

# Progression of the Rapier

By Alexandre De Sant Roma De Sau



## Table of Contents

Introduction .....	3
Thesis .....	4
Scientific advancements in metallurgy .....	5
Social changes .....	7
Swords as Fashion .....	8
Economic changes.....	9
The Hilt.....	9
Sword progression .....	11
Decoration of the rapier .....	14
Conclusion.....	15
Bibliography .....	17
Appendix A Parts of the Sword.....	20
Appendix B Three Categories of Hilts .....	22
Appendix C.....	24
Extant Examples .....	27

# Introduction

The sword has always been an icon of power, prestige, and chivalry. It has adapted to society's needs from its very invention throughout time to the present day. I will be focusing on these changes specifically that I find to be the most expressive and most descriptive part of the sword. The Hilt. While changes to the blade, pommel and grip affect the sword's capabilities and qualities, the hilt is the most expressive and is easily described both visually and by cataloged styles.

In this paper I will be discussing the progression of the sword hilt from the simple cross section to becoming the complex hilt we know as a rapier in all its forms. I will limit the scope of this research to only the hilt, which is the protection of the hand.

Swords have been around since the bronze age and have developed over time to match the needs of warfare. Specifically, I will talk about the changes in the sword from 1350 to 1650. This 300-year period brought about a series of changes in how swords were made, used, and viewed in society. I will use descriptions of hilts from the AVB Norman Book of the Rapier and Smallsword (Norman, 2019).

The hilt was created to protect the hand from cuts and thrusts from one's opponent. As a weapon of war, a gauntlet would be worn to protect the hand. In the 11<sup>th</sup> to the 14<sup>th</sup> century, the hilt took basic shape in the simple form of a crucifix, which remained popular until around 1450. This is when the sword changed from a weapon of war to also be a civilian weapon of personal defense. The hilt then began to evolve in order to better protect the now un-gauntleted hand.

So how did we get from a weapon of war designed to kill using cuts, thrusts, and slashes that only the wealthy could afford, to the light and nimble fashion piece that focused on thrusting? This will be the main topic of my paper. The discussion will focus on changes in metallurgy, society, economics, and sumptuary laws that brought about the changes in how a sword was designed and made.

Prior to 1450, swords were very expensive due to the scarcity of metal and the in-depth process used to make these swords. New advancements in mining and metallurgy allowed for thinner, longer, and more flexible blades to be available at much less extravagant prices and became more available for many to afford. Social and economic changes to European culture also affected the development of the hilt and how it reflected one's status in the community. It became not only a tool for defense, but also a fashion accessory as well as a way to show your wealth and status.

The terms Rapier, Sidesword and Arming sword are all modern distinctions. The definitions of these terms tend to overlap with each other depending on the point of view and literally which language you speak. “Spada de Lato”, in Italian, means (Side Sword). “Espada de Ropero” In Spanish means, (Clothing Sword).

The distinctions of side sword and rapier are modern terms for what would have simply been called a sword. (Arms and Armor, n.d.) A side sword is described as a sword with a simple guard and a double-edged blade which tapers to a sharp point. It is designed primarily for cutting and the ability for thrusting. A rapier is defined as a long slender flexible double-edged blade with a complex hilt to protect the hand. It is mainly designed for thrusting and has cutting capabilities.

It is difficult to determine approximate timelines for each different type of hilt as they continued to be used for long periods in the renaissance and in many regions throughout Europe. Swords made in a particular style to a region would also be found in other areas in Europe. Sword designers and makers travelled extensively, and they lived quite lavishly as they were jealously sought after by wealthy patrons. The most reliable way to find a style of sword date is by looking at paintings or looking at guild records for personal commissions.

## Thesis

The advancements in mining, metallurgy, socioeconomic and social changes brought about innovations in the sword hilt to further protect the un-gauntleted hand for civilian use, rather than simply a weapon of war and it fueled the evolution of the sword into a fashion accessory and personal protection tool.

## Scientific advancements in metallurgy



Figure 1 The Cutler (Sachs, 1494-1576)

The metals for European swords were sourced from three main areas. Toledo Spain, Solingen Germany, and Brescia, in northern Italy. These areas were the sources of the high carbon iron ore used to make swords, and they also had large deposits of manganese and limonite which were infused to create steel. Iron ore was mined and sent to foundries where the raw iron was refined and sent to smithies nearby to create tools for agriculture, construction, in addition to swords, spears, and armor. Weapons were not made entirely by individual smithies. Each smithy specialized in a specific component of a weapon, such as the blade, the hilt, or the pommel. This optimized production to allow each smithy to focus on one craft. The components were then sent to another location to be assembled and decorated before being sold as a finished

weapon. (Gabriele Tonelli, 2022)

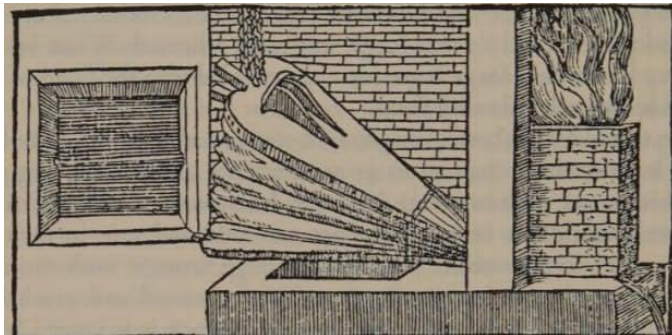


Figure 2 blast furnace (Smith, 1968)

