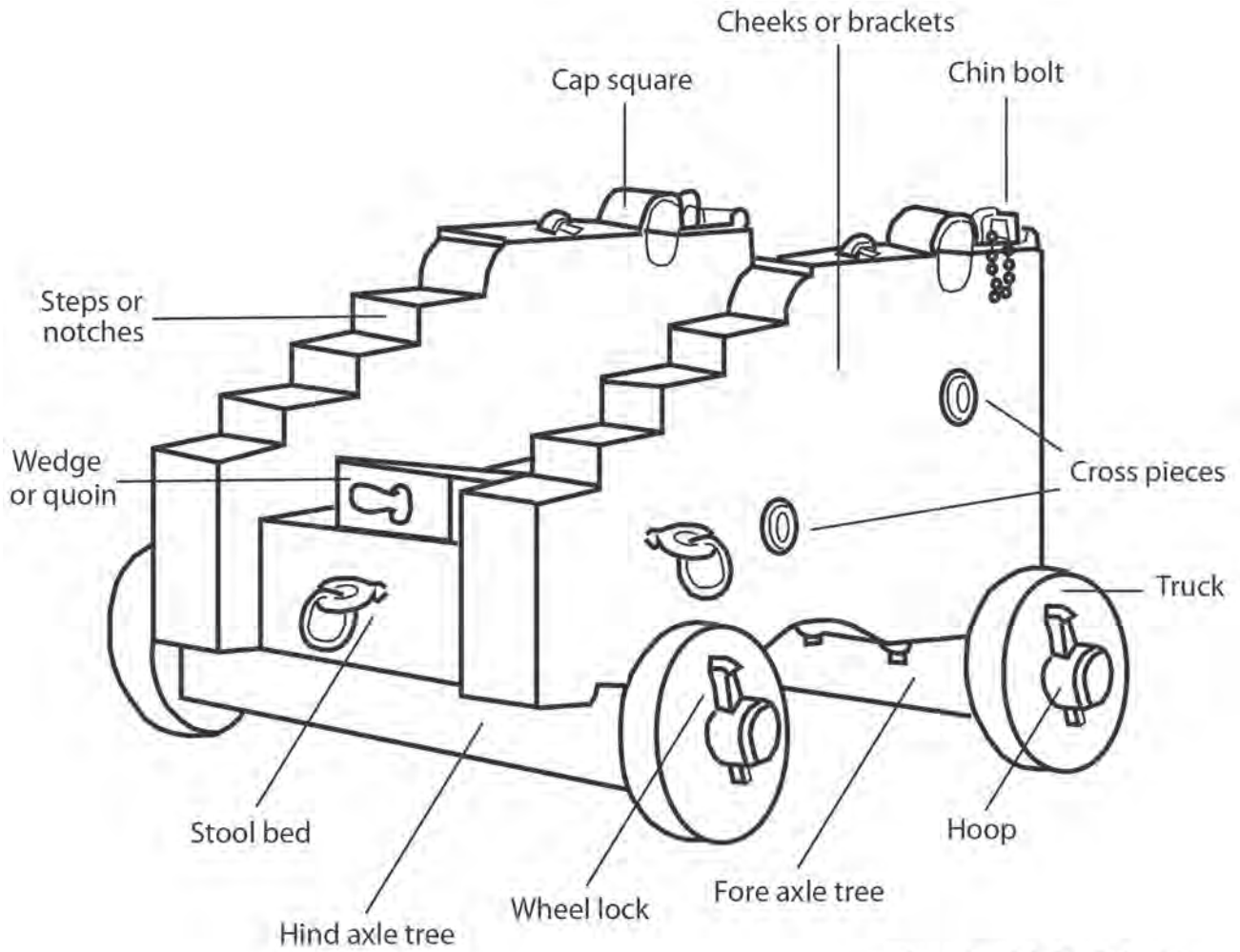
Wooden wedges, of various thicknesses, to be placed between the lower part of the cannon’s breech and the upper side of the trail in order to set the elevation of the piece.

**Wheel lock** – Esse de roue – *Sotrozo*

A strong wrought-iron, flat pin, driven through the end of the wheels axle in order, to prevent the wheel slipping off.



# THE PARTS OF A COMMON SEA CARRIAGE



(Drawing M.-E. Sténuit)

## TOOLS

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**Name in English** – Name in French – *Name in Spanish*  
Definition

**Bed** – Coussin, Chevet – *Almohada*

A wood support for a mortar or a howitzer, either rectangular or in the shape of a truncated pyramid. It is used for aiming the gun.

**Breeching** – Brague – *Braga*

The breeching of a gun is a strong cable by which the recoil of the piece is checked at such a point that the muzzle is brought wholly within the port-hole, where the gunners can sponge and reload it.

**Calibre compass or Gunner's rule** – No reliably correct translation extant – *Compas de medir balas*

A variety of the callipers, specially designed for measuring cannon balls and engraved with precise information referring to each calibre. The weight of the shot was read off at the head. On the reverse, the weight of powder charges necessary and other informations such as range, etc., were given.

**Callipers** – Compas d'épaisseur – *Calibrador*

The callipers were used to measure lengths of time fuzes, fuze plugs, diameter of shot, and calibre of cannons. It was made of hinged sheet brass with steel points. A graduated scale along the side was set up in inches and divisions. See also "Calibre compass" or Gunner's rule".

**Charger** – Chargeoir, Chargeur – *Cuchara de cañon, Cargador*

A simple spoon-like instrument at the end of a shaft used to put the shot into the muzzle.

**Crusher** – No reliably correct translation extant – *No reliably correct translation extant*

Apparatus for measuring the pressure of the powder gas in the bore of a cannon.

**Fuze or Fuse** – Mèche, Fusée – *Mecha*

A tube filled with combustible matter, used to ignite the charge of a bomb or a shell.

**Gauge** – Lunette or Passe-balle – *Pasa bala*

The gauge is a metal circle (usually made of copper), with or without a handle, that is used to check the exact calibre of a cannon ball or of other projectiles. The operation takes two gauges, the one with an opening, slightly larger than the other. Each of the cannon balls, which are checked for exact diameter must pass through the first one from all sides and be stopped by the second, also from all directions under which it is presented. Each gauge usually bears the engraved mention of its internal diameter.

**Grommet** – Estrope – *Estrovo, Estribo, Gaza*

A rope ring used as a wad to hold a cannonball in place in the tube.

**Hand-spike** – Anspect – *Espeque de cabra*

Wooden crow-bar with one extremity covered of iron, inserted under the base ring of the cannon in order to raise it sufficiently to introduce the wooden wedges in order to correct the elevation of the piece.

**Haversack** – Musette – *Mochila*

In artillery service, a leather bag, with a leather flap affixed, used in the field to carry the powder cartridges from their safe storage box to the piece in order to prevent mishaps while the cartridges were being transported.

**Ladle** – Cuiller – *Cuchara*

Used to put powder in the cannon or to remove projectiles from pieces, when firing was no longer desired. The ladle was made of sheet brass affixed to a wooden head and adapted for a shaft. It was designed to be shoved under the projectile and withdrawn from the tube.

Also, an iron ring used for carrying shot or hot shot, to the artillery piece. It had one to three handles, depending on the size of the shot being transported. A large shot required two or three men to transport. Also called a shovel.

**Lighted match** – Bâton à mèche – *Palo de mecha*

A stick prepared to burn at an even rate, used to fire cannon, gunpowder, etc.

**Lintstock** – Boute-feu – *Botafuego*

Small wooden stick, open on one side in order to receive the lighted extremity of a match, the rest, is turned around the stick. It was used to hold a slow match for igniting the powder in the vent. One end of the lintstock was tipped with an iron point so that, between firings, it could be inserted in the ground or, on a ship, in a prepared safe hole.

**Mandrel** – Mandrin – *Mandril*

A metal bar, used as a core around, which metal may be forged or otherwise shaped.

**Mant(e)let** – Mantelet – *Mantilla*

A bullet-proof shield made of wood, rope matting, or metal used to protect cannon crews at the embrasures.

**Match** – Mèche – *Mecha*

Means of ignition made in a rope-like form and impregnated with a mixture of fine powder and tar.

**Partisan lin(t)stock** – No reliably correct translation extant – *No reliably correct translation extant*

Spear with match holders.

**Plummet** – Fil à plomb – *Plomada*

A lead or iron weight suspended by a string. Used for levelling gun carriages and platforms. Also known as line-and-bob.

**Port-fire** – Porte-feu – *No reliably correct translation extant*

Paper tube filled with a fine priming mixture.

**Powder-horn** – Corne d'amorce – *Cebador*

Ox horn filled with gun powder. The extremity is usually equipped with a small spring allowing, when pressed, to let the priming powder run.

**Priming horn** – Corne d'amorce – *Cebador*

See **Powder-horn**.

**Priming iron or wire** – Dégorgeoir, Epinglette – *Saca-filásticas*

Copper wire pointed at one end with a circular or 8-shaped loop at the other. It was inserted through the vent in order to pierce the cartridge bag seated in the chamber. This allowed the flame from the primer to reach the propellant charge.

**Quoin** – Coin de mire – *Cuña de punteria*

A wedge placed under the breech of a gun to fix its elevation.



**Rammer or Ramrod** – Refouloir – *Atacador*

A wooden cylinder made of elm, poplar, maple, or similar wood used in muzzle-loaders. The rammer was attached to a wooden staff, usually the opposite end of the sponge. The centre of the rammer was slightly concave to avoid contact with the fuse. It was used to drive the powder cartridge and projectile to the base of the bore in preparation for firing.

**Rope breechings** – Brague ou drague – *Braguero*

A thick and strong rope passed into the two sides of a gun carriage and fixed to the ship's hull, on both sides of the cannon's embrasure, in order to limit the recoil of the cannon when fired.

**Shot locker** – Parc à boulets – *Chillera, Balero*

A wooden shelf on the side of a ship, pierced on the upper surface with hemispherical cavities aimed to house the shots that must be kept at hand during a fight.

Also a square or triangular frame in the free space between the cannons for storing shots.

**Shovel** – Pelle – *Pala*

See Ladle.

**Sight** – Mire – *Mira*

System Equipment and/or implements used to align a weapon for accuracy before firing. Could have been cast as part of the cannon or could be portable and installed on the piece before the battle (more elaborate and fragile implements).

**Sponge** – Ecouvillon – *Lanada*

Wooden cylinder fixed at the extremity of a long stick, used for cleaning the inner part of a gun. The cylinder is surrounded by a sheep skin; the friction dries the humidity, due to the explosion of the powder.

**Tackle** – Brague ou Drague – *Cable*

See **Rope breechings**.

**Tampion screw** – No reliably correct translation extant – *No reliably correct translation extant*

A cork-screw-like implement on a long handle for drawing out the remains of a tampion.

**Wad** – Bourre, Valet – *Taco*

A stopper made of natural fibres, tightly winded into a ball, which is pushed on top of a cannon shot in order to block it and to seal the charged cylinder of the piece.

**Wadhook or Worm** – Tire-foin, Tire-bourre – *Sacatrapos*

A tool formed like a corkscrew at the end of a long pole, for drawing out remains of the charge in a muzzle-loader.

## PROJECTILES, ETC.

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**Name in English** – Name in French – *Name in Spanish*  
Definition

**Bar-shot** – No reliably correct translation extant – *Bala enramada, Bala de palanqueta*

A projectile formed like a dumb bell. Some were solid, others sliding (with double bar), all were meant to start swirling round once in the air so as to destroy sails, cut the ship's rigging and cables and sailor's necks.

**Bomb** – Bombe – *Bomba, Bala hueca*

An explosive projectile, a hollow cast-iron ball, filled with gunpowder and "shrapnel" of any kind, with a fuse to produce delayed detonation.

**Canister** – Charge à mitraille – *Tarro de metralla*

A canvas cylindrical bag or a can made of light metal and filled with small sharpened missiles that will scatter after leaving the gun. Canisters were designed to be used at close range against enemy troops with the desired effect being that of a huge shotgun blast. See also Grape shot.

**Cannonball** – Boulet de canon – *Bala de cañon*

Stone or iron (copper, exceptionally, in colonial Chile) spherical projectile for use in any type of piece. A solid shot or a round shot.

**Cartridge or Cartouch** – Cartouche, Gargousse – *Cartucho*

A bag or case holding a prepared, pre-weighed powder charge for putting into a cannon. The cartridge may be made of parchment, textile, strong paper or thin sheet-iron.

**Cartridge case or box** – Garde-feu, gargoussier – *Guarda cartucho*

A leather or light wood, cylindrical case or bag, containing and protecting from fire the cartridge of gun powder. This case or bag was to be seated between the bottom of the bore and the base of the projectile. The bag was punctured by the priming wire through the vent, and fine priming powder was then inserted in the vent to allow the transfer of the spark to ignite the charge.

**Case-shot** – Mitraille – *Pomo de metralla*

Small shots or lead balls, contained in a canvass, wooden, tin or iron-sheet cylindrical case or in netting. Will scatter upon firing. See also Shrapnel.

**Chain-shot** – Boulet à chaîne, Balle à l'ange – *Bala de cadena*

A projectile consisting of two shots or two half shots, linked by a chain. Will start swirling when in the air. Was used to cut masts and rigging of naval vessels, to shear sails and/or to maim enemy personnel.

**Cross-bar shot** – Boulet ramé – *Bala de palanqueta, bala enramada*

A projectile consisting of two cannon balls, linked by a strong iron shaft. This shot, when fired, begins to swirl and cuts masts and rigging of enemy ships.

**Double headed shot** – Boulet ramé – *Bala enramada*

A projectile consisting of two lenticular portions, i.e. two half-balls, linked by an iron shaft. See Cross-bar shot.

**Grape shot** – Grappe de raisin – *Saquillo de metralla*

A cylindrical case of light wood, canvas or netting, holding a number of balls, nails or stones, etc., to be fired out of any artillery piece. The small iron balls, etc., which will scatter upon firing are arranged like grapes around a wooden stick stuck in the wooden bottom part.

**Grenade** – Grenade – *Granada*

Small hollow ball to be thrown by hand filled with “artifices” and ignited by an exterior fuse. It was at first made of glass or earthenware and of iron from the 17<sup>th</sup> century on.

**Gun powder** – Poudre à canon – *Polvora de cañon*

Black powder is an explosive mixture, made of saltpetre (potassium nitrate), sulphur and finely ground charcoal, used as a propellant in cannons, in shells and cartridges, for blasting, etc. The Chinese who invented it, it is said, used it only for fireworks. It was introduced in Europe through Egypt, it is also said, in the first half of the 14<sup>th</sup> century and quickly put to a different use.

**Hot shot** – Boulet rouge – *Bala roja*

A solid shot projectile, which has been heated white- or red-hot in a specially constructed furnace and has to be handled by the gunner with special tools. An incendiary projectile used in mortars, siege cannons and also at sea.

**Langrel or Langrage** – Mitraille – *Metralla*

Pieces of iron of various sizes, used as case-shot. Sometimes gathered in a bag called a langrel-bag.

**Magazine** – Magasin – *Almacén*

A safe storage area for prepared explosive projectiles and gunpowder on land (in forts), often part of the arsenal.

**Palisade shot** – Boulet de palissade – *Bala de dos puntas*

Round shot on the middle of an iron bar in the form of two spikes.

**Petard** – Pétard – *No reliably correct translation extant*

Bell-shaped mine, in iron or bronze, filled with powder and fused for bursting the wooden door of a city gate, etc., (when solidly secured to it).

**Powder-room** – Soute aux poudres, Sainte Barbe – *Pañol de la polvora*

The part of the hold, where the powder is stored on a ship.

A very commonly used denomination but technically incorrect. See further on, under “Sainte-Barbe”.

**Prime-cartridge** – Etoupille – *No reliably correct translation extant*

Small pipe filled with powder, which is placed in the vent. It then replaces the priming powder or pulverin. There are ordinary prime-cartridges and percussion prime-cartridges.

**Priming powder** – Pulvérin – *Ceba*

A specially prepared, extra fine powder that is laid in the vent field in order to communicate the fire to the main charge in the cannon.

**to Ram** – Refouler, Bourrer – *Atacar, Piconear*

To force a charge into a firearm.

**Red-hot ball or shot** – Boulet rouge – *Bala roja*

See Hot-shot.



**Round shot** – Boulet rond – *Bala común*

A spherical, solid shot of stone, lead, cast-iron, steel or exceptionally copper.

**Saint Barbara** – Sainte Barbe – *Santa Barbara*

The Patron Saint of all artillery men, gunners, etc. on land or at sea. Her feast day is on December 4<sup>th</sup>. On French ships, her name often designated the powder-room. Erroneously so, according to Jean Boudriot. He writes: “*The Sainte Barbe was a space situated under the main cabin, that is at the level of the first battery for the ships-of-the-line, and at the level of the ‘false bridge’, next to the ‘carré de l’Etat-Major’ or staff headquarters, this also aft, in the frigates*”. “*One must avoid mistaking the Sainte Barbe* – Boudriot further writes – *with the powder room. The Sainte Barbe does not contain powder or inflammable items but only tools and implements such as match tubs, empty cartridges, lintstocks, priming powder horns or pulverins, spring plates, etc. On board the ships-of-the-line the master gunner has a small room for his own use in the Sainte Barbe.*”

**Shell** – Obus – *Obús*

The artillery projectile of the 20<sup>th</sup> century, with a powder-filled case or cartridge (with bottom firing cap) crimped on it. May be solid or explosive and then is tipped with a contact firing device.

**Shot** – Boulet – *Bala*

The basic, solid projectile, non-explosive. May be in stone or in iron (exceptionally in copper). In English, the word also designates the action of shooting (as in “killed by the first shot”).

**Shot locker** – Soute aux boulets – *Pañol de las balas*

The main storage place for the ship’s cannon balls, usually a big, strong cubical box located on the lower deck and just behind the main mast.

**Shot rack** – Ratelier à boulets – *Chillera, Balero*

Some kind of wooden shelf on the side of a ship, pierced on the upper surface with hemispherical cavities made to house the shots that must be kept at hand during a fight.

Also a square or triangular frame in the free space between the cannons for storing shots.

**Shrapnel** – Shrapnel – *No reliably correct translation extant*

The lead or iron balls, any sharp or heavy small items that can kill or maim people when shot in a hollow projectile, so filled or in an explosive bomb. A word used since the 19<sup>th</sup> century only in that sense. In WWI and WWII the word also designated the fragments of an explosive shell. For earlier periods, see Case shot.

## GUNNER'S VOCABULARY

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**In English** – In French – *In Spanish*  
Definition

**to Aim a gun** – Pointer un canon – *Apuntar un cañon*  
To point a gun.

**Artillery piece** – Pièce d'artillerie – *Pieza de artillería*  
Refers in the most general way to cannons (with flat trajectories) and howitzers and mortars (with curved trajectories).

**Ballistics** – Balistique – *Balística*  
The science of dealing with the motion and trajectory of projectiles.

**Bastard** – Bâtard – *Bastardo*  
An adjective that designates a gun of any type, which is not exactly cast according to the theoretical ideal length to calibre ratio. Example: “A bastard culverin”: Is a “long gun” the length of which is less than 25 times its calibre or more than 35 times its calibre, the theoretical figures for a “true culverin” being 28 to 32 times.

**Brass** – Laiton – *Latón*  
Or “yellow copper”. An alloy made of red copper (mostly) and zinc (33%) or lead, used to make modern cartridges. In English, the word is sometimes misused for bronze.

**Broad-side** – Bordée – *Descarga de cañonazos*  
A simultaneous discharge of all the guns on one side of a warship.

**Bronze** – Bronze – *Bronce*  
An alloy made of copper (mostly) and tin, used (since the 16<sup>th</sup> century) to cast durably solid cannons.

**Bushing** – Bague – *No reliably correct translation extant*  
A close-fitting section of a pipe inserted in a cylinder in order to reduce its diameter (by example in a touch-hole, in a vent).

**Calibre** – Calibre – *Calibre*  
Diameter of a cannon's bore, expressed in inches, or in the weight of the solid shot corresponding to it.

**to Calibrate a gun** – Calibrer, régimer un canon – Calibrar  
To determine the correct range (for an artillery gun, mortar, etc.) by observing where the fired projectiles hit the ground for each particular elevation and a fixed charge of powder.

**Cannon shot** – Portée de canon – *Tiro de cañon*  
The range of a cannon.

**Cannonade** – Canonnade – *Cañoneo*  
A continued discharge of cannon.

**to Cannonade** – Canonner – *Cañonear*

To attack continuously with cannon.

**Canteen** – Cantine – *Cantina*

A box fitted with compartments, in which officers on foreign service pack spirit bottles, knives, forks, etc. Also, a tin vessel used by the soldiers to carry water or other drinkables in.

**Casemate** – Casemate – *Casamata*

A vault or chamber in a rampart, with embrasures for artillery.

An armoured enclosure for guns in a modern warship (20<sup>th</sup> century).

**Chief gunner** – Maître canonier – *Sargento artillero (o de batería)*

An artillery officer in charge of supervising all the cannons of a small vessel or one or a part of the guns of one gundeck (or one side of it) on a large ship of the line.

**Depression** – Dépression – *Depresión*

The angle, which the axis of the bore of a gun is lowered under the horizontal plane.

**Discharge of cannon** – Décharge de canon – *Descarga de cañon*

The firing of a gun.

**to Dispart a gun** – Calibrer un canon – *Probar el calibre de un cañon*

To measure the dispart of a gun, the dispart being the difference of a gun's internal diameter, measured at the muzzle and the base ring. (In order to check the quality of the founder's work or to check wear and tear on an old gun.)

**Elevation** – Elévation – *Elevación*

The angle at which the axis of the bore of a gun is raised above the horizontal plane.

**Embrasure** – Embrasure – *Tronera*

An opening through, which a cannon can be discharged.

**Enfilade** – Enfilade – *Enfilada*

A fire of musketry or artillery, made in the direction of the length of a line of troops, or a line of rampart.

**Evening-gun** – Coup de canon de retraite – *No reliably correct translation extant* Signalling the end of the day's work (in peacetime).

**to Fire a gun** – Tirer le canon, un coup de canon – *Disparar un cañonazo*

To discharge a gun.

**(Cannon or gun) Founder** – Fondateur (de canons) – *Fundidor (de cañones)*

A founder (or caster), who makes cannons (and often, in the early days, church bells, statues, etc.).

**Founding House** – Fonderie – *Taller de fundición*

Cannon foundry.

**Gun-boat** – Chaloupe canonnière – *Cañonera*

Light vessel carrying ordnance, manoeuvred with oars. (For operations in large rivers, estuaries or in inside waters, in the Baltic Sea for instance.)



**Gunmetal** – No corresponding word in French – *No reliably correct translation extant*  
Any metal or alloy used in making a gun, iron excepted.

**Gun port** – Sabord – *Porta, Tronera*  
An opening in a ship's hull through which a cannon's muzzle is run out for firing.

**Gun-shot** – Portée de canon – *Tiro de cañon*  
The distance that a shot is able to cover when the cannon is fired.

**Gunnage** – Du port de x – *De a x piezas*  
A naval term for the number of guns carried by a ship-of-war.

**Gunner** – Canonnier, Artilleur – *Artillero*  
The member of an artillery crew, who is responsible for giving the orders for cleaning, loading, and firing the cannons.

**to House the guns** – Serrer les canons, Mettre les canons à la serre – *Batiportar la artillería*  
To lash and secure the guns on the bulwark (in case of rough weather), so that their mouths touch with the top of the port.

**to Lay a gun** – Pointer un canon – *Apuntar un cañon*  
To aim or point a gun.

**to Load the gun** – Charger le canon – *Cargar el cañon*  
To insert the charge of powder and the projectile into the gun.

**Mant(e)let** – Mantelet – *Mantilla?*  
The vertically hinged door that closes the gun ports.

**Morning-gun** – Coup de canon de la diane – *No reliably correct translation extant*  
The cannon shot off in military harbours or on commanding ships at dawn. It announces the end of the night rest and the beginning of the day's work.

**to Mount a gun** – Monter un canon – *Montar un cañon*  
To place a gun on its carriage.  
A naval term indicating how many guns were carried on a ship (e.g. "the ship mounts seventy-four guns").

**to Nail up a gun** – Enclouer un canon – *Enclavar un cañon*  
To intentionally render an artillery piece unserviceable in order to avoid its capture and use by the enemy. Various means were used to accomplish this. A nail or small rod could be driven through the vent hole; a shot could be wedged in the bottom of the bore with the use of iron wedges driven in with the rammer; shells could be caused to burst in the bore, or broken shot fired from the tube with a high charge; two weapons could be fired at each other, muzzle to muzzle; the trunnions could be broken off, or busted by firing heavy charges full of shot at great elevations.

**Ordnance** – Ordonnance – *Artillería*  
Generic term which, for the artillery, encompassed all types of cannons and projectiles for sea or land service, all gun carriages, mortar beds, caissons, and travelling forges, with their equipment, all other apparatuses, tools and machines required for the service and manoeuvres of artillery, together with the materials for their construction, preservation and repair.

**Piece** – Pièce – *Pieza*

A gun in the widest possible description.

**to Point the gun** – Pointer le canon – *Apuntar un cañon*

To lay or train a gun.

**Point blank** – A bout portant – *A quema ropa*

Refers to a shot fired by any type of fire weapon from very close by, almost at contact.

**Port-cell** – Seuillet – *Batiporte*

The piece of wood lining the lower edge of the opening of a porthole.

**to Pound** – Pilonner – *Martillear a cañonazos, Batir a cañonazos*

To strike repeatedly with grouped cannon shots.

**Pounder** – Calibre (exprimé en “livres de balle”) – *Calibre, peso en libras*

A gun that discharges an iron shot of a specified weight in pounds (e.g. “a 6-pounder”).

**Powder-room** – Sainte-Barbe ou Soute aux poudres – *Santa Bárbara or Pañol de polvora*

The room or part of hold where the gun powder is stored on a ship. It is lined with copper sheets and the barrels are wood in order to avoid any possibility of a spark. It is lighted through a glass window with the lantern in the next hold.

**to Prime the gun** – Amorcer le canon – *Cebar el cañon*

To insert priming powder or a priming tube in the vent of the cannon.

**to Prove the gun** – Faire l’épreuve d’un canon – *Probar un cañon*

To test a new gun just received from the foundry.

**Range** – Portée– *Alcance*

The maximum horizontal distance at which a gun can hit its target.

**Recoil** – Recul – *Retroseso*

The backward movement of a cannon immediately after being discharged, due to the sudden pressure of the explosion.

**Round** – Volée, Bordée – *Bordada*

A discharge of all the guns on one side, of one gundeck.

**Sailing-gun** – Coup de canon de partance – *No reliably correct translation extant*

The cannon shot fired at intervals in order to announce the imminent departure of a ship of a squadron.

**Salvo** – Salve – *Salva*

A simultaneous discharge of the artillery of one or several ships, against one target.

**to Scale or Seal a gun** – Souffler un canon – *Limpiar un cañon*

To burn a small quantity of powder into the bore of a gun, in order to empty and clean it.

**to Seize the breechings** – Braguer les canons, Aiguilleter, Briguer, Amarrer – *Amarrar Trincar, Aprezar los cañones*

To fix the guns and carriages with strong cables in order to minimize the recoil when they are fired and/or to secure them in rough weather.

**to Shoot blank, at the mark** – Tirer à blanc – *Tirar la prueba*

To shoot with powder and no projectile (for signals or for salutes).

**to Shoot off the gun** – Tirer le canon – *Tirar el cañon, Disparar un cañonazo*

To discharge a cannon, to fire a shot.

**to Shot the gun** – Charger le canon – *Poner la bala en el cañon*

To put the shot inside the gun.

**Sight** – Mire – *Mira*

The equipment or the implements used to accurately aim a weapon before firing.

**to Spike a gun** – Enclouer un canon – *Enclavar un cañon*

See **to Nail up**.

**to Train a gun** – Pointer un canon – *Apuntar un cañon*

To aim or point a gun.

**Trajectory** – Trajectoire – *Trayectoria*

Curved path taken by a projectile in its flight through the air. The trajectory is affected by the elevation of the tube, the weight of the projectile and the amount of gunpowder used (and to a lesser degree by the wind). It can be ruined, also, by a last-second movement of the ship in choppy seas.

**True** – Vrai – *Legitimo*

An adjective that designates a type of gun, exactly corresponding to its theoretical characteristics, mostly the exact ratio, length to calibre. Example: “a true culverin” with a ratio of 30.

**to Unload the gun** – Décharger un canon – *Descargar un cañon*

To shoot off a cannon.



## ABBREVIATIONS USED IN TEXT

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For the captions of the illustrations in the Large Green Albums and Small Green Albums (LGAs and SGAs), the Editor has used either MLP's references or new abbreviations referring to the museums where the cannons can actually be seen today.

The references used by MLP in his SGAs may refer either to his personal photo numbers, to museum's numbers (exhibit numbers), to entries in museum's catalogues or to the museums where the cannons could be seen at his times.

