Detail of a silver denarius from the Museum collection, decorated with the head of Pax (or Venus), 36–29 BCE. PM object 29-126-864.
numismatics (pronounced nu-mis-MAT-ics) is the study of coins, paper money, tokens, and medals. More broadly, numismatists (nu-MIS-ma-tists) explore how money is used: to pay for goods and services or to settle debts. Ancient coins and their contexts—including coins found in archaeological excavations—not only provide us with information about a region’s economy, but also about historical changes throughout a period, the beliefs of a society, important leaders, and artistic and fashion trends.
Modem Problems, Ancient Origins

My change is forty-seven cents, a quarter, two dimes, and two pennies, one of them Canadian. Despite the steaming tea beside me, I’m cranky, because, strictly speaking, I’ve been cheated. Not by much of course, not enough to complain, but I recognize, albeit belatedly, that the Canadian penny isn’t money, not even in Canada, where a few years ago they demonetized their one-cent piece. Still, it’s the right color, the right shape, almost the right size, and it even has a portrait on it, just the wrong one. It passes for money, but isn’t. I’ll give it to someone else later, continuing a game of hot potato where no one wants to be left holding it. My irritation is allayed only by this: I am participating in a tradition that is millennia-old, the scrutiny of coinage, the study of numismatics.

The first people to use coins were from modern Turkey, right around 600 BCE. Their coins were different from ours today, less regular and made from precious metal, a mix of gold and silver known as electrum, but their experience, as they went to market or paid their taxes, was similar to mine in the coffee shop. They looked at the lumps of metal in their hand and tried to figure out how much money they had left, and whether they had been cheated.

Current research suggests that coins were invented to simplify and regularize this task. Amounts of metal were measured to specific levels of purity and then stamped with an official mark, thereby speeding up transactions and, for the first time in history, guaranteeing certain pieces of metal were trustworthy. The idea caught on quickly, spreading through Western Asia Minor before being adopted by the city-states of Archaic Greece.

Aegina and Athens were among the earliest Greek cities to adopt coinage (ca. 7th century BCE), and both quickly developed imagery that represented them. Aegina, the island city-state, chose a turtle, while on the mainland, Athens put the face of its patron deity, Athena, on the front (known as the obverse) and her symbols, the owl and the olive branch, on the back (the reverse). They even started using the first three letters of their city’s name, ΑΘΕ, to signify: this is ours, we made this, and we stand behind it.

These coins circulated throughout the Greek world as well as outside its linguistic borders. By the Hellenistic period (ca. 331–31 BCE), coinage was, in many ways, the vehicle for transmitting Greek culture. In Central Asia, coinage was one of the most enduring legacies of the Greek conquests of the region. Alexander the Great, and later the Seleucid dynasts, introduced coinage as a means of organizing tribute payments from their subjects, and successive rulers in the region maintained the same types of coins, sometimes for centuries.

Of course, local adaptations happened everywhere. In Bactria (modern Afghanistan), they abandoned the traditional round shape of coins, using whatever shape the metal happened to be, and quickly added their own local deities and languages to the model they inherited from the Greeks. In the western Mediterranean, the Romans were slow to adopt coinage and, starting in the 4th century BCE, began minting coins in bronze rather than silver, using large, unwieldy pieces (the smallest was only slightly smaller than a baseball in diameter) known today as aes grave (pronounced ice-GRAHV-eh). Bronze coins eventually shrunk to a more manageable weight and size, and different denominations of small change were added.

During the 2nd Punic War (218–201 BCE), Rome adopted silver coins and, through much of its history, struck the denarius, a 4.5-gram silver coin that represented roughly a day’s pay for an unskilled laborer. The coin flourished, with only small variations, across the whole empire, eventually becoming a powerful symbol of Rome itself.