During the fourteenth century Iron ore was smelted in a blast furnace to refine the iron into a usable material. The blast furnace, known as an indirect reduction forge, was a 2-phase process. The blast furnace reduced the iron ore to make molten pig iron, which is an iron alloy containing several percent, silicon and phosphorus. Iron was stacked in layers with coal and cooked to a liquid state and then allowed to drain into the bottom of the forge. This pulled carbon into the iron. The result was formed into ingots. The pig iron was then refined in a finery, called a Breccian forge which could reach temperatures of 1400 degrees Celcius. At these temperatures the oxidation of carbon and silicon changes the pig iron into high carbon iron or steel by separating the impurities from the metal. This new steel is poured into ingots and then compacted using a water powered hammer. (Gabriele Tonelli, 2022) Large trip hammers could work metal at a larger scale than a metal smith could work

with hammer and anvil. A large trip hammer could work incredible amounts of steel at once, making productivity increase speed and volume exponentially. (Gabriele Tonelli, 2022)

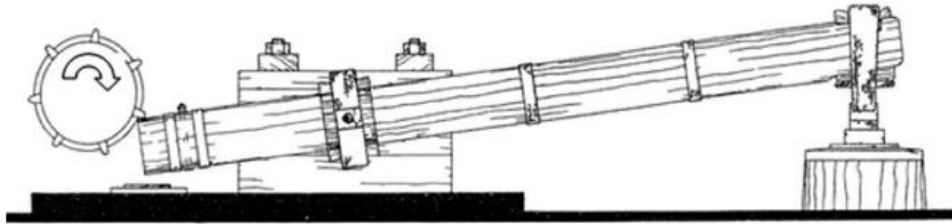


Figure 3 Trip Hammer (Gabriele Tonelli, 2022)

Advancing mining techniques such as the use of water power for bellows to pump water from the mines and pump air to allow miners to breathe, winches to bring ore to the surface, and counterweights to use less effort to move large quantities of materials, improved scale and speed of metal production. These new technologies increased access to the mines that could be worked for longer hours with less injuries. The use of counterweights and winches allowed more products to reach the surface with less effort. The use of pumps ran by water wheel reinvigorated older mines which were submerged by water or lack of oxygen.



Figure 4 (Renshaw, 2024)

Advancement in tools and machinery such as the use of water to power bellows, large trip hammers and grinding wheels created new opportunities for trade and industrial growth of regions rich in metal ores. These new tools allowed for smiths to spend less effort to maintain their fires and more time to hone their craft and increase their productivity. (Williams, 2024)

With these new innovations in metallurgy smiths were able to reach consistently higher temperatures and introduce more carbon to the iron to make stronger steel. Adding carbon

to the iron along with Manganese, nickel, cobalt, copper and other materials added strength and malleability. These were known as alloy steel. Adding carbon to steel made it harder but it also made it more brittle. Carbon creates a tighter molecular structure that holds its shape with less room between the bonds with the iron. Heating the metal to 1400 degrees Fahrenheit allows these bonds to be molded and shaped by hammer and anvil. Once you have achieved the metal shape desired, the metal is quenched in oil or water to lock the shape into place and make the metal stronger and fix the molecular structures. To make high carbon steel malleable, it must be tempered or annealed. Tempering is a process of reheating the metal to a lower temperature and allowing it to cool at a slower rate. This gives more space between the ionic bonds and allows the iron to move or bend and be able to return to its original shape. Annealing is a similar process of heating, but the goal is to make the metal soft and pliable. This process is usually done before the quench. Annealing allows the iron to have room between the ionic bonds and returns the metal to a softer state that can be worked at cold temperatures. (Untracht, 1968) The craftsmen of the 14<sup>th</sup> and 15<sup>th</sup> centuries had no idea of molecular structure or exactly what the carbon did for the metal, but they did know that it worked. They believed it was the practice of heating the metal repeatedly that caused the metal to become harder and stronger. It wasn't until the 19<sup>th</sup> century that smiths understood it was the carbon infused with the metal that enhanced its strength and structure. (Gabriele Tonelli, 2022)

## Social changes

What began as a weapon of war, the rapier gradually became a civilian weapon. Around 1520 it became socially acceptable to wear a sword as personal protection while traveling or hunting, but it was still not an essential part of male fashion. As the trend continued, men of elevated social status, both noble and merchant classes began to wear swords during their everyday lives. This was not only a defensive weapon, but also a display of wealth, status, and a fashion statement. It soon became a central part of gentlemanly grace to not only own a sword but also to show prowess in its mastery. (Capwell, 2012)

Baldassare Castiglione wrote in his "Book of the Courtier" about the duel of honor and the need to defend one's personal integrity. Carrying a rapier implied martial prowess, strength, and courage for all to see. It became a frequent and prominent accessory for portraits to complement the subjects' beautiful clothing, with armor and weapons of war in the background to show that this person was both a warrior and a gentleman. The popularity of these weapons was not without social cost. The proclivity of private duels caused many deaths and civil disturbances among the cities of Europe during this time. In 1562 Queen Elizabeth wrote a proclamation against carrying sharpened swords. (Concerning ruffs Hose

and Swords, 2001) This did not dampen the desire to both wear and use these new fashion statements and noblemen would spend extraordinary amounts of money to have the newest fashion of sword to match their wardrobe.

## Swords as Fashion



*Figure 5 Sir Martin Frobisher (Ketel)*

As the sword became normalized as gentlemanly fashion, the need to personalize and create artful decoration of these weapons also became a reality. No longer did a person have to be nobility to own a sword; they only needed to be wealthy enough to afford to purchase one. Swords became not just accessories, but status symbols, decorated in creative and often costly extremes. It became such a part of genteel fashion that swords became subject to sumptuary laws regarding types of decoration allowed to the hilt and the length of blade. (Concerning ruffs Hose and Swords, 2001)

The manufacture of rapiers usually required the expertise of several master craftsmen. Blades were made by specialist smiths while hilt-makers supplied the guards, pommels, and grips required to fashion them into complete weapons. This work often took place far from the place of blade manufacture. Blades were often sold in large quantities by blade merchants to sword cutlers or to private commissions. (Capwell, 2012)

Hilts were often beautified or bedazzled from simple non hardened steel or brass. By adding gold, silver, precious and semi-precious stones, carving or etching designs, silver or gold wiring, and affixing plates of brass or silver, craftsmen were able to create works of art from the unadorned versions more suitable for practical use.