A	Annapolis, U.S. (MLP ref)
AC	Mariner's Museum, Newport News, Virginia; U. S. (MLP ref.)
AGI	Archivo General da Indias, Seville, Spain
AHM	Amsterdams Historisch Museum, The Netherlands
Akershus Slot	Arkershus Castle, Oslo, Norway (outside)
Akershus Slot Museum	Arkershus Castle, Oslo, Norway (inside)
Albany	Albany, U.S. (MLP ref.)
Altes Zeughaus	Kantonales Museum Altes Zeughaus, Solothurn, Switzerland
Amsterdam	Probably for Rijksmuseum Amsterdam, The Netherlands (MLP ref.)
Amsterdam Scheepvaart	Het Scheevaart Museum, Amsterdam, The Netherlands
Armémuseum	Armémuseum Stockholm, Sweden
Bangso	Bongbomuseet, Frederilshavn, Denmark
Basle	Historisches Museum, Basle, Switzerland
Bayerisches Nationalmuseum	Bayerisches Nationalmuseum, Munich, Germany
Bayerisches Armeemuseum	Bayerisches Armeemuseum, Ingolstadt, Germany
Belém	Museu da Marinha, Belém, Lisbon, Portugal
Belfast	Ulster Museum, Belfast, Northern Ireland
BM	British Museum
Borgia Apts	Borgia Appartements, Vatican, Italy
Brest	Musée National de la Marine, Brest, France
Brussels, MRA	Musée Royal de l'Armée, Brussels, Belgium
Brussels Porte de Hal	Musée de la Porte de Hal, Brussels, Belgium
BUEI	Bermuda Underwater Exploration Institute.
C	<i>The Cannon Hall, Guide to the Royal Danish Arsenal Museum, Copenhagen 1948, Denmark (MLP ref.)</i>
CG	Capitán General
Chapultepec	Chapultepec Castle, Mexico City, Mexico D.F. (MLP ref.)
Char S.C.	Charleston, South Carolina (MLP ref.)
DAK	Danske Asiatic Kompagni (the Danish Asiatic Company)
Delft	Army Museum of the Netherlands, Delft, The Netherlands
DG	Director General
DHM	Deutsches Historisches Museum, Berlin, Germany
Doordrecht	Doordrecht Nederlands voor Geschiedenis en Kunst, Netherlands
Dover Castle	Castle of Dover, England
Draguignan	Musée de l'Artillerie, Draguignan, France
EA	Editor's album
EIC	See HEIC
Elburg	Elburg Museum, The Netherlands

Enk	Enkuizen Museum, The Netherlands
Enkuizen City Hall	Enkuizen City Hall, The Netherlands
Firepower	Firepower Museum, Woolwich, England
FMU	Forsvarsmuseet, Oslo, Norway
Fort Douglas	Fort Douglas, Salt Lake City, Parade Ground; U.S. (MLP ref.)
Ft. Niagara	Fort Niagara, U.S. (MLP ref.)
Ft. William Henry, NY	Fort William Henry, New York, U.S. (MLP ref.)
Geneva	Ancien Arsenal, Geneva, Switzerland
Gibraltar	Alameda Gardens, Gibraltar
GNM	Germanisches Nationalmuseum, Nuremberg, Germany
GRASP	Groupe de Recherche Archéologique Sous-marine Post-médiévale (Group for Underwater Post-Mediaeval Archaeological Research)
Graz	Landeszeughaus, Graz, Austria
GWIC	Geoctroyeerde West Indische Compagnie (the Chartered West India Company, the full name)
H	Havana, Cabana Port, Cuba (MLP ref.)
Havana, P. D. Armas	Havana..., Cuba (MLP ref.)
HEIC	Honourable East-India Company (English). Often called “The East India Company”
HGM	Heeresgeschichtliches Museum (Army History Museum, Vienna)
HMSO	Her Majesty’s Stationary Office
Horten	Martinemuseet, Horten, Denmark
IG	Inspector General
IMM	Internationales Maritimes Museum, Hamburg, Germany
Invalides	<i>Catalogue du Musée de l’Artillerie de Hôtel des Invalides, Paris, 1889</i> , France.
Inv.	Musée de l’Armée at the Invalides, Paris, France
Kaiserburg	Kaiserburg Museum, Nuremberg, Germany
Kronborg	Maritime Museum, Kronborg, Denmark
Kronborg Slot	Kronborg Castle at Elsinore, Denmark
La Neuveville	Musée d’Histoire de la Neuveville, Switzerland
Leiden	Leiden, The Netherlands (MLP ref.)
LGA	One of the so-called “Large Green Albums”
Lisbon, Castelo São Jorge	St. George Castle in Lisbon, Portugal
Lisbon or Lisbon MM	<i>Catálogo do Museu Militar (Antigo Museu da Artilharia)</i> , Lisboa, 1930, Portugal (MLP ref.)
Lisbon Marinha	Museu Marinha, Lisbon, Portugal
Lisbon, Museu do Combatente	Museu da Liga dos Combatentes in Lisbon, Portugal
M	<i>Catálogo General del Museo de Artillería</i> , Madrid, 1909, Spain (MLP ref.)
MA	Musée de l’Armée, Paris (Army Museum, Paris, at the “Invalides”)
Madrid	<i>Catálogo General del Museo de Artillería</i> , Madrid, 1909, Spain (MLP ref.); or Museo de Artillería Madrid, Spain (no longer exists)
MAH	Musée d’Art et d’Histoire, Geneva, Switzerland
MES	Marie-Eve Sténuit (assistant Editor)
MHG	Museum für Hamburgische Geschichte, Hamburg, Germany
MLP	Mendel Lazear Peterson
NMN	Norsk Maritimt Museum, Oslo, Norway
MM	Mariner’s Museum, Newport News, Virginia, U.S.
MNMP	Musée National de la Marine, Paris, France
MNF	Museo Nazionale, Florence, Italy

Monaco	Palais Princier, Monaco
Monjuïc	Museu Militar del Castell de Monjuïc, Barcelona, Spain
MPP	Museo Poldi Pezzoli, Milan, Italy
Munic or Munich	Munich (MLP ref.), probably the today Bayerisches Nationalmuseum, Germany
Nassau Water Tower	Bahamas (MLP ref.)
Newburg or Newburg NY	Newburg, New York, U.S. (MLP ref.)
Nice	Musée National de la Marine, Nice, France
NMA Edinburgh	National Museum of Antiquities, Edinburgh, Scotland
NMN	Norsk Maritimt Museum, Oslo, Norway
No MLP ref.	Means that a photo of the inscription has been found in the MLP's archives, but was not referenced and the editor has not been able to identify the cannon that bears it
Nurnburg	Nuremberg, Germany (MLP ref)
NWP	Naval Weapon Plant (Gun Factory), Washington D.C.
Oslo	Oslo, Norway (MLP ref.)
P	Paris, Hôtel des Invalides, France (MLP ref.)
P au P	Port au Prince, Haiti (the Citadel) (MLP ref.)
PNY	Portsmouth, Va. Navy Yard, U.S. (MLP ref.)
Port-Louis	Musée National de la Marine, Port-Louis, France
PRO	Public Record Office
Q	Quebec, Canada
RA	Royal Armouries (at the Tower of London)
Rijksmuseum	Rijksmuseum, Amsterdam, The Netherlands
Rochefort	Musée National de la Marine, Rochefort, France
Rome	Museo della Infanteria, Roma, Italy
Rotunda, Woolwich	<i>Official Catalogue of the Museum of Artillery in the Rotunda</i> , Woolwich, London, 1906, England
Royal Danish Arsenal Museum	<i>The Cannon Hall, Guide to the Royal Danish Arsenal Museum</i> , Copenhagen 1948 (sometimes erroneously referenced by MLP as "Royal Danish Artillery Museum"), Denmark
RS	Robert Pierre André Sténuit (Editor)
SAMA	Revue de la Société des Amis du Musée de l'Armée (the Magazine of the Society of the Friends of the Army Museum, Paris, issued since 1909)
Saratoga	Saratoga, U.S. (MLP ref.)
Segovia	Museo Espécifico de la Academia de Artillería, Segovia, Spain
Sevilla, MHMR	Seville, Museo Histórico Militar Regional, Spain
SFHM	Statens Forsvarshistoriske Museum / Orlog Museum, Germany
SGA	One of the so-called "Small Green Albums"
SI	The Smithsonian Institution (Washington DC)
Solothurn	Artillerie Museum, Solothurn, Switzerland
SPM	Shockland Polder Museum, The Netherlands
St. Augustine	Castillo de San Marcos in St. Augustine, Florida
St. George, Bermuda	St. George Fort in Bermuda (MLP ref.)
Stockholm	Sjöhistoriska Museet (Maritime Museum), Stockholm, Sweden
TG	Teniente General
Ti or T	Ticonderoga, U.S. (MLP ref.)
Tøjhmuseet	Tøjhmuseet (National Museum of Military History), former Royal Danish Arsenal Museum, Copenhagen, Denmark
Toledo	Museo del Ejército in Toledo, Spain
Torre del Oro	Museo Marítimo Torre del Oro, Seville, Spain



Toulon Tower	Musée National de la Marine, Toulon, France The White Tower, also called “The Keep”, which houses the Royal Armouries, The United Kingdom’s National Museum of Arms and Armours, London, England
TT	Teddy Tucker (Edward B. Tucker)
Tudor House	Tudor House Museum, Southampton, England
Turin	Museo Nazionale d’Artiglieria, Torino, Italy (MLP ref.)
UEI	English United East India Company. The East India Company, as it was commonly called, was officially chartered by Queen Elisabeth I in 1600 as “The Governor and Company of Merchants of London Trading into the East Indies”. This Company, in 1709, merged with a competitor, another company trading to the East, to form “The United Company of Merchants of England Trading to the East Indies”, the official name until 1858, when the “India Act” put the whole of India in the British Empire and saw the end of the Company. The “East India Company” was also called “The Honourable Company” and, more commonly, “John Company” (origin of the nickname uncertain but note that the Dutch United East India Company, the VOC, was commonly called “Jan Compagnie”).
USMA	US Military Academy Museum : <i>Catalogue of the US Military Academy Museum</i> , West Point – New York, 1944 (MLP ref.)
USMR Coll.	?, U.S. (MLP ref.)
USNM	National Museum Collection, Washington, DC, U.S. (MLP ref.)
Vasamuseet	Vasamuseet, Stockholm, Sweden
Vaud	Musée Militaire Vaudois – Château de Morges, Morges, Switzerland
Venice or Venice	Venice Historic Naval Museum, Italy (MLP ref.)
Vienna	Heeresgeschichtliches Museum, Vienna, Austria
Vincennes	Service Historique de la Défense, Vincennes, France
VOC	Vereenigde Oost-Indische Compagnie, the Dutch United East India Company (full name: “Geocroyeerde Nederlandsche Vereenichte Oost-Indische Compagnie”)
W or Woolwich	<i>Official Catalogue of the Museum of Artillery in the Rotunda</i> , Woolwich, London, 1906, England (MLP ref.)
WGF	Washington Gun Factory, Washibngton DC, U.S.
WIC	West Indische Compagnie (the West India Company)
Windsor	Windsor Castle, England
WP or West Point, NY	Collections of the US Military Academy Museum at West Point, U.S. (MLP ref.)
Yorktown	National Historical Park, Yorktown, U.S.
Zurich	Schweizerisches Landesmuseum, Zurich, Switzerland

## THE ANNEXED DOCUMENTS. A GENERAL INTRODUCTION

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The information that follows has been concentrated in printed form, for the greater convenience of the viewer of the digitalized version of the photo albums and of the Encyclopaedia, when in search of a translation or of a chronological, historical or geographical reference.

When a cannon or a mortar, etc., is not dated, but bears the name and/or arms, symbol, or motto, etc. of the ruler then on the throne or of the authority in power, or of the “grand master of the artillery” (or corresponding officer), or the founder’s name, and if the period of the reign, or of the activity of the “grand master” or of the founder, are known, then the piece can be approximately dated.

The following lists contain the necessary chronological landmarks in the form of the periods of activity of the most important princes, masters of artillery and founders.



## MOTTOS ON CANNONS

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In alphabetic order

A DEO VICTORIA

Victory for God (Bern)

A REGE ET VICTORIA

For the King (of Spain) and for Victory

AUSPICIO REGIS ET SENATUS ANGLIAE

Under the Auspices of the King and Senate of England (motto of the The English United East India Company)

CAROLUS EDGARI SCEPTRUM STABILIVIT AQUARUM

Charles (of England) hath established/imposed Edgar's Sceptre on the Waters

CAROLUS UNUM EST SECUNDUM NON HABET

Charles (the First of Spain) is Unique and has no Second

CIVITAS VERIE

City of Veere (in the Northern Netherlands)

CONFLICTUS LAUDE CORONO

I crown the Fight with Glory

DEO ET JUSTAE CAUSAE

For God and Just Cause (motto of Frederik VI of Denmark)

DEUS ET PATRIA

God and Fatherland (motto of Christian VIII of Denmark)

DEO ET POPULO

For God and the People (motto of Christian VI of Denmark)

DIRIGE MEUM

[Jehovah] do Lead Me (motto of Christian IV of Denmark)

DOMINUS MIHI ADJUTOR

The Lord be my Helper (motto of Frederik IV of Denmark)

DOMINUS / DEUS PROVIDEBIT

The Lord be my Providence (motto of Frederik III of Denmark)

FORTIS CADERE, CEDERE NON POTEST

The Brave may fall, but never yield (motto around the arms of the Earl of Drogheda, England, late 18<sup>th</sup> c.)



FUGITE A ME OMNES QUIA PRECEPTUM MEI DOMINI FACIO  
Flee all away from me for I act upon the Order of my Lord

GLORIA EX AMORE PATRIAE  
Glory through the Love of Fatherland (motto of Christian VII of Denmark)

HAEC GENERI INCREMENTA FIDES  
Fidelity hath won these Honours for our Race (motto of the Townshend family, England, 1778)

I.H.S.  
Contraction of “Ιησουζ” (Jesus in Greek)

INVINCIBILIS  
Invincible

IN VIRTUTE DEI NOMINE QUO FACTUM INVICTUM MANEBO  
I shall remain undefeated by Bravery in the Name of God by whom I have been created

JEHOVA DIRIGE COR MEUM  
Lord, lead my Heart (motto of Christian IV of Denmark)

LIBERALITATE OPTIMI  
By the Benevolence of the Best One

LUCTOR ET EMERGO  
I fight and I triumph

NEC PLURIBUS IMPAR  
Not an equal match for numbers (motto of “The Sun King”, King Louis XIV of France)

NEMO ME IMPUNE LACESSIT  
Nobody defies me without impunity

NON SOLIS RADIOS SED JOVIS FULMINA MITTO  
I bring not only the Rays of the Sun but the Thunder of Jupiter

NUTRISCO ET EXTINGO  
I nourish and extinguish (motto of King of France François I)

PARCERE SUBJECTIS  
Save the weak Persons

PER ASPERA AD ASTRA  
Though Difficulties to the Stars

PIETATE ET JUSTITIA  
With Piety and Justice (motto of Christian V of Denmark)

PLURIBUS NEC IMPAR

Equal to no Others

POST TENEBRAS LUX

Light after Darkness (above arms of the Geneva Republic on guns 17<sup>th</sup>-18<sup>th</sup> centuries)

PRO GLORIA ET PATRIA

For Glory and Fatherland (motto of Frederik II of Prussia, 1740-1786)

PRUDENTIA ET CONSTANTIA

By Prudence and Constancy (motto of Frederik V of Denmark)

QUO FATA VOCANT

Whiter/Wherever the Fates call/Whiter Destiny takes me (motto of the Earl of Romney, Master of Ordnance, 1695, England)

R. F. P. = REGNA FIRMAT PIETAS

Piety strengthens the Realms (motto of Christian IV of Denmark)

REPELLAT NON PETAT HOSTEM

To drive back the Enemy, not to attack him.

RES PARVAE CONCORDIA CRESCUNT

With Concord small Things grow great

SANCTA BARBARA, CATHOLICIS BARBARA

Saint Barbara, Universal Barbara

S.P.Q.P. = SENATUS POPULUSQUE PALERMITANNO

The Senate and the People of Palermo

SERVATUR IMPERIUM

On the (Spanish) Empire's Service

SPECTEMUR AGENDO

Let us be judged by our Acts

SPES PACIS IN ARMIS

The Hope for Peace in the Arms (on the city of Bern coat of arms)

TANDEM BONA CAUSA TRIUMPHAT

Finally the Good Cause is Victorious (motto of the gun foundry of Frederiksværk, Denmark)

TRIA IUNCTA IN UNO

Three joined in One

ULTIMA RATIO JUSTITIAE

The Final Argument of Justice.

Found on a gun cast for Dom Pedro, Prince and, at the time, Regent of Portugal.

ULTIMA RATIO REGIS

The Final Argument of the King.

Found on some guns made for King Frederik II (1740-1786) of Prussia.

ULTIMA RATIO REGUM

The Final Argument of the Kings.

First moulded on the bronze guns of Louis XIV (of France), then of all successive reigns.

Also on guns of the Dukes of Savoy (17<sup>th</sup>-18<sup>th</sup> centuries).

VEDI VERA DOMI

Contemplate the Truth of the Lord

V.D.M.I.Æ. = VERBUM DOMINI MANET IN ÆTERNUM

The Word of God lasts for ever

VIDE MIRA DOMINI

See the Wonder of the Lord

VIGILATE DEO CONFIDENTES

Watch yourself and Trust in God

VIOLATI FULMINA REGIS

The offended King's Thunderbolt

VIRTUTIS AD NAMURGAM PREMIUM

A Reward for Bravery at Namur (refers to the capture of Namur by William III of England in 1695)



## LIST OF MAJOR EUROPEAN AND AMERICAN CANNON FOUNDERS

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### In alphabetic order

Name	Function, place(s) and period of practice; <i>date of some attested or surviving cannons</i>
Abasce, Khuda	Gun-founder, England; <i>1747</i>
Achamer, Johann	Gun-founder in Vienna; <i>1710</i>
Adams, Jacob	Gun-founder in Woolwich active in 1779
Adant, Jacob	Gun-founder in Damme; <i>1431</i>
Agar or Agaut or Hagar	Master founder to Henri III, France, 1574-1585
Agniel(s), Claude	Gun-founder in Lyons 1521-1527
Agostini or Agostino Nicolo	Gun-founder to Pius II in Piacenza 1461-1462 (or 1469?)
Aker works	A foundry in Sweden, active in the 18 <sup>th</sup> and 19 <sup>th</sup> centuries, owned by Gustav Kierman. Furnished guns for the Danish Navy.
Albenga, Giorgio	Master founder to the Duke of Mantua, in Casale and Ferrara 1588-1601 (pupil of Jean of Bologne), cast also the doors of Ferrara Cathedral
Albergetti or Alberghetti	
– Alberghetto I de Dandoli	Gun-founder in Ferrara 1487-1497
– Alberghetto II	1510-1541
– Alberghetto III	1578
– Alessandron	?
– Antonio	Gun-founder in Venice; <i>1684</i>
– Antonio Angelo	1788
– Battista (Zuanne)	Gun-founder to the Grand Duke of Tuscany 1549-1609
– Camillo	Gun-founder; <i>1527</i>
– Carlo I	Gun-founder in Venice 1669-1671
– Carlo II	Gun-founder in Venice; <i>1695, 1699</i>
– Carlo III	<i>1720</i>
– Carlo IV	<i>1782</i>
– Cesare	1547-1603
– Domenico	?
– Emilio	<i>1542</i>
– Ercole	<i>1565</i>
– Fabio	<i>1522</i>
– Francesco	<i>1829</i>
– Galeacius or Galeazzo	<i>1522</i>
– Geronimo or Hieronymus	Gun-founder; <i>1543, 1565</i>
– Giacomo	<i>1792</i>
– Gian Francesco	<i>1672</i>
– Giovanni (Zanin)	<i>1507</i>
– Giovanni	<i>1573</i>
– Giovanni Battista I	?

– Giovanni Battista II	Gun-founder in Venice; 1708, 1709, 1711
– Giovanni Battista (III?)	1770-1803
– Giulio	Gun-founder in Venice, 1616
– Giust Emilio I	?
– Giust Emilio II	1666-1755
– Giust Emilio III	1722
– Ippolito	?
– Orazio	1599
– Orazio Antonio	1700
– Paolo	1567
– Sigismondo I	1487-1550
– Sigismondo II	1534-1610
– Sigismondo III	Gun-founder in Venice, came and studied artillery in England, author of <i>Artilleria Veneta</i> ; 1636, 1684
– Sigismondo IV	1702
– Sigismondo V	1722
– Virginio	1570
Aldgate, William of	Gun-founder in London 1353-1360
Algei(e)r, Valentin	Gun-founder in Ulm 17 <sup>th</sup> century
Alonzo, Felipe	Gun-founder in Spain, worked with Bernardo Antonio Guerrero; 1781
Amelle, de Luchon	See Luchon
Ammeroy, Cornelius	Gun-founder in the Netherlands, active in 1602
Ancher, Erich	Owner of the gun foundry of Moss Iron-Works (with Waern), Norway, 1750-1760; 1755, 1760
Anciola, D. Manuel de	Owner of an iron foundry in Tagollaga (near Hernani, in the Province of Guipuscoa); maker of wrought-iron pieces; 1767, 1769
Andrieu, Simon	Gun-founder in Lille 1467; 1473
Anes, Francisco	Gun-founder in India, a Portuguese; 1515
Anselot	Gun-founder in Cambrai; 1401
Anthonisz., Coenraad	Gun-founder in The Hague 1591-1616; 1592
Antoine, Maximilien	Gun-founder in Namur; 1744
Anton & Waern	Owners of the Moss Work in Norway; 1756, 1760, 1761
Appenzeller, Hans	Gun-founder in Innsbruck 1499, introduced new methods of casting
Aran, Johann von	Gun-founder in Augsburg 14 <sup>th</sup> century, cast 20 pieces of brass with hollow iron bullets
Aranha, Francisco José	Gun-founder in Lisbon 19 <sup>th</sup> century
Arcanis or Arcana Cesenen de	Gun-founder family to Henry VIII in Salisbury place, south of Fleet Street, London, 1523-1542
– Arcanus (= Archangel?)	Gun-founder; 1542
– Archangel or Arcangelo	Gun-founder; 1542
– Franciscus	Gun-founder, Inspector of Mines in 1523; 1529, 1535
– Raphael	Gun-founder
Armstrong, Sir W.G. & C <sup>o</sup>	Gun-founder in England, active 1864
Arnoldus, Fredericus	Gun-founder in Germany (Fulda); 1630
Artis, Savarse	Gun-founder in London; 1514
Astarita, Dominicò	Gun-founder in Naples; 1692, 1693
Atkinson	See Muir & Atkinson

Aubert, André	Gun-founder in Angers; <i>1488</i>
Babel, Pierre	Gun-founder in Amiens; <i>1516</i>
Bacon, Anthony	Gun-founder in Woolwich in 1774-1782
Bader, Michel	Gun-founder in Stockholm; <i>1494</i>
Bagala	Gun-founder in Spain; <i>1520</i>
Bagley, Matthew	Gun-founder under Queen Ann, England, from a family of bell-founders at Chacombe, Northants, Director and owner of the foundry at Moorfields, London, (killed by the bursting of a gun mould in May 1716) ; <i>1706</i>
Bagot, Guillaume	Gun-founder in Paris, Artilleur to François I; <i>1537</i>
Baghshaw	Worked with Harrison & Co
Baier, Michael	Gun-founder in Nuremberg 1566-1575
Bailey Pegg & Company	A gun-foundry in London, active 1812-1840
Bajar, Jean	Gun-founder in Mons; <i>1741</i>
Baker, John	Active in 1574 in England
Baker, Sir Richard	Active in 1574 in England
Bakers (brothers)	Gun-founders in Mayfield, Sussex 1617-1664
Bal(l)ard, Laurent	Gun-founder in Brisach; <i>1676</i>
Baldnerus, Oswaldus	Gun-founder in Nuremberg; <i>1557</i>
Ballesteros	
– Fernando	Gun-founder in Lisbon; <i>1604, 1625</i>
– Francis	Gun-founder in Malaga; <i>1622</i>
– Sebastianus	Gun-founder in Malaga; <i>1609</i>
Balthasard, Jean	Gun-founder in Nancy; <i>1556</i>
Balthazar (= Herold Balthasar?)	Gun-founder in Vienna in 1681
Bande, Jorge	Gun-founder from Luxembourg, worked in Liérganes (Spain); <i>1629</i> and in La Cavada (Spain); <i>1640</i>
Baptista or Baptiste	Gun-founder in Arbe and Ragusa 1506-1537, Director of the Ragusa Arsenal; <i>1524</i>
Barbafaut	Gun-founder in Abbeville; <i>1438</i>
Barbara, Alonzo	Gun-founder in Spain; <i>1477</i>
Barbet, Jehan	Gun-founder in Lyons, “Canonier du Roi”; <i>1507</i>
Barnola, Joseph	Gun-founder in Barcelona 1738-1774; <i>1738, 1742, 1743, 1744, 1746, 1750, 1756, 1762, 1772, 1774</i>
Barre, Pierre	Gun-founder in Paris, “Canonier du Roi”; <i>1536</i>
Barrozzi, Giacinto	Gun-founder in Vignola 1555-1581, inventor of a seven-barrel gun weighing 500lb.
Bartels, C. E.	Gun-founder in Hanover; <i>1788, 1794</i>
Bartolomeo or Bartolomeus	Gun-founder in Malaga c. 1560
Baude, Jean	Director of the foundry of the French Army in Narbonne, then Master founder for the French Navy in Toulon 1669; <i>1670, 1677</i>
Baude, Pierre or Peter (alias Bawood)	Gun-founder at Houndsditch, London 1528-1546, also a bell-founder (Sutton Place, Woking 1530)
Baum, Moller v.	Master of Gunnery of Hamburg (one of five); <i>1662</i>
Bauzon, André de	Gun-founder in Nîmes (iron guns); <i>1363</i>
Beckmann, Lukas	Master of Gunnery of Hamburg (one of five); <i>1721</i>
Bedford, John	Gun-founder in England (iron guns), c. 1780
Bennin(c)k or Benningk	



– Albrecht	Royal gun-founder in Lübeck 1662-1685 then in Copenhagen 1692-1695; <i>1662, 1679, 1687, 1692</i>
– Gerdt	Gun-founder in Dantzig; <i>1617</i>
– Hermann	Gun-founder in Denmark and in Lubec (1643), may have worked at Amsterdam and Hamburg as well; <i>1643, 1662</i>
– Mattias	Gun-founder in Lübeck; <i>1564</i>
Bento Afonso, Fr.	Gun-founder in Portugal; <i>1750</i>
Beradine, Pierre	Gun-founder in Bourg-en-Bresse; <i>1448</i>
Bercan, Anthoine (alias Berquen), Anthony	Gun-founder in Breisach 1691, then in Strasbourg 1714-1737, Commissioner of the King's foundry; <i>1714, 1730, 1735, 1737</i>
Berchner, Ulla	Owner of the gun foundry of Stafsiø (his personal mark, "VB", used long after his death); <i>1691, 1694, 1695, 1697, 1699, 1705, 1731, 1804</i>
Berenger	
– Claude de la Falize	Gun-founder in Douai, Commissioner of the King's foundry 1696; <i>1702, 1704, 1706, 1708, 1714, 1716</i>
– François Simon	Gun-founder in Douai 1738-1795, Commissioner of the King's foundry, remoulded the Strasbourg Arsenal 1757, installed hydraulic forge at Douai 1793, dismissed by the Revolutionary Tribunal 1793, reinstated 1795
– J.	Gun-founder in Douai; <i>1755, 1757, 1759, 1779, 1788</i>
– Jean Theophile de la Periere	Gun-founder in Douai 1801-1819, last Commissioner of the King's foundry; <i>1807, 1813</i>
– Jean-François	Son of François-Simon, gun-founder in Strasbourg; <i>1756, 1758</i>
– Nicolas	Gun-founder in Douai 1723-1738, Commissioner of the King's foundry
– T.	Gun-founder in Douai; <i>1756</i>
Berger or Borgerinck or Berguerinx or Borguerinck or Bergherinck, Lambert(o)	Gun-founder in Dunkirk 1656; <i>1638</i> . Also in Brussels; <i>1672</i>
Berinc(?), J.	Gun-founder for the French India Company, 18 <sup>th</sup> century
Bernadon	Gun-founder in St. Malo; <i>1495</i>
Bernard	
– Claude	Gun-founder in Paris 17 <sup>th</sup> century
– Guillaume	Gun-founder in Dijon; <i>1521</i>
Bernardino, Antonio	Gun-founder in Florence 1497-1512
Berquen, Anthony	See Bercan
Berti, Carlo Francesco	Gun-founder; <i>1711</i>
Besche, Abraham	Gun-founder in Burgundy 1666-1671
Beseler	Caster in Rendsburg, Denmark; <i>1756</i>
Betem, Martin	Gun-founder in Malines; <i>1538</i>
Beten, Martin	Gun-founder in Hesse 1525-1547
Bevyn, Hubert	Gun-founder in Ypres; <i>1583</i>
Bianco	
– Biaggio	Gun-founder in Pavia; <i>1808, 1809, 1810</i>
– Francesco	Gun-founder in Turin; <i>1793</i>
– G. Antonio	Gun-founder in Turin; <i>1785</i>
– Gian Battista	Gun-founder in Genoa; <i>1780</i>

Blakely, Theophilus Alexander	A Captain, designer of muzzle-loading cannons for the British army, also used by the Confederate States of American during the American Civil War; <i>1861, 1863</i>
Boca(r)ro (see also Dias-Boccaro)	
– Manuel Tavares	Gun-founder in Macau (1625-1664), a Portuguese; <i>1640, 1647, 1681</i>
– Jeronymo Tavares	Master founder in 1674. The son of Manuel Tavares
Bolwerk Nucella & Co	Gun-founders in Sweden c. 1759
Borchardt	
– ? & Steen	(See Steen)
– Johan	Gun-founder; <i>1715</i>
Borchart	Royal gun-founder 1588-1603 in the old St. Klara Monastery in Møntergade, Denmark; <i>1604, 1609</i>
Borgerinck, Lamberto	See Berger
Borgognoni/e	
– Annibale	Gun-founder in Ferrare 16 <sup>th</sup> century; <i>1555, 1560, 1561, 1565, 1580</i>
– Oderico	Founder, brother of Annibale
Borchartsen, Rolf	Royal gun-founder in Denmark 1616 (or 19?)-1624; <i>1623</i>
Borthwick, Robert	Gun-founder in Edinburgh c. 1470, Master of Artillery to James IV of Scotland, cast train of guns called “Seven Sisters”
Botch, Christophe	Gun-founder in Tyrol; <i>1570</i>
Both family	Gun-founders active in Utrecht from 1590 to 1825
– Gerard	Gun-founder in Utrecht; <i>1600</i>
– Thomas	Gun-founder in Utrecht 1570-1584; <i>1584</i>
– Willem	Gun-founder in Utrecht
Bouverie, Joseph	Gun-founder in Namur; <i>1734</i>
Bouchard (brothers)	Gun-founders in Tours and Orleans 1417-1451, cast great bombards of 370lbs. to 1,067lbs.
Bouchart	Gun-founder in 1604
Boug(n)ero or Bouquero	Gun-founder, Commissioner of the King’s foundry in Douai 1793-1795 then in Turin 1803-1808; <i>1795 (An III), 1807, 1808</i>
Bourne & Co	Gun-founders in England active in 1774-1775
Boury, Smith	Gun-founder (?) in Lyons; <i>1793</i>
Bowen, William	Gun-founder in Woolwich 1742-1764; <i>1742, 1756, 1760, 1761, 1764</i>
Bowling	Gun-founder in England 1800-1820 (iron)
Bow(y)er, John & Henry	Gun-founders in Hartfield, Sussex 1513-1538
Boyarro, Manuel Tavaris (+ Boccaro?)	Gun-founder in Portugal; <i>1647</i>
Brazier, John	Gun-founder in Cornhill, London 1361
Brézin, Michel	Director of the foundry of the Arsenal in Paris in 1796; <i>1812</i>
Bright, Richard	Gun-founder in England, active in 1778
Brodie, Alexander	Gun-founder on the river Severn, England, active early 19 <sup>th</sup> century
Browne	
– George	Gunner at the Tower, London 1517, maker of iron shot
– George	King’s gun-founder in Horsmonden, Kent 1613-1681
– John	King’s gun-founder under Charles I in Brenchley, Kent, and

– Thomas	Imbhams, Surrey 1613; <i>1638, 1640</i>
– William	Gun-founder in Ashurst, Sussex 1589-1613
Bruges, Peter of	Gun-founder in London; <i>1512</i> Gun-founder in Bruges in 1346, Master Armourer to Edward III, provided guns for the English at Tournai
Bullen, George	Active in 1574 in England
Burgerhuys	
– Johannes	Gun-founder in Middelburgh (?-1679), worked with Arent Vander Put; <i>1616, 1678</i>
– Michael	Gun-founder in Middleburgh; <i>1616, 1630</i>
Burkart or Burcharts, Rudolph (same as Borrchartsen, Rolf ?)	Gun-founder in Denmark 1623-1644; <i>1623</i>
Burting	
– Peter	Owner of the Fossum Iron-Works 1669-1702; <i>1692</i>
– C.	Owner of the Fossum Iron-Works after 1702
Bustindui, José Ignacio	Examining master (“maestro examinador”) and founder in Spain; <i>1840</i>
Butler, John	Gun-founder in Fernhurst, Sussex 1762-1776
Byker, William	Gun-founder in London 1382-1388, “Artillator” and maker of guns in the Tower
Calabrese, Angelo	Gun-founder in Ferrara; <i>1535</i>
Calleffi, Ercole	Gun-founder to François II, in Italy c. 1680
Caltoff, Caspar	See Kaltoff
Cambier, Jehan	Gun-founder in Mons and Tournai 1438-1439 and 1451
Campi	
– Bartolomeo	Gun-founder in Pesaro 1557-1558
– Jacopo	Gun-founder in Florence 1555, produced a great gun that could be taken to pieces for transport
Capon, Lesteur	Gun-founder in Avignon 1790-1806
Car(r)on works	Falkrik 1759-present day, produced iron guns, 3-to 41-pounders and the famous “Carronade”
Carpenter, John	Active in 1574 in England
Casses, Frances	Founder in Spain; <i>1679</i>
Castellano, Diego de	Gun-founder in Lisbon; <i>1589</i>
Castner, Johann Michael	Gun-founder in Vienna 1731-1739
Castronova or Castronomo or Costronoma or Costronovo	
– Francis or Francesco	Gun-founder in Naples and Palermo 1741-1759; <i>1741</i>
– Hieronimus or Jerome	Gun-founder in Naples; <i>1736, 1745, 1757, 1759</i>
– Vincenzo	Gun-founder in Palermo; <i>1718</i>
Cauthals (family)	Beside guns, this family produced fine bronze work, including the Crucifix on the Great Bridge at Malines
– Bartholome(w)	Gun-founder in Malines 1694-1722 (or 1661-1721?)
– J[e]an II and II (Father & son)	Gun-founders in Malines 1607-1686; <i>1643, 1647, 1683</i>
– Seghers	Gun-founder in Malines; <i>1689</i>
Cebrano or Cebranus	
– A. (or Gian) Battista	Gun-founder in Italy; <i>1740, 1741, 1758, 1759</i>
– Fran. Ant.	Gun-founder in Italy; <i>1736</i>
Cenni,	
– Cosimo or Cosma	Gun-founder to the Grand Duke of Florence, produced, inter



– Ioanis Mario or Giovanni Maria	alia, over 12 half-culverins from 1619 to 1670; <i>1643</i> Gun-founder to the Grand Duke of Florence; <i>1657, 1664, 1670</i>
Censori or Censon	
– Anchise	Gun-founder in the Italian Peninsula, 17 <sup>th</sup> century
– Giovanni Battista	Gun-founder in Bologna and Ferrare; <i>1579, 1617</i>
– Hieronymus	Gun-founder in Naples; <i>1736, 1745</i>
Challoner Nynyan	Active in 1574 in England
Chaspel or Chaspal	Gun-founder in Vienna; <i>1761</i>
Chatellan or Chatelet	Gun-founder in Montauban; <i>1795</i>
Chauvin, Pierre	Gun-founder in Courtray (?) in 1401
Chollet	
– Jehan	Master of the Artillery of Louis XI, in Chartres; <i>1478</i>
– Nicolas	Gun-founder in Chartres
Churchill	Gun-founders at Woolwich active 1756-1762
Classen, General J.F.	Founder general in Frederiksværk, Denmark 1756-?; <i>1757, 1762, 1764, 1766</i>
Claus, Meister	Gun-founder c. 1600
Collard, Joseph	Gun-founder in Dinant in 1389
Collebaut Colart	Gun-founder in Binche 1406-1408
Collen	
– Peter van	Gun-founder in Cologne and London; <i>1543</i> , associated with Peter Baude, introduced explosive shells
– Thomas	Active in 1574 in England
Colleng, William	Gun-founder in Woolwich, active 1782-1783
Collins, Stephen	Active in 1574 in England
Conti (di)	
– Francesco I	<i>1480</i>
– Francesco II	?
– Iacopo	Gun-founder in Venice; <i>1536</i>
– Marco I	Gun-founder in Venice; <i>1538</i>
– Marco II	?
– Marc'Antonio I	?
– Marc'Antonio II	<i>1680</i>
– Nicoló I	<i>1556</i>
– Nicoló II	?
– Nicoló III	<i>1702</i>
– Tomaso	<i>1537</i>
– Vincenzo	?
– Zuan Marco	?
Cookson, John	Gun-founder at Woolwich, active 1776-1783
Cordeiro, Luis Candido	Gun-founder in Portugal; <i>1771</i>
Cordwell, Samuel	Gun-founder in London 1636, the King's gun-stone and gunpowder maker
Cornel(l)is, John	Gun-founder in London; <i>1571</i>
Cornwall, John	Gun-founder in London in 1361
Costa	
– Bartholomeu da	Engineer, gun-founder, a Portuguese; <i>1773</i>
– Salvador	Gun-founder in Portuguese colonies 17 <sup>th</sup> century?