By the time the Roman Empire collapsed, its coinage system had been in place across the whole of the Mediterranean world for centuries and the kingdoms of the Middle

LEFT: This gold stater, depicting a lion and a bull, was recovered at Sardis in ancient Anatolia (modern Turkey) and dates to ca. 560–546 BCE. Gift of The American Society for the Excavation of Sardis, 1926. Photo courtesy of the Metropolitan Museum of Art, image 26.59.2.
The First Coins of Archaic Greece

Specific images were selected to represent different Greek city-states. **TOP:** A silver coin from Aegina (404–350 BCE) includes a turtle on the obverse and an incised or stamped square divided into five parts on the reverse. PM object 29-126-413. **BOTTOM:** Athens depicted its patron deity, Athena, on this silver coin from 450 BCE. On the reverse is an owl with olive leaves. PM object 29-126-406.
When examined closely, a single coin can reveal a great deal about the time and the way it was made. See pages 18–19 for more information on this denarius. The portrait on the obverse (or front) of the coin, along with the legend, tell us that the coin was struck in the reign of Domitian. We can see it was struck, not made in a mold, from its irregular edge. By looking at the portrait, we can hypothesize about the date of the coin. Domitian, in this case, does not wear a beard, which became fashionable in the generation after his reign. We can safely guess that he was a 1st-century emperor, based on his lack of facial hair alone.

- **Coin Legend**
  Romans loved to use abbreviations on their coins, which can make deciphering them tricky, even if you know your Latin well! This legend, which is described in the text, is shorthand for names, titles, powers, and honors that the emperor claimed. PM object 29-126-944.

- **Distinct Iconography**
  Domitian claimed Minerva, the goddess of wisdom and of war, as his patron deity. The reverse of this denarius shows the goddess in her full power and might, armed with a spear and her father Jupiter’s thunderbolt. The image tells the viewer that Minerva was ready to defend Rome and Domitian’s reign. PM object 29-126-944.
Domitian built a temple in honor of Minerva inside the Forum of Nerva in Rome, seen above. Ancient historians reported that he considered Minerva his patron deity. Photo by Sophie Crawford Waters.

We can often identify coins by their portraits, since they frequently resemble those we have in other media. Compare the Penn Museum’s denarius to the portrait bust below of the Emperor Domitian from the Capitoline Museum. Photo from Wikimedia.

Minerva was the Roman equivalent of the Greek goddess Athena. She was the goddess of wisdom, the arts, strategy in war, trade, and science. PM object 29-128-9.
Ages continued in the tradition of the Romans, even if their coins lacked some of the artistry of the high empire. They continued to use the same names as the Romans, so, from the *denarius* we get the Islamic “dinar,” the French “denier,” and the Spanish “dinero.”

**How to Read a Coin**

There are two little bronze-colored circles in my hand, and I know at a glance that one is “real” and one is “fake.” Of course, the Canadian penny isn’t fake, per se, but it’s not really right either. I know it primarily from the reverse of the coin, where I see a pair of maple leaves, rather than the Lincoln memorial. In numismatic terms, I know it’s “wrong” because I recognize that the iconography, also known as the device, isn’t right for this coin type. Looking more closely, I can also read the text on my two pennies, and see that one is labeled Canada while the other says United States of America. These are the coins’ legends, and, along with the other phrases on the coins, they can tell me a great deal about the producers of the coins, their values, and, often, the date when the coins were produced.

For most coins, ancient or modern, it is sensible to begin with the images or iconography, not only because many ancient coins lack legends, but also because this is the most obvious and memorable feature of a coin. Let’s take an example from the Penn Museum’s collection, a denarius of the emperor Domitian, who reigned from 81 to 96 CE. Domitian wasn’t a particularly good emperor, but on the obverse of his coin we can see his portrait. It can be compared to the portrait bust of Domitian in the Capitoline Museum, and could be identified by its iconographic similarities, even if we lacked the legend. The reverse shows Minerva, who is identified by her helmet and aegis, her breastplate that was decorated with the likeness of Medusa, indicated here by the barely visible snake-like tendril slipping down from her right shoulder.

Even with this basic information, a historian can begin to construct a useful narrative about Domitian. For starters, Domitian was known to have a special relationship with Minerva. He built a large temple for her in Rome and reportedly considered her his patron deity. The historian Suetonius, writing just a few years after Domitian, reported the rumor that Domitian even dreamed about Minerva shortly before his death. He says: “He dreamed that Minerva, whom he worshipped superstitiously, came out of her temple and declared that she could no longer protect him, since she had been disarmed by Jupiter.” The story, or at least Domitian’s unusual devotion to the goddess, is supported by this
LIKE A BAD PENNY

Deciphering the Modern U.S. Dime

RIGHT: President Franklin Roosevelt has appeared on the U.S. dime since 1946 because he founded the National Foundation for Infantile Paralysis, now known as the March of Dimes.

Modern coin design owes a great deal to the ancient world and a dime can be read just as easily as a denarius.