Whole clothing concepts were often incorporated to match an outfit to a rapier to complement each other often at great expense. Not only was the sword made to match but also the scabbard and hanger would all work in cohesion with the clothing to show an air of wealth and elegance. These rapiers with hilts of gold, silver, and precious gems were extremely expensive. Goldsmiths, stone setters, and silversmiths would bedazzle simple rapier hilts to create intricate patterns and designs. For those who could not afford such decoration, semi-precious stones were much less expensive options to elevate their look. Chiseling, engraving, etching, wire inlay, damascene, encrusting, enameling, and plating were even less expensive ways to beautify a rapier hilt. (Capwell, 2012)

## Economic changes

With the many wars between England France and Spain, the Moorish invasion versus the Holy Roman Empire, and various smaller campaigns, Europe spent huge amounts of money on weapons and armor. This caused a shift in focus and resources towards arms and armor.

An influx of goods from the new world, treasures in gold, silver, and precious stones entered Europe's fashionable trends, and these were often presented as gifts to favored subjects and political allies. Artisans created delicious new swords decorated with these items brought back from their explorations. Turquoise from Brazil, Lapis lazuli from Argentina, Emeralds from Colombia (Singapuri, 2019), these gems found their way to be made into razor edged works of art. Artisans were highly paid to create new works of art, and many new types of decoration were invented. As these treasures were made by tradesmen and craftsmen, the demand for them grew throughout Europe. This wave of wealth then began to trickle down to the merchant classes.

As this wealth entered the merchant class, it provided them with access to more of the luxury items traditionally afforded only by the noble class. To protect their new riches, it became an everyday practice to openly wear a rapier for personal protection as well as a fashion statement.

## The Hilt

The rapier hilt is made up of various combinations of parts that can be assembled in many different configurations. The parts discussed in this section are further defined and explained in appendix A.

A simple sword hilt is the defensive portion of a sword below the blade, containing the guard or quillons to protect the hands from attack during swordplay, the grip and the pommel.

A complex hilt is the defensive portion of a sword below the blade, to protect the hands from attack during swordplay which contains a combination of quillons, quillon block, forward arms, ricasso, with the addition of bars, plates and loops of metal to take the place of a gauntlet.

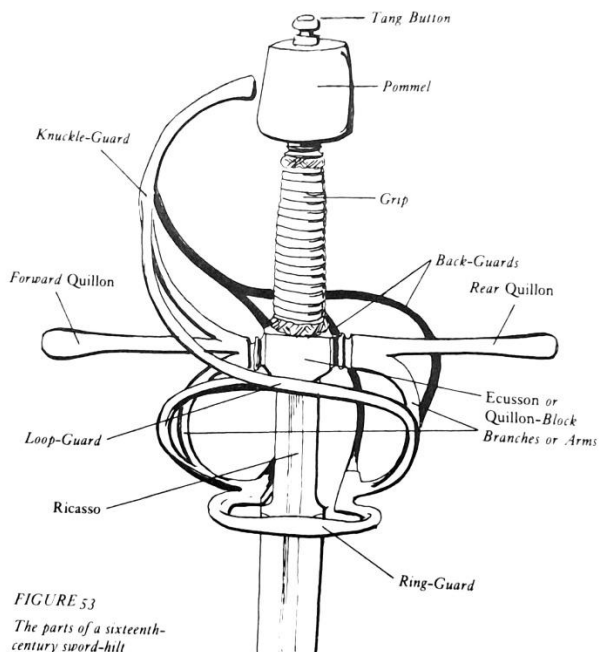
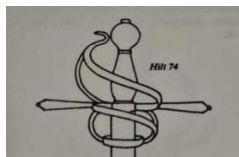
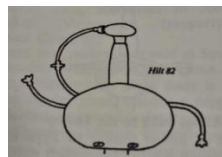


FIGURE 53  
The parts of a sixteenth-century sword-hilt

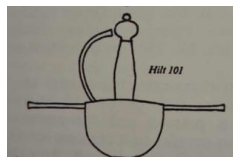
(Oakeshot, 2000)



Loop Guard



Shell Guard



Cup guard

(Normand, 2019)

There are three main categories of complex rapier hilts. Loop Guards or “Espada De Lazo”, Shell Guards or “Espada de Concha”, and Cup Guards known as, “Espada de Taza” in the Spanish Language. Rapier hilts vary in every shape and size from very simple hilts to intricate guards such as the Schiavona, but they can be categorized into these three types of complex hilts. For a more detailed description of these categories for rapiers see appendix B.