Cupito, Giovanni Maria	Gun-founder from Messina; <i>1610</i>
Curtius, Jean (alias Curcio, Juan)	From Liège, created and worked in the foundry of Liérganes (Spain) 1616-1629
Coulson	See Jukes
Coutur or Coltura, Giovanni	Gun-founder from Avignon, worked for the Duke of Farnese 1555-1560
Crans	
– Adrianus	Master gun-founder at The Hague 1730-1745; <i>1734</i>
– Cyprianus or Cipriaen Iansz	Gun-founder in Amsterdam; <i>1736, 1740, 1743, 1748</i>
Crantz, Jan	Master founder at the Great Gun Foundry at The Hague 1724-?
Cranz or Crans	
– Jan	Master founder at The Hague foundry 1754-?
– Cornelis	Master founder at The Hague 1745–1754; <i>1748</i>
Crawshay, Richard	Gun-founder in England, active 1784
Craymer, Henry	Gunner at the Tower (died 1509), succeeded by Humphrey Walker
Crewz, Mathias	Gun-founder in Vienna; <i>1747</i>
Crowe, Sir Sackville	Gun-founder at Maresfield Furnace, Sussex 1620-1627
Crowley & Co	Gun-founders at Woolwich active 1756-175
D	Gun-founder in England (iron guns); <i>1781</i>
Daneels, Robrecht	Gun-founder in Ghent; <i>1606</i>
Dartain (d'Artein or Dartien)	
– I. Felix III	General Commissioner of the Foundries of Strasbourg; <i>1782</i>
– Jean Baptiste	Gun-founder in Strasbourg, Superintendent of the Foundries of the Artillery in Paris 1778; <i>1767, 1769, 1773, 1775, 1777, 1778, 1779, 1781, 1782, 1786, 1794</i>
d'Auxy	Flemish family, owner of gun foundry in Mons, active in the late 15 <sup>th</sup> century
Debio	Gun-founder in Palermo; <i>1570</i>
Derck, Jan Nicolaas	Gun-founder in Hoorn (1690-c.1764); <i>1765</i>
Devalens, Barnard	Gun-founder at St. Katherine's, London; <i>1540</i>
Dias	
– João	Gun-founder; <i>1549</i>
– Lucas Manoel	Gun-founder in Lisbon; <i>1659</i>
Dias-Boccaro (family)	A dynasty of Portuguese gun-founders working in the Portuguese colonies in India and China, 16 <sup>th</sup> –17 <sup>th</sup> century
– Francisco	The son of Francisco Dias. Gun-founder (died 1587)
– Pedro	The son of Francisco Dias Boccaro). Master founder in Goa from 1588 to 1640; <i>1594, 1623</i>
Dietrich	
– Kasper	Gun-founder in Ingolstadt; <i>1556</i>
– P.F. or F.F	Gun-founder in Malines; <i>1760, 1761, 1765, 1795</i>
Dinant, Gilles de	Gun-founder in Brussels in 1381
Dinckelmaier, Hans	Gun-founder in Vienna in 1594
Djafer or Diafer	Gun-founder, instructor in Algiers in 1581
Dobler, Michel	Gun-founder in Vienna
Donicourt de Roucourt, Beranger	Gun-founder in The Hague (1738-1807), Commissioner of the foundries Douai; <i>1746</i>
Dorino, Ioardo	Gun-founder from Genova, worked in Italy in 1553

Dormea, Segurano	Gun-founder in Genoa; <i>1586</i>
Dorpfel, Georg	Gun-founder in Nuremberg; <i>1694</i>
Dreffet	Gun-founder, active in 1813 (Switzerland?)
Duffyld, John	Active in 1574 in England
Dupont	
– François	Student gun-founder of the King of France in Rochefort; <i>1773</i> . Gun-founder in Algiers; <i>1775</i> . Superintendent of the foundries in Rochefort; <i>1790</i>
Dycke, Thomas	Active in 1574 in England
Eade & Wilton	Gun-founders in England (iron), active 1756-1781
Eardley-Wilmott, F.M.	Gun-founder in England (or the name of a Company?); <i>1857</i> , <i>1859</i>
Ehrencreutz, Jesper	Founder of the Erendhal Iron-Works in Sweden from 1689
Er(h)endal works	Foundry in Sweden, active in the 18 <sup>th</sup> century Furnished guns for the Danish Navy
Elingen, Berthold von	Gun-founder in Metz; <i>1473</i>
Ellys, Thomas	Active in 1574 in England
El-Mu'allim, C'afar	Gun founder in Algiers; <i>1581</i> (= Djafer?)
Elvyngton, Edward	Active in 1574 in England
Emery, Martin	Gun-founder from Colovray (or Colovrex); <i>1680</i>
Endorfer	
– Alexander	Gun-founder in Innsbruck, associated to Leonhard Maght; <i>1515</i>
– Georg	Gun-founder active in Austria in the 15 <sup>th</sup> c., one of the earliest gun-founders in bronze; <i>1404 or 1487 (?)</i>
Endtfelder, Hans Wolf	Gun-founder, <i>1603</i>
English & Co	Gun-founders in England, active 1771-1774
Ernst	
– A. B.	Gun-founder in Munich; <i>1731</i>
– Johannes Baptista	Gun-founder in Lindaw; <i>1708</i>
Escartim or Escartin,	
Lucas Mattias	Gun-founder in Lisbon; <i>1651, 1652, 1661, 1671</i>
Este, Alfonso di	Duke of Ferrara 1563-1597, called “Bombardiere”, made a gun named “Giulia” from debris of the statue of Pope Julius II by Michel Angelo, preserving only the head
Everhard, Michael	Gun-founder in Middelburg (Zeeland); <i>1764</i>
Everyfylde, John	Active in 1574 in England
Falize de la (see Bérenger)	
Farcy, Michel	Gun-founder in Dunkirk; <i>1643</i>
Faulkener, John	Active in 1574 in England
Faure	Gun-founder in Perpignan; <i>1750</i>
Favereau, Jehan	Gun-founder in St. Omer; <i>1438</i>
Ferkyn, John	Gun-founder in London; <i>1411</i>
Fermer or Farmer, Alexander	Gun-founder in Hamsel, Sussex 1567-1573 (or 1581)
Ferrera Gomes, Mel[chior?]	Gun-founder in Portugal; <i>1676</i>
Figar(i), Giacomo Maria	An Augustinian priest, gun-founder (?) active in Douai in the 18 <sup>th</sup> c., credited with the invention of the triple guns made by Berenger
Figueiras, Petrus Georgius	Gun-founder in Portugal; <i>1578</i>
Fispong works	Gun-foundry in Sweden, active in the 19 <sup>th</sup> century,



Flete, Simon	manufactured guns for the Danish Government. Gun-founder in London 1407, Keeper of the Wardrobe and Artillery
Flicher, Elias	Gun-founder 17 <sup>th</sup> century, worked in Poland
Follaire, Pierre	Gun-founder in Basle; <i>1445</i>
Fossum works	Gun-foundry in Norway, owned by Peter Burting, active 1669-1702.
Fowl(l)e, Nicholas	Gun-founder in Mayfield and Riverhall, Sussex 1573-1634
Framyme or Fremyme, G.	Gun-founder in Hungary; <i>1685</i>
Franciscus	Gun-founder in Barcelona; <i>1737</i>
Fransquin	
– Jacques	Gun-founder in Luxembourg 1729-1734
– Lambert	Gun-founder in Luxembourg and/or in Malines 1729-1744
Frederic, Charles	Inspector 1683-1689, under-master 1689-1690 at Copenhagen Arsenal, Denmark
Fr[e]isleva, Cristobal	Gun-founder in Ricla; <i>1557, 1565</i>
Fremy, Claude	Gun-founder in Amsterdam; <i>1685</i>
Frèrejean, frères	Gun-founders in Pont-de-Vaux and Rouen; <i>1794</i>
Frey, Martin	Gun-founder in Bavaria (Munchen) under Maximilian, 17 <sup>th</sup> century
Fuchs, Felix	Royal gun-founder in Copenhagen, Denmark 1626-1637; <i>1633</i>
Fuller John and family	Gun-founders at Waldron and Heathfield then in Brightling c. 1650-1787. They also made guns for Ireland, Sardinia and Naples (the Fuller mark was J.F. upon the trunnions); <i>1745</i>
Füssli or Fuesli	A dynasty of founders from Zurich, attested from 1450 to 1840
– Hans III	(1616-1684) Gun-founder in Zurich; <i>1678</i>
– Moriz	Gun-founder in Zurich; <i>1679, 1680, 1681</i>
G (for?)	Probably a founder's signature. Cast around touch hole on French cannons of the time of King Louis XII (r. 1498-1515) and of François I (r. 1515-1547)
Gamst, Hans Christensen	Gun-founder in Denmark; <i>1769</i>
Gardynner, John	Active in 1574 in England
Gaschlin, Lewis	From Douai, worked at Woolwich with Schalch, his uncle, 1716-1772
Gascoigne, Charles	Gun-founder in Falkirk 1769, co-inventor of the carronade (first called "Gasconade"). Manager at Carron 1769-1779. Founded gun foundries in Russia for Catherine the Great, Knight of the Order of St. Vladimir, General in the Russian Army and Counsellor to the Empress
Gedani, B. B.	Gun-founder, worked in Poland; <i>1716</i>
Gerardo, Juan	Gun-founder in Sevilla; <i>1661</i>
Gerber, Abraham	Gun-founder in Bern 1 <sup>st</sup> quarter of 18 <sup>th</sup> century
Gielis, Simon or Sijmoe	Gun-founder in Malines (and in Francort?); <i>1517, 1520, 1528</i>
Giles, Arnold	Gun-founder in St. Olaves, London 1541-1571
Gilpin, Richard	Gun-founder in Woolwich; <i>1756, 1760, 1762, 1770</i>
Giordani, Innocent	Gun-founder in Naples; <i>1607, 1642</i>
Giovanni, Antonio di	Gun-founder in Florence 1496-1500
Giovardi, Vincenzo	Gun-founder from Genova, worked for the Republic of Lucca

	1589-1618
Glydd, Thomas	Active in 1574 in England
Gnole Company	Active in Woolwich; <i>1776</i>
Godefroy, Gautier	Gun-founder in Liège; <i>1576</i>
Gomes de Oliveira, Luis	Gun-founder in Lisbon; <i>1699, 1707</i>
Gomez, Diego	Gun-founder in Spain; <i>1676</i>
Gor	
– Jacques	Commissioner of the King's foundry in Perpignan; <i>1738</i>
– Pierre	Commissioner of the King's foundry in Paris; <i>1750</i>
Gott, Samuel	Gun-founder in Bayham and Lamberhurst, Kent 1654-1700
Gotz, J.U.	Gun founder in Basle; <i>1756</i> .
Gratwicke	
– Roger	Active in 1574 in England
– Thomas	Active in 1574 in England
Grave	
– Antonies	Gun-founder in Denmark; <i>1559</i>
– Heyndrick de	Gun-founder in Ghent; <i>1685</i>
– Jean Albert de	Gun- and bell-founder in Amsterdam 1690-1720; <i>1720</i>
– D.	Gun-founder in Amsterdam; <i>1725</i>
Gresham, Sir Thomas	Gun-founder in Mayfield, Sussex; <i>1573, 1574</i>
Guerrero, Bernardo Antonio	Gun-founder in Spain, worked with Felipe Alonzo; <i>1781</i>
Guillaume	Gun-founder in Laon; <i>1358</i>
Guindertal, Johannes	Gun-founder at the Havre de Grâce; <i>1636</i>
Hall J & E	Gun manufacture in Dartford, active in 1844 (for Mexico)
Hallil, Leopold	Gun-founder in Vienna; <i>1714, 1717, 1723, 1726</i>
Hallut, Remy or Remigi de	Gun-founder in Malines 1534-1562, married the widow of Poppenruyter and became Director of the Malines foundry; <i>1547, 1551, 1553, 1561</i>
Harivel	Gun-founder in Modena; <i>1751, 1752</i>
Harrison	Gun-founder in Robertsbridge, Sussex 1734-1746
Harrison & Bagshaw	Gun-founders active at Woolwich (iron) in 1755-1756
Harrison & Co	Gun-founders at Woolwich 1760-1784; <i>1783</i>
Harrison and Legas	Gun-founders in Lamberhurst, Kent c. 1750
Harscamp, Henry de	Gun-founder in Namur; <i>1620</i>
Haubner, Christ	Gun-founder; <i>1689</i>
Hauptmann	Gun-founder in Switzerland; <i>1792</i>
Haye, Thomas	Active in 1574 in England
Heban	Gun-founder under the French Revolution
Heins, Johann Martin	Gun-founder in Hamburg; <i>1680</i>
Henckle James & Co	Gun-founders at Wandsworth, London, active early 19 <sup>th</sup> century
Henkell, James Jr	Gun-founder at Wandsworth 1783 (same as above?)
Hennequin, Jean-Baptiste	Gun-founder in Dunkirk; <i>1643</i>
Herman, Jacquere	Gun-founder in Ghent Castle; <i>1550</i>
Herold, Balthazar	Gun-founder in Nuremberg and Vienna 1615-1663
Heroldt, Andreas	Gun-founder in Dresden; <i>1650</i>
Heuwin	
– Georges	Gun-founder in Bourbourg; <i>1588</i>
– Obert	Gun-founder in Bourbourg; <i>1588</i>
– Philippes	Gun-founder in Bourbourg; <i>1588</i>

Hilger (von Breibergk), Martin or Merten	Gun-founder in Graz; <i>1579, 1580</i>
Hirder (zu Neupurg), Sebolt	Gun-founder in Germany (Nuremberg); <i>1524, 1534, 1546</i>
Hod(g)son Robert	Gun-founder in Pownsley, Sussex 1573-1574
Hoereken, Jehan	Gun-founder in Luxembourg; <i>1458</i>
Hogge	
– Bryan	Maker of gunpowder, Sussex; <i>1562</i>
– Ralph	Gun-founder in Sussex 1543-1588, gun-stone maker to the Queen and gun-founder to the Privy Council. Was associated with Peter Baude in casting the first iron gun in England
Holloway, Farrett	Gun-founder in Salehurst, Sussex; <i>1711</i>
Holtzmann	
– Friedrich	Royal gun-founder in Copenhagen under Christian V; <i>1696, 1708</i>
– J. B.	Royal gun-founder in Copenhagen under Christian VI; <i>1735, 1742</i>
Hoobrecht, Cornelis	Gun-founder in Ghent; <i>1539</i>
Hopkins, Will	Gun-founder at the Tower of London; <i>1571</i>
Hornhaver	
– Heinrich	Gun-founder in Frederiksværk, Denmark, 1764-1768
– J.P.	Gun-founder in Frederiksværk, Denmark, 1794-1804
Houwe, Pierre	Gun-founder in Château l'Ecluse; <i>1404</i>
Hubert, de Saint	Gun-founder, in charge of the foundry of Rochefort; <i>1702, 1703</i>
Hubrecht	Gun-founder in Ypres; <i>1484</i>
Hueber, Wolfgang Lothar	Gun-founder in Tyrol for Maximilian I; <i>1536</i>
Huebrecht	Gun-founder in Bruges 1421-1425
Hugget	Gun-founder at the Huggets Furnace, Mayfield, Sussex 1543 (= Hogge?)
Humphrey & Co	Gun-founders in England; <i>1779</i>
Hussein, Mohamed	Gun-founder in Ahmednugger; <i>1664</i>
Hutchinson, G.	Gun-founder working in Fort William and Cossipore (India); <i>1833, 1838, 1839</i>
Iacobi or Jacobi, Johann	Gun-founder in Prussia (1661-1726), active in Berlin from 1697 to his death; <i>1706, 1708</i>
Iordan or Jordan, Christophori	Gun-founder in Naples; <i>1594</i>
Iordani, Joseph and Santoni	Gun-founders in Naples; <i>1650, 1675</i>
Isted, Thomas	Active in 1574 in England
James or Tames	Gun-founder in England; <i>1777</i>
Jarre	Master of Gunnery of Hamburg (one of five); <i>1662</i>
Jeffrey, Bartholomew	Active in 1574 in England
Johnson	
– Cornellis	Gun-founder (?) at the Tower of London 1514-1540
– Harry	Master gunner in Calais and St. Botolph's, London 1536-1541
– John	Gun-founder in Buxted, Sussex, covenant servant to Peter Baude; <i>1543</i>
– Thomas	Queen's gun-founder in Combe, Kent; <i>1576</i>
Jones, Jones	Gun-founder of Bristol, active 1774-1777
Journe, Martin	Gun-founder in Malines; <i>1469</i>
Jukes, George	Gun-founder in Robertsbridge, Sussex 1734-1746, associated



Jukes Coulson & Co	with Harrison
Kaltoff, Kaspar	Gun-founders in England, active 1780 (iron guns)
Karim, Ahmed	Gun-founder in Holland and Vauxhall 1628-1664, assisted the Marquis of Worcester in his experimental work at Vauxhall
Kastner, Johann Michael	Gun-founder; <i>1770</i>
Katelare, Jacques de	Gun-founder in Vienna; <i>1731, 1733, 1737, 1739</i>
Keir, James	Gun-founder in Bruges; <i>1431</i>
Keller von Steinbock	Gun-founder in England, active in 1786
– Jean-Jacques	Gun-founder in Besançon, Neubrisach and Pignerol, then Commissioner of the Royal foundry of Douai 1660-1694; <i>1674, 1679, 1681, 1683, 1684, 1685, 1688</i>
– Hans Johan-Balthazar	First commissioner of the Royal foundry of Douai 1694 worked with his brother Jean-Jacques
Kemmer, Hans	Royal gun-founder in Elsinore, Denmark; <i>1625</i>
Kiermann, Gustav	Owner of the Åker gun foundry until 1766; <i>1764</i>
King	
– Henry & Cornelius	Gun-founders at the Royal Brass Foundry at Woolwich; <i>1813, 1814, 1816</i>
– John (or I° or F) & Henry	Master founder and assistant founder at the Royal Brass Foundry at Woolwich 1785-1813, Government founders 1788; John was also storekeeper at Upnor Castle in 1790; <i>1785 to 1813</i>
Kinman, Francis K.	Gun-founder at Woolwich 1782-1817; <i>1794, 1796, 1798, 1807, 1808, 1817</i> . Worked also for King of Portugal João VI; <i>1818</i>
Klett, Valentin	Gun-founder in Suhl (steel pieces); <i>1610, 1611, 1616</i>
Knott, George	Gun-founder at Woolwich (iron), 1780-1783
Kollman, Daniel	Master Keeper of the Arsenal of Vienna; <i>1678</i>
Koster(us)	
– Andraus	Gun-founder in the Netherlands c. 1640
– A(s)sverus	Gun-founder in Amsterdam; <i>1624, 1628, 1633, 1642, 1643</i>
– Gherhard(us)	Gun-founder in Amsterdam (1627-1679); <i>1653, 1660</i>
Lafuente, Francisco	Gun-founder in Portugal; <i>1588</i>
Laignel, Claude	Gun-founder in Marseilles; <i>1525</i>
Laire, Symon	Gun-founder in Bruges; <i>1433</i>
Lambard, John (alias Gardiner)	Active in 1574 in England
Lambert, William	Gun-founder 1647-1675, to the Marquis of Worcester at Vauxhall, then at the service of the King of Spain during the Interregnum, then returned to Vauxhall in 1665
Lambillon (alias Leleu), Lambert	Gun-founder in Malines; <i>1469</i>
Lampre Giovanni (alias Lamprecht Zovane or Ioannes)	Gun-founder to the Duke of Ferrare 1576-; <i>1584</i>
Langenbeck, G.	Master of Gunnery of Hamburg (one of five); <i>1662</i>
La Puente, Francisco de	Gun-founder from Castile; <i>1588</i>
Latterellus, Philip	Decorator of guns, Venice and/or (?) Malta; <i>1773</i>
Lee, Francis	Gunpowder maker at Bedruth, Cornwall 1562-1578
Lefevre	
– Adrien & Clement	Gun-founders in Binche; <i>1414</i>
– Williame	Gun-founder in Namur; <i>1477</i>

Legas	See Harrison
Legrand, François	Gun-founder in Tournai 1552-1554
Le Gros	Gun-founder at Rochefort; <i>1743</i>
Lehnmeyer, Johann	Gun-founder in Glückstad, Denmark; <i>1687</i>
Leiminger, Pieter	Gun-founder in Innsbruck; <i>1507</i>
Leleu, Lambert	See Lambillon
Le Moine, Guillaume (alias Guglielmo Monaco)	Founder in Naples, created bombards from 1453 on
Lespine, Jacques or Jacquemin de	Gun-founder in Luxembourg; <i>1458</i>
Leu(w), Samuel	Gun-founder in Geneva; <i>1721</i>
Levett, Parson	Owner of the gun foundry at Oatlands, near Buxted 1543- 1549, Commissioner to oversee ironworks in Sussex 1546
Loeffer or Löffler	
– Gregory	Gun-founder in Augsburg 1542-1558; <i>1534, 1542, 1543, 1545, 1550, 1558</i>
– Hans Christopher	Gun-founder in Innsbruck; <i>1569, 1579, 1583, 1586, 1594</i>
Luchon, Amelle de	Gun-founder in Noyon; <i>1417</i>
Luis, Joh. H.	Master of Gunnery of Hamburg (one of five); <i>1721</i>
Lütckens	Master of Gunnery of Hamburg (one of five); <i>1662</i>
Luytens, Heyndric	Gun-founder in Ghent; <i>1580</i>
McKenzie, John	Gun-founder in England (iron), active 1778
Maestri, Adriano di	Master of Artillery in Florence; <i>1499</i>
Maght, Leonhard	Gun-founder in Innsbruck, associated to Alexander Endorfer; <i>1515</i>
Malines, Jehan de	Gun-founder in Malines 1466-1474, “Canonier” to the Duke of Burgundy; <i>1420, 1474</i>
Mangles, Robert	Gun-founder in England (iron), active 1777-1779
Manton, Joseph	Gun-founder in London; <i>1790</i>
Manuel, D.	Gun-founder in Anciola in Tagollaga; <i>1769</i>
Mareschal, Jehan	Gun-founder in St. Omer; <i>1438</i>
Marhoffer, Leopold	Gun-founder in Vienna; <i>1537</i>
Maritz	
– Jean or Johannes I	Gun-founder, Superintendent of the foundries of the Artillery of France, Commissioner of the King’s foundry in Strasbourg; <i>1725, 1742</i>
– Jean II	Gun-founder, Director of the foundry of Strasbourg 1740, Lyon and Douai, Director General of gun foundries 1755 (son of Jean I); <i>1745</i>
– Jean III	Gun-founder in Strasbourg, Seville, Barcelona 1768 and Master gun-founder of the Heavy Ordnance Brass Foundry at The Hague 1770; <i>1773, 1776, 1780, 1783, 1785, 1788, 1792, 1798, 1813</i>
– Jean IV	Gun-founder in Strasbourg and Commissioner of the King’s foundry in Douai
– L. & J.	Gun-founders at The Hague; <i>1807, 1823</i>
– Samuel	Gun-founder in Bern and Strasbourg; <i>1752, 1754, 1769</i>
Maron, Guillaume	Gun-founder in Binche; <i>1440</i>
Marr, Valentin	Gun maker, armourer at the Copenhagen Arsenal 1759-1775
Marselius, Christian	Gun-founder, worked in Russia; <i>1675</i>
Martin, Claud[e]	Major and gun-founder (?) in Luknow

Massaroli, Nicolo	Gun-founder in Venice
Mather	Gun-founder (?) in Toulouse; <i>1833</i>
Matsen, Laurits	Gun-founder in Copenhagen; <i>1541</i>
Matthews, George	Gun-founder at Woolwich, active 1782-1786
Matthews & Co or Matthews & Homfray	Gun-founders in England (iron), active 1779-1783
May, Thomas (= Mayo?)	Active in 1574 in England
Maye, George	Active in 1574 in England
Mayer	
– ?	Gun-founder in France; <i>1706</i>
– Hans	Gun-founder in Lietzen; <i>1659, 1667</i>
– John	Gunner at the Tower, London 1516, in succession to Humphrey Walker, deceased
Mayo, John & Thomas	Gun-founders at the time of Queen Mary, London; <i>1554</i>
Mazo, Gregorio Simon del	Gun-founder in Spain; <i>1704</i>
Mazzaroli(s)	
– Francisco	Gun-founder in Venice; <i>1669</i>
– Giovanni or Johannis or Ioane	Gun-founder in Venice; <i>1686, 1708</i>
Meissner or Meissmer, Hans	Gun-founder in Bavaria (Landshut); <i>1543, 1544</i>
Melville, Lieut. General Robert	Co-inventor of the “Carronade” with Gascoigne, Lieutenant-Governor of Guadeloupe 1763-1770
Memmersdorfer, Georg	Master hammersmith in Nuremberg (steel); <i>1694</i>
Mente, Korte	Master Founder in Denmark; <i>1539</i>
Meurer	Master of Gunnery of Hamburg (one of five); <i>1662</i>
Meurs or Muers, Enricus	Gun-founder in Amsterdam; <i>1600, 1604, 1613, 1668</i>
Meyer	
– Fridrich or Frederich	Royal gun-founder in Oslo 1681-89; <i>1681, 1685</i>
– Giovanni or Johan or Gerhardt	Gun-founder in Stockholm; <i>1669, 1708, 1771</i>
– G. S.	Gun-founder in Stockholm; <i>1788, 1795</i>
Middeldorp, Karsten	Gun-founder in Reval (Estonia); <i>1559</i>
Middleton (family)	Gun-founders in Sussex 1574-1649
Migonus, Ioannes	Gun-founder; <i>1778</i>
Milleme, Hubert de	Gun-founder in Ypres; <i>1503</i>
Mir, Francisco	Gun-founder in Barcelona 1735; <i>1737</i>
Mohamed or Muhamad, son of Hamzat	Gun-founder in Cairo; <i>1530</i>
Mollance	See Mons
Moller, Johann Valentin	Gun-founder in Hamburg; <i>1721</i>
Mollyng, John	Gun-founder in Cornhill 1382-1396, made “great brass cannons” of 181, 234 and 266lb.
Moltzfelt, Herman	Gun-founder in Poland; <i>1602</i>
Monaco, Guglielmo	See Le Moine
Moniot, Guillaume	Gun-founder in Namur; <i>1620</i>
Mons	A blacksmith, the supposed constructor of the famous “Mons Meg” bombard, 15 <sup>th</sup> century
Monteith, James or Jacobus	Gun-founder in Edinburgh; <i>1641, 1642, 1647, 1652, 1653, 1657</i>
Montoya, Justo	Gun-founder (iron) in Oñate; <i>1837, 1838, 1839</i>
Montserrat, Bernart de	Gun-founder in Caen, made carts gun weighing 2000 lb; <i>1375</i>
Moreau	Gun-founder in Namur; <i>1734</i>