Iconography: Bust of Roosevelt

Legend: “Liberty” and “In God We Trust”

Date Minted: “2016”

Place Minted: “P” for Philadelphia

Initials of the Engraver: “JS” for John Sinnock

coin, where, fully empowered, Minerva holds a thunderbolt, the weapon of her father, Jupiter.

The coin legends add to the narrative, and provide us with further insight into the specific circumstances of the coin’s minting. Both obverse and reverse are covered with typical Roman abbreviations. IMP CAES DOMIT AVG GERM-P-M-TR-P-XV. They pile on the names, titles, powers, and honors: Imperator Caesar Domitianus Augustus Germanicus Pontifex Maximus Tribunicia Potestas XV—The Emperor Caesar Domitian Augustus Germanicus the Greatest Priest, Holder of the Tribunician Power for the 15th Time. The reverse reads IMP-XXII-COS-XVII-CENS-P-P—Imperator XXII, Consul XVII, Censor, Pater Patriae—Hailed General 12 times, Consul 17 times, Censor, Father of the Nation. Once interpreted, the legends give us the details of the exact years in which the coin was struck, in this case 95–96 CE.

Reading this coin requires familiarity with Latin, just as reading a Greek coin would require Greek, but we can do the same thing with the change in my pocket. Let’s look at a common U.S. dime. On the obverse, we see Franklin D. Roosevelt, though his name does not appear on the coin. Instead, the legend reads LIBERTY, and we see the date to the right, along with several letters, a tiny set just below the bust, and another, larger letter just above the date. Those below the bust are JS, the initials of John Sinnock, the engraver responsible for the design, while above the date we see, on this coin, a tiny P, standing for Philadelphia. This refers to the Philadelphia Mint, which has been in operation since 1792, when it was put into the hands of David Rittenhouse by George Washington. The current Mint building dates to 1969. (See page 20 for more information on the Philadelphia Mint."

If I gathered more loose change, we would see that there are also D and S dimes, struck in mints at Denver and San Francisco, but minting is a Philadelphia tradition, and U.S. coins without mint marks are almost always struck in the nation’s first capital.

Scholars of American coinage will tell you that Roosevelt has been on the dime since 1946, when the Bureau of the Mint gave him the honor because of his work founding the National Foundation for Infantile Paralysis, now known as the March of Dimes. U.S. law dictates that no president can appear on coins while still alive; interestingly, the Romans had the same policy regarding political leaders until Julius Caesar. This history behind our money attracts many to the study of coinage, and it is just as fascinating in the ancient world as the modern.

Numismatists will often seek further information about coins. For ancient coins the weight, diameter, and
metal content can be very important, and can explain matters relating to economic policy. Domitian, for instance, is known to have tried to improve the metal content of Roman coins early in his reign, striking high-quality silver and gold coins, but, by the end of his reign, he had given up on the effort and had returned to lower quality precious metals as a means of reducing costs.

In modern times, mechanized minting has reduced the variety of weights and sizes in coinage, but collectors still value coins with errors, and you will hear technical terms like “double-struck,” “cracked die,” or “broad-strike” used gleefully. Each of these derive from mistakes in the minting process, which were commonplace in pre-mechanized minting, but are highly unusual given modern quality controls.

**Coins, Archaeology, and Numismatic Research**

In an excavation, coins are exciting finds. They are not particularly rare, but they are incredibly useful for dating the context in which you are digging. This is because coins, unlike so many other artifacts, can usually be fixed in time. In the Roman period, it is sometimes possible to date a coin to just a few months within a specific year, and, by extension, to say when a particular part of a site was in operation. Of course, this is not always straightforward. Dates on coins only tell the numismatist or the archaeologist when a coin was struck, not when it was buried, but, in context, coins can be a significant help in providing a *terminus post quem*—the earliest possible date—for the other finds.

However, coins remain independently valuable for scholarship, both singly and in groups. The iconography of individual coins can provide a wealth of information, ranging from popular hairstyles to cross-cultural influences. We can use coins to uncover information about ancient commerce, and, because bartering remained common throughout antiquity, coins can tell us when and where different parts of the ancient world were monetized.