# Sword progression

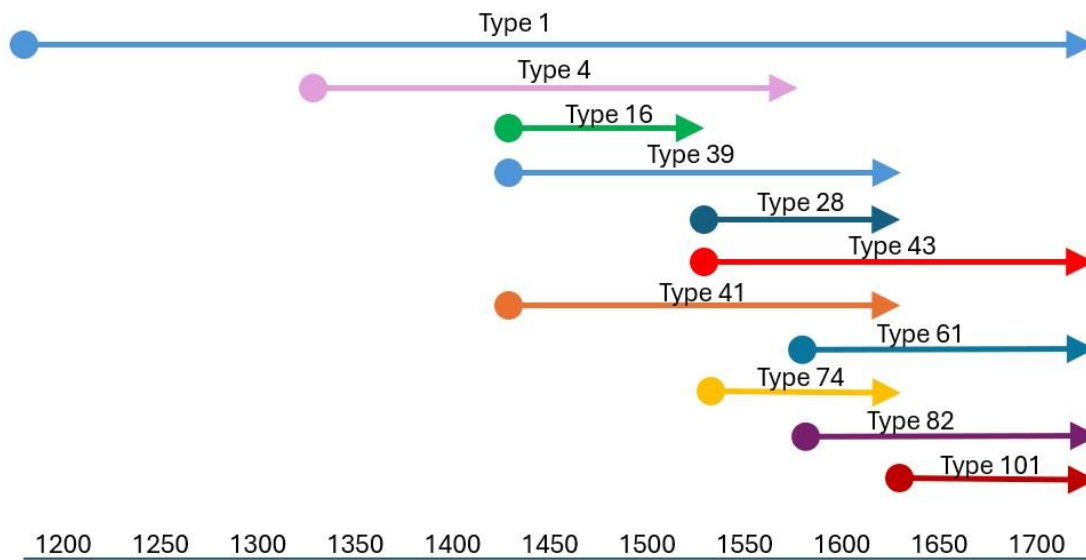
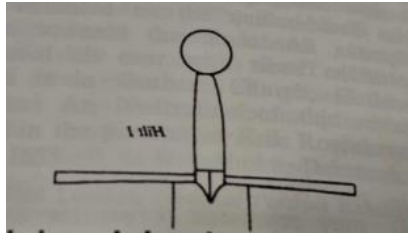


Figure 6 Rapier timeline of popularity of use

When describing these swords below, I will be using the categorized names employed by AVB Norman in his book (Normand, 2019) as it is the most common reference for describing sword types. These sword types listed in *The Book of the Rapier and Smallsword* are not listed in chronological order. Many hilt designs overlap each other as they fall in and out of fashion, making a cohesive linear growth chart difficult. For a more in depth description of the parts of the sword, see appendix A.

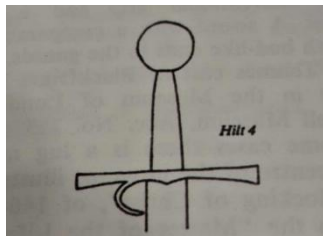
Deciphering a rapier from a sidesword can be difficult since their hilts are comparably interchangeable. The main differences between rapiers and sideswords are tied to their purpose. A sidesword is a cut and thrust sword. The blade is usually shorter, wider, and heavier than a rapier as it is designed for use in closer combat settings. The sidesword mostly relies on cuts with the ability to thrust when necessary. Rapiers are designed to be longer, lighter and thinner, with thrusts as the main type of attack with the ability to cut when appropriate. However, both types of swords are capable of the same actions of fencing.

Let us examine the most basic hilt and look at the changes made to it to protect the hand from different attacks as the amalgamation of its characteristics and use is formulated

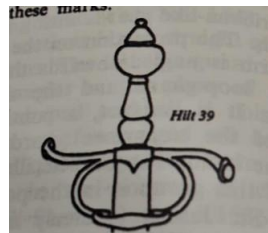
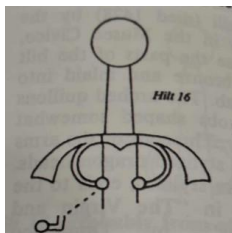


over time. The Type 1 hilt is a basic quillon block and pair of quillons. It acts as a barrier to the opposing sword from sliding down the blade and cutting the hand. This is the basic Cutting sword or arming sword. It is simple and elegant in design and as it is meant to be used with a gauntlet it is well suited for its use. Quillons could be bent to almost any configuration from straight, curved, counter curved, or forward S curved.

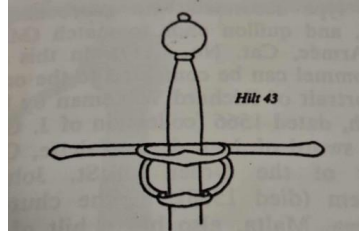
To create a better thrusting angle and allow for more control of the blade it became popular to place the index finger over the quillons for better blade alignment. This left that finger exposed to attack. Adding a finger ring to protect from cuts above the quillons prevented the index finger from cuts or the opponent sliding down the blade to the exposed digit. This became Type 4.



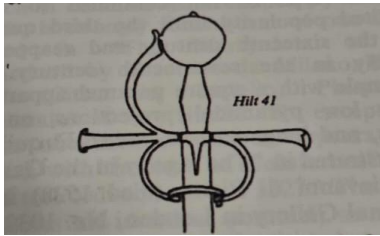
As swords came to be used without a gauntlet it became increasingly necessary to protect the hand. A second ring allowed for additional protective rings and prongs to be put forward of the quillons to protect the hand and fingers of the sword wielder. This became type 16 and 39



In addition to the frontal defense, an additional ring across the quillons became popular to protect the back of the hand. Sometimes spanning diagonally from the forward arms to the quillons other times in parallel to the ring or prongs at the forward arms. This became types 28 and 43.

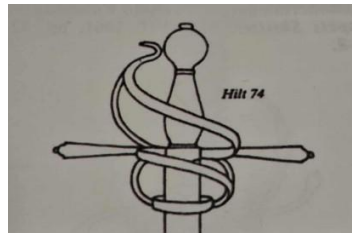
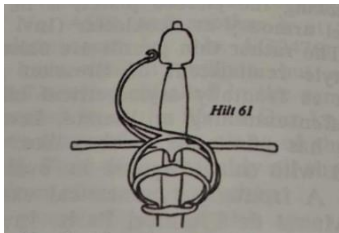


To protect the knuckles and fingers of the wielder, a curved bar extending from the bottom

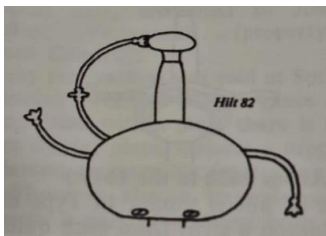


of the rear quillon near the quillon block to hover just above the pommel of the sword was added. This was logically called a knuckle guard and though it restricted grip changes, it was excellent for protecting against cuts to the hand. This became the type 41.