Morel, Juan	Gun-founder in Seville; <i>1563</i>
Moreni or Morenus, Andrea	Gun-founder in Florence; <i>1746</i>
– Sons of	Gun-founders in Florence c. 1745-1765; <i>1746</i>
Morgan, Robert	Gun-founder in England (iron), active 1758-1764
Muers (see Meurs)	
Muir or Mure & Atkison	Gun-founders in Woolwich; <i>1776, 1779, 1780</i>
Mullenbeck, Andrew	Gun-founder in London 1531-1571
Muller, Nicolaas	Gun-founder in Amsterdam; <i>1734</i>
Muluh, Pieter	Gun-founder in Germany for the Elector of Saxe; <i>1523</i>
Mün(i)ch, Georges	Gun-founder (from Dresden), working in Geneva, also founder of the Marquis de Breteuil, minister of Louis XV; <i>1725</i>
Munir, Ali	Gun-founder in Adrianople; <i>1464, 1470</i>
Murad, son of Abdu'llah	Chief gunner in Adrianople; <i>1524</i>
Musarra, Fidericus	Gun-founder in Spain; <i>1552</i>
Myddleton, Arthur	Active in 1574 in England
Mylton	Gun-founder at Hugget's Furnace, Mayfield, Sussex; <i>1573</i>
Nalda, Diego de	Gun-founder in Spain; <i>1589</i>
Narp, Arnaud de	Gun-founder in Bordeaux 1398, sent to England for service under Richard II
Neidhar(d)t, Wolfgang	Gun-founder in Augsburg 1603-1609; <i>1603</i>
Nel(l)e, William	Gunner at the Tower of London; <i>1484</i>
Neubert, Johann Zacharia	Gun-founder in Warsaw; <i>1781</i>
Neuwert, Jacob	Gun-founder in Berlin (d. 1669); <i>1646</i>
Newlyn, William	Gun-founder ("Magister gunnorum") in Calais 1377
Nie(u)port, Johannes	Gun-founder in The Hague; <i>1681, 1694, 1702</i>
Nieuwenhuysse, Gerard	Gun-founder in Malines, brother-in-law of Poppenruyter and succeeded him as head of the Malines foundry in 1568; <i>1578</i>
Norenbarch, Matias	Gun-founder; <i>1558</i>
North, W.	Gun-founder in London or Woolwich c. 1790-1827; <i>1827</i>
Nourenbergh, Hance de	Gun-founder in Malines; <i>1467</i>
d'Olive, Pierre	Gun-founder in Bruges; <i>1441</i>
Oliver, G. & J.	Gun-founders at Wapping, London, 19 <sup>th</sup> century
Orban	See Urban
Oudermeulen, Paul	Gun- and bell-founder in the Spanish Netherlands; <i>1632</i>
Ouderogue or Ouderogge or Ouwerock	
– Cornel(l)is or Cornely	Gun-founder in Amsterdam (before 1625), then in Rotterdam, also a bell-founder, cast statue of Erasmus by Henrik Keyser at Rotterdam; <i>1649, 1660, 1666</i>
– Dirk Jansz.	Gun-founder in Rotterdam
– Jo[h]annes	Gun- and bell-founder in Rotterdam, cast several guns for England; <i>1676, 1682</i>
Owen or Owyn	
– John & Robert	Gun-founders in Houndsditch and Calais 1529-1553; King's gun-founders in 1546, England; <i>1537, 1538, 1557</i>
– Thomas	Brother to the above, Queen's gun-founder in 1546-1571; <i>1550, 1571</i>
Oxsen van Husem, Lourens or Laurens	Gun-founder (from Schleswig-Holstein) worked in Batavia for the VOC 1654-1670; <i>1660, 1669</i>

Palar, John	Active in 1574 in England
Paquet, Gilles	Gun-founder in Ghent Castle; 1550
Par(r)izot	Gun-founder in Turin 1790-1813
Pastenae(c)ker	
– Corneille	Gun-founder in Malines 1552-1556
– François	Gun-founder in Malines; 1554
Pauli, Joh. Ulrich	Master of Gunnery of Hamburg (one of five); 1721
Paz, Francesco de la	Gun-founder in the Philippines; 1688
Peck, Peter	Gun-founder in Munich; c. 1550
Pelham (family)	Iron founders at Waldron, Sussex 1574-1715
Pender, Hans	Gun-founder in Siegen; 1538
Perdrix or Pedry, Jacques	Gun-founder in Cambrai and Valenciennes 1616-1672
Perger, Jorg	Gun-founder in Nuremberg; 1543
Perigerus or Peringer Leon(h)ardt or Lienhard	Gun-founder in Bavaria (Landshut); 1554, 1566
Perrier or Périer	Gun-founder in Paris 1793-1794
– Jacques-Constantin	Gun-founder, creator of the “Fonderie de Chaillot”, Paris, in 1778
– Augustin	Worked with his brother; 1791, 1793
Petit, Arnold	Gun-founder in Ghent; 1600
Petrini, Antonio	Gun-founder in Florence, author of <i>Arte Fabrice</i> , inventor of a double-barrel cannon; 1642
Phillips	
– John	Gun-founder in England; 1587
– Richard	Gun-founder in Houndsditch (died 1633); 1601
Pit or Pitt (family)	Gun-founders in Houndsditch 1535-1639, associated with the Owen brothers in 1535 and working up to the reign of James I
– Henry	Gun-founder in Houndsditch under Queen Elizabeth; 1580, 1590, 1591
– William	Gun-founder under Henry VIII (1491-1547), England
Plasencia y Farinas	Gun-founders in Spain; 1874
Pögl, Zebald	Harquebus maker in Austria, c. 1465-1528, from Thörl, in Styria (Southern Austria), worked for Emperor Maximilian I; c. 1500
Poitevin, F.	Gun-founder in Vienna 1767-?; 1767, 1776, 1781
Pole, Howard de la	Gun-founder in London; 1514
Pope, Nicholas	Gun-founder(?)
Poppenruyter, Hans (alias Van Nuermerkt Jean)	Gun-founder in Malines 1490-1534; worked in England made over 144 pieces for Henry VIII, including the heavy siege train called “The Twelve Apostles”, produced also a large number of guns for Margaret of Austria
Posson	Gun-founder in Liège; 1740
Pourier, Jeak(?)	Gun-founder in Ghent; 1591
Presgrave, D.	Gun-founder working in Cossipore (India); 1839
Pryce, Thomas	Gun-founder in England (iron), active 1759
Puckle, James	Designer of guns, author of <i>The Club</i> , inventor of a flint-lock revolving gun patented July 25 1718, took out the patent for the manufacture of cannons of London 1718-1732
Quemsel or Quennel, Peter,	

Thomas & Robert	Gun-founders in Imbhams, Surrey 1575-1650
Quinkelberger, Johann Christian	Gun-founder in Switzerland; <i>1638</i>
Raby, Edward or (& masters) or Raby & Rogers	Gun-founders in Woolwich 1758-1760 and at the Warren Furnace, Sussex 1761-1771
Ransart, Pierre	Gun-founder in Cambrai; <i>1616</i>
Raynold, Robert	Active in 1574 in England
Regnault, Louis-François	Gun-founder, worked in France, Bavaria and Germany, 19 <sup>th</sup> century
Reig, Medard(us)	Gun-founder in Graz 1684-1698; <i>1684, 1688, 1698</i>
Reimão or Reimon	Gun-founder in India, a Portuguese; <i>1533</i>
Relfe, William	Active in 1574 in England
Remnant	Gun-founder in Woolwich 1727-1750, agent for John Fuller, established a shot-foundry near the river to the north of the Arsenal
Reynsberger, Thomas	Gun-founder in Valenciennes; <i>1552</i>
Reysinger, Hans	Gun-founder in Germany c. 1620
Ribot or Rivot, Petrus	Gun-founder in Barcelona 1718-1720; <i>1718, 1720, 1724, 1726, 1727</i>
Richier de Metz, Antoine	Gun-founder in Luxembourg; <i>1445</i>
Rivas or Ribas, Antonio de	Gun-founder in Peru, a Spanish; <i>1660, 1666</i>
Riz, David	Gun-founder in England, active 1778-1785
Robertson, John	Gun-founder in England; <i>1782</i>
Rocca	
– Aloyxius	Gun-founder in Genoa; <i>1747</i>
– Giacomo or Jacobus	Gun-founder in Genoa; <i>1706, 1710, 1725</i>
– Luigi	Gun-founder in Genoa, worked with Giacomo, before 1750
Roebuck, John M.D.	Gun-founder in Falkirk, originator of the Carron Company; <i>1759</i>
Roen or van Roen, Franciscus	Royal gun-founder at Glückstadt 1641-1677 (or 1635-1660?); <i>1650, 1653, 1655, 1660, 1673</i>
Roth, C. F.	Gun-founder in Forckheim; <i>1707</i>
Rotispfen, Arnold	Gun-founder in London, inventor of “a new method for making guns”; <i>1626</i>
R(o)uelle	Gun-founder in France; <i>1797</i>
Round, John	Gun-founder in London; <i>1639</i>
Rulant, Rutger	Master of Gunnery of Hamburg (one of five); <i>1721</i>
Ruppertinoe, P.	Gun-founder under Charles II, England; <i>1671</i>
Rutter, John	Gun-founder in London 1514-1516
Sagen, Jacques	Gun-founder in Perpignan; <i>1691</i>
Salamanca, Gutierrez de	Gun-founder in Spain; <i>1793</i>
Sautray, Guillaume	Superintendent of the Foundries in Lyons; <i>1706</i>
Schalch, Andrew	Worked at the Fonte Nationale at Douai, then organizer and first Master founder at the Royal Brass Foundry at Woolwich 1716-1770; <i>1726, 1732, 1733, 1739, 1743, 1748, 1756</i>
Schön, Hans	Gun-founder in Vienna; <i>1608</i>
Schulths, Jacob	Gun-founder in Vienna; <i>1630</i>
Schultz, Heinrich	Gun-founder in Berlin; <i>1669</i>
Schumaker, Captain	First chief of the Rocket Corps (special arm of service 1816- 1842), inventor and constructor of the “espingols”



Scorer, Robert	Shot-founder at Parrock and Hartfield, Sussex; <i>1513</i>
Scott	See Stott
– Charles	Descendant from the Barons of Bawerie, Scotland. Invented leather guns for Gustavus Adolphus and was Quarter-Master-General of the Swedish Army, then took service in the Danish Army and became General of Artillery and member of the Privy Council. (Died in 1631)
– Robert	
Seest	
– Pieter	Gun-founder in Amsterdam; <i>1764, 1770, 1771, 1781, 1786(?)</i>
– Christian	Gun-founder in Amsterdam and in Liège; <i>1786(?)</i> , <i>1800</i>
Segurano	Gun-founder in Genoa; <i>1586</i>
Seguro, Francesco	Gun-founder in the Royal Foundry of Naples; <i>1795</i>
Seiser, Konrad or Conrad	Gun-founder in Graz; <i>1652</i>
Sennar, T.	Gun-founder in France (?); <i>1746</i>
Senningk or Semminck, Gerdt	Gun-founder at Danzig; <i>1623</i>
Sewolt, Hider	Gun-founder in Nuremberg; <i>1546</i>
Seymour, Lord Thomas	Owned ironfields and gun-foundries at Worth, Sussex, Admiral of the Fleet 1544, executed for high treason in 1549
Siegfriedt, Ludolf,	Gun-Founder in Oldenburg; <i>1646</i>
Simon or Sijmoen	See Gielis
Sithof(f) or Silhof	
– Albert	Gun-founder in Malines; <i>1638</i>
– Jan or Johannes	Gun-founder in Brussels 1623-1634, then in Malines 1634-1638; <i>1623, 1631</i>
Skoclege, Richard	Gun-founder in London; <i>1514</i>
Sohn, Joh.	Master of Gunnery of Hamburg (one of five); <i>1721</i>
Solano	
– Mattias	Gun-founder to the King of Spain 1720-1746 and before, in Panama (1719); <i>1719, 1732, 1733, 1737, 1746</i>
– José	Successor of Mattias Solano; <i>1756, 1762, 1773</i>
Sone & Stephens	Gun-founder in England, active 1755-1758
Sowyn, James	Gun-founder in London; <i>1529</i>
Splinter, Everard	Gun-founder in Enkhuizen. Worked also for Christian IV of Denmark; <i>1629, 1640</i>
Spreckelsen, Johan von	Master of Gunnery of Hamburg (one of five); <i>1662</i>
Stace, John	Active in 1574 in England
Stafiso	The Stafsio Foundry in Sweden, which cast guns for the Danish Navy. First owner Gert Stroning. Active in the 19 <sup>th</sup> century
Stanes, William	Purveyor of gunpowder; <i>1347</i>
Steen & Borchardt	Gun-founders in Enkhuizen; <i>1765, 1757</i>
Stephenson	Gun-founder in London, 18 <sup>th</sup> century
Steylart, Adrien	Gun-founder in Malines 1578-1579
Storch, I (or J.). F. A.	Gun-founder in Munich; <i>1788</i>
Størning, Gert	First owner of the Swedish gun foundry Stafsiø 1666- ; <i>1670, 1691</i>
Stott or Scott, Charles	Gun-founder in England, active 1779
Struve, Otto	Gun-founder in Hamburg; <i>1704</i>
Stumm, Andreas Philipp	Gun-founder in Nuremberg; <i>1759</i>
Sumaripe, Francesco	Gun-founder c. 1550

Tanner, David	Gun-founder in England (iron), active 1779-1786
Thomas	
– Williams	Gun-founder in England, worked with Francis Kinmans, 1781-1786
Thorpe, John	Active in 1574 in England
Thury	Gun-founder in Paris during the French Revolution; 1793
Tiavsky, Franz	Gun-founder in the Royal Foundry of Naples; 1795
Tolhuys	
– Johan	Gun-founder in Utrecht 1552-1560
– Wilhelm	Gun-founder in Haarnem; 1533
Torschell M. K.	Private brass and bell founder in Copenhagen
Toussaint, Mélotte de Dinant Jean	Gun-founder in Malines; 1744
Treadwell, Daniel	An American inventor, perfected a method for making cannons with wrought-iron and steel in 1835
Tremy, Claude	Gun-founder in Amsterdam; 1682
Triebel	
– Jacob	Gun-founder in Zell c. 1730-1750
– Caspar	Gun-founder 18 <sup>th</sup> century, Germany
Trigance, Francis	Gun-founder in Turin; 1769
Triultio, Giovanni Battista	Gun-founder at the service of Duke Vittorio Amedeo II 1699-?
Utenwenst, Joes	Gun-founder in Malines; 1633
Urban or Orban	Gun-founder in Adrianople c. 1540-1550, cast guns of 25 in. calibre and over for Mohamed II; he is described by Holinshed as a Dane and by other writers as a Hungarian (?)
Valderstero, Ferdinando de	Gun-founder in Spain; 1623
Val[l]ette	Gun-founder in Strasbourg and Metz; 1805, 1809
Van den Bergh	Gun-founder in Malines; 1467
Van den Ghein, Petrus	Gun-founder; 1561
Van der Beke, Mathieu	Gun-founder in Antwerp; 1477
Van der Bruggen, Cornelis	Gun-founder in Ghent; 1650
Van der Hart, Koster Asverus	Gun-founder in Amsterdam, delivered cannons to Denmark and Norway during the period 1612-1659, then Royal gun-founder in Copenhagen 1672-1692; 1643, 1673, 1680, 1683
Van der Loe, Henri	Gun-founder in Malines; 1388
Vander Oudermeulen	Gun-founder in Malines
Vander Put, Arent or Arend(t)	Gun-founder in Rotterdam; 1616, 1618, 1623, 1673
Van (den) Nieuwenhuyse	
– Gaspard	Gun-founder in Malines; 1574
– Jasper	Gun-founder in Malines 1590-1634
– Peter	Gun-founder in Malines; 1603
Van Norenbarch, Matias	Gun-founder in Denmark 1558; 1559
Van Nuermerkt, Jean	See Poppenruyter
Van Seest, A.	Gun-founder in Amsterdam; 1764
Van Trier or Treuren, Jean	Gun-founder in Antwerp 1584 and in Brussels 1589
Velasco	Gun-founder (?) working in Spain in 1874
Verbruggen	
– Jan or John	Master founder at the bell and cannon foundry of Enkhuizen 1746-1754, then at the National Heavy Ordnance Foundry at The Hague 1755-1770, then came from The Hague to succeed Schalch at Woolwich 1770-1781; 1752, 1759, 1760 and 1774,

– Pieter or Peter	<i>1775, 1776, 1777, 1778, 1779 (with Pieter)</i> Son of Jan. Master founder at the Royal Brass Foundry at Woolwich 1770-1786; <i>1774, 1775, 1776, 1777, 1778, 1779, 1780, 1783 (all with Jan), 1782, 1785 (alone)</i>
Veri, Raymondo de	Gun-founder in Majorca; <i>1728</i>
Verti, Gilles	Gun-founder in Lille; <i>1438</i>
Vitalis, Hieronymus	Gun-founder in Cremona; <i>1571</i>
Voie-I-Abet or Voye-Y-Habet, Bernardo or Barnardo	Gun-founder, in charge of the gun foundry at Seville; <i>1719, 1720, 1724, 1726, 1736</i>
Von Dam, Claus	Gun-founder in Hamburg, then Royal gun-founder in Denmark 1638-1655; <i>1643, 1644</i>
Von Guntheim, Jörg	Gun-founder of Strasbourg. Worked for Emperor Maximilian, the Council of Basle, the King of Aragon and the King of England among others; <i>1514</i>
Von Mandern	Gun-founder in Denmark c. 1630
Von Sydow	Gun-founder; <i>1827</i>
Vries, Gilles de	Gun-founder in Ghent; <i>1550</i>
V <sup>te</sup> (for Vicente?), Ioanes	Gun-founder in Portugal; <i>1537</i>
Waerck, Fridrics	Gun-founder in Denmark 1759-1802
Waern, Mathias	Owner of the gun foundry of Moss Iron-Works (with Ancher), Norway, 1750-1760; <i>1755, 1760</i>
Wagner, Peter	Gun-founder; <i>1646</i>
Walker	
– Humphreys	Gunner at the Tower, London 1509-1517, maker of the bombard “Basilicus”, also maker of the railings around the tomb of Henry VII at Westminster Abbey
– John or Joshua	Gun-founder at Woolwich, active 1784-1786
– Samuel & Co	Gun-founders at Woolwich, active 1774-1786, also in Roterham, early 19 <sup>th</sup> century; <i>1800</i>
Walpole, William	Active in 1574 in England
Walter, Abel	Gun-founder at Sowley in Hampshire, active 1757-1758
Warner (family)	Gun-founders in Parrock, Surrey 1518-1547
– Williamson	Gun-founder at St. George’s, London 1551-1571
Webb William	Active in 1574 in England
Wegewaert or Wegtwaert or Wegwoert	
– Co(e)nraet	Gun-founder in The Hague 1614-1664, Director of the National Foundry at The Hague, maker of breech-loaders; <i>1639, 1643, 1650, 1659</i>
– Kylinaus	Gun-founder in Campen; <i>1640</i>
Weinberger or Weinperger	Gun-founder in Vienna 1785-1797; <i>1790, 1797</i>
Weinholt, Johann Gottfridt	Gun-founder in Dresden 1733-1769; <i>1733, 1741, 1769</i>
Weis, Urban	Gun-founder in Vienna, <i>1550</i>
Wellens, Peter	Gun-founder at Bridge Without, London; <i>1571</i>
Wemis, John	Gun-founder in London 1622, Master gunner of England, inventor of a new way of making light ordnance
Wergeland works	A Swedish gun works active in the 17 <sup>th</sup> century
Western(e)	
– Thomas	Gun-founder at Ashburham in Sussex (1669-1688), then in



– Maximilian	London, until 1690 Son of Thomas, gun-founder in Noorfields, London 1684-1704, succeeded to his father in 1690
Weston, Michael	Gun-founder in Cowden, Kent 1567-1573
Whiteman, Richard and Philip	Gun-founders in London; 1687
Whitworth, Sir Joseph	British engineer and industrial (1803-1887), inventor of large rifled breech-loading gun (patented in 1855) used during the American Civil War
Wiard, Norman	Inventor of the Wiard rifle, a semi-steel light artillery piece. 60 pieces (6- and 12-pounders) were produced at the O'Donnell's Foundry of New York between 1861 and 1862; 1861
Wichtendal, Ludwig	Gun-founder in Danzig; 1625
Wiedemann, Colonel	Not a real gun-founder, "his art consisted in hammering and chasing in brass" (made a brass-covered lead cannon which burst at proof in Windsor Park in April 1749); 1751
Wightman Philip	Gun-founder in England; 1695, 1696
Wilkinson, John & Co	Gun-founders at Woolwich, active 1760-1779
William "the Founder"	Gun-founder in London 1385, cast 12 cannons for Richard II of Dover
Wilson, James	Gun-founder in England, active 1779
Wimme, François	Gun-founder in Ghent; 1564
Winhoffer, Michael Franz	Gun-founder in Hermannstadt; 1722
Witlockx, Guillaume	Gun-founder in Malines 1723-1733
Woert, Conrad Wegl	See Wegtwaert
Wolf, Kaspar	Gun-founder on Pressburg; 1692
Wolff, J. J.	Gun-founder in Southampton; 1842
Woodward, William	Gun-founder in London 1382-1388, made 73 guns and one great multi-barrel gun for Richard II
Woody, Robert	Active in 1574 in England
Wright & Prickett or Wright & Co	Gun-founders in England (iron), active in 1771-1784
Wyss,	
– Daniel P.	Gun-founder in Switzerland; 1721
– H. Ant.	Gun-founder in Switzerland 18 <sup>th</sup> century
Wytyld, Robert	Active in 1574 in England
Young, Heldryke	Gun-founder at St. Katherine's, London 1540
Zechenter, Anton	Gun-founder in Ofen 1724-1756; 1731
Zhdanov	Gun-founder in St. Petersburg, 18 <sup>th</sup> century
Zumbrack, William	Gun-founder in England, active 1781
Zuriarrain, Juan José	Gun-founder in Vedia, Biscay (forged iron); 1838

Source: The above list relies mostly on a similar list established over the years by Mendel L. Peterson. It has been completed by the Editor from the cannons themselves, from museum's catalogues and from a variety of books specifically devoted to gun-founders (see bibliography).

## A NOTE ON FRENCH FOUNDRIES

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In the late 17<sup>th</sup> century, two foundries were created in order to supply the French Navy with bronze guns. The main one was in Rochefort and produced for the “Ponant” (i.e. the Atlantic harbours, Channel included) from 1669 to 1840, and the other one was installed in Toulon, supplying the “Levant” (the Mediterranean) from 1667 until the beginning of the 19<sup>th</sup> century. They both belonged to the State. Before that, the Navy used to work with the master founders of Lyons, Saintes, Le Havre, etc.

For the iron pieces, on the other hand, the Navy worked with private foundries. In the middle of the 18<sup>th</sup> century and the beginning of the 19<sup>th</sup> century for instance, the following houses were working for the King: Ruelle (which became royal property in 1776), Plancheurnier, Estoüards, Lescaux, Rancogne, Lamothe, Bonrecueil, Jomelière, Ans, Plazac, la Mouline, Pontrouche, Bigorry, Saint-Gervais, Putanges, Pontrouchaud, de Firbay, de Lavalade, Indret (1777-1827), Creusot (from 1792 on), Nevers (from the Revolution until 1850), Liège (in Belgium, from 1803 to 1813).

(From Boudriot, *L'artillerie de Mer de la Marine Française 1674-1856*, *Triton* n°85 (supplement to *Neptunia* 90, 1968, p. 11)

## THE MEN IN CHARGE

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(15<sup>th</sup>-19<sup>th</sup> century)

The Masters-General of Ordnance

The “Maîtres Généraux et Grands Maîtres de l’Artillerie”, the “Amiraux de France” and the “Grands-Maîtres de la Navigation”

The “Capitanes Generales”, “Inspectores” and “Directores Generales” etc “de la Artilleria”

NB: The following lists are made from:

- 1) the names cast on the actual pieces of artillery, photographed all over Europe by MLP and/or by the Editor;
- 2) from a number of museums catalogues and/or museums notices or signs;
- 3) from a number of books, articles and miscellaneous publications, sources on the subject of ancient ordnance, of the history of the various artillery corps and artillery departments in Europe (which are all to be found in the general bibliography).

It is believed that, regrettably, none of the following lists is absolutely complete or absolutely correct. Nevertheless it is believed that they will be found useful.



### The Masters of Ordnance and the early organization of the King's Artillery

The first Master of the Ordnance was appointed in 1414 by King Henry V, he was Sir Nicholas Merbury, and succeeded to the twelfth Keeper of the Privy Wardrobe at the Tower, who had, until his appointment, been in charge of not only the artillery at the Tower and elsewhere in England, but of all kinds of weapons and military equipment in general.

From the beginning of the Age of Artillery in England, the organization of the production and use of ordnance pieces had been conspicuous by its absence. For most of the 14<sup>th</sup> century gunners, were civilian artificers, following their trade just like any other craftsmen. They made cannons and manned their pieces in action for a fee during military campaigns overseas or in the defence of fortifications, usually on the coast. The permanent garrisons of such fortifications were extremely small and the matters of artillery were under the responsibility of provincial Master Gunners, the ancestors of the later Master of the Ordnance. The first attempt at a central organization of artillery at the national level occurred with the designation of the first Masters of the Ordnance or Chief Gunners or Chief Cannoner.

As an example, the patent of Patrick de la Meyte in 1484, when appointed as the first Chief Gunner, read: "*March 11 1484. Grant for life to Patrick de la Mote, Canoner of the office of Chief Cannoner or Master Founder and Surveyor and Maker of all the King's cannons in the Tower of London and elsewhere etc...*"<sup>1</sup>

Very soon, the Master of the Ordnance became responsible for the founding, probing, surveying and transporting artillery pieces to the army in the field, or in fortifications, as well as to the Navy. His duty included organizing the production and distribution of ammunition, powder and all necessary tools, implements etc., including field carriages (and the horses and personnel to pull them) and naval carriages. They had an organization, which having been called the Office of Armory became the Office of Ordnance under Henry VIII in 1544 and the Board of Ordnance in 1597. The Master General was Head of the Ordnance and had under him a Lieutenant General of the Ordnance and a Surveyor General of the Ordnance. The Ordnance Office was totally independent from the military and until the establishment of a permanent Army and Navy it was the only permanent military department in England. The growing importance of the job is reflected in the growing importance of the people, who held it.

The name of the Master General of the Ordnance was not systematically engraved or cast on bronze cannons made under his authority, but it became more customary from the late 17<sup>th</sup> century on and during the 18<sup>th</sup> and 19<sup>th</sup> century.

## A list of the Masters-General of Ordnance<sup>2</sup>

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### In alphabetic order

Ambrose, 1 <sup>st</sup> Earl of Warwick	1560-1589
Audeley, Thomas	1482-1483
Beresford, William Carr, 1 <sup>st</sup> Viscount Beresford	1828-1830
Berkeley, William, 1 <sup>st</sup> Baron Berkeley	1664-1670
(in commission with Sir John Duncombe and Thomas Chicheley)	
Bigod, Sir Rauf	1483-1485
Blount, Charles, 1 <sup>st</sup> Earl of Devonshire	1603-1606
Blunt, Mountjoy, 1 <sup>st</sup> Earl of Newport	1634-1661
Browne, George, Colonel	?-1702
Cadogan, William, 1 <sup>st</sup> Earl of Cadogan	1722-1725
Campbell, John, 2 <sup>nd</sup> Duke of Argyll	1725-1740 and 1742
Carew, George, 1 <sup>st</sup> Lord Carew, 1 <sup>st</sup> Earl of Totnes	1608-1629
Chicheley, Sir John	1679-1682
(in commission with Sir William Hickman and Sir Christopher Musgrave)	
Chicheley, Thomas, Knight	1664-1670
(in commission with Sir John Duncombe and William Berkeley)	
Chicheley, Thomas, Knight	1670-1679
Churchill, John, 1 <sup>st</sup> Duke of Marlborough	1702-1711 (or 12?) and 1722
Clifford, Sir Robert	1495-1508
Compton, Sir William	1660-1663
Cornwallis, Charles, Marquess Cornwallis	1795-1801
Devereux, Robert, 2 <sup>nd</sup> Earl of Essex	1597-1601
Dudley, Ambrose, 3 <sup>rd</sup> Earl of Warwick	1560-1585
Dudley, Ambrose, 3 <sup>rd</sup> Earl of Warwick, jointly with Sir Philip Sidney	1585-1586
Dudley, Ambrose, 3 <sup>rd</sup> Earl of Warwick	1586-1590
Duncombe, Sir John	1664-1670
(in commission with William Berkeley and Thomas Chicheley)	
Fauroner (or Falconer), Richard	1506-?
Gargave, Sir John, Knight	—
Gargave, Sir Thomas, Knight	—
Glaucestre, William (in Normandy and in France)	1435
Grandby, John, Marquess	1763-1770
Gyleford (or Guilford), Sir Richard	1485-1494
Hamilton, James, 4 <sup>th</sup> Duke of	1712
Hampton, John	?-1450
Hardinge, Henry, 1 <sup>st</sup> Viscount Harding	1852

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<sup>2</sup> Includes the early Masters of the Ordnance and the Chief Gunners, who held the office of Chief Cannoner or Master Founder and Surveyor and Maker of all the King's cannons in the Tower of London and elsewhere (15<sup>th</sup>-16<sup>th</sup> century) and similarly worded charges in England and in Great Britain.

Hastings, Francis Rawdon, 2 <sup>nd</sup> Earl of Moira	1796-1807
Henry, 1 <sup>st</sup> Lord Percy of Alnwick	1644
Hert, Thomas	1526-1527
Herveys, Philip	1461-1463
Hickman, Sir William, 2 <sup>nd</sup> Bt. (in commission with Sir John Chicheley and Sir Christopher Musgrave)	1679-1682
Hobby, Sir Philip	1547-1554
John, 1 <sup>st</sup> Earl of Peterborough	1642
Jud(d)e, John	1456-? (died 1460)
Kempt, Sir James	1830-1834
La Rochefoucauld, François de la, Marquess de Montendre	1725
Lee, Sir Henry	1590-1597
Legge, George, Colone, later 1 <sup>st</sup> Lord Dartmouth	1682-1689
Lennox, Charles, 3 <sup>rd</sup> Duke of Richmond	1782-1783 and 1784-1795
Ligonier, John, 1 <sup>st</sup> Viscount Ligonier	1759-1763
Malborough, John, 1 <sup>st</sup> Duke of	1702-1712 and 1714-1722
Manners, Marquess of Granby	1763-1770
Merbury, Nicholas	1415-1420
Montagu, John, 2 <sup>nd</sup> Duke of Montagu	1740-1742 and 1742-1749
Montjoy, 1 <sup>st</sup> Earl of Newport	1634-1642
Morris (or Marys of Morice), Sir Christopher	1536-1543
Mote (or Meyte), Patrick de la	1484-?
Murray, Sir George	1834-1835 and 1841-1846
Musgrave, Sir Christopher (in commission with Sir William Hickman and Sir John Chicheley)	1679-1682
Newport, William	?-1506
Norton, Sir Sampson	1494-1495 and 1511
Paget, Henry William, 1 <sup>st</sup> Marquess of Anglesey	1827-1828 and 1846-1852
Par, Gilbert	1437-?
Pendlebury, James	1710-1731(?)
Phipps, Henry, 1 <sup>st</sup> Earl of Mulgrave	1810-1819
Pitt, John, 2 <sup>nd</sup> Earl of Chatham	1801-1806 and 1807-1810
Ralph, 1 <sup>st</sup> Lord Hopton of Stratton	1644-1649
Savage, Richard, 4 <sup>th</sup> Earl Rivers	1712(?)
Schomberg, Frederick, 1 <sup>st</sup> Duke of Schomberg	1689-1690
Seymour, Sir Thomas (afterwards 1 <sup>st</sup> Lord Seymour of Sudeley)	1543-1547
Sidney, Sir Philip (joint master)	1585-1586
Sidney of Sheppey, Henry, 1 <sup>st</sup> Earl of Romney	1693-1702
Skeffington, Sir William	1515-1536
Somerset, Fitzroy James Henry, 1 <sup>st</sup> Baron Raglan	1852-1855
Southwell, Sir Richard	1554-1560
Spencer, Charles, 3 <sup>rd</sup> Duke of Marlborough	1755-1758
Stafford, Sir Thomas (acting)	1629-1634
Sturgeon, John	1477-1482
Townshend, George, 4 <sup>th</sup> Viscount Townshend	1772-1782 and 1783-1784
Vaughan, Thomas	1450-1456 and 1460
Vere, Horace, 1 <sup>st</sup> Lord Vere of Tilbury	1629-1634
Vivian, Sir Richard Hussey, 1 <sup>st</sup> Bt.	1835-1841



Wallys, Bernardyne de	1536
Wellesley, Arthur, 1 <sup>st</sup> Duke of Wellington	1819-1827
Willoughby, Henry	1513
Wode, John	1463-1477

Note: The position was vacant from 1601 - 1603, 1606 - 1608, 1690 - 1693, 1745 - 1755, 1758 - 1759, 1770 - 1772 and 1855 - 1904).