A range of techniques exist for studying groups of coins. One of the most common is the study of hoards. In the absence of banks, most people in the Greco-Roman world buried their savings to keep them safe. Archaeologists recover these stores of wealth when, for one reason or another, the owner was unable to retrieve them. Studying hoards can reveal moments when individuals suddenly came into a lot of money, and other cases where years of careful saving paid off. We call the former circulation hoards, because they reflect what money was circulating at a particular moment. My change from the coffee shop is a tiny circulation hoard. The latter is called a savings hoard, and will show coins that extend across a lengthy period of time, sometimes even across generations of savers. We can learn a lot from hoards about how long coins circulated before they were buried, helping us to make archaeological dating even more secure.

Today, both single coins and groups find their way into databases that are increasingly available online and to the public. Scholars are working to make coins more accessible and to link the databases, sharing information with our peers. It is becoming easier to ask, and maybe even answer, larger questions such as why governments struck coins since minting is so expensive? Why do some periods produce more coins than others? Do those periods correspond with economic depressions or times of great...
prosperity? What proportion of the ancient economy was monetized? Were coins weighed or counted in antiquity? We think we have answers to some of these questions and can continue to pursue others with digital collaboration paving the way for new research in this field.

**Numismatics and the Penn Museum**

The Penn Museum is at the heart of this new research, by uploading images of our coins to our Collections Database and working to link our data with major collections across the world. These efforts will make the Museum’s coin collection more accessible to scholars, making numismatics a greater component of our teaching mission. Many of the curatorial sections of the Museum have coins as part of their holdings, and students are increasingly engaging with these objects.

But, as we move into the future with our coin collection, it is also worth looking at its history, since the numismatic collection is intimately linked to the foundation of the Museum itself. Most of the coins in the Mediterranean Section come from early donors. These individuals were prominent, and at times colorful, Philadelphians in the late 19th century who mixed collecting with scholarly pursuits.

One of the most important numismatic donors was Colonel Robert C. H. Brock, who not only donated items from his personal collection, but also provided a fund for the further expansion of the coin collection. Brock was a lawyer in Philadelphia, a graduate of Oxford University, and a colonel in the National Guard who traveled extensively. Data from the Museum Archives suggests that Brock collected for the Penn Museum while abroad, buying coins in Egypt and Croatia. He was an avid numismatist and a member of the board from 1898 to 1902, when he broke rather publicly from the Museum due to a feud with Sara Yorke Stevenson, one of the founders of the Museum and the curator of the Egyptian and Mediterranean Sections. Brock fought with Stevenson over the publication of the Museum’s Bulletin, and the dispute culminated in a memo in which Brock declared that he could not be a participant in any organization affiliated with “that woman.”

Stevenson was a distinguished archaeologist and driving force behind the Museum, as well as an outspoken fighter for women’s rights and suffrage. She and Brock butted heads, and she came out victorious. Luckily for the Museum, she maintained more cordial relationships with other coin donors, such as the Morris siblings, who donated a large coin collection to the University, along with their own land, which is now the University of Pennsylvania’s Morris Arboretum. The Morrises were also great travelers who collected while abroad, bringing art and coins back from Europe. Their donations, along with those of Brock and Hermann Hilprecht, form the backbone of the Mediterranean Collection and the heart of the collection that is used in our classrooms today.

The study of coins is closely tied to Philadelphia, from historic times to the change I’m carrying in my pocket right now. Today, in Old City, the Mint is busily striking new coins that will be sent to banks this year. They will examine every batch of coins for quality and uniformity, continuing a tradition hundreds of years old. Across the river at the Penn Museum, students and scholars alike study coins from more than 2,000 years ago, hoping to extrapolate some information about people and societies long gone. These days, I check my change compulsively, a habit built up from hours spent cataloging *denarii* and studying Roman bronze coins. After all, I can never be sure what pieces of history I’ll find there.

**JANE SANCINTO, PH.D.,** received her doctorate in 2018 from the Ancient History Graduate Group at Penn. She is a numismatist with a special interest in the circulation of coins in Roman Syria. In September, she will start a new position as Thomas F. Cooper Postdoctoral Fellow in Classical Studies at Oberlin College and Conservatory.

**FOR FURTHER READING**


**ONLINE RESOURCES**

Coinage of the Kings of Macedonia: numismatics.org/pella/

Online Coins of the Roman Empire: numismatics.org/ocre/

Roman Provincial Coinage Online: http://rpc.ashmus.ox.ac.uk

Penn Museum Collections Database: penn.museum/collections/