As rapiers matured and became more complex, they also evolved to transition more smoothly between its various parts. Two examples of this are Type 61 and 74. These transitions combine cohesively to better protect the hand.

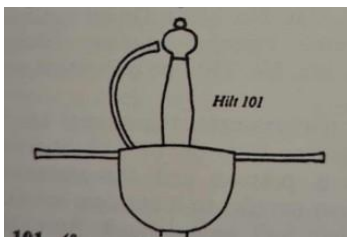


Hilts became more complex by adding different combinations of parts and new concepts



like the shell guard. This was a convex or concave curved shape of metal that was affixed to the forward arms of the hilt to protect the hand. Type 82.

A later addition was the cup hilt. This was essentially a shield or bowl of metal encompassing the entire hand with long or short quillons which can be straight or curved; supporting forward arms affixed to the cup guard. This is known as Type 101.



For a more detailed description of these sword types and their construction, see Appendix C.

## Decoration of the rapier

**Engraving** This is characterized by carving designs into the metal of the hilt using shaped chisels not unlike chip carving. Hilts are most commonly engraved with foliage scrolls, flowers, and acanthus leaves along the edges and borders. The earliest evidence of engraving on a rapier is from Spain around 1550 AD. It is often accompanied by the use of shaped punches.

**Etching** This is a chemical process of acid which is exposed to metal with a design in resist. It is most often found on the blades of rapiers displaying names and mottos. It is also found on hilts from Italy, Germany, and Spain displaying birds, foliage, shields and trophies of arms. It can be created in Relief which is where the design is left raised similar to woodcuts, or Intaglio, which has the lines cut away by the acid to look similar to engraving. Intaglio etching can be confused with engravings on hilts by museums and collectors especially since they are often found together on the same swords.

**Damascening** This is created by hatching many cuts into steel to allow gold or silver leaf to gain purchase into the harder metal and be pressed flat using a stylus into the surface of the steel to create designs and imagery.

**Encrusting** This is similar to damascene, but the metal used for decoration is raised above the surface and then engraved or chiseled into a design. It is often done in silver and gold and is one of the most common forms of decoration in precious metals. In many cases encrusting was made with wire creating a running scrollwork or geometric patterns like interlocking circles.

**Plating** Instead of Hatching lines and using thin sheets of metal, large plates of silver, brass or gold are attached to entirely cover or partially cover the hilt and these plates are engraved with intricate designs. These plates are riveted to the base metal of the hilt or made to completely surround the metal itself.

**Inlay** This is created by chiseling channels and lines into the base metal, and a contrasting metal is then pressed into these channels creating beautiful sweeping lines to accentuate the shapes of the hilt. Another style of inlay is Inlaid sheets. Small sheets of metal are pressed into fissures in the base metal and chiseled or pierced to be flush with the surface to create plaques and knobs for quillon ends.

**Piercing** This is created by incorporating drilled or punched holes into the integral design of the Hilt in order to manage weight and form an intricate pattern. This method is often accompanied by chiseling and wire inlay.

**Chiseling** This is created by cutting designs into the base metal of the hilt using files, chisels, and abrasives to define the lines of the shape of the bars and incise sweeping or geometric designs into the face of the flat surfaces of the hilt. It was common to shape the bars of the hilts with flask shaped sections or create rope like and twisted portions by filing away parts of the structure using many different shaped files. During the 1570s there was a fashion for guards to be chiseled and pierced to appear as if they were made of chains with rectangular links.

**Enameling** This is a colored layer of glass most often found in three distinct styles for hilt decoration. Basse Taille is glass embedded into hollowed out sections and resting flush with the surface and highly polished. Another is En Pleine, where the glass is painted onto the surface of the metal and stands slightly proud above the surface. The third is the most rarely seen. Cloisonne is a style of enameling that uses soldered wire or thin cuts of metal to create compartments which contain the enamel and define its shape.

## Conclusion

While the Arming sword was still used on the battlefield and for ceremonial purposes like Succession and knighting, these new styles of sword with complex hilts, and longer lighter more flexible blades became the social norm for everyday wear among civilian society.

These swords were available to anyone who could afford them because of innovations in metallurgy and automation. This made acquiring the materials and their refinement easier to achieve and cost efficient. Changes in trade and the ability to bring in riches from far off places allowed for a revolution of new decoration to be created to beautify these new swords.

A market for fashionable designs and thirst for etiquette of how to be a warrior and a gentleman through the writings of many popular writers at the time and courtiers brought a need for a new weapon to be created. New civilian styles of fighting centered on thrusting rather than cutting and slashing required a culture of schools and study that became extremely popular among the noble and merchant classes.

All of these new ways of thinking and changes in social, economic and scientific advances created space for the evolution of the sword from the sidesword of the 13<sup>th</sup> century to the rapier of the 14<sup>th</sup> through 17<sup>th</sup> centuries. The progression of shapes and designs that swords have undergone during this time period are evident throughout Europe and can be found in many museums and private collections. The Rapier is an elegant weapon evolved to meet the changing needs of society and has become an icon of the European Renaissance.