## THE MEN IN CHARGE IN FRANCE

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### The “Maîtres Généraux et Grands-Maîtres de l’Artillerie”, the “Amiraux de France” and the “Grands-Maîtres de la Navigation”

In France, the charge of “Grand-Maître de l’Artillerie” and similarly named functions remained largely honorary since the fabrication of cannons and their use on the field was for a long time left in private hands, very much like in England. Charles VII and later Louis XI were the first to try and organize the production and maintenance of ordnance and their use on the battle field and the charge of “Grand-Maître de l’Artillerie” and similarly named functions became progressively better organized. It is only under Louis XIV, however that the first actual Artillery Regiments were created, to be exclusively in charge of the production and use of the artillery.

The charge of “Grand-Maître de l’Artillerie” in France was by and large comparable to the corresponding position in England, with the important exception that in France the guns to be made for and used by the army were the responsibility of the “Grand-Maître de l’Artillerie”, whereas the naval guns were to be produced, maintained, distributed and supplied with their ammunition, implements, carriages, etc., by the “Amiral”.

As for the “Amiral de France”, it was a title that was for a long time considered in France as a dignity belonging to the Crown and was frequently given to a “prince de sang”. The “Grand Amiral de France” ruled the whole of the Navy, including naval justice and naval police, including both the Navy and the Merchant Marine, which was also under the direct control of his administration. The “Grand Amiral” was giving the Captain’s commissions, his passport, and his substitutes signed all the everyday paperwork in the French trading harbours. All the “Ordonnances du Roy sur la Marine” was bearing the signature of the “Grand Amiral de France”.

The dignity was suppressed by Louis XII in 1627, but Louis XIII re-established it in 1669. The Assemblée Nationale after the Revolution suppressed it again, but it was re-established by Napoléon and confirmed by Louis XVIII. The title of “Grande Amiral” was suppressed forever after the 1830 Revolution, but it was replaced under Louis Philippe by three charges of “Amiral”, ranking with the “Maréchaux de France”.

The name and coat of arms of the “Grand Amiral de France” often features on naval guns from the time of Louis XIV on.

Between 1626 and 1669, the charge of “Amiral de France” changed name. A new charge, the one of “Grand-Maître, Chef et Surintendant Général de la Navigation et du Commerce de France” was created by the all powerful minister of Louis XIII, Cardinal de Richelieu, who meant to unify under his own authority the whole of the naval command. In 1627, he managed to have the charge of “Amiral de France” suppressed. He became “Amiral de Provence” or “Amiral des Mers du Levant” in 1631, as well as “Amiral de Bretagne”. In 1635, he also acquired the charge of “Général des Galères” (the galleys based in Toulon were traditionally a separate corps, not under the direct authority of the naval command). The Cardinal also had concentrated in his hands all the powers of the former “Secrétaire d’Etat” in charge of the Navy. Little by little, he managed to bring under his authority a number of separate jurisdictions. In 1627, he had created the “Conseil de Marine”, the Marine Council, whose function it was to examine the prizes of the privateers and also to prepare the maritime regulations as decided by the “Grand-Maître”. After his death, in 1642, the charge continued to be exercised, until its suppression in 1669.

**A LIST OF THE “MAÎTRES-GÉNÉRAUX”, “GRANDS-MAÎTRES DE L’ARTILLERIE”,  
“AMIRAUX DE FRANCE” AND “GRANDS-MAÎTRES DE LA NAVIGATION”**

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**In alphabetic order**

**“Maîtres-Généraux de l’Artillerie” (1461-1512):**

Bastet de Crussol, Louis, Lord of Crussol and of Florensac	1469-1472
Bournel, Guillaume, Lord of Lambercourt	1473-1477
Bureau, Jean	1439-?
Busserade (or Benserade), Paul de, Lord of Crépy	1504-1512
Cadiot, Gobert	1472-1473
Cholet, Jean, Lord of La Choletière	1477-1479
Guyot de Lauzières, Guy, Lord of Montreuil	1493-1495
La Grange, Jean de, Lord of Vieil-Châtel	1495-1501
Le Groing, Héliion	1469
Picart, Guillaume, Lord of Etelan	1479
Ricard de Genouillac, Jacques Galiot	1479-1493
Silly, Jacques de, Lord of Lonrai	1501-1504

**“Grands-mâtres de l’artillerie” (from 1512 to 1755):**

Babou, Jean, Lord of La Bourdaisière	1567-1569
Béthune, Maximilien de, Baron, then Marquess of Rosny, then Duke of Sully	1599-1610
Béthune, Maximilien II de, Marquess of Rosny, Prince of Henrichemont	1610-1629
Bourbon, Louis Ier Auguste de, Duke of Maine	1694-1736
Bourbon, Louis Charles, Count of Eu, Duke of Aumale	1736-1755
Coëffier de Ruzé, Antoine, Marquess of Effiat	1629-1634
Cossé, Charles Ier de, Count of Brissac	1547-1550
Crevant, Louis de, Duke of Humières	1685-1694
Daillon, Henry de, Count then Duke of Lude	1669-1685
D’Espinay, François, Lord of Saint-Luc	1596-1597
D’Estrées, Antoine IV, Marquess of Coeuvres	1597-1599
D’Estrées, Jean, Count of Orbec	1550-1567
Gontaut, Armand de, Baron of Biron	1569-1578
La Porte, Armand-Charles de, Duke of La Meilleraye, Mayenne and Rethelois-Mazarin	1646-1669
La Porte, Charles de, Marquess, then Duke of La Meilleraye	1634-1646
Philibert, Lord of La Guiche	1578-1596
Ricard de Gourdon de Genouillac, Jacques Galiot, Lord of Acier	1512-1546
Taix, Jean de, Lord of Taix	1546-1547



Note: The charge is suppressed in 1755.

**“Lieutenants généraux”:**

Chabot, Claude, Marquis de Saint Maurice in 1708

**“Amiraux de France”:**

d'Amboise de Chaumont, Charles II	1508-1511
d'Annebaut, Claude, Baron of Retz and La Hunaudaye	1543-1547
d'Artois Louis-Antoine, Duke of Angoulême	1814-1830
Batarnay de Joyeuse, Anne de, Baron of Arques, Duke of Joyeuse	1582-1587
Baudin, Charles	1854
Beauvoir de Chastellux, Georges de	1420
Bourbon, Louis de, Count of Roussillon	1466-1486
Bourbon, Louis de, Count of Vermandois	1669-1683
Bourbon, Louis Alexandre de, Count of Toulouse	1683-1737
Bourbon, Louis Jean Marie de, Duke of Penthièvre	1737-1791
Bracquemont, Robert de, said “Robinet”	1417-1418
Branças, André de, Lord of Villars	1594-1595
Bréban, Pierre de, known as “Clignet”	1405-1408
Brichanteau, Antoine de, Marquis of Nangis	1589-1590
Bruat, Armand Joseph	1855
Bueil, Jean V de	1450-1461
César, Duc de Vendôme et de Beaufort	1650-1655
Chabot, Philippe, Count of Charny	1525-1543
Charner, Léonard Victor	1864
Châtillon, Jacques 1 <sup>er</sup> de, Lord of Dampierre	1408-1415
Coëtivy, Prigent VII de, Lord of Rais	1439-1450
Coligny, Gaspard II	1552-1572
Courtenay, Edouard de	1439-14?? (appointed by Henri VI)
Culant, Louis de, Lord of Cullant and Châteauneuf	1421-1437
Duperré, Victor	1830
d'Estaing, Charles Henri	1792
Gontaut-Biron, Charles de	1592-1594
Gouffier de Bonnivet, Guillaume	1517-1525
Hamelin, Ferdinand	1854
La Trémoille, Louis II de, Viscount of Thouars, Prince of Valmont	1517
Lorraine, Charles de, Duke of Mayenne	1578-1582
Mackau, Ange-René-Armand de,	1847
Maillé, Armand de, Duc de Fransac, Marquis de Brézé	1643-1646
Mallet de Graville, Louis	1486-1508 and 1511-1516
Montauban, Jean de	1461-1466
Montfort de Laval de Lohéac, André de	1437-1439
Montmorency, Henri II de	1612-1626
Montmorency-Damville, Charles de, Duke of Damville	1596-1612
Murat, Joachim	1805-1814
Noailles, Antoine de	1547-1552
Nogaret, Bernard de	1589-1592

Nogaret de La Valette, Jean Louis, Duke of Epernon	1587-1589
Parseval-Deschennes, Alexandre Ferdinand	1854
Poix, Jean de, or de Tyrel	1418
Pole, William de la, Duke of Suffolk	1424-1437 (appointed by Henri VI)
Recourt, Charles de, Viscount of Beauvoir	1418-1419
Rigault de Genouilly, Charles	1864
Romain-Desfossés, Joseph	1860
Roussin, Albin-Reine	1840
Savoie, Honorat II de, Marquis of Villars	1572-1578
Tréhouart, François Thomas	1869
Truget, Laurent	1831
Vendôme, François de, Duc de Beaufort	1651-1669

Note: Between 1627 and 1669, the charge was called “**Grand-Maître, Chef et Surintendant Général de la Navigation et du Commerce de France**” (it was created by and to the benefit of the Cardinal of Richelieu and suppressed after the death of the Duke of Beaufort, in 1669):

Armand, Jean du Plessis, Cardinal Duke of Richelieu	1627-1642
Anne d’Autriche, Queen Regent	1646-1650
César, Duke of Vendôme	1650-1665
Maillé-Brézé, Jean Armand de, Duke of Fronsac	1642-1646
Vendôme, François de, Duke of Beaufort	1665-1669

## A LIST OF THE “TENENTES GENERAIS DA ARTILHARIA DO REINO”

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In alphabetic order

### IN THE ARMY OF PORTUGAL

Andrade, Manuel de	1659-1662
Andrade, Manuel de	1667-1673
Carvalho e Silva, Manuel Gomes de	1748-1754
Carvalho e Silva, Manuel Gomes de (son)	1754-1781
Chaves, Duarte Texeira	1698-1704
Chegaray, Fernando de	1716-1721
Correa Lucas, Rui	1640-1659
Cunha d'Eça, João da	1781-1788
Cunha d'Eça Telles de Menezes, José Xavier	1788-1792
Figuereido, Gomes Diogo de	1673-1684
Figuereido, Henrique Henriques de	1662-1663
Macedo e Vasconcelos, Amaro de	1721-1746
Macedo e Vasconcelos, José Antonio	1746-1748
Rebelo, Manuel Perreira	1684-1698
Saldanha de Albuquerque de Matos Coutinho e Noronha, João de	1704-1709
Sampaio, Manuel Barreto de	1663-1667
Soares, Diogo Luiz Ribeiro	1709-1715
Villa Verde, Bartolomeu Ferreira	1715-1716



**LIST OF THE “CAPITANES GENERALES”, “INSPECTORES” AND “DIRECTORES  
GENERALES”, ETC., “DE LA ARTILLERIA”**

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**In alphabetic order**

**IN THE ARMY OF SPAIN<sup>1</sup>**

Acuña y Vela, Don Juan de, CG de Artillería	1586-1609
Alava, Don Francisco de, CG de Artillería	1580-1586
Alava, Don Miguel de, TG de Artillería	1823
Alva de Liste, Count of, CG de Artillería	1660-1670(?)
Alvarez de Sotomayor, Don Martin, CG y IG de Artillería	1795-1797
Aragon, Don Pedro de, CG de Artillería	1670-1676
Aranda, the Count of, first General Director del Real Cuerpo de Artillería	1756-1758
Avila Fuente, the Marquess of, CG de Artillería	1650-1655
Barbara, Alonso and Tomas, Maestros Lombarderos for the Catholic Kings	1477
Campilo, Don José, one of the interim CG de Artillería during the period 1737, 1754	1740(?) - 1750(?)
Campo de Alange, the Count of, CG de Artillería ad interim	1793-1795
Cienfuegos, Don José, TG de Artillería	1823-1825
Coloma, Don Manuel, Marquess of Canales, CG de Artillería	1711-1713
Cornel, Don Antonio, IP ad interim	1799 and, again, 1809-1810
Eguía, Don Francisco de, DG ad interim	1810
Eslaba, Don Sebastian de, IG ad interim	c. 1753-1754
Expeleta, the Count of, DG y Coronel General de Artillería	1808
Garcia y Loygorri, Don Martin, DG de Artillería ad interim	1810-1812
Gazola, the Count of and de La-Croix, Don Maximiliano, together IGs de Artillería	1761-1763
Gazola, the Count of, sole IG del Real Cuerpo de Artillería	1763-1780
Godoy, Don Manuel, Principe de la Paz, Jefe Superior de Artillería and Navarro y Sangran, Don José, Teniente Coronel de Artillería	1803-1808 1805-1808
Grimaldo, Don José de, CG de Artillería ad interim	1713-1732(?)
Guzman, Don Diego Felipe de, Marquess of Leganés, CG de Artillería	1630-1645
Ibarra, Don Joaquin de, Subinspector ad interim del Cuerpo de Artillería	1825

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<sup>1</sup> From Salas, Ramon de, *Memorial Historico de la Artillería Española*, Madrid, 1831, the reader is referred for more details, and other sources.

Lacy, the Count of, IG de Artillería	1780-1793
Lozcana, the Marquess of, CG de Artillería	1645-1650
Mariani, the Count of, first TG, also IG de Artillería	1732-1737
Massones, Don Jayme, DG ad interim	1758-1761
Maturana, Don Vicente Maria, Coronel General y Director de Artillería	1808-1809
Megia, Don Diego, CG de Artillería	1627-1630
Mendoza, Don Julio de, Marquess of San German and of La Hinojosa, CG de Artillería	1609-1627
Montemar, the Duke of, TG y IG de Artillería ad interim	1737-?
Morla, Don Tomas de, Director y Coronel General de Artillería	1808
Munarriz, Don Juan Manuel, Subinspector del Cuerpo de Artillería	1822-1823
Nuño de Tavora, Don Juan, CG de Artillería	1678-1711
O-Donell, Don Carlos, TG de los Reales Ejercitos	1825-1830
O-Farril, Don Gonzalo, Director y Coronel General de Artillería	1808 (March 21 to April 6)
Ramirez, Francisco, Maestro Bombardero of the Catholic kings	1489-?
Revilla-Gigedo, the Count of, IG de Artillería	1797-1799
Rey, Don Juan del, IG de Artillería	1754-1756
San Esteban, Conde of, CG de Artillería	1660-1670
Somodevilla, Don Cenon, Marquess of the Ensenada, IG ad interim	c. 1750(?)
Urrutia, Don José de, Inspector y Commandante General del Real Cuerpo de Artillería	1799-1803
Ustariz, the Marquess of, IG de Artillería ad interim	c. 1740(?)
Zacarias, Micer Domingo, Maestro mayor de la Artillería Española for the Catholic Kings	1475-1477

Note: From April 9, 1655 to 1660, the charge of CG de Artillería was held by a group of three members of the “Consejo Supremo de la Guerra”.

NB: The above list concerns the “old” Kingdom of Spain and does not include the other Spanish Kingdoms and possessions where Spanish guns were cast also, under the authority (and occasionally bearing the name) of the local Captain General of the Artillery, such as the Vice Royalties of Peru and New Spain (Mexico), the Kingdom of Naples, the Duchy of Milan, the County of Flanders (considerable gun-founding activity).

## IN THE ARMY OF FLANDERS (1567-1707)

Agurto y Salcedo, Francisco Antonio de, Marquess of Gastañaga, Knight of the Order of Alcántara (1662)	1679-1682
Berlaymont, Charles de, Baron of Hierges, Count of Berlaymont	1577-1579
Blois, Louis II de, Lord of Trélon, Craigne and Fresnoy	1574-1577
Borja y Velasco, Iñigo de, Knight and Commander of Santiago	1621-1622
Brimeu, Charles de, Count of Megem, Lord of Humbercourt	1567-1572
Cantelmo, Andrea, previously CG del Ejército de Aragón	1642-1643
Fontaine, Paul-Bernard de, Count of S.R.I., Lord of Fougerolles, Maestre de Campo General del Ejército de Flandes	1638-1642
Gamarra y Contreras, Esteban de, Knight of Santiago (1624)	1652-1653
Henin, Pierre de, Third Count of Boussu, Lord of Brevy	1597
La Cueva-Benavides y Enriquez, Isidro Melchior de, Fifth Marquess of Bedmar, Knight of Calatrava and of the Saint-Esprit, Commander of the Order of Santiago	1682-1690
Leiva, Antonio Luis de, Fourth Prince of Ascoli, Fourth Marquess de Atella, Count of Monza	1582-1585
Licques, Jacques de, Lord of la Cressonnière	1572-1573
Longueval, Charles de, Count of Bucquoy, Knight of the Golden Fleece	1603-1621
Longueval, Charles Albert de, Count of Bucquoy, Baron of Vaulx, Knight of the Golden Fleece (1650), CG de la Caballería del Ejército de Flandes	1644-1645
Mansfeld-Friedeburg, Charles de, CG of Luxemburg ad interim	1585-1590
Mejía Felipez de Guzman, Diego, Marquess of Leganes, CG de la Caballería del Ejército de Flandes	1622-1625
Pardieu, Valentin de, Count of La Motte	1590-1595
Pignatelli, Nicolo de, Sixth Duke of Bisaccia, also General del Reino de Napoles, Coronel del Regimiento de Fusileros de la Artillería	1695-1705
Procope, François	1705-1707
Rye de la Palude, Claude de, Baron of Balançon and Romange, Lord of Vuillefans	1631-1638
Rye de la Palude, Philibert de, Count of Varax and of La Roche, Lord of Balançon	1595-1597
Sfondrati, Sigismondo, Marquess of Montafia, Knight of Calatrava (1621) and of the Golden Fleece (1650), Commander of Montemolin (1633) and of Santiago	1646-1652
Solis y Vargas Carvajal, Fernando de, Knight of Santiago (1644)	1653-1658



Van den Berg-S'Heerenberghe, Hendrik, Count of Berg, Lord of Boxmeer etc	1625-1631
Varas, Conde de, CG de Artillería	1574
Vega, Pedro Alvarez de, Fifth Count of Grajal, Third Marquess of Montaos, Lord of Villafuerte, Cervantes, Neira etc, Maestre de Campo General del Ejercitó de Flandes	1690-1695
Velasco y Alvear, Francisco Marcos de, First Marquess de Pico de Velasco, Knight of Santiago (1661)	1678-1679
Velasco y Henin, Fifth Count of Salazar, Fourth Marquess of Belveder, Knight of the Golden Fleece (1673)	1568-1574
Velasco y Velasco, Luis de, Marquess of Belvedere (1616), Second Count of Salazar (1621), CG de la Caballería Ligera del Ejercitó de Flandes	1598-1603
Villalpando y Enríquez de La Carra, José Funes de, Third Marquess of Osera and of Castañeda, Count of Ablitas	1674-1678

#### IN THE ARMY OF LOMBARDY (1535-1707)

Aguayo, Diego Manrique de, First Marquess of Santaella (1649), Knight of Santiago (1624)	1635
Aragón y Tafella, Martín de, Knight of Santiago, member of the Secret Council of Milan, CG de la Caballería Ligera del Estado de Milan	1636-1638
Brancaccio, Frey Giuseppe, Knight of the Order of Malte	1658-1665
Branchacho, Juan Bautista, CG de la Artillería in Naples	1693
Cárdenas y Manrique de Lara, Juan de, Knight of Santiago and Commander of Villarubia	1624-1633
Cardona, Ramón de,	1552-1555
Colmenero y Gattinara, Francisco, Count of Colmenero and of S.R.I. (1715-1719)	1702-1706
Córdoba Figueroa y Pimentel, Francisco Fernández de, Knight of San Juan de Jerusalem, Commander of Poyos y Peñalén (1702), Baillif of Lora (1719), CG de la Caballería Extranjera del Estado de Milan	1691-1693
Corella y Moncada, Jerónimo, Ninth Count of Cocentaina, Second Marquess of Almenara, Knight of Alcántara (1606)	1623
Dell Valle y Miranda, Pedro González, Maestre de Campo General del Ejército del Reino de Nápoles, member of The Secret Council of Milan (1650-1657)	1656-1657
Della Rena, Geri, Marquess of S.R.I., later General de la Artillería del Ejército de los Pinineos (1637), also Governor of the Arms of Rosellón (1638), member of the Secret Council of Milan	1635-1636
Fuentes, Conde de, CG de la Artillería in the States of Milan	early 17 <sup>th</sup> century

Garay de Rada y Otañez, Juan de, Marquess of Villarubia de Langre, Knight of Santiago (1629), Commander of Villarubia de Ocaña (1643), also Governor of Perpignan	1638-1639
La Cueva y Velasco, Pedro de, Lord of Torregalindo y el Portillejo, Knight of Santiago (1518) and of Alcántara (1531), Commander of the Queen in the Order of Santiago and Commander General of the Order of Alcántara, also CG de la Artillería de España,	1536-1541
Laguna, Juan Bravo de, Count of Montecastello (Consort), member of the Secret Council of Milan	1620-1623
Lara, Juan Manrique de, Lord of San Leonardo de Yagüe, Honria etc, Knight of Calatrava (1524) and of Clavero (1550)	1545-1550
Lara y Briceño, Jorge Manrique de, Count of Settimo and Desio, a member of the Secret Council of Milan	1575-1620
Lara y Sousa, Gaspar Manrique de, Knight of Santiago (1653), Maestre de Campo general del Ejército de Lombardia	1688-1691
Luján y Manrique, Fadrique Enriquez de, Lord of the House of Los Lujanes, Knight of Alcántara (1613), Commander of Heliche and Castilleja	1634-1635
Luna y Perez de Lugo, Manuel de, Knight of Santiago (1543), also Governor of Asti and of Cremona	1551-1552
Maggi, Cesare, Count of Annone, nicknamed “Cesaro di Napoli”	1555-1568
Medici, Gian Giacomo de, Marquess of Marignano, nicknamed “el Medeghino”	1543-1545
Monsoriu, Vicente, Maestre de Campo General del Reino de Nápoles (1648), Knight of Santiago (1637), member of the Secret Council	1648-1655
Moscoso y Montemayor, Cristóbal de, Count of Las Torres de Alcorrin, Duke of Algete and Marquess of Cullera, later Second Maestre de Campo General del Ejército de Lombardia (1702) and CG del Ejército del Reino de Valencia (1705)	1693-1702
Mújica Butrón y Valdés, Rrodrigo de, Lord of Araboyana de Mogica (1662), Maestre General de Campo del Reino de Sicilia	1646-1648
Napoles, César de, CG de la Artillería in Naples	1573
Orilla, Don Marcio, Marquess of Arillano, CG de la Artillería in Naples	1693
Padilla y Gaitán, Francisco de	1609-1620
Pedro ???	1568-1574
Ravenna, Benedetto di, TG de la Artillería de España	1542-1543
Serra, Giovanni Francesco, Second Marquess of Strevi, First Marquess of Almendralejo (1641), Maestre de Campo General del Ejército del Milanesado, Knight of Santiago (1640), member of the Secret Council	1642-1646
Sotello y Peinado, Antonio Arias, Knight of Santiago (1639)	1639-1642

Valdés, Fernando González de, from 1676 on, shared the Charge with the General de la Caballería, also a Maestre de Campo General	1671-1687
Velandila Arce y Arellano, Frey Iñigo de, Marquess of Tejada de San Llorente, Knight of the Order of San Juan de Jerusalem (1627), Baillif of Lora and Grand Prior of Castilla (1668), CG de la Caballería del Estado	1665-1670
Visconti, Vercellino Maria, Marquess of San Alessandro, Decurión and member of the Secret Council of Milan, Superintendent of the Fortifications of the State	1655-1656

### IN OTHER SPANISH POSSESSIONS

Sanchez de Moya, Francisco, CG de la Artillería in Cuba	1606
Silva, Don Géronimo de, CG de la Artillería in the Philippines	1622



## LINES OF SUCCESSION ON THE THRONES OF EUROPE DURING THE AGE OF ARTILLERY 14<sup>TH</sup>-19<sup>TH</sup> CENTURY

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Kings of Portugal  
Kings of Spain  
Kings of France  
Kings of England (and, from 1707 on, of the United Kingdom)  
Kings of Scotland  
Kings of Denmark  
Kings of Norway  
Kings of Sweden  
Rulers in the Spanish (Southern) Netherlands  
Rulers in the Independent (Northern) Netherlands  
Rulers in Switzerland  
Rulers and ruling bodies in the States that have later become part of Italy  
Kings of Italy  
Rulers in Austria  
Rulers in Germany  
Rulers and ruling bodies in the German States  
Emperors of Germany (or rather “Emperors of the Holy Roman German Empire”)

The most frequent marks and/or inscriptions cast on artillery pieces are the name or coat of arms or motto or symbol of the King that was on the throne at the time the gun was cast for his army or navy.

It is therefore of great importance that the reader find easily, the period during which the said King or ruler or ruling body was in power.

The following pages are meant to answer that need.

It will be noted that the above countries are NOT in alphabetical order, but in geographical order, in the same order that is, as the order of presentation of the MLP's LGAs and of the EAs.

The reason is history. A number of the Kings or rulers of the countries of Europe during the “Age of Artillery” (that is from the 14<sup>th</sup> century on) have at times reigned or ruled over several adjacent countries, the result being that the cannons they have had cast were bearing the name, coat of arms or motto of one same King in two or three “countries”, which had been earlier or would later become different separated entities. One example is Portugal (ruled by a Spanish monarch, for dynastic reasons, from 1580 to 1640). Also the multiplicity of crowns traditionally worn by the King of Spain, who at times ruled on part of what is now France: Burgundy, Franche-Comté, Flanders, as well as on part of Savoy and most of what is now northern and southern Italy, plus Sardinian and Sicily. Napoleon and Co., once ruled Spain and large parts of present-day Italy, Belgium and the Netherlands. Furthermore, at least one King of Spain, called himself “King of England” and inversely, several Kings of England, called themselves “King of France”, all this for real if tenuous residual historical reasons. But the claim is cast in bronze, for ever, on their cannons, as also in gold or in silver on their coinage. Traditionally also, a number of Austrian-German Emperors (Holy Empire) were Kings of Spain or of royal blood. What is now Belgium has been in turn Burgundian, Spanish, Austrian, French and Dutch. The mix-up of the three Scandinavian dynasties over the centuries requires long explanations, etc...

Studying the production of artillery by such “polycrowned” Kings in close geographical, West to East, and historical association brings much light to a complicated subject.

## **Kings of Portugal**

### Joanine or De Avis Dynasty:

D. João I (1383-1433)  
D. Duarte I (1433-1438)  
D. Afonso V (1438-1481)  
D. João II (1481-1495)  
D. Manuel I (1495-1521)  
D. João III (1521-1557)  
D. Sebastião I (1557-1578)  
D. Henrique I (1578-1580)

### Second Interregnum 1580 (in Açores until 1583):

#### Governors:

D. Jorge de Almeida  
D. João de Mascarenhas  
D. João Tello de Menezes  
D. Diogo Lopes de Sousa  
D. Francisco de Sá Menezes  
D. Antonio I (1580-1583)

### Philips Dynasty:

D. Felipe I (1580-1598)

D. Felipe II (1598-1621)

D. Felipe III (1621-1640)

### De Bragança Dynasty:

D. João IV (1640-1656)

D. Afonso VI (1656-1667)

D. Pedro, Principe Regente (1667-1683)

D. Pedro II (1683-1706)

D. João V (1706-1750)

D. José I (1750-1777)

D. Maria I (1777-1816) with her husband and uncle, Pedro III

D. João, Principe Regente (1799-1816)

D. João VI (1816-1826)

D. Pedro IV (1826-1828)

D. Miguel I (1828-1834)

D. Maria II (1834-1853)

D. Pedro V (1853-1861)

D. Luís I (1861-1889)

D. Carlos I (1889-1908)

## **Kings of Spain**

Ferdinand and Isabel (1504-1516)

Felipe I (1504-1506)

Jeanne I (1504-1516)

Carlos I (1516-1555) (called Carlos V since 1519)

Felipe II (1555-1598)

Felipe III (1598-1621)

Felipe IV (1621-1665)

Carlos II (1665-1700)

### Bourbon Dynasty:

Felipe V (1700-1746)

Luis I (1724)

Fernando VI (1746-1759)

Carlos III (1759-1788)

Carlos IV (1788-1808)

### Imposed by France:

José Napoleon (1808-1813)

### Return of the Bourbons:

Ferdinand VII (1808-1833, in exile until 1814)

Isabel II (1833-1868)

Carlos IV (1833-1840) Pretender

Provisional Government (1868-1871)

Amadeo I (1871-1873)

1<sup>st</sup> Republic (1873-1874)

Carlos VII (1872-1875) Pretender

Alfonso XII (1874-1885)

Regency (1885-1886)

Alfonso XIII (1886-1931)

## **Kings of France**

### Valois Dynasty:

Philippe VI (1328-1350)  
Jean le Bon (1350-1364)  
Charles v (1364-1380)  
Charles VI (1380-1422)  
Charles VII (1422-1461)  
Louis XI (1461-1483)  
Charles VIII (1483-1498)  
Louis XII (1498-1515)  
François I (1515-1547)  
Henri II (1547-1559)  
François II (1559-1560)  
Charles IX (1560-1574)  
Henri III (1574-1589)

### Bourbon Dynasty:

Henri IV (1589-1610)  
Louis XIII (1610-1643)  
Louis XIV (1643-1715)  
Louis XV (1715-1774)  
Louis XVI (1774-1792)

### First Republic:

Convention (1792-1795)  
Directory (1795-1799)  
Consulate: Napoleon, Consul (1799-1804)

### First Empire:

Napoleon I, Emperor (1801-1814)  
Les Cent Jours (Napoleon 1815)

### Restoration (Bourbons):

Louis XVIII (1814-1824)  
Charles X (1824-1830)

### July Monarchy (Bourbons-Orleans):

Louis Philippe I (1830-1848)

### Second Republic:

Louis Napoleon Bonaparte (1848-1852)

### Second Empire:

Napoleon III, Emperor (1852-1870)

### Third Republic (1871-1940)

## **Kings of England (and, from 1707 on, of the United Kingdom)**

Edward II (1307-1327)  
Edward III (1327-1377)  
Richard II (1377-1399)  
Henri IV (1399-1413)  
Henri V (1413-1422)  
Henri VI (1422-1461)  
Edward IV (1461-1483)  
Edward V (1483-1483)  
Richard III (1483-1485)

### Tudor Dynasty:

Henri VII (1485-1509)  
Henri VIII (1509-1547)  
Edward VI (1547-1553)  
Mary I (1553-1558)  
Elizabeth I (1558-1603)

### Stuart Dynasty:

James I (1603-1625)  
Charles I (1625-1649)

### Commonwealth:

Cromwell (1649-1660)

### Stuart Dynasty:

Charles II (1660-1685)  
James II (1685-1688)  
William III (1689-1702)  
Anne (1702-1714)

### Hanover Dynasty:

George I (1714-1727)  
George II (1727-1760)  
George III (1760-1820)  
George IV (1820-1830)  
William IV (1830-1837)  
Victoria (1837-1901)



### **Kings of Scotland**

James I (VI) (1567-1625)  
Charles I (1625-1649)  
Charles II (1649-1685)  
James II (VII) (1685-1689)

William and Mary (1689-1694)  
William III (II) (1694-1702)  
Anne (1702-1709)

### **Kings of Denmark**

Christian I (1448-1481)  
Hans I (1481-1513)  
Christian II (1513-1523)  
Frederik I (1523-1533)  
Christian III (1534-1559)  
Frederik II (1559-1588)  
Christian IV (1588-1648)  
Frederik III (1648-1670)

Christian V (1670-1699)  
Frederik IV (1699-1730)  
Christian VI (1730-1746)  
Frederik V (1746-1766)  
Christian VII (1766-1808)  
Frederik VI (1808-1839)  
Christian VIII (1839-1848)  
Frederik VII (1848-1863)  
Christian IX (1863-1906)

### **Kings of Norway**

Danish until 1814  
Swedish until 1905

### **Kings of Sweden:**

Part of the Scandinavian Confederation  
(1397-1520) and therefore under the  
Danish Crown. Then independent.  
Gustav I Vasa (1523-1560)  
Erik XIV (1560-1568)  
Johan III (1568-1593)  
Sigismund III Vasa (1592-1599)  
Karl IX, Regent (1595-1604)  
Karl IX (1604-1611)  
Gustav II Adolf (1611-1632)  
Kristina (1632-1654)  
Karl X (1654-1660)

Karl XI (1660-1697)  
Karl XII (1697-1718)  
Ulrica Eleanora (1718-1720)  
Frederik I (1720-1751)  
Adolf Frederik (1751-1771)  
Gustav III (1771-1792)  
Gustav IV Adolf (1792-1809)  
Karl XIII (1809-1818)  
Karl XIV Johann (1818-1844)  
Oscar I (1844-1859)  
Karl XV (1859-1872)  
Oscar II (1872-1907)

### **Rulers in the (Southern) Netherlands (approximately present-day Belgium)**

Burgundian domination (Dukes of):	Albert and Isabelle (1598-1621)
Philippe le Bon (the Good) (1421-1467)	Felipe IV (1621-1665)
Charles le Téméraire (the Bold) (1467-1477)	Charles II (1665-1700)
First Austrian domination (1477-1506):	Felipe V (1700-1712)
Mary of Burgundy x Maximilien of Habsburg (1477-1482)	Second Austrian domination (1714-1795):
Philippe le Beau (the Fair) (1482-1506)	Archduke Charles; as Charles III, Pretender to the Spanish Throne (1703-1711); as Charles VI, Emperor (1711-1740)
Spanish domination (House of Austria):	French domination (1795-1806)
Charles V (1506-1555)	Louis Napoleon (1806-1810)
Felipe II (1555- 1598); with	Napoleon I (1810-1814)
Governors: Marguerite of Parma (1559-1567), the Duke of Alba (1567-1573)	Dutch domination (1815-1830)
	Independent (as Kingdom of Belgium) (1830 to today).

### **Rulers in the Independent (Northern) Netherlands (approximately present-day Holland)**

Stadhouders:	William III of Nassau (1672-1702)
William I of Nassau, Prince of Orange (1559-1567 and 1572-1584)	Kings:
Frederic-Henri of Nassau, Prince of Orange (1625-1647)	William I (1815-1840)
William II of Nassau, Prince of Orange, (1647-1650)	William II (1840-1849)
	William III (1849-1890)
	Wilhelmina (1890-1948)

### **Rulers in Switzerland**

Appenzel:	Johann Conrad von Roggenbach (1656-1693)
Independent (1377-1411)	Johann Conrad II von Reinach-Hirzbach (1705-1737)
Divided in two Cantons: Ausser-Rhoden (Protestant) and Inner-Rhoden (Catholic)	Johann Sigismund von Roggenbach (1737-1793)
Both joined to the Canton of Santis (1797-1803)	Bern:
Independent (1803)	Imperial City (1218)
Basel (Basilea):	Canton (1353)
Johann Franz von Schonau (1651-1656)	Chur:
	Johann V Flugli von Aspermont (1601-1627)

- Joseph Mohr von Zernetz (1627-1635)  
 Johann VI Flugi von Aspermont (1636-1661)  
 Ulrich VI von Mont (1661-1692-  
 Ulrich VII von Federspiel (1692-1728)  
 Joseph Benedikt von Rost (1728-1754)  
 Bishop Johann Anton, Freiherr von Federspiel (1755-1777)
- Einsiedlen:  
 Batus Kuttel, Abbot (1780-1808)
- Fischingen:  
 Franz Troger (1688-1728)
- Freiburg (Friburg, Fribourg, Freyburg):  
 In the Swiss Confederation from 1481 on  
 Changed name during the Helvetian Republic period (became Sarine et Broye)  
 Change name back to Freiburg in 1803
- Geneva:  
 Canton and city, independent (1530-1798)  
 Occupied by France (1798-1813)  
 Independent (1813)  
 Joined to the Swiss Confederation (1815)
- Graubunden:  
 Canton from the 14<sup>th</sup> century  
 Joined the Swiss Confederation (1803)
- Haldenstein:  
 Thomas I (1609-1628)  
 Julius Otto (1628-1666)  
 Georg Philip (1666-1695)  
 Johann Lucius von Salis (1701-1722)  
 Gubert von Salis (1722-1737)  
 Thomas III von Salis (1737-1783)
- Luzern (Lucerne):  
 Joined the Swiss Confederation (1332)
- Muri:  
 Placidius von Zurlauben (1684-1723)  
 Neuchatel:  
 Henri II (1695-1663)
- Jean Louis (1663-1671)  
 Charles Paris (1671-1673)  
 Marie de Orleans-Nemours (1672-1707)  
 Friedrich I von Prussia (1707-1713)  
 Friedrich Wilhelm II, of Prussia (1786-1797)  
 Friedrich Wilhelm III, of Prussia (1797-1806)  
 Alexandre Berthier, Prince (1806-1814)  
 Friedrich Wilhelm III (1814-1840)
- Obwalden:  
 Part of the Canon of Unterwalden
- Reichenau-Tamins:  
 Johann Rudolf (1709-1723)  
 Thomas Franz (1723-1740)  
 Johann Anton (1742-1765)
- Rheinhuu:  
 Gerold II von Zurlaben (1697-1735)
- St. Gall (St. Gallen):  
 Beda Angehrn Von Hagenwyl, Abbot (1767-1796)
- Schaffhausen:  
 Joined the Swiss Confederation (1501)
- Schwyz (Schwytz, Suitensis):  
 One of the three first Cantons of the Swiss Confederation (1291)
- Sitten:  
 Hildebrand (1565-1604)  
 Franz Friedrich am Buel (1760-1780)
- Solothurn (Solodornensis, Soleure):  
 Joined the Swiss Confederation (1481)
- Unterwalden (Subsilvania):  
 One of the three first Cantons of the Swiss Confederation (1291)
- Uri (Uranie):  
 One of the three first Cantons of the Swiss Confederation (1291)
- Zug (Tugium, Tugiensis):  
 Joined the Swiss Confederation (1352)
- Zurich (Thicurinae, Thuricensis, Tirurinae, Tiricensis):  
 Joined the Swiss Confederation (1351)



## Rulers and ruling bodies in Switzerland

Independent Confederation (1648-1798)  
French Occupation (1798-1803), Helvetian Republic imposed by the Directory  
Independent (1815)

## Rulers and ruling bodies in the Italian States

Arquata: Francesco Gonzaga (1593-1616)  
Filippo Spinola (1641-1667) Ferdinand Gonzaga (1616-1678)  
Giulio Spinola, Marquis (1661-1691) Carlo (1678-1680)  
Gerardo Spinola (1682-1694) Ferdinand II (1680-1723)

Bardi: Cispadne Republic:  
Federico Landi (1590-1627) 1796-1797

Belgiojoso: Cisterna:  
Antonio I Barbiano (1769-1779) Giacomo Dell Pozzo (1670-1696)

Belmonte: Correggio:  
Anthony Pignatelli (17??-17??) Camillo (1597-1605)  
Sirus (1605-1630)

Bozzolo: Desana:  
Giulio Cesare Gonzaga (1593-1609) Antonio Maria Tizzone (1598-1614)  
Scipione Gonzaga (1609-1670) Carlo Giuseppe Francesco Tizzone  
(1641-1676)

Cagliari: Emilia (Emilia-Romagna):  
Felipe V of Spain (1700-1714) Under nominal control of the Papacy  
Carlos III of Spain, Pretender (1734- until 1796  
1759) Incorporated in the Italian Republic and  
the Kingdom of Napoleon (1796-1814)  
Returns to the Papacy (1815)

Campi: Gazzoldo:  
Carlo Centurioni (1654-1663) Francesco Ippoliti (1616-1632)  
Giovanni Battista Centurione (1663- Hannibal Delgi Ippoliti (1632-1666)  
1715)

Casale: Genoa:  
Vicenzo I Gonzaga (1587-1612) Republic in the Middle Ages  
Francesco IV Gonzaga (1612) Remodelled into the Ligurian Republic  
Ferdinand Gonzaga (1612-1626) by Napoleon (1798)  
Vicenzo II Gonzaga (1626-1627) Incorporated in the Kingdom of  
Carlo I Gonzaga (1627-1637) Napoleon (1805)  
Carlo II Gonzaga (1637-1655) Incorporated in the Kingdom of Sardinia  
Ferdinand Carlo Gonzaga (1665-1708) (1815)

Castiglione dei Gatti: Guastalla:  
Hercules and Cornelius Pepoli (or Ferrante II Gonzaga (1575-1630)  
Pepli)  
Alessandro and Sicinius Pepli (1703- Livorno:

Cartiglione delle Stiviere:

- Ferdinand II Medici (1621-1670)  
 Cosimo III Medici (1670-1723)  
 Giovanni Gastone Medici (1723-1737)
- Loano:  
 Giovanni Andrea Doria I (1560- 1606)  
 Giovanni Andrea Doria II (1622-1640)  
 Giovanni Andrea Doria III (1654-1737)
- Lombardy-Venetia:  
 France (until 1814)  
 Austria (until 1859 and 1866)
- Lucca (Luca, Lucensis, Lucca and Piombino):  
 Republic (1369-1799)  
 Felix and Elisa Bonaparte, Prince and Princess (1805-1814)  
 Maria Luisa di Borbone, Duchess (1817-1824)  
 Carlo Lodovico di Borbone, Duke (1824-1847)
- Maccagno:  
 Giacomo III Mandelli (1618-1645)  
 Giovanni Francesco Mandelli (1645-1668)
- Mantua (Mantova):  
 Vincenzo I Gonzaga (1587-1612)  
 Francesco IV Gonzaga (1612)  
 Ferdinand Gonzaga (1612-1626)  
 Vincenzo II Gonzaga (1626-1627)  
 Carol I Gonzaga (1627-1637)  
 Carol II Gonzaga (1637-1665)  
 Ferdinand Carol Gonzaga (1665-1707)  
 Austria (1708-1797)  
 Cisalpine Republic (1797-1802)  
 Italian Republic (1802-1805)  
 Napoleonic Kingdom of Italy (1805-1814)  
 Austria (1814-1866)
- Massa di Lunigiano:  
 Alberico I Cybo Malaspina, Prince of Massa (1568-1623)  
 Carlo I Cybo Malaspina (1623-1662)  
 Alberico II Cybo Malaspina (1662-1690)
- Messerano:  
 Francesco Filiberto Ferrero Fieschi (1584-1629)  
 Paolo Besso Ferrero Fieschi (1629-1667)  
 Francesco Ludovico Ferreo Fiecshi (1667-1685)  
 Carlo Besso Ferrero Fieschi (1685-1690)
- Milan:  
 Spain (until 1714)  
 Austria (until 1796 and 1814-1859)  
 France (until 1814)  
 Italia (1859-1946)
- Mirandola:  
 Alexander I (1602-1637)  
 Alexander II (1637-1691)
- Modena (Mutina):  
 Cesare d'Este (1598-1628)  
 Francesco I d'Este (1629-1658)  
 Alfonso IV d'Este (1658-1662)  
 Francesco II d'Este (1662-1694)  
 Francesco III d'Este (1737-1780)  
 Ercole (Hercuils) III d'Este (1780-1796)  
 Napoleon Kingdom of Italy (1796-1813)  
 The House of Austria-Este (from 1814 on)
- Naples & Sicily (Two Sicilies):  
 Spain:  
 Felipe IV of Spain (1621-1665)  
 Carlos II (1665-1700)  
 Felipe V of Spain (1700-1713)
- Bourbons:  
 Carlo III (1734-1759)  
 Ferdinando IV, 1<sup>st</sup> reign (1759-1799)  
 Neapolitan Republic (1799)  
 Ferdinando IV, 2<sup>nd</sup> reign (1799-1805)  
 Joseph Napoleon (1806-1808)  
 Joachim Murat (Gioacchino Napoleone) (1808-1815)

- Ferdinando IV, restored in Naples (1815-1816)  
 Ferdinando IV, as King of the Two Sicilies (1816-1825)
- Two Sicilies :  
 Francesco I (1825-1830)  
 Ferdinand II (1830-1859)  
 Francesco II (1859-1869)
- Parma:  
 Ranuccio Farnese I (1592-1622)  
 Odoardo Farnese (1622-1646)  
 Ranuccio Farnese II (1646-1694)  
 Francesco Farnese I (1694-1727)  
 Filippo di Borbone (1737-1765)  
 Ferdinando di Borbone (1765-1802)  
 Marie Luigia, Duchess (1815-1847)  
 Carlo II di Borbone (1847-1849)  
 Carlo III di Borbone (1849-1854)  
 Roberto di Borbone (1854-1858)
- Piacenza (Placentia):  
 Ranuccio Farnese I (1592-1622)  
 Odoardo Farnese (1622-1646)  
 Maria Theresa, as Duchess of Piacenza (1740-1744)  
 Carlo Emmanuel III of Sardinia, as Duke of Piacenza (1744-1745)  
 Felipio di Borbone, as Duke of Parma and Piacenza (1748-1765)  
 Ferdinando di Borbone (1765-1802)
- Piombino:  
 Niccolo Ludovici (1634-1665)  
 Giovanni Baptiste Ludovici (1665-1669)
- Pisa:  
 Ferdinand I de Medici (1595-1608)  
 Cosimo II de Medici (1608-1620)  
 Ferdinand II de Medici (1620-1670)  
 Cosimo III de Medici (1670-1723)  
 Gian Gastone (1723-1737)  
 Francesco I Lorraine (1737-1765)  
 French occupation (1807-1814)
- Porcia:  
 Hannibal Alfonso Emmanuel (1704)
- Retegno (Trivulzio):  
 Hercules Teodoro Trivulzio (1656-1664)  
 Antonio Teodoro Trivulzio (1676-1678)  
 Antonio Gaetano Trivulzio-Galilo (1679-1705)  
 Antonio Tolomeo Trivulzio-Galilo (1707-1767)
- Ronco:  
 Napoleone Spinola (1647-1772)  
 Carlo Spinola (1699-1720)
- San Georgio:  
 Giovanni Dominic Milano (1731-1740)  
 Giacomo Francesco Milano (1740)
- Sardinia:  
 Carlo Emanuele I (1580-1630)  
 Vittorio Amedeo I (1630-1637)  
 Francesco Hyacint, under Regency of his mother Maria Cristina (1637-1638)  
 Carlo Emanuele II (1638-1675); under Regency of his mother Maria Cristina (1639-1648); under supposed Regency of Maurice and Thomas (1639-1641); alone as Duke (1641-1675)  
 Vittorio Amedeo II (1675-1730); under Regency of his mother Maria Giovanna Battista (1675-1680); alone as Duke (1680-1713); as King of Sicily (1713-1718); as King of Sardinia (1718-1730)  
 Carlo Emanuele III (1730-1773)  
 Vittorio Amedeo III (1773-1796)  
 Carlo Emanuele IV (1796-1802)  
 Vittorio Emanuele I (1802-1821)  
 Carlo Felice (1821-1831)  
 Carlo Alberto (1831-1849)  
 Vittorio Emanuele II (1849-1878)
- Sicily:  
 Carlos II of Spain (1665-1700)  
 Felipe V of Spain (1701-1713)



Victor Amadeus II of Savoy (1713-1720)  
 Carlos III (IV of Austria) (1720-1734)  
 Carlo III (Charles Bourbon) (1734-1759)  
 Ferdinando III (1759-1825) (became Ferdinando I in 1816 as King of Two Sicilies)  
 Ferdinando II (1830-1859)  
 Solferino:  
     Carlo Gonzaga (1640-1678)  
 Soragna:  
     Niccolo Meli-Lupi (1731-1741)  
 Tassarolo:  
     Agostino Spinola (1604-1616)  
     Filippo Spinola (1616-1688)  
 Trent:  
     Pietro Vigilius (1776-1800)  
 Tresana:  
     Guglielmo II Malasina (1613-1651)  
 Tuscany (Etruria) (Capital Florence):  
     Cosimo I de Medici (1537-1574)  
     Francesco I de Medici (1574-1587)  
     Ferdinando I de Medici (1587-1609)  
     Cosimo II de Medici (1609-1621)  
     Ferdinand II de Medici (1621-1670)  
     Cosimo III de Medici (1670-1723)  
     Giovanni Gaston de Medici (1723-1737)  
     Francesco III (1737-1746)  
     The same as Francesco I, Emperor (1746-1765)  
     Pietro Leopoldo (1765-1790)  
     The same as Leopoldo II, Emperor (1790-1792)  
     Ferdinando III (1791-1801)  
     Louis I (1801-1803)  
     Charles Louis, under Regency of his mother Maria Louisa (1803-1807)  
     Annexed to France (1807-1814)  
     Ferdinando III restored (1814-1824)  
     Leopoldo II (1824-1848, 1849-1859)  
     Provisional Government (1859)

United to Italian Provisional Government (1859-1861)  
 Urbino:  
     Francesco Maria II (1574-1624)  
 Vasto:  
     Cesare d'Avalos (1704-1729)  
 Venice (Venezia):  
     Marino Grimani (1595-1605)  
     Leonardo Dona (1605-1612)  
     Marco Antonio, Memmo (1612-1615)  
     Gianni Bembo (1615-1618)  
     Niccolo Dona (1618)  
     Antonio Priuli (1618-1623)  
     Francesco Contarini (1623-1624)  
     Gianni Cornea (1625-1629)  
     Niccolo Contarini (1630-1631)  
     Francesco Erizzo (1631-1646)  
     Francesco Molin (1646-1655)  
     Carlo Contarini (1655-1656)  
     Francesco Corner (1656)  
     Bertuccio Valier (1656-1658)  
     Gianni Pesaro (1658-1659)  
     Dominico Contarini (1659-1674)  
     Niccolo Sagredo (1675-1676)  
     Alois Contarini (1676-1684)  
     Marco Antonio Giustimani (1684-1688)  
     Francesco Morosini (1688-1694)  
     Sylvestre Valier (1694-1700)  
     Alois Mocenigo II (1700-1709)  
     Gianni Corner II (1709-1722)  
     Alois Mocenigo III (1722-1732)  
     Carlo Ruzzini (1732-1735)  
     Alois Pisani (1735-1741)  
     Pietro Grimani (1741-1752)  
     Francesco Loredano (1752-1762)  
     Marco Foscarini (1762-1763)  
     Alois Mocenigo IV (1763-1778)  
     Paolo Renier (1779-1789)  
     Lodovico Manin (1789-1797)  
     Franz II of Austria (1798-1806)  
 Ventimiglia:  
     Gianni VI (1725)

## Napoleonic Italy

Italian Republic :

Bonaparte (1802-1804)

Kingdom of Italy :

Napoleon I (1805-1814)

## Kings of Italy

Vittorio Emmanuele II (1870-1878)

Umberto I (1878-1900)

## Rulers in Austria

Lower Austria:

Albert IV The Patient (1395-1404)

Albert V (1404-1439)

Ladislav I The Posthumous (1440-1457)

Frederick V The Peaceful (1457-1493)

Albert V The Prodigal (1457-1463)

Upper Austria:

Frederick IV of the Empty Pockets (1406-1439)

Sigismund The Rich (1439-1490)

Maximilian I (1490-1493)

Austria reunited (Hapsburg Dynasty):

Charles I (1519-1521)

Frederick I (1521-1564)

Maximilian II (1564-1576)

Rudolf V (1576-1608) (= Rudolf II of the Holy German Empire and Rudolf I of Hungary)

Matthias II (1612-1619)

Ferdinand II (1618-1637)

Ferdinand III (1637-1657)

Leopold I (1657-1705)

Joseph I (1705-1711)

Charles VI (1711-1740)

Maria Theresa (1740-1780); with

Franz I (1745-1765); widow (1745-1780)

Joseph II (1765-1790); with his mother Maria Theresa (1765-1780); alone (1780-1790)

Leopold II (1790-1792)

Franz II (I) (1792-1835); as Franz II, Holy Roman Emperor (1792-1806); as Franz I, Austrian Emperor (1806-1835)

Ferdinand I (1835-1848)

Franz Joseph I (1848-1916)

(Nominal) rulers in what is, at present, loosely called “German territory”:

**“Emperors of the Holy Roman Germanic Empire” or “Roman Empire of the Occident” (as opposed to the Emperors of the Oriental Roman Empire, based at Constantinople since Constantine I). Dissolved by Napoleon.**

Charles IV (1355-1378)  
Sigismund (1433-1437)  
Friedrich III (1452-1493)  
Maximilien I (1493-1519)  
Charles V (1519-1556)  
Ferdinand I (1556-1564)  
Maximilien II (1564-1576)  
Rudolf II (1576-1612)  
Matthias I (1612-1637)  
Ferdinand II (1637-1657)  
Leopold I (1658-1705)  
Joseph I (1705-1711)  
Charles VI (1711-1740)  
Charles VII Albert (1742-1745)  
François I (1745-1765)  
Joseph II (1765-1790)  
Leopold II (1790-1792)  
François II (1792-1806)

**Rulers in “Germany”, in the modern sense of the Germanic Confederation” of 1815 — after the Congress of Vienna — which became the “German Empire” in 1871.**

Wilhelm I (also King of Prussia) (1871-1888)  
Wilhelm II (1888-1918)  
Friedrich III (1888)

**Rulers and ruling bodies in the semi-independent German States**

Aachen (Achen, Urbs Aquensis, Aquis Grani):  
Free City  
Part of France in 1801  
Annexed to Prussia in 1815  
Anhalt:  
1603-1618:

Johann Georg von Dessau  
Christian I von Bernburg  
Augustus von Plotzkau  
Rudolf von Zerbst  
Ludwig von Cothen  
1618-1621:  
Christian I von Bernburg

Augustus von Plotzkau  
 Rudolf von Zerbst  
 Ludwig von Cothen  
 Johann Kasimir von Dessau  
 Georg Aribert von Dessau  
 1621-1630:  
 Christian I von Bernburg  
 Augustus von Plotzkau  
 Ludwig von Cothen  
 Johann Kasimir von Dessau  
 Georg Aribert von Dessau  
 Johann von Zerbst  
 1670-1693:  
 Christian I von Bernburg  
 Viktor Amadeus von Bernburg  
 Wilhelm von Harzgerode  
 Carl Wilhelm von Zerbst  
 Emmanuel Lebrecht von Cothen  
 Anhalt-Bernburg:  
 Christian I (1603-1630)  
 Christian II (1630-1656)  
 Viktor I Amadeus (1656-1718)  
 Karl Friedrich (1718-1721)  
 Viktor II Friedrich (1721-1765)  
 Friedrich Albercht (1765-1796)  
 Alexius Friedrich Christian (1796-1834)  
 Alexander Carl (1834-1863)  
 Anhalt-Cothen:  
 Ludwig (1603-1650)  
 Wilhelm Ludwig (1650-1665)  
 Lebrecht von Plotzkau (1665-1669)  
 Emanuel von Plotzkau (1669-1670)  
 Emanuel Lebrecht (1671-1704)  
 Leopold (1704-1728)  
 August Ludwig (1728-1755)  
 Anhalt-Dessau:  
 Johann Georg I (1603-1618)  
 Johann Kasimir (1618-1660)  
 Johann Georg II (1660-1693)  
 Leopold I (1693-1747)  
 Leopold II Maximilian (1747-1751)  
 Leopold Friedrich Franz (1751-1817)  
 Leopold Friedrich (1817-1871)  
 Friedrich I (1871-1904)  
 Anhalt-Plötzkau:  
 August (1603-1653)  
 Lebrecht (1653-1665)  
 Anhalt-Zerbst:  
 Rudolf III (1603-1621)  
 Johann VI (1621-1667)  
 Carl Wilhelm (1667-1718)  
 Johann August (1718-1742)  
 Johann Ludwig and Christian August (1742-1746)  
 Christian August (1746-1747)  
 Johanna Elisabeth von Holstein-Gottorp, Dowager Princess Regent (1747-1752)  
 Friedrich August (1747-1793)  
 Arenberg:  
 Karl 1568-1616, prince 1576  
 Philip Karl (1616-1640)  
 Philip Franz (1640-1674), Duke 1644  
 Karl Eugen (1674-1681)  
 Philip Karl Franz (1681-1691)  
 Leopold Philip Karl (1691-1754)  
 Karl Leopold (1754-1778)  
 Ludwig Engelbert (1778-1820)  
 Augsburg:  
 Heinrich V von Knorrigen (1598-1646)  
 Gustavus Adolphs, Sweden (1632-1634)  
 Sigmund Franz, Archduke of Austria (1646-1665)  
 Johann Christof von Freiberg (1665-1690)  
 Alexander Sigismund von Pfalz-Neuburg (1690-1737)  
 Johann Franz von Stauffenberg (1737-1740)  
 Josef von Hesse-Darmstadt (1740-1768)  
 Clemens Wenzel, Prince of Poland and Saxony, Bishop (1768-1803)  
 Baden:  
 Wilhelm (1622-1677)



- Ludwig Wilhelm (1677-1707)  
 Ludwig Georg (1707-1761), under  
 Regency of his mother Francisca  
 Sibylla until 1727  
 August Georg (1761-1771)
- Baden-Durlach:  
 Georg Friedrich (1604-1622)  
 Friedrich V (1622-1659)  
 Friedrich VI (1659-1677)  
 Friedrich VII Magnus (1677-1709)  
 Karl IV Wilhelm (1709-1738)  
 Carl Friedrich, under guardianship of  
 Magdalena Wilhelmine  
 (grandmother) and Karl August  
 (uncle) (1738-1745); Marchgrave in  
 Durlach (1738-1771); Marchgrave  
 in all Baden (1771-1803); as Elector  
 (1803-1806); as Grand Duke  
 (1806-1811)  
 Carl Ludwig Friedrich (1811-1818)  
 Ludwig I (1818-1830)  
 Leopold I (1830-1852)  
 Ludwig II (1852-1856)  
 Friedrich I as Prince Regent (1852-  
 1856); as Grand Duke (1856-1907)
- Bamberg:  
 Johann Philip von Gebsattel (1599-  
 1609)  
 Johann Gottfried von Aschhausen  
 (1609-1622)  
 Johann Georg II, Fuchs von Dornheim  
 (1622-1633)  
 Franz, Graf von Hatzfeld (1633-1642)  
 Melchior Otto, Voight von Salzburg  
 (1642-1653)  
 Philip Valentin, Voight von Rieneck  
 (1653-1672)  
 Peter Philip von Dernbach (1672-  
 1683)  
 Marquard Sebastian, Schenk von  
 Staufenberg (1683-1693)  
 Lothar Franz, Freiherr von Schoenborn  
 (1693-1729)
- Friedrich Karl, Graf von Schoenborn  
 (1729-1746)  
 Johann Philip Anton Freiherr von  
 Frankenstein (1746-1753)  
 Franz Conrad, Graf von Stadion  
 (1753-1757)  
 Adam Friedrich, Graf von Seinsheim,  
 Bishop (1757-1779)  
 Franz Ludwig, Freiherr von Erthal,  
 Bishop of Bamberg and Wurzburg  
 (1779-1795)  
 Christoph Franz, Freiherr von Buseck,  
 Bishop (1795-1802)  
 Georg Karl von Fechenbach (1802-  
 1803)
- Bavaria:  
 Wilhelm IV (1508-1550)  
 Ludwig X (1516-1545), together with  
 Wilhelm IV  
 Albert V (1550-1579)  
 Wilhelm V (1579-1597)  
 Maximilian I (1598-1651)  
 Ferdinand Maria (1651-1679)  
 Maximilian II, Emanuel (1679-1726)  
 Karl Albert (1726-1744)  
 Maximilian III, Joseph (1745-1777)  
 Carl Theodor (1777-1799)  
 Maximilian IV, Joseph as Elector  
 (1799-1805)  
 Maximilian IV, as King Maximilian I,  
 Joseph (1806-1825)  
 Ludwig I (1825-1848)  
 Maximilian II (1848-1864)  
 Ludwig II (1864-1886)  
 Otto (1886-1913), Prince Regent  
 Luitpold (1886-1912)
- Bentheim-Bentheim:  
 Arnold Jobst (1606-1643)  
 Ernst Wilhelm (1643-1693)  
 Arnold Moritz Wilhelm (1693-1701)  
 Hermann Friedrich (1701-1731)  
 Friedrich Karl Philip (1731-1753)
- Bentheim-Tecklenburg-Rheda:  
 Adolf (1606-1623)

- Moritz (1623-1674)  
 Johann Adolf (1674-1701)  
 Friedrich Moritz (1701-1710)  
 Moritz Kasimir I (1710-1768)  
 Moritz Kasimir II (1768-1805)
- Biberach:  
 Free Imperial City (1312-1803)  
 Under the control of Baden (1803-1806)  
 Under the control of Württemberg (1806)
- Brandenburg-Ansbach:  
 Joachim Ernst (1603-1625)  
 Friedrich II, Albrecht and Christian (1625-1634)  
 Albrecht II (1634-1667)  
 Johann Friedrich (1667-1686)  
 Christian Albrecht (1686-1692)  
 Georg Friedrich II (1692-1703)  
 Wilhelm Friedrich (1703-1723)  
 Karl Wilhelm Friedrich (1723-1757)  
   under Regency of his mother,  
   Christine Charlotte until 1729  
 Alexander (1757-1791)
- Brandenburg-Bayreuth:  
 Christian (1603-1655)  
 Christian Ernst (1655-1712)  
 Georg Wilhelm (1712-1726)  
 Georg Friedrich Karl (1726-1735)  
 Friedrich (1735-1763)  
 Friedrich Christian (1763-1769)  
 Alexander (1769-1791)
- Brandenburg-Ansbach-Bayreuth:  
 Friedrich Wilhelm II of Prussia (1791-1797)  
 Friedrich Wilhelm III of Prussia (1797-1805)
- Brandenburg-Prussia:  
 Joachim Friedrich (1598-1608)  
 Johann Sigismund (1608-1619)  
 Georg Wilhelm (1619-1641)  
 Friedrich Wilhelm (1640-1688)  
 Friedrich III (1688-1701); as Friedrich I, King of Prussia (1701-1713)
- Bremen:  
 Johann Friedrich of Holstein-Gottorp (1596-1634)
- Bremen and Verden:  
 Swedish (1648-1719)
- Bretzenheim:  
 Carl August (1790-1803)
- Brunswick (Braunschweig):  
 Free City
- Brunswick-Bevern:  
 Ferdinand Albrecht I (1666-1687)
- Brunswick-Blankenburg:  
 Ludwig Rudolf (1714-1731)
- Brunswick-Lüneburg-Calenberg:  
 Georg I (1636-1641)  
 Christian Ludwig (1641-1648)  
 Georg II Wilhelm (1648-1665)  
 Johann Friedrich (1665-1679)  
 Ernst August (1679-1698)
- Brunswick-Lüneburg-Celle:  
 Ernst V (1592-1611)  
 Christian (1611-1633)  
 August, the Elder (1633-1636)  
 Friedrich V (1636-1648)  
 Christian Ludwig (1648-1665)  
 Georg II Wilhelm (1665-1705)
- Brunswick-Lüneburg-Dannenberg:  
 Julius Ernst (1598-1636)  
 August II, the Younger, in district of Hitzacker (1604-1635)
- Brunswick-Lüneburg-Calenberg-Hannover:  
 Georg Ludwig (George I of England) (1698-1727)  
 Georg II August (George II of England) (1727-1760)  
 Georg III, King of Great Britain (1760-1814)
- Brunswick-Wolfenbüttel:  
 Heinrich Julius (1589-1613)  
 Friedrich Ulrich (1613-1634)  
 August II (1634-1666)  
 Rudolf August (1666-1704)  
 Anton Ulrich, as Joint Ruler (1685-1704); alone (1704-1714)