## Bibliography

- Arms and Armor*. (n.d.). Retrieved from Sidesword VS Rapier: What is the Difference:  
<https://www.youtube.com/watch?v=-bp9BFTrNdl>
- Bealer, A. W. (1976). *The Art of Blacksmithing*. Edison: Castle Books.
- Biringucci, V. (1990). *The pirotechnia of Vannoccio Biringuccio : the classic sixteenth-century treatise on metals and metallurgy*. (C. S. Smith, & M. T. Gnudi, Trans.) New York: Dover Publications.
- Capwell, T. (2012). *The Noble Art of the sword Fasion and fencing in Renaissance Europe 1520-1630*. Verona: Paul Holberton.
- Coe, M. D., Peter Connolly, Harding, A., Harris, V., La Rocca, D. J., North, A., . . . Wilkinson, F. (1996). *Swords and Hilt Weapons*. London: Prion Books Limited.
- Concerning ruffs Hose and Swords*. (2001, July 14). Retrieved from Elizabethan Sumptuary Statutes: <https://elizabethan.org/sumptuary/ruffs-hose-swords.html>
- Cup-Hilted Rapier*. (n.d.). Retrieved from The Met:  
<https://www.metmuseum.org/art/collection/search/32802>
- Gabriele Tonelli, M. F. (2022, November 11th). *Archaeometallurgical Investigation on Historical Sword-Making Techniques in Northern Italy Between the Sixteenth and Seventeenth Centuries*. Retrieved from Springer Nature Link:  
[https://link.springer.com/chapter/10.1007/978-981-19-2037-0\\_6#Sec8](https://link.springer.com/chapter/10.1007/978-981-19-2037-0_6#Sec8)
- Ishikawa, C. (2004). *Spain in the Age of Exploration 1492 - 1819*. Seattle: University of Nebraska Press.
- Ketel, C. (n.d.). *Sir Martin Frobisher 1535*. Bodleian Libraries , Oxford.
- Neuschel, K. B. (2020). *Living by the Sord Weapons and marterial culture in france and britain, 600 - 1600*. Ithaca: Cornell University.
- Norman, A. (2019). *The Rapier and the Small-sword, 1460-1820*. Ken Trotman Publishing.
- Normand, A. (2019). *The Rapier and Small-Sword, 1460 - 1820*. Ken Trotman Publishing.
- Oakeshot, E. (2000). *European Weapons and Armour*. Suffolk: Boydell Press.

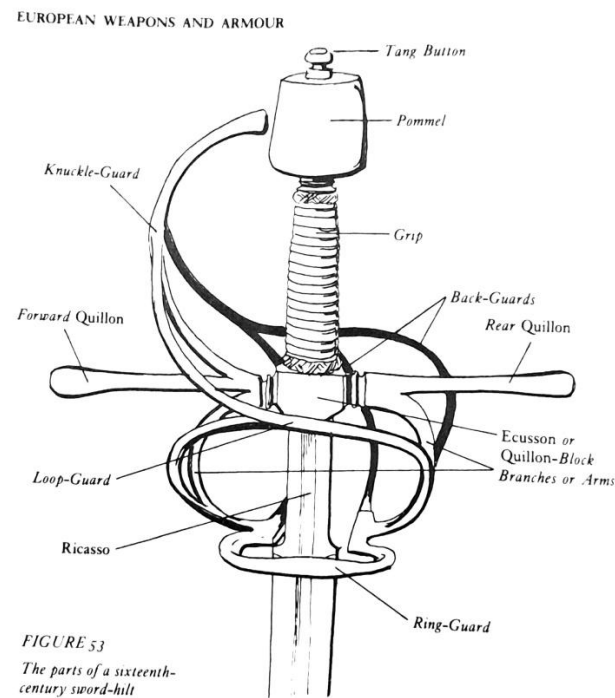
- Rapier*. (n.d.). Retrieved from the met:  
<https://www.metmuseum.org/art/collection/search/27356>
- Rapier*. (n.d.). Retrieved from The Met:  
<https://www.metmuseum.org/art/collection/search/22366>
- Rapier*. (n.d.). Retrieved from The Met:  
<https://www.metmuseum.org/art/collection/search/27422>
- Rapier*. (n.d.). Retrieved from The Met:  
<https://www.metmuseum.org/art/collection/search/27417>
- Rapier with Scabbard*. (n.d.). Retrieved from The Met:  
<https://www.metmuseum.org/art/collection/search/27958>
- Reinert, S. A., & Fredona, R. (2017). *Merchants and the Origins of*. Retrieved from Harvard Business school: [https://www.hbs.edu/ris/Publication%20Files/18-021\\_b3b67ba8-2fc9-4a9b-8955-670d5f491939.pdf](https://www.hbs.edu/ris/Publication%20Files/18-021_b3b67ba8-2fc9-4a9b-8955-670d5f491939.pdf)
- Renshaw, J. (2024, December 20). *The Illustrated guide to sixteenth century mining*. Retrieved from Aveva: <https://www.aveva.com/en/our-industrial-life/type/article/the-illustrated-guide-to-sixteenth-century-mining/>
- Sachs, H. (1494-1576). *The Book Of Trades*.
- Sammuri, P., & Macini, P. (2022). The renaissance of minerals, mining and metallurgy in. *HAL open science*, 171-181.
- Singapuri, N. (2019, April 17). *A Brief History of Renaissance Jewelry*. Retrieved from MOJ: <https://store.museumofjewelry.com/blogs/news/the-history-of-renaissance-jewelry#:~:text=Gemstones%20used%20in%20period%20jewelry,metal%20which%20was%20extensively%20decorated>
- Smith, C. S. (1968). *Sources for the History of the Science of Steel 1532-1786*. Colonial Press, Inc.
- sword*. (n.d.). Retrieved from The Met:  
<https://www.metmuseum.org/art/collection/search/23367>
- Thomas, R. (2018). *The Art & Craft of the Blacksmith*. Beverlyly: Quarto Publishing group.
- Tracy, J. D. (1990). *The Rise of merchant empires: long-distance trade in the early modern world, 1350-1750*. Cambridge: Cambridge University Press.
- Untracht, O. (1968). *Metal Techniques For Craftsmen*. Garden City: Doubleday.