- August Wilhelm (1714-1731)  
 Ludwig Rudolph (1731-1735)  
 Ferdinand Albrecht II (1735)  
 Karl I (1735-1780)  
 Karl Wilhelm Ferdinand (1780-1806)  
 Friedrich Wilhelm (1806-1815)  
 Karl II, under Regency of Georg III of Great Britain (1815-1820)  
 Karl II, under Regency of Georg IV of Great Britain (1820-1823)  
 Karl II (1823-1830)  
 Wilhelm (1831-1884)  
 Prussia rule (1884-1913)
- Cammin:  
 Kasimir of Pomerania (1574-1602)  
 Franz of Pomerania (1602-1618)  
 Ulrich of Pomerania (1618-1622)  
 Bogilsaus of Pomerania (1622-1637)  
 Ernst Bogislaus of Croy (1637-1650)
- Cleves (Cleve, Kleve):  
 Georg Wilhelm of Brandenburg-Prussia (1624-1640)  
 Friedrich Wilhelm of Brandenburg-Prussia (1640-1688)  
 Friedrich II of Brandenburg-Prussia (I of Prussia) (1688-(1701)-1713)  
 Friedrich Wilhelm I of Prussia (1713-1740)  
 Friedrich II (the Great) of Prussia (1740-1786)
- Cologne:  
 Ernst von Bayern (1583-1612)  
 Ferdinand von Bayern (1612-1650)  
 Maximilian Heinrich von Bayern (1650-1688)  
 Josef Clemens von Bayern (1688-1723)  
 Clemens August von Bayern (1723-1761)  
 Sede Vacante (1761)  
 Maximilian Friedrich, Graf von Koningsegg-Rothenfels (1761-1784)  
 Maximilian Franz von Osterreich (1784-1801)  
 Anton Viktor von Osterreich (1801)
- Constance:  
 Johann Georg von Hallwyl (1601-1604)  
 Jakob von Fugger (1604-1626)  
 Sixtus Werner von Prassberg (1626-1627)  
 Johann IV, Truchsess von Waldburg (1628-1644)  
 Johann Franz I von Prassberg (1644-1689)  
 Markwart Rudolf von Rodt (1689-1704)  
 Johann Franz II, Schenk von Staufenberg (1704-1740)  
 Damian Hugo von Schoenborn (1740-1743)  
 Kasimir Heinrich Anton von Sickingen (1743-1750)  
 Franz Conrad von Rodt (1750-1775)  
 Maximilian Christoph von Rodt (1775-1800)  
 Karl von Dalberg (1800-1802)
- Corvey (Corvei, Corbie, Corbey, Curbei):  
 Dietrich IV von Beringhausen (1585-1616)  
 Heinrich V von Aschenbrok (1616-1624)  
 Johann Christoph von Brambach (1624-1638)  
 Arnold IV von Waldois (1638-1661)  
 Christoph Bernhard von Galen (1661-1678)  
 Christoph von Bellinghousen (1678-1696)  
 Florenz von der Velde (1696-1714)  
 Maximilian von Horrich (1714-1721)  
 Karl von Pittersdorf (1722-1737)  
 Kaspar II von Boselager-Hohneburg (1737-1758)  
 Philip, Freiherr Spiegel von Disenberg (1758-1776)  
 Theodor, Abbot (1776-1793)  
 Ferdinand, Freiherr von Lunig (1794-1803)

Dortmund (Tremoniensis):

Annexed to Nassau-Dilenburg (1803)

Annexed to Prussia (1815)

East Frisland:

Enno III (1599-1625)

Rudolph Christian (1625-1628)

Ulrich II (1628-1648)

Enno IV Ludwig (1648-1660)

Georg Christian (1660-1665)

Christine Charlotte, Regent (1665-1690)

Christian Eberhard (1665-1708)

Georg Albrecht (1708-1734)

Karl Edzard (1734-1744)

Friedrich II (the Great) of Prussia (1740-1786)

Friedrich Wilhelm II (of Prussia) (1786-1797)

Friedrich Wilhelm III (of Prussia) (1797-1807)

George IV (of Great Britain) (1815-1820)

Eichstatt (Eichstadt):

Johann Conrad von Gemmingen (1595-1612)

Johann Christoph von Westerstetten (1612-1636)

Marquard II, Schenk von Castell (1636-1685)

Johann Eucharius, Schenk von Castell (1685-1697)

Johann Martin von Eyb (1697-1704)

Johann Anton I Knebel von Katzenellenbogen (1705-1725)

Sede Vacante (April 27-July 3 1725)

Franz Ludwig, Schenk von Castell (1725-1736)

Johann Anton II von Feriberg-Hopferau (1736-1757)

Raimund Anton, Graf von Strasoldo (1757-1781)

Sede Vacante (1781)

Johann Anton III, Freiherr von Zehmen (1781-1790)

Sede Vacante (1790)

Joseph, Graf von Stubenberg (1790-1802)

Einbeck (Eimbeck):

City (1274) Member of the Hanseatic League

Seat of the Dukes of Brunswick-Grubenhagen

Erbach:

Georg IV (1565-1605)

Friedrich Magnus von Erbach-Reichenberg-Furstenau (1605-1618)

Ludwig II von Erbach (1605-1683)

Johann Kasimir von Erbach-Wildenstein-Breuberg (1605-1627)

Georg Albrecht I von Erbach (1605-1647)

Georg Ludwig I (1647-1693)

Philip Ludwig (1693-1720)

Friedrich Karl (1720-1731)

Georg Wilhelm (1731-1757)

Franz (1757-(1806)-1823)

Erfurt:

Free City (1601-1631)

Swedish occupation (1631-1648)

Emerich Josephn Freiherr von Brielbach Buresheim (1764-1774)

Friedrich Karl Joseph, Freiherr von und zu Erthal, Archbishop (1774-1802)

Essen:

Margaretha Elisabeth, Gräfin von Manderscheid-Geroldstein (1598-1604)

Elisabeth IX von Berg (1604-1614)

Maria Clara, Gräfin von Spaur (1614-1644)

Anna Eleonora, Gräfin von Stauffen (1645-1646)

Anna Salome I, Gräfin von Salm-Reifferscheidt (1646-1688)

Anna Salome II, Gräfin von Manderscheid-Blankenheim (1689-1691)



- Bernhardine Sophie, Gräfin von Ostfriesland-Ritberg (1691-1726)  
 Francesca Christine, Gräfin von Pfalz-Sulzbach (1726-1776)  
 Maria Kunigunde, Gräfin von Sachsen (1776-1803)
- Esslingen:  
 Free Imperial City from 1209 on  
 Passed to Württemberg (1802)
- Frankfurt:  
 Karl Theodor von Dalberg (1810-1815)
- Freiburg-im-Breisgau:  
 Free City from the 12<sup>th</sup> century  
 Hapsburg possession (1368-1803)  
 United to Baden (1805)
- Freising:  
 Ernst, Herzog von Bayern (1566-1612)  
 Stefan von Sieboldsdorf (1612-1618)  
 Veit Adam von Gebeck (1618-1651)  
 Albert Sigismund, Herzog von Bayern (1652-1685)  
 Joseph Clemens, Herzog von Bayern (1685-1694)  
 Johann Feanz Eckher, Feriherr von Kapfing (1695-1727)  
 Johann Theodor von Bayern (1727-1763)  
 Clemens Wenzel von Sachsen (1763-1768)  
 Ludwig Joseph, Freiherr von Welden (1769-1788)  
 Joseph Conrad (1790-1803)
- Friedberg:  
 Johann Eberhard von Cronberg (1577-1617)  
 Konrad Low von Steinfurt (1617-1632)  
 Wolf Adolf von Karben (1632-1671)  
 Johann Eitel von Diede zu Furstenstein (1671-1685)  
 Philip Adolf Rau von Holzhausen (1685-1692)
- Johann IV Schiltz von Gortz (1692-1699)  
 Adolf Johann Karl von Bettendorf (1700-1705)  
 Johann V von Steinfurt (1706-1710)  
 Johann Erwin von Greiffenklau-Vollraths (1710-1727)  
 Hermann II von Riedesel zu Lauterbach (1727-1745)  
 Johann Eitel II von Diede zu Furstenstein (1745-1748)  
 Ernst Ludwig von Breidenbach zu Breidenstein (1749-1755)  
 Franz Heinrich von Dalberg (1755-1776)  
 Johann Maria Rudolph von Waldbott-Bassenheim (1777-1805)  
 Clemens August von Westphalen (1805-1818)
- Fugger-Babenhausen:  
 Maximilian II zu Babenhausen (1598-1629)  
 Johann III zu Babenhausen (1598-1633)  
 Sebastian zu Kirchheim-Worth, guardian of Sigmund Joseph and Johann Rudolf zu Babenhausen (1668-1677)  
 Johann Rudolph zu Babenhausen (1685-1693)  
 Sigmund Joseph zu Babenhausen (1685-1696)
- Fugger-Nordendorf:  
 Marquard zu Nordendorf (1601-1624)  
 Nikolaus zu Nordendorf (1611-1676)
- Fulda:  
 Balthasar von Dernbach (1570-1606); under control of the Teutonic Order (1576-1602)  
 Johann Friedrich von Schwalbach (1606-1622)  
 Johann Bernhard, Schenk von Schweinsberg (1623-1632)

- Johann Adolf von Hoheneck (1633-1635)  
Hermann Georg von Neuhof (1635-1644)  
Joachim von Graveneck (1644-1671)  
Bernhard Gustav Adolf, Markgraf von Baden (1671-1677)  
Placidus von Droste zu Erwitte (1678-1700)  
Adalbert I von Schleifras (1700-1714)  
Konstantin von Buttlar (1714-1726)  
Adolf von Dalberg (1726-1737)  
Amandus Freiherr von Buseck (1737-1756)  
Adalbert II von Walderdorf (1757-1759)  
Heinrich VIII, Freiherr von Bibra (1759-1788)  
Sede Vacante (1788)  
Adalbert III von Harstall (1788-1803)
- Furstenberg-Stuhlingen:  
Friedrich Rudolf (1614-1655)  
Franz Maximilian (1655-1681)  
Prosper Ferdinand (1681-1704)  
Joseph Wilhelm Ernst (1704-1762)  
Joseph Wenzel (1762-1783)  
Joseph Maria Benedict (1783-1796)  
Karl Joachim (1796-1804)  
Karl Egon (1804-1854)
- Furstenberg-Purglitz:  
Karl Egon I (1762-1787)  
Philip Maria Josef (1787-1790)  
Karl Gabriel Maria (1790-1799)  
Karl Egon II (1799-1804)
- Furth:  
Swedish (1632-1806)  
Passed to Bavaria (1806)
- Goslar:  
Imperial free city annexed to Prussia in 1802  
Passed to Westphalia (1807-1814)  
Passed to Prussia (1814-1815)  
Passed to Hanover (1815-1866)  
Back to Prussia (1866)
- Gottingen:  
City, seat of the Dukes of Brunswick (1286-1442)  
Member of the Hanseatic League from the 14<sup>th</sup> century on
- Hagenau:  
Free City from 1257 on  
Absorbed into France (1679)
- Halberstadt:  
Heinrich Julius of Brunswick-Wolfenbuttel (1566-1613)  
Heinrich Karl of Brunswick-Wolfenbuttel (1613-1615)  
Rudolf III of Brunswick-Wolfenbuttel (1615-1616)  
Christian of Brunswick-Wolfenbuttel (1616-1624)  
Christian Wilhem of Brandenburg-Prussia (1625-1627)  
Leopold Wilhelm of Austria (1627-1648)
- Hall (Hall am Kocher, Schwabisch Hall):  
Free City from 1276 on  
Annexed to Wurttemberg (1803)
- Hamburg:  
Member of the Hanseatic League from 1241 on  
Free City (1510)  
Occupation by France (Napoleonic Period)  
Joined the North German Confederation (1866-1871)  
Part of the German Empire (1871)
- Hameln (Hamlin, Hamelin, Quernhameln):  
Member of the Hanseatic League in the 15<sup>th</sup> century
- Hanau-Lichtenberg:  
Johann Reinhard I (1599-1625)  
Philip Wolfgang (1625-1641)  
Friedrich Kasimir (1641-1685)  
Philip Reinhard (1685-1712)  
Johann Reinhard III (1712-1736)  
Ludwig IX of Hesse-Darmstadt (1736-1785)

Passed to Hesse-Darmstadt (1785)  
Hanau-Munzenberg:  
Philip Ludwig II (1580-1612)  
Philip Moritz (1612-1638), Katarina  
Belgia of Nassau-Orange Regent  
(1612-1626)  
Philip Ludwig III (1638-1641), Sibylle  
Christine Regent (1638-1641)  
Johann Ernst (1641-1642)  
Wilhelm VIII of Hesse-Cassel (1736-  
1760)  
Wilhelm IX of Hesse-Cassel, Count,  
under regency of his mother Mary of  
England (1760-1764)  
Wilhelm IX alone (1764-1803)

Hannover:  
Georg III (1760-1820)  
Georg IV (1820-1830)  
Wilhelm IV (1830-1837)  
Ernst August (1837-1851)  
Georg V (1851-1866)  
Absorbed by Prussia (1866)

Hatzfeld:  
Sebastian I (1568-1630)  
Melchior (1630-1658)  
Hermann, joint ruler (1630-1658)  
Franz II (1677-1685)  
Sebastian II (1677-1708)

Hatzfeld-Wildenburg-Krottorf:  
Sebastian I (1569-1630)

Heilbronn:  
Free Imperial City from 1360 on  
Passed to Wurttemberg (1803)

Helfentsien-Gundelfingen:  
Froben (1573-1622)  
Georg Wilhelm (1622-1627)

Herford:  
Free Imperial City (1631-1647)  
Passed to Prussia (1803)

Hesse-Cassel (Hessen-Kassel):  
Moritz (1592-1627)  
Wilhelm V (1627-1637)

Wilhelm VI (1637-1663), Amalie  
Elisabeth von Hanau Regent (1637-  
1650)  
Wilhelm VII (1663-1670), Hedwig  
Sophie von Brandenburg Regent  
(1663-1677)  
Karl (1670-1730)  
Friedrich I (1730-1751), also King of  
Sweden  
Wilhelm VIII (1751-1760)  
Friedrich II (1760-1785)  
Wilhelm IX (1785-1803)  
Wilhelm I, as Elector (1803-1821)  
Wilhelm II (1821-1847)  
Friedrich Wilhelm (1847-1866)  
Passed to Prussia (1866)

Hesse-Darmstadt:  
Ludwig V (1596-1626)  
Georg II (1626-1661)  
Ludwig VI (1661-1678)  
Ernst Ludwig (1678-1739)  
Ludwig VIII (1739-1768)  
Ludwig IX (1768-1790)  
Ludwig X (1790-1806), as Grand  
Duke Ludwig I (1806-1830)  
Ludwig II (1830-1848)  
Ludwig III (1848-1877)  
Ludwig IV (1877-1892)  
Ernst Ludwig (1892-1918)

Hesse-Homburg:  
Friedrich I (1596-1638)  
Ludwig Philip (1638-1643)  
Wilhelm Christof (1643-1681)  
Friedrich II (1681-1708)  
Friedrich III Jacob (1708-1746)  
Friedrich IV Karl (1764-1751)  
Friedrich V Ludwig (1751-1820)  
Friedrich VI Josef (1820-1829)  
Ludwig Wilhelm (1829-1839)  
Philip August (1839-1846)  
Gustav Adolph (1846-1848)  
Ferdinand Heinrich (1848-1866)  
Passed to Darmstadt and annexed to  
Prussia (1866)

Hildesheim:

Ernst of Bavaria (1573-1612)  
Ferdinand of Bavaria (1612-1650)  
Maximilina Heinrich of Bavaria (1650-1688)  
Jobst Edmund von Brabeck (1688-1702)  
Joseph Clemens of Bavaria (elected 1702, installed 1714-1723)  
Clemens August of Bavaria (1724-1761)  
Sede Vacante (1761-1763)  
Friedrich Wilhelm, Bishop (1763-1789)  
Franz Egon (1789-1803)  
Passed to Prussia (1803)

Hohenlohe-Bartenstein:

Charles Philip Francis (1729-1763)  
Divided between Bavaria and Wurttemberg (1806)

Hohenlohe-Bartenstein-Pfedelbach:

Established in 1728  
Philip Karl Kaspar (1728-1729)  
Ferdinand Ruprecht Franz (1729-1745)  
Josef Anton (1745-1764)

Hohenlohe-Ingelfingen:

Philip Heinrich (1743-1781); as Prince (1764-1781); with Heinrich August (1765-1796)  
Friedrich Ludwig (1796-1806)

Hohenlohe-Kirchberg:

Friedrich Eberhard (1701-1737)  
Karl August (1737-1767)  
Christian Friedrich Karl (1767-1806)

Hohenlohe-Langenburg:

Philip Ernst (1610-1628)  
Ludwig Krato (1628-1632)  
Joachim Albrecht (1632-1675)  
Heinrich Friedrich (1675-1699)  
Albrecht Wolfgang (1699-1715)  
Ludwig (1715-1765)  
Christian Albrecht Ludwig (1765-1789)

Karl Ludwig (1789-1806)

Hohenlohe-Neuenstein-Neuenstein:

Wolfgang (1575-1610)  
Kraft (1610-1641)  
Wolfgang Julius (1641-1698)

Hohenlohe-Neuenstein-Oerhingen:

Johann Friedrich I (1641-1702)  
Wolfgang Julius von Neuenstein (1641-1698)  
Siegfried von Welkersheim (1645-1684)  
Johann Ludwig von Kuenzelsau (1641-1689)  
Friedrich Krato (1702-1709)  
Karl Ludwig von Welkersheim (1702-1756)  
Johann Friedrich II (1702-1765)  
Ludwig Friedrich Karl (1765-1805)  
Passed to Ingelfingen (1805)

Hohenlohe-Neuestein-Welkersheim:

Georg Friedrich (1610-1645)  
Siegfried (1645-1684)  
Karl Ludwig (1702-1756)

Hohenlohe-Pfedelbach:

Ludwig Eberhard (1600-1650)  
Friedrich Kraft (1650-1681)  
Hiskias (1681-1685)  
Ludwig Gottfried (1685-1728)  
Passed to Hohenlohe-Bartenstein (1728)

Hohenlohe-Waldenburg-Schillingsfurt:

Georg Friedrich II (1600-1635)  
Moritz Friedrich (1635-1646)  
Georg Adolf (1646-1656)  
Ludwig Gustav (1656-1697)  
Philip Ernst (1697-1753)  
Karl Albrecht (1753-1793)  
Karl Albrecht Christian (1793-1796)  
Karl Albrecht Philip Josef (1796-1806)  
Passed to Bavaria and Wurttemberg (1806)

Hohenzollern-Hechingen:

Eitel Friedrich IV (1576-1605)  
Johann Georg (1605-1623)



Eitel Friedrich V (1623-1662)  
 Philip Christoph Friedrich (1662-1671)  
 Friedrich Wilhelm (1671-1735)  
 Friedrich Ludwig (1735-1750)  
 Joseph Wilhelm (1750-1798)  
 Hermann Friedrich Otto (1798-1810)  
 Friedrich Hermann Otto (1810-1838)  
 Friedrich Wilhelm Constantin (1838-1849)  
 Passed to Prussia (1849)  
 Holstein-Schauenburg (Schaumburg, Holstein-Ponneberg):  
   Adolf XIII (1576-1601)  
   Ernst II (1601-1622)  
   Jobst Hermann (1622-1635)  
   Otto VI (1635-1640)  
 Isenburg:  
   Wolfgang Ernst von Birstein (1596-1633)  
   Wolfgang Heinrich von Offenbach-Birstein (1633-1635)  
   Johann Ludwig von Offenbach-Birstein (1635-1685)  
   Johann Philip (in Offenbach) (1685-1718)  
   Wilhelm Morits (in Birstein) (1685-1711)  
   Wolfgang Ernst (1711-1754), Prince in 1744  
   Wolfgang Ernst II (1754-1803)  
   Karl I (1803-1820)  
   Wolfgang Ernst III (1820-1866)  
   Karl II (1866)  
 Isenburg-Budingen:  
   Johan Ernst (1633-1685)  
   Johann Kasimir (1685-1693)  
   Ernst Kasimir I (1693-1749)  
   Gustaf Friedrich (1749-1768)  
   Ludwig Kasimir (1768-1775)  
   Ernst Kasimir II (1775-1801)  
   Ernst Kasimir III (1801-1848)  
   Adolf II (in Wachtersbach) (1805-1847)  
   Ernst Kasimir IV (1848-1861)  
   Bruno (1861-1906)  
 Isny:  
   Free Imperial City from 1635 on  
   Acquired by Wurttemberg (1803)  
 Jagendorf:  
   Occupied by Hungaria (1483-1493)  
   Occupied by Bohemia (1506-1524)  
   Belonged to Brandenburg-Ansbach (1524-1623)  
   Johann Georg von Brandenburg-Ansbach (1607-1623)  
   Passed to Austrian (1623-1624)  
   Passed to Liechtenstein (1624)  
 Julich-Berg:  
   Wolfgang Wilhelm von Pfalz-Neuburg (1624-1653)  
   Philip Wilhelm von Pfalz-Neuburg (1653-1690)  
   Johann Wilhelm von Pfalz-Neuburg (1690-1716)  
   Carl Philip Wilhelm von Pfalz-Neuburg (1716-1742)  
   Carl Theodor (1742-1799)  
   Given to Pfalz-Neuburg (1799-1801)  
 Julich-Cleve and Berg:  
   Johann Wilhelm (1592-1609)  
   Inter Regnum (1609-1624)  
   Given to Pfalz-Neuburg (1624)  
 Kaufbeuren (Kaufburen):  
   Free City (1286-1803)  
   Passed to Bavaria (1803)  
 Kempten:  
   Principality from 1348 on  
   Ruprecht von Bodnau (1678-1728)  
   Anselm Reichlin von Meldegg (1728-1747)  
   Englebert von Sorgenstein (1747-1760)  
   Absorbed by Bavaria (1803)  
 Knyphausen:  
   Ruled by local nobility (14<sup>th</sup> century-1623)  
   Sold to Oldenburg (1623)  
   Autonomous (1653)

Bentick family (1733)  
 Wilhelm Gustav Friedrich (1774-1835)

Konigsegg:  
 A Swabian family from the 11<sup>th</sup> century  
 on  
 Franz Hugo (1736-1771)  
 To Bavaria (shortly after 1800)

Landau:  
 Imperial City from 1291 on  
 Occupied by France (1680-1815)

Leiningen:  
 Ludwig (1597-1622)  
 Karl Friedrich Wilhelm (1756-1807)  
 Absorbed by Baden, Bavaria, Hesser  
 and Nassau (1806)

Lippe-Detmold:  
 Simon VII (1613-1627)  
 Simon Ludwig (1627-1636)  
 Simon Philip (1636-1650)  
 Johann Bernhard (1650-1652)  
 Hermann Adolf (1652-1666)  
 Simon Heinrich (1666-1697)  
 Friedrich Adolf (1697-1718)  
 Simon Heinrich Adolf (1718-1734)  
 Simon August (1734-1782)  
 Joined the German Empire (1871)

Lowenstein-Wertheim:  
 Johann Ludwig Vollrath (1721-1790)  
 Friedrich Ludwig (1721-1796)  
 Carl Ludwig (1721-1799)  
 Friedrich Carl (1799-1806)

Lubeck:  
 Johann Friedrich (1608-1634)  
 Johann X (1635-1655)  
 Christian Albrecht (1655-1666)  
 August Friedrich (1666-1705)  
 Christian August (1705-1726)  
 Carl (1726-1727)  
 Adolf Friedrich (1727-1750)  
 Friedrich August (1750-1785)  
 Peter Friedrich Ludwig (1785-1803)  
 Absorbed by Oldenburg (1803)

Luneburg:

Member of the Hanseatic League from  
 the 13<sup>th</sup> century on  
 Passed to Hanover (1705)  
 Passed to Prussia (1866)

Magdeburg:  
 Christian Wilhelm (1598-1631)  
 Leopold Wilhelm (1631-1638)  
 August (1638-1680)  
 Passed to Brandenburg (1680-1806)  
 Passed to France (1806-1814)  
 Passed to Prussia (1814)

Mainz:  
 Johann Adam (1601-1604)  
 Johann Schweickhard von Kronberg  
 (1604-1626)  
 Georg Friedrich von Greiffenklau zu  
 Wollrath (1626-1629)  
 Anselm Kasimir Wambolt von  
 Umsteadt (1629-1647)  
 Swedish (1631-1635)  
 Johann Philipp, Graf von Scheonborn  
 (1647-1673)  
 Lothar Friedrich, Feiherr von  
 Metternich-Burscheid (1673-1675)  
 Damian Hartard, Freiherr von der  
 Leyen (1675-1678)  
 Karl Heinrich von Metternich-  
 Winneburg (1679)  
 Anselm Franz, Freiherr von Ingelheim  
 (1679-1695)  
 Lothar Franz, Graf von Schoenborn  
 (1695-1729)  
 Franz Ludwig von Pfalz-Neuburg  
 (1729-1732)  
 Philip Karl von Eltz-Kempenich (1732-  
 1743)  
 Philip Charles, Graf von Ostein (1743-  
 1763)  
 Emeric Joseph (1763-1774)  
 Friedrich Charles Joseph (1774-1802)

Mansfeld:  
 Voderort Line  
 (Bornstadt)  
 Bruno II (1546-1615)

Wolfgang III (1615-1638)  
 Bruno III (1615-1644)  
 Joachim Friedrich (1615-1623)  
 Philip V (1615-1657)  
 Karl Adam (1638-1662)  
 Georg Albrecht (1657-1696)  
 Maximilian Philip (1657-1664)  
 Franz Maximilian (1664-1692)  
 Heinrich Franz (1644-1715)  
 Karl Franz (1692-1717)  
 Heinrich Paul Franz (1717-1780)  
 Josef Wenzel Nepomuk (1780)  
 (Eisleben)  
 Jobst II (1579-1619)  
 Ernst IV (1579-1609)  
 Johann Georg II (1619-1647)  
 (Friedeburg)  
 Peter Ernst I (1532-1604)  
 (Arnstein)  
 Wilhelm V (1601-1615)  
 (Artern)  
 Johann Georg IV (1585-1615)  
 Volrat VI (1585-1626)  
 Hinterort line  
 Ernst VI (1567-1609)  
 Friedrich Christof (1579-1631)  
 David (1592-1628)  
 Ernst Ludwig (1631-1632)  
 Christian Friedrich (1632-1666)  
 Mecklenburg-Gustrow:  
 Johann Albrecht II (1611-1636)  
 Gustav Adolph (1636-1695)  
 Mecklenburg-Schwerin:  
 Adolf Friedrich (1592-1658)  
 Christian Ludwig I (1658-1692)  
 Friedrich Wilhelm (1692-1713)  
 Carl Leopold (1713-1747)  
 Christian Ludwig II (1747-1756)  
 Friedrich II (1756-1785)  
 Friedrich Franz I (1785-1837)  
 Paul Friedrich (1837-1842)  
 Friedrich Franz II (1842-1883)  
 Friedrich Franz III (1883-1897)  
 Friedrich Franz IV (1897-1918)

Mecklenburg-Strelitz:  
 Adolf Friedrich III (1708-1752)  
 Adolf Friedrich IV (1752-1794)  
 Karl II (1794-1816)  
 Georg (1816-1860)  
 Friedrich Wilhelm (1860-1904)  
 Memmingen:  
 Friedrich V of Bohemia (? –1623)  
 Given to Maximilian I  
 Munster:  
 Ferdinand von Bavaria (1612-1650)  
 Christof Bernhard (1650-1678)  
 Ferdinand von Fuerstenberg (1678-1683)  
 Maximilian Heinrich von Bavaria (1683-1688)  
 Friedrich Christian von Plettenberg (1688-1706)  
 Franz Arnold von Wolff-Metternich (1706-1718)  
 Clemens August von Bavaria (1719-1761)  
 Sede Vacante (1761)  
 Maximilian V, Graf von Konigsegg-Rothenees (1762-1784)  
 Maximilian Franz of Austria (1784-1801)  
 Sede Vacante (1801)  
 Anton Victor of Prussia (1801-1802)  
 Munsterberg:  
 Johann Weikhard of Auersperg (1634-1677)  
 Munsterberg-Oels:  
 Karl II (1587-1617)  
 Heinrich Wenzel (1617-1639)  
 Karl Friedrich (1617-1647)  
 Nassau:  
 (Nassau-Dillenburg)  
 Heinrich (1662-1701)  
 Wilhelm (1701-1724)  
 Christian (1724-1739)  
 (Nassau-Weilburg)  
 Carl August (1719-1753)  
 Friedrich Wilhelm II (1788-1816)

(United Nassau)  
 Duke Wilhelm (1816-1839)  
 Duke Adolph (1839-1866)

Nordhausen:  
 Imperial Free City from 1220 on  
 Annexed to Prussia in 1803

Nostitz-Rieneck:  
 Anton Johann (1683-1736)

Nurnberg:  
 Free City from 1219 on  
 Annexed to Bavaria in 1806

Oettingen-Oettingen:  
 Albrecht Ernst I (1659-1683)  
 Albrecht Ernst II (1683-1731)

Oldenburg:  
 Anton Gunther (1603-1667)  
 Danish (1667-1773)  
 Friedrich V of Denmark (1746-1766)  
 Christian VII of Denmark (1766-1773)  
 Friedrich August, as Count (1773), as  
 Duke (1775-1785)  
 Peter Friedrich Wilhelm (1785-1823)  
 Peter Friedrich Ludwig (1823-1829)  
 Paul Friedrich August (1829-1853)  
 Nicolaus Friedrich Peter (1853-1900)

Osnabruck:  
 Philip Sigismund of Brunswick (1591-  
 1623)  
 Eitel Friedrich of Hohenzollern (1623-  
 1625)  
 Franz Wilhelm of Wartenberg (1625-  
 1661)  
 Ernst August of Brunswick (1662-  
 1698)  
 Sede Vacante (1698)  
 Karl of Lorraine (1698-1715)  
 Sede Vacante (1715-1716)  
 Ernst August II of Brunswick (1716-  
 1728)  
 Clemens August of Bavaria (1728-  
 1761)  
 Friedrich August (1764-1802)

Paderborn:  
 Theodor Adolph (1650-1661)

Ferdinand II (1661-1683)  
 Hermann Werner (1683-1704)  
 Franz Arnold (1704-1718)  
 Clemens August (1718-1761)  
 Sede Vacante (1761-1783)  
 Wilhelm Anton (1763-1782)  
 Friedrich Wilhelm (1782-1789)  
 Franz Egon (1789-1803)  
 Annexed to Prussia (1803-1807)  
 Joined to Westphalia (1807-1813)  
 Returned to Prussia (1814)