Valentine, E., Noble, D., & Parsons, C. (2024). *An Illustrated Reference Guide to Rapiers*. Huntingdon: Ken Trotman publishing.

Wagner, E. (1967). *Cut and Thrust Weapons*. New York: Hamlyn Publishing group limited.

Williams, C. (2024, January 27). *7 Technologies from the 1500s (Sixteenth Century Inventions)*. Retrieved from Tech Training HQ: <https://www.techtraininghq.com/7-technologies-from-the-1500s-sixteenth-century-inventions/>

## Appendix A Parts of the Sword



**Outer Guard**      The combination of bars and shells protecting the outer or back portion of the hand.

**Inner Guard**      The combination of bars and shells protecting the inside or fingers of the hand.

**Quillons**          The main metal arms containing a quillon block extending perpendicular to the blade. These can be straight, curved, or S curved.

**S Curve**            Alternating directions for Quillons or loops. These can be vertical or horizontal.

**Quillon Block**      The pass-through portion of the Quillons which contain the blade

**Ricasso**             The inner portion of the forward arms which the index finger or two fingers wrap around the unsharpened portion of the blade of a sword.

**Forward Arms**      A curved bar or set of bars connecting to the quillons at the top of the quillon block to protect the forefinger as it is placed over the quillon for better control of the sword.

**Post**                    A piece of metal protruding from the forward arms perpendicular to the plane of the blade. Often in pairs or in combination with another type of defense. Stops blades from sliding down the blade into the hand.

**Knuckle Guard**        A metal bar stemming from the forward quillon to protect the knuckles from cuts to the hand.

**Ring Guard**            A metal ring perpendicular to the blade attached at either the forward arms or the quillons to protect the hand.

**Diagonal Ring**        A metal band spanning from either the forward arms to the quillons, or the quillons to the knuckle guard. These diagonal rings or loops are often S curved.

**Shell**                    A shaped metal disk which can be concave or convex to protect the hand either on the inner guard or the outer guard.

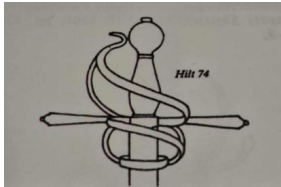
**Cup**                      A concave shaped metal bowl protecting the hand and ricasso attached at the forward arms.

**Grip**                      The wooden, metal, or bone portion of the hilt designed for a comfortable hold of the sword with the hand. It can often be wrapped in leather, wire, or cloth for a more comfortable grip.

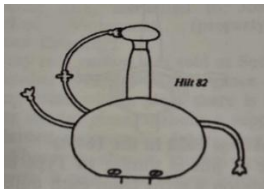
**Pommel**                The weighted counterbalance at the end of the grip of the sword to allow for the blade to move with different characteristics in relation to the counterweight of the hilt and blade.

## Appendix B Three Categories of Hilts

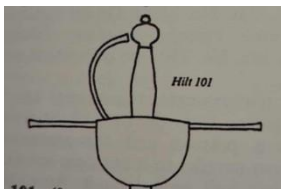
There are three main categories of complex rapier hilts. Loop Guards or Espada De Lazo, Shell Guards or Espada de Concha, and Cup Guards or Espada de Taza. Rapier hilts vary in every shape and size from very simple hilts to intricate guards such as the Schiavona but can be categorized into these three types of complex hilts.



**The loop guard** is the most common type of complex hilt. They are characterized by having at least one band of steel, either round or flat, sometimes with several bands or rings combining to protect the hand from being struck by the opponent's sword. This hilt can also include posts, pegs, and loops of metal spanning from one end of the hilt to the other. They can have one quillon or two with or without a knuckle guard.



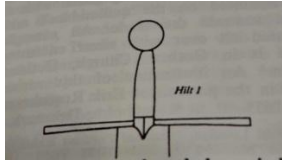
**The shell guard** is characterized by having at least one flat metal shape plate which can be either concave or convex to protect the hand either on the inner guard or the outer guard. A shell guard can have loops or rings in addition to the metal plate for additional protection but is still categorized as a shell guard. They can have one or two quillons, with or without a knuckle guard.



**The cup hilt** is a later example of complex hilts with the earliest examples from the last part of the 16<sup>th</sup> century. It is categorized as a hilt with a saucer shaped guard through the center of which a blade can pass through. This can be a flat plate or a deep cup which protects the hand by completely encompassing it inside the ricasso. The hilt is made of a pair of quillons and forward arms. The hilt can have a knuckle guard or not, as both were common.

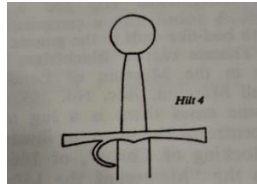
The cup hilt often had an upturned rim to catch the point of the opponent's blade and was often connected to the forward arms by screws or brazed to the riccasso. Quillons can be made in a variety of shapes and sizes from very short and curved to long and straight.

## Appendix C



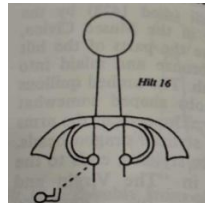
AVB Type 1

This hilt is the simplest and most common hilt during the 13<sup>th</sup> to the 16<sup>th</sup> century, with variations of curved quillons or straight. It may have a quillon block or a grooved slot for the tang of the sword to pass through to keep the quillons from twisting on the hilt. It was most used with armor and armored gauntlets to protect the hands.



AVB Type 4

This hilt consists of simple quillons with a single finger ring mounted in front of the hand. It dates from the 14<sup>th</sup> century and is often found on both single- and double-edged blades. This begins the change to the more complex hilts as it shows how this type of hilt protects the index finger to be wrapped around the quillons to allow for more control and to place the blade in line with the arm for better thrusting capabilities. When a knuckle guard is added it would be considered an AVB type 8 guard



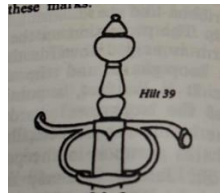
AVB Type 16

Dates from 1470 to 1550 consisting of a pair of quillons, each with a finger ring forming the arms of the hilt. At the ends of the finger rings is a Post on the outside of the hand or (outer Guard) to prevent the opponent's sword from sliding down the blade and into the hand of the wielder.



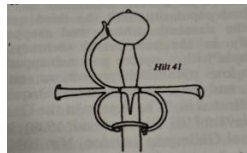
AVB Type 28

Dates from about 1530 to 1630. This hilt has a pair of quillons bent into an S curve, supporting arms and a single post at the end of the forward arm. A diagonal ring extends from the forward quillon to the rear arm end.



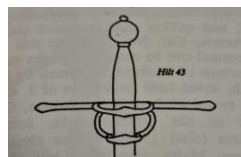
AVB Type 39

Dates from 1470 to 1630. This is the longest lived of all the developed hilts and remained in use well into the 17<sup>th</sup> century and beyond as it gradually merged into the smallsword AVB type 112. This hilt is made of a pair of quillons curved or straight forward arms, and a side ring mounted across the ends of the forward arms perpendicular of the blade.



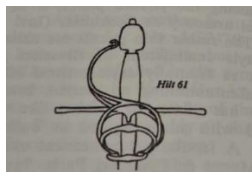
AVB Type 41

From about 1470 to 1630. This hilt differs from type 39 only in that it has a knuckle bow in addition to the quillons, forward arms and side ring. The quillons can be bend forward, in an S curve, either horizontal or vertical.



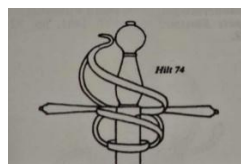
AVB Type 43

Dating from 1550 to 1630. This hilt consists of a pair of quillons, forward arms and two side rings. One spanning the ends of the arms and another larger ring across the quillons. Most often the quillons are straight but can have variations of curved or S curved quillons.



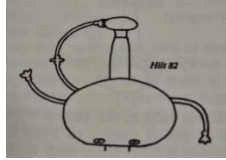
AVB Type 61

Dating early 1600 to 1640. This hilt consists of a pair of quillons, forward arms supporting three rings and a loop guard linking the largest ring with the knuckle guard.



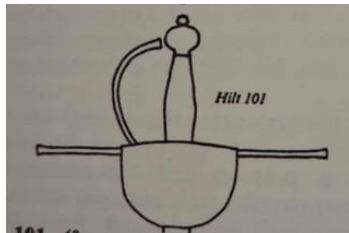
AVB Type 74

Dating from 1545 to 1630. This hilt consists of a pair of quillons, forward arms, a side ring at the ends of the quillons and two diagonal loop guards from the end of the rear forward arms to the forward quillon and from the rear quillon to the tail of the knuckle guard. This creates the look of a spiral of metal to protect the outside of the hand.



AVB Type 82

Dating from 1630 to 1700. This hilt consists of a pair of quillons and forward arms with or without a knuckle guard. A cup or dish surrounding the ricasso attached to the ends of the forward arms with a center slot for the blade to pass through. Often there is an upturned rim to catch the tip of the opponent's blade.



AVB Type 101

Dating from 1650 this hilt consists of a long or short pair of quillons which can be straight or curved, supporting a pair of forward arms attached to a concave shape that encompasses the hand, and Knuckle guard. This provides the most coverage to the hand by encasing it inside the ricasso which is protected by the cup. This protects against attacks to the hand and fingers.

## Extant Examples



This AVB Type 1 hilt is an excellent example of a simple hilted arming sword. It's wide blade and lack of hand protection shows its beauty in simplicity. This sword although created in the 1400s shows the common shape of the 13<sup>th</sup> century design. (sword, n.d.)



This AVB Type 22 hilt from the 16th century Italian rapier shows a complex hilt with two prongs and a side ring stemming from the quillons which are bent forward to catch the blade in combat. The double-edged blade is long and wide for cut and thrust fencing. (Rapier, n.d.) This hilt style is similar in form to the Type 16 in shape and design for protection of the hand.



An AVB Type 41 Italian rapier hilt from the 15<sup>th</sup> century is similar to a bolognese side sword. The quillons are shaped in an S curve supporting forward arms and a small ring at the top and a knuckle guard. (Rapier, n.d.)



An AVB Type 53 Spanish Hilt from the 15<sup>th</sup> century with written gilded bars shaped with S shaped quillons supporting a horizontal ring and an S shaped diagonal loop from the arms to the knuckle guard. (Rapier with Scabbard, n.d.) This hilt style is similar in form to the Type 61 in shape and design for protection of the hand and shows how the flow of the bars are a cohesive design of defense.



An AVB Type 43 German Rapier hilt from the 16<sup>th</sup> century. It is a blackened Thybault style rapier with straight quillons supporting forward arms and two parallel horizontal rings. This example shows a basic guard without any adornment other than blackening. (Rapier, n.d.)



An AVB Type 82 Spanish Bilboa hilt from the 17<sup>th</sup> century. It has straight quillons supporting wide forward arms, two shell guards that are etched with intaglio and a knuckle bow. The ends of the quillons and bend of the knuckle guard are filed and chiseled to create rings and lozenges. (Rapier, n.d.)



An AVB Type 101 Spanish Cup hilt from the 17<sup>th</sup> century. This hilt consists of long straight quillons and a large shell guard and a knuckle guard. The ends of the quillons and bend of the knuckle guard are filed and chiseled to create rings and lozenges. (Cup-Hilted Rapier, n.d.)