Passau:  
 Sebastian (1673-1689)  
 Johann Philip (1689-1712)  
 Raimund Ferdinand (1713-1722)  
 Josef Dominik (1723-1761)  
 Sede Vacante (1761-1763)  
 Leopold Ernst (1763-1783)  
 Joseph (1783-1795)  
 Thomas (1795-1796)  
 Leopold (1796-1803)  
 Divided between Bavaria and Salzburg  
 (1803-1805)  
 Absorbed by Salzburg (1805)

Pfalz:  
 (Chur Pfalz)  
 Johann Wilhelm (1690-1716)  
 Carl Philip (1716-1742)  
 Carl Theodor (1742-1799), as Elector  
 Palatine (1742-1799); as Elector of  
 Bavaria (1777-1799)  
 (Pfalz-Birkenfeld-Zweibrucken)  
 Christian IV (1735-1775)  
 Carl II (1775-1795)  
 (Pfalz-Simmern)  
 Friedrich IV (1583-1610)  
 Friedrich V (1610-1623)  
 Carl Ludwig (1648-1680)  
 Carl (1680-1685)  
 (Pfalz-Sulzbach)  
 Christian August (1632-1708)  
 (Pfalz-Zweibrucken)  
 Johan II (1634-1694)

Pomerania:



Philip Julius (1592-1625)  
 Philip II (1606-1618)  
 Franz (1618-1620)  
 Bogislaus XIV (1620-1637)  
 Christian of Sweden (1632-1654)  
 Charles X of Sweden (1654-1660)  
 Charles XI of Sweden (1660-1697)  
 Charles XII of Sweden (1697-1718)  
 Adolf Fredrik of Sweden (1751-1771)  
 Gustav III, King of Sweden (1771-1792)  
 Gustav IV Adolf of Sweden (1792-1809)  
 Prussian (1815)

Prussia:  
 Friedrich I (1701-1713)  
 Friedrich Wilhelm (1713-1740)  
 Friedrich II (1740-1786)  
 Friedrich Wilhelm II (1786-1797)  
 Friedrich Wilhelm III (1797-1840)  
 Friedrich Wilhelm IV (1840-1861)  
 Wilhelm I (1861-1888)  
 Friedrich III (March 1888-June 1888)  
 Wilhelm II (1888-1918)

Quedlinburg:  
 Dorothea von Sachsen (1610-1617)  
 Dorothea Sophia von Saxe-Altenburg (1618-1645)  
 Anna Sophie I von Pfalz-Birkenfeld (1645-1680)  
 Anna Sophie II von Hesse-Darmstadt (1681-1683)  
 Anna Dorothea von Saxe-Weimar (1684-1704)  
 Annexed to Prussia (1803)

Rantzau:  
 Christian I (1650-1663)  
 Detlef (1663-1697)

Ratzeburg:  
 August von Brunswick (1610-1636)  
 Annexed to Mecklenburg-Schwerin (1648)

Regensburg (Ratisbon):  
 Fre City from 1180 on

Anton Ignaz, Bishop (1769-1787)  
 Sede vacante (1787)  
 Max Prokop (1787-1789)  
 Josef Conrad (1790-1803)  
 Carl Theodor (1804-1817)

Reuss-Greiz:  
 (Unter-Greiz)  
 Heinrich III (1733-1768)  
 (Ober-Greiz)  
 Heinrich XI (1723-1800)  
 Heinrich XIII (1800-1817)  
 Heinrich XIX (1817-1836)  
 Heinrich XX (1836-1859)  
 Heinrich XXII (1859-1902)

Reuss-Rodenthal:  
 Heinrich V (1668-1698)

Reuss-Schleiz:  
 Heinrich II (1572-1635)  
 Heinrich XII (1744-1784)  
 Heinrich XLII (1784-1818)  
 Heinrich LXII (1818-1854)  
 Heinrich LXVII (1854-1867)  
 Heinrich XIV (1867-1913)

Rheinisch Confederation:  
 Carl von Dahlberg (1804-1817)

Rostock:  
 A City of the Hanseatic League from 1218 on

Salm:  
 Friedrich III (1779-1794)  
 Friedrich IV (1794-1801)

Salm-Dhaun:  
 Wolfgang Friedrich (1606-1638)

Salm-Kyrburg:  
 Johann Kasimir (1607-1651)  
 Otto II (1606-1637)  
 Johann Philip (1623-1638)  
 Otto Ludwig (1623-1634)

Saxe-Altenburg:  
 Johann Philip I (1602-1639)  
 Friedrich VIII (1602-1625)  
 Johann Wilhelm IV (1602-1632)  
 Friedrich Wilhelm II (1603-1669)  
 Friedrich Wilhelm III (1669-1672)

Joseph (1834-1848)  
 Georg (1848-1853)  
 Ernst I (1853-1908)

Saxe-Cobourg-Saalfeld:  
 Franz Josias (1745-1764)  
 Ernst Friedrich (1764-1800)  
 Franz (1800-1806)  
 Ernst I (1806-1826)

Saxe-Cobourg-Gotha:  
 Ernst I (1826-1844)  
 Ernst II (1844-1893)  
 Alfred (1893-1900)

Saxe-Eisenach:  
 Johann Wilhelm (1690-1729)  
 Wilhelm Heinrich (1729-1741)  
 Ernst August I of Saxe-Weimar (1741-1749)  
 Friedrich III of Saxe-Gotha-Altenburg (1749-1755), as regent for Ernst August II Constantin of Saxe-Weimar-Eisenach (1748-1758)

Saxe-Eisenberg:  
 Christian (1675-1707)

Saxe-Gotha-Altenburg:  
 Friedrich I (1680-1691)  
 Friedrich II (1691-1732), with his brother, Johann Wilhelm (1691-1707)  
 Friedrich III (1732-1772)  
 Ernst Ludwig (1772-1804)  
 August (1804-1822)  
 Friedrich IV (1822-1825)

Saxe-Hildburghausen:  
 Ernst Friedrich I (1715-1724)  
 Ernst Friedrich II (1724-1745)  
 Ernst Friedrich III Carl (1745-1780)  
 Joseph Friedrich, Prince Regent (1780-1784); joint Regent (1784-1787), alone (1786-1826)

Saxe-Lauenburg:  
 Magnus II (1581-1603)  
 Moritz (1581-1612)  
 Franz II (1581-1619)  
 August II (1619-1656)  
 Julius Heinrich (1656-1665)

Franz Erdmann (1665-1666)  
 Julius Franz (1666-1689)

Saxe-Meiningen:  
 Berhard III (1680-1706)  
 Ernst Ludwig I (1706-1724)  
 Ernst Ludwig II (1724-1729)  
 Carl Friedrich (1729-1743)  
 Friedrich Wilhelm (1743-1746)  
 Anton Ulrich (1746-1763)  
 Carl, under Regency (1763-1775); alone (1775-1782)  
 Bernhard II, under Regency of Luise Eleonore (1803-1821)  
 Berhard II (1821-1886)  
 Georg II (1866-1914)

Saxe-Old-Gotha:  
 Johann Kasimir (1572-1633)  
 Johann Ernst (1572-1638)

Saxe-Romhild:  
 Heinrich III (1680-1710)

Saxe-Saalfeld:  
 Johan Ernst VIII (1680-1729)  
 Christian Ernst and Franz Josias (1729-1745)

Saxe-Weimar:  
 Johann Ernst (1605-1626)  
 Friedrich VII (1605-1622)  
 Wilhelm IV (1605-1662)  
 Albrecht II (1605-1644)  
 Johann Friedrich VI (1605-1628)  
 Ernst III (1605-1675)  
 Friedrich Wilhelm (1605-1619)  
 Bernhard (1605-1639)  
 Johann Ernst (V) II (1662-1683)  
 Wilhelm Ernst (1683-1728)  
 Johann Ernst (VI) III (1683-1707)  
 Ernst August I (1728-1748)  
 Ernst August II Constantine (1748-1758)

Saxe-Weimar-Eisenach:  
 Ernst August Konstantin (1748-1758)  
 Franz Josias of Saxe-Cobumalia of Brunswick (1758-1775), Regent for Carl August

- Carl August (1775-1828)  
 Carl Friedrich (1828-1853)  
 Carl Alexander (1853-1901)
- Saxe-Weisenfels:  
 Johann Adolf (1680-1697)  
 Johann Georg (1697-1712)  
 Christian II (1712-1736)
- Saxony:  
 Friedrich Wilhelm von Saxe-Altenburg,  
 Regent (1591-1601), for Christian II  
 (1591-1611); August (1591-1615);  
 with Christian II and Johann Georg  
 (1591-1611); with Johann Georg  
 (1611-1615)  
 Johann Georg (1591-1656), with  
 Christian II and August (1591-1611);  
 with August (1611-1615); alone (1615-  
 1656)  
 Johann Georg II (1656-1680)  
 Johann Georg III (1680-1691)  
 Johann Georg IV (1691-1694)  
 Friedrich August I (1694-1733)  
 Friedrich August II (1733-1763)  
 Xaver, Prince Regent (1763-1768)  
 Friedrich August III (1763-1806), later  
 Friedrich August I (1806-1827)  
 Anton (1827-1836)  
 Friedrich August II (1836-1854)  
 Johann (1854-1873)  
 Albert (1873-1902)
- Sayn-Altenkirchen:  
 Johanetta (1648-1686)  
 Johann Wilhelm of Saxe-Eisenach  
 (1686-1729)  
 Wilhelm Heinrich (1729-1741)  
 Karl Wilhelm Friedrich Alexander of  
 Brandenburg-Ansbach (1757-1791)
- Sayn-Wittgenstein-Berleburg:  
 Georg V (1606-1631)  
 Georg Wilhelm (1643-1684)
- Schaumburg-Lippe:  
 Wilhelm I Friedrich Ernst (1748-1777)  
 Philip II Ernst (1777-1787)  
 Georg Wilhelm (1787-1860)
- Adolph Georg (1860-1893)  
 Albrecht Georg (1893-1911)
- Schleswig-Holstein:  
 Christian VII of Denmark (1784-1808)  
 Friedrich VI of Denmark (1808-1839)  
 Christian VIII of Denmark (1839-  
 1848)
- Schleswig-Holstein-Gluckburg:  
 Philip Ernst (1698-1729)
- Schleswig-Holstein-Ploen:  
 Friedrich Carl of Holstein-Ploen  
 (1729-1761)
- Schleswig-Holstein-Gottorp:  
 Johann Adolf (1596-1616)  
 Friedrich III (1616-1659)  
 Christian Albrecht (1659-1694)  
 Danish occupation (1675-1679 and  
 1683-1689)  
 Friedrich IV (1694-1702)  
 Karl Friedrich (1739-1762)  
 Karl Peter Ulrich (1739-1762)  
 Paul (1762-1773)
- Schwarzburg-Arnstadt:  
 Christian Gunther II (1642-1666)  
 Johann Gunther IV (1666-1669)  
 Anton Gunther II (1669-1716)
- Schwarzburg-Rudolstadt:  
 Carl Gunther (1605-1630) with  
 Ludwig Gunther (1605-1646) and  
 Albrecht Gunther (1605-1634)  
 Johann Friedrich (1744-1767)  
 Ludwig Gunther IV (1767-1790)  
 Friedrich Carl (1790-1793)  
 Ludwig Friedrich (1793-1807)  
 Friedrich Gunther (1807-1867)  
 Albert (1867-1869)  
 George (1869-1890)  
 Gunther Viktor (1890-1918)
- Schwarzburg-Sondershausen:  
 Anton Gunther I (1642-1666)  
 Christian Wilhelm (1666-1721)  
 Gunther XLIII (1721-1740)  
 Christian Gunther III (1750-1794)  
 Gunther Friedrich Carl I (1794-1835)

- Gunther Friedrich Carl II (1835-1880)  
 Karl Gunther (1880-1909)
- Schwarzenberg:**  
 Johann Adolf (1641-1683)  
 Ferdinand Wilhelm Eusebius (1683-1703)  
 Adam Franz (1703-1732)  
 Josef Adam (1732-1782)  
 Johann (Nepomuk) (1782-1789)
- Silesia:**  
 Austrian (1626-1740)  
 Friedrich II, King of Prussia (1740-1786)  
 Friedrich Wilhelm II (1786-1797)  
 Friedrich Wilhelm IIO (1797-1840)
- Silesia-Liegnitz-Brieg:**  
 Joachim Friedrich, in Brieg (1586-1602); in Liegnitz (1596-1602)  
 Johann Christian, in Brieg (1602-1621); in Liegnitz (1602-1621)  
 Georg Rudolf, in Liegnitz (1602-1653)  
 Georg III, in Brieg (1639-1664)  
 Ludwig IV, in Brieg (1639-1663); in Liegnitz (1653-1663)  
 Christian, in Liegnitz (1663); in Brieg (1664); in Ohlau (1639-1672)  
 Georg Wilhelm, in Liegnitz–Brieg (1762-1675)
- Sinzendorf:**  
 Georg Ludwig (1616-1680)  
 Christian Ludwig (1681-1687)  
 Philip Ludwig (1687-1742)  
 Johann Wilhelm (1742-1766)
- Solms-Hohensolms:**  
 Herman Adolf (1562)  
 Philip Reinhard I (1613-1635)  
 Carl Christian (1744-1804)
- Solms-Laubach:**  
 Christian August (1738-1784)  
 Friedrich Ludwig (1784-1822)
- Solms-Lich:**  
 Georg Eberhard (1596-1602)  
 Ernst II (1602-1619)  
 Philip II (1590-1631)
- Solms-Roedelheim:**  
 Friedrich Sigmund (1632-1697)  
 Johann Friedrich (1632-1696)  
 Johann August (1632-1680)
- Speyer:**  
 Philip Christof von Soetern (1610-1652)  
 Lothar Friedrich von Metternich (1652-1675)  
 Johann Hugh von Orsbeck (1675-1711)  
 Heinrich Hartard von Rollingen (1711-1719)  
 Damian Hugh von Schoenborn-Puckheim (1719-1743)  
 Franz Christof von Hutten zu Stolzenberg (1743-1770)  
 August Philip von Limburg-Velhen-Styrum (1770-1797)  
 Philip Franz von Walderdorf (1797-1802)
- Sprinzenstein:**  
 Ferdinand Maximilian (1646-1679)  
 Franz Ignaz (1679-1705)  
 Johann Ehenreich (1705-1729)
- Stolberg-Rossla:**  
 Jost Christian (1704-1739); with Christof Friedrich of Stolberg-Stolberg (1704-1738)  
 Friedrich Botho (1739-1768); with Christof Ludwig II of Stolberg-Stolberg (1739-1761); with Carl Ludwig of Stolberg-Stolberg (1761-1768)
- Stolberg-Stolberg:**  
 Johann (1606-1612) with Heinrich XXII (1607-1612)  
 Heinrich XXII (1607-1615); with Wolfgang Georg (1612-1615)  
 Wolfgang Georg (1612-1631)  
 Christof II of Schwartza (1572-1638); with Heinrich Volrad (1618-1638)  
 Heinrich Volrad of Ortenau (1618-1641)



- Johann Martin (1638-1669)  
 Friedrich Wilhelm (1669-1684); with  
 Christof Ludwig I (1669-1684)  
 Christof Ludwig I (1669-1704)  
 Christof Friedrich (1704-1738); with  
 Jost Christian of Stolberg-Rossla  
 (1704-1739)  
 Christof Ludwig II (1738-1761); with  
 Friedrich Botha of Stolberg-Rossla  
 (1761-1768)
- Stolberg-Wernigerode:  
 Ludwig Georg (1572-1618)  
 Heinrich Ernst (1638-1672)  
 Ernst (1672-1710)  
 Friedrich Carl von Guedern (1710-  
 1767)  
 Christian Ernst (1710-1771)  
 Heinrich Ernst II (1771-1778)  
 Christian Friedrich (1778-1824)  
 Heinrich XII (1824-1854)
- Stralsund:  
 Swedish (1637-1815)
- Strasbourg:  
 Ludwig Constantin of Rohen (1756-  
 1779)  
 Annexed to France (1789)
- Teutonic Order:  
 Maximilian of Austria (1588-1618)  
 Karl of Austria (1618-1624)  
 Johann Eustache von Westernarch  
 (1625-1627)  
 Johann Caspar von Stadion (1627-  
 1641)  
 Leopold Wilhelm of Austria (1641-  
 1662)  
 Karl Josef of Austria (1662-1664)  
 Johann Caspar II von Ampringen  
 (1664-1684)  
 Ludwig Anton von Pfalz-Neuburg  
 (1684-1694)  
 Ludwig Franz von Pfalz-Neuburg  
 (1694-1732)  
 Clemens August von Bavaria (1732-  
 1761)
- Karl Alexander, Grand Master (1761-  
 1780)  
 Max Franz (1780-1801)  
 Karl Ludwig (1801-1804)  
 Anton Victor (1804-1809)
- Thurn and Taxis:  
 Anselm Franz (1714-1739)
- Trier:  
 Lothar von Meternich (1599-1623)  
 Philip Christof von Soetern (1623-  
 1652)  
 Karl Caspar von der Leyen (1652-  
 1676)  
 Johann Hugo von Orsbeck (1676-  
 1711)  
 Karl Josef of Lorraine (1711-1715)  
 Franz Ludwig von Pfalz-Neuburg  
 (1716-1729)  
 Franz Georg von Schoenborn-  
 Puckheim (1729)1756)  
 Johann Philip von Walderdorf (1756-  
 1768)  
 Clemens Wenzel, Archbishop (1768-  
 1802)
- Ulm:  
 Imperial City from 1155 to 1802  
 Passed to Bavaria in 1803  
 Passed to Wurttemberg in 1809
- Waldeck:  
 Johann II of Neu-Landau (1638-  
 1668)  
 Heinrich Wolrad of Wildungen  
 (1645-1664)  
 Georg Friedrich of Wildungen (1664-  
 1692); as Regent for Heinrich  
 Wolrad (1645-1664); as Count  
 (1664-1692); made Prince in 1682  
 Karl August Friedrich (1728-1763)
- Waldeck-Pyrmont:  
 Friedrich Karl August, in Waldeck  
 (1763-1812)  
 Georg, in Pyrmont 1805-1812; in  
 Waldeck-Pyrmont (1812-1813)  
 Georg Heinrich (1813-1845)

- Emma, as Regent for Georg Victor (1845-1852)  
 Georg Victor (1852-1893)  
 Friedrich (1893-1918)
- Wallmoden-Gimborn:  
 Johann Ludwig (1782-1806)  
 Annexed to Berg in 1806
- Werden & Helmstaedt:  
 Heinrich II Duden (1573-1601)  
 Conrad II Cloldt (1601-1614)  
 Hugo Prevtaeus von Assindia (1614-1646)  
 Heinrich IV Duecker (1646-1667)  
 Adolf von Borken (1667-1670)  
 Ferdinand von Erwitte (1670-1706)  
 Coelestin von Geismar (1707-1719)  
 Theodor Thier (1719-1727)  
 Simon von Bishopnick (1727-1728)  
 Benedict von Geismar (1728-1757)  
 Anselm von Sonius (1757-1774)
- Westphalia:  
 Jerome (Hieronymus) Napoleon (1807-1813)
- Wied-Neuwied:  
 Johann Friedrich Alexander (1737-1791)
- Wismar:  
 Swedish (1648-1803)  
 Sold to Mecklenburg-Schwerin in 1803 (confirmed in 1815)
- Wolgast:  
 Swedish (1633-1634)
- Worms:  
 Imperial Free City from 1156 on  
 Annexed to France in 1801  
 Passed to Hesse-Darmstadt in 1815
- Wurttemberg:  
 Friedrich I (1593-1608)  
 Johann Friedrich I (1608-1628)  
 Eberhard III (1628-1674); with Ludwig Friedrich von Moempelgard as Regent (1628-1631); with Julius Friedrich von Weiltingen as Regent (1631-1633)
- Wilhelm Ludwig (1674-1677)  
 Eberhard Ludwig (1677-1733); with Friedrich Karl as Regent (1677-1693)  
 Charles Alexander (1733-1737); with Charles Rudolf von Nesutadt as Regent (1737-1738), with Charles Friedrich von Oels as Regent (1738-1744)  
 Charles Eugen, Duke (1744-1793)  
 Ludwig Eugen (1793-1795)  
 Friedrich I Eugen (1795-1797)  
 Friedrich, as Duke Friedrich II (1797-1803); as Elector Friedrich I (1803-1806); as King Friedrich I (1806-1816)  
 Wilhelm I (1816-1864)  
 Charles I (1864-1891)  
 Wilhelm II (1891-1918)
- Wurttemberg-Oels:  
 Sylvius Friedrich (1668-1697)  
 Christian Ulrich, in Bernstadt (1664-1697); in Oels (1697-1704)  
 Charles of Juliusburg (1688-1745)  
 Charles Friedrich (1704-1744)
- Wurzburg:  
 Johann Gottfried von Aschhausen (1617-1622)  
 Philip Adolf von Ehrenberg (1623-1631)  
 Franz, Graf von Hatzfeld (1631-1642)  
 Johann Philip Franz von Schonborn (1642-1673)  
 Johann Hartmann von Rosenbach (1673-1675)  
 Peter Philip von Dernbach (1675-1683)  
 Conrad Wilhelm von Wertenu (1683-1684)  
 Johann Gottfried II von Guttenberg (1684-1698)  
 Johann Philip II von Greifenklau (1699-1719)

Johann Philip Franz, Graf von  
Schonborn (1719-1724)  
Christoph Franz von Hutten (1724-  
1729)  
Friedrich Karl, Graf von Schonborn  
(1729-1746)  
Anselm Franz, Graf von Ingelheim  
(1746-1749)

Karl Philip von Greifenklau (1749-  
1754)  
Adam Friedrich, Bishop (1775-1779)  
Franz Ludwig, Bishop (1779-1795)  
Georg Karl, Freiherr von Fechenbach,  
Bishop (1795-1803)  
Ferdinand, Grand Duke (1806-1814)

## MAJOR WARS IN THE AGE OF ARTILLERY

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Who was at war with whom in Europe, in the other parts of the world, where Europeans fought each other, or the locals with the help of artillery?

From the first shot fired on land, at the walls of a castle, or from a vessel at sea to another vessel – from about 1350 to the early 19<sup>th</sup> century – much powder was burnt in anger by all concerned in the conflicts hereafter listed.

There were major wars too, as we all know, after that, and the gun founders business continued to prosper, but cannons by then, were easily identifiable and had become undecorated and unmarked and coming therefore out of the scope of Mendel Peterson's interest.

<b>Date</b>	<b>Name of War</b>	<b>Who against whom</b>
1337-1453	Hundred Years War	Kingdom of France / Kingdom of England
1425-1454	War of Lombardy	Republic of Venice / Duchy of Milan
1454-1466	Thirteen Years War	Teutonic Order State / Kingdom of Poland
1468-1478	Bohemian War	Kingdom of Bohemia / Kingdom of Hungary
1470-1471	Dano-Swedish war	Kingdom Sweden / Kingdom of Denmark
1477-1488	Austrian-Hungarian War	Duchy of Austria – Kingdom of Hungary
1492-1583	Muscovite-Lithuanian Wars (or Russo-Lithuanian Wars)	Grand Duchy of Moscow / Grand Duchy of Lithuania + Kingdom of Poland
1495-1497	Russo-Swedish War	Russia + Denmark / Sweden
1494-1498	First Italian War	Kingdom of France / Italian States + Holy Roman Empire + Kingdom of England
1499-1504	Second Italian War	Kingdom of France + Papal States + Republic of Venice + Kingdom of Spain (to 1501) / Duchy of Milan + Kingdom of Naples + Spain (from 1501)
1519-1521	Polish-Teutonic War	Kingdom of Poland / Teutonic Knights
1522-1559	Habsburg-Valois Wars	Kingdom of Spain + Holy Roman Empire + Kingdom of England + Papal States / Kingdom of France + Republic of Venice
1554-1557	Russo-Swedish War	Tsardom of Russia / Swedish Empire
1558-1583	Livonian War	Livonian Confederation + Polish-Lithuanian Commonwealth + Kingdom of Denmark-Norway + Kingdom of Sweden + Zaporozhian Cosaks + Principality of Transylvania / Tsardom of Russia + Kingdom of Livonia
1562-1598	French Wars of Religion	Protestants (Huguenots, England, Scotland) / Catholics (Catholic League, Spain, Savoy)
1563-1570	Northern (First) Seven Years War	Denmark-Norway + Free City of Lübeck + Kingdom of Poland-Lithuania / Kingdom of Sweden



1568-1648	Eighty Years War (or Dutch War of Independence)	United Provinces + Kingdom of England + Nassau + Huguenots / Spanish Empire + Holy Roman Empire
1580-1583	War of the Portuguese Succession	Portugal loyal to Philip + Kingdom of Spain / Portugal loyal to António, Prior of Crato + Kingdom of France + Kingdom of England
1585-1604	Anglo-Spanish War	Kingdom of England + United Provinces + Portuguese loyal to Prior of Crato / Kingdom of Spain + Kingdom of Portugal
1590-1595	Russo-Swedish War	Tsardom of Russia - Kingdom of Sweden
1593-1606	Long War (or Fifteen or Thirteen Years War)	Habsburg Monarchy / Ottoman Empire
1618-1648	Thirty Years War	Protestant States and allies / Roman Catholic States and allies
1620-1621	Polish-Ottoman War	Kingdom of Poland-Lithuania / Ottoman Empire
1639-1651	Wars of the Three Kingdoms	Kingdom of England / Ireland-Scotland
1640-1688	Portuguese Restoration War (or Acclamation War)	Kingdom of Portugal + Kingdom of Spain
1652-1664	First Anglo-Dutch War	Kingdom of England / United Provinces of the Netherlands
1665-1667	Second Anglo-Dutch War	Kingdom of England / United Provinces of the Netherlands + Kingdom of Denmark + Kingdom of France
1667-1668	War of Devolution	Kingdom of France / Spanish Empire + United Provinces of the Netherlands + Kingdom of England + Swedish Empire
1672-1674	Third Anglo-Dutch War	Kingdom of England + Kingdom of France / United Provinces of the Netherlands + Kingdom of Denmark-Norway
1672-1678	Franco-Dutch War	Kingdom of France + Kingdom of England + Swedish Empire + Bishopric of Münster + Archbishopric of Cologne / United Provinces of the Netherlands + Holy Roman Empire + Kingdom of Spain + Brandenburg
1683-1684	War of the Reunions	Kingdom of Spain / Kingdom of France
1688-1697	War of the League of Augsburg (or War of the Grande Alliance or War of the Palatine Succession or The Nine Years War)	Grande Alliance (United Provinces of the Netherlands + Kingdom of England + Holy Roman Empire + Kingdom of Spain + Piedmont-Savoy + Sweden Empire + Scotland) / Kingdom of France + Irish Jacobites
1701-1713	War of the Spanish Succession	Holy Roman Empire + Kingdom of England + United Provinces of the Netherlands + Spain loyal to Charles + Duchy of Savoy + Kingdom of Prussia + Kingdom of Portugal / Kingdom of France + Spain loyal to Philip + Electorate of Bavaria
1718-1720	War of the Quadruple Alliance	Kingdom of Spain / Great Britain + Kingdom of France + Holy Roman Empire + United Provinces of the Netherlands + Duchy of Savoy
1727-1729	Anglo-Spanish War	Great Britain / Kingdom of Spain

1740-1748	War of the Austrian Succession (called King George's War in America)	Kingdoms of France, Prussia and Spain + Electorate of Bavaria + Electorate of Saxony (1741-42) + Kingdom of the Two Sicilies + Kingdom of Naples + Republic of Genoa + Swedish Empire + Jacobites / Habsburg Monarchy + Great Britain + Electorate of Hanover + United Provinces of the Netherlands + Electorate of Saxony (1742-45) + Kingdom of Sardinia + Russian Empire
1741-1743	Russo-Swedish War	Russian Empire / Swedish Empire
1756-1763	Seven Years War (called French and Indian War in America)	Kingdom of Prussia + Great Britain + Electorate of Hanover + Duchy of Brunswick-Wolfenbüttel + Kingdom of Portugal + Hesse-Kassel + Schaumburg-Lippe / Holy Roman Empire + Kingdom of Austria + Kingdom of France + Russian Empire + Kingdom of Spain + Kingdom of Sweden + Electorate of Saxony + Kingdom of Naples
1775-1783	American War of Independence (or American Revolutionary War)	The Thirteen Colonies + France + the Netherlands + Spain / Kingdom of Great Britain + Loyalists
1780-1784	Fourth Anglo-Dutch War	Great Britain / United Provinces of the Netherlands + Kingdom of France
1792-1802	French Revolutionary Wars	French Republic + Kingdom of Denmark and Norway + Kingdom of Mysore / Holy Roman Empire + Kingdom of Prussia + Great Britain + Russian Empire + French royalists + Kingdom of Spain + Kingdom of Portugal + Kingdom of Sardinia + Kingdom of Naples + Italian States + Ottoman Empire + United Provinces of the Netherlands + Haiti + United States
1803-1815	Napoleonic Wars	Napoleon's French Empire / the rest of Europe + United Kingdom + Ottoman Empire

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(Describes the customary artillery on board Dutch vessels of the time.)



## ACKNOWLEDGMENTS

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It is my pleasant duty as the Editor, to express here, in the name of the late Mendel Peterson, the gratitude he felt, as shown in his correspondence and in so many of his notes, for the Keepers and/or Curators of all the Military and Naval Museums of Europe and of the Americas where he worked. Wherever he went, he was kindly authorized to make photographs and he was helped both materially and scientifically in all possible ways by the museum's Directors or Fort's Commanding Officers, eager to put at his disposal their deep knowledge of their ancient collections and the ancient catalogues of their library. Some of them, sadly, have passed away but to all of them I want to convey here the very sincere expression of Mendel Peterson's gratitude as he undoubtedly would have done himself had he been able to publish his *magnum opus* in his days.

And, personally, I have great pleasure in addressing my very sincere thanks to all the Curators of the same museums or of the museums that have succeeded to the ones that were visited by Mendel Peterson, for having extended to me the same courtesies. They are too numerous to be mentioned individually, but the names of the museums in which I have been allowed to photograph and to work, where I have been in my turn helped and advised, are all over the present publication.

In our common name, to all of them, to the departed and to the ones around, a big salvo of thanks.

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And it must be said also that without the help of my co-editor, daughter, and assistant Marie-Eve, her extremely critical mind and her agile ten fingers, not a word of the above text or, indeed, of any of the many volumes of this publication could ever have appeared in print or on-line.

– Editor

A new tool of research has been created for the use of scientists in all fields of History. Mendel Peterson crafted it. This volume is Part One.

Mendel Lazear Peterson (1918-2003) spent his whole life learning to read cannon language. In all the important Army, Navy and History museums of the world, he has studied, deciphered and photographed well above twelve thousand bronze and iron cannons, howitzers and mortars.

Reading cannons, the inscriptions, marks, mottos, symbols, allegories, cyphers, coats of arms and portraits that used to cover bronze artillery pieces in the Age of Artillery (mid-14th to mid-20th century) is reading about Power, about History. Who could explain History better than the instruments that made it? For this long period, cannons — have been “Ultima Ratio Regum”, “The Last Argument of the Kings”, the argument that settles it all, between enemy rulers or between commercially competing nations after everything else has been tried and has failed: Diplomacy, negotiations and bribery, influence, threats and ultimatums.

For the Editor, it is a fitting monument to the memory of a friend, of a very remarkable American, whose belatedly fulfilled desire had always been to share his passion with his peers.

- Editor



“THE LAST ARGUMENT OF THE KINGS”