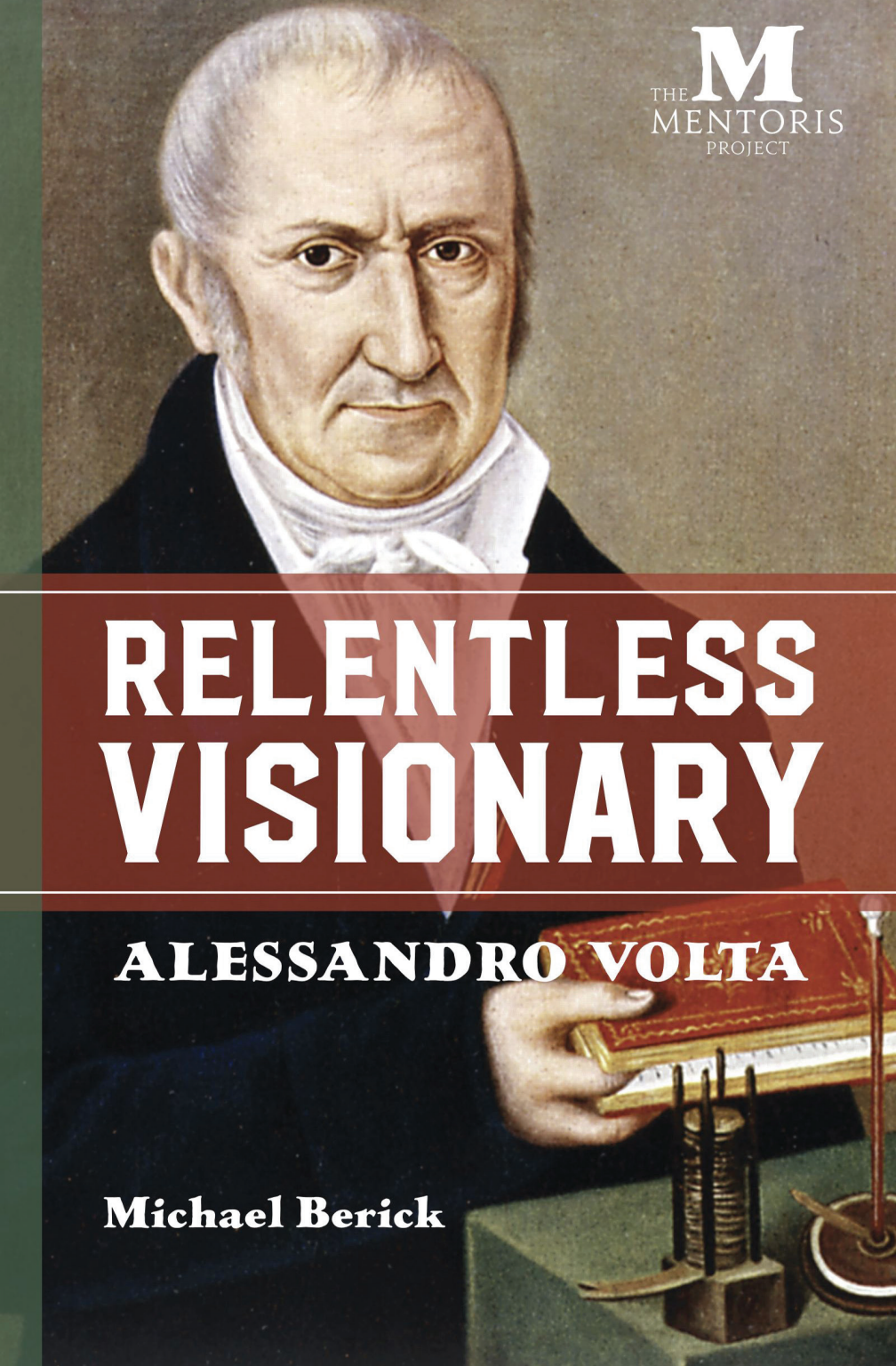
THE
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VISIONARY
ALESSANDRO VOLTA
Michael Berick

# Preface

Frogs' legs, the torpedo fish and the cell phone are all connected. In fact, the cell phone owes its existence to frog legs and the torpedo fish. The same can be said for a range of everyday essentials, including computers, cars, toys and tools.

What these devices have in common is that they each operate with a battery. The link between batteries and frog legs and the torpedo fish will be revealed in the following pages, but the lynchpin is a man named Alessandro Volta.

Alessandro Giuseppe Antonio Anastasio Volta was an Italian scientist who was born in Como, Italy in 1745 and died there in 1827. In his life he traveled throughout Europe and became a renowned electricity experimenter, as scientists were often called at that time, credited with many significant discoveries and inventions. He was the first person to identify the gas known as methane, and created the first authoritative list of conducting metals. He studied atmospheric science and made advancements in the field of meteorology. He also created an

array of instruments, including the "electrical pistol." His most important invention, and the crowning glory of his career, was the Voltaic pile, which is now recognized as the first electric battery. Electricity is the primary form of energy that powers our world, and batteries of all sizes and levels of power perform incalculable functions on a daily basis.

Although his name may not be as well known as Thomas Alva Edison or Nikolas Tesla, Alessandro Volta was an influential scientist of his generation. Volta's work and contributions continue to affect our lives in ways big and small, obvious and not-so-obvious. For example, a connection can be drawn between his work and Mary Shelley's novel *Frankenstein*.

Alessandro Volta was an extraordinary scientist, and lived an extraordinary life. He was born and raised in a small Italian town, and it is said that he didn't speak for the first several years of his life. His family lived far from Europe's intellectual centers, and he had no formal education, but this did not impede Volta's intelligence or curiosity.

A product of the Age of Enlightenment—a time when ideas on reason, science, literature and liberty took center stage—Volta employed a very modern, hands-on approach to his work. He built his career by seeking out influential people and key opportunities that would help him achieve his goals. He met Benjamin Franklin and other great men in his field, and he socialized with the rich and with royalty. In fact, Napoleon Bonaparte was a fan and became an important patron. Volta's success is all the more intriguing because of the many challenges he had to overcome.

Alessandro Volta saw things not just as they were, but as what they could be. He was a disrupter, an innovator and a visionary.

Above all, however, he was relentless—Volta's hunger to create, and his drive to invent and discover were simply remarkable.

*Relentless Visionary* covers the journey of Volta's life, revealing his steps to becoming a celebrated scientist and compelling historical figure, and examines his legacy within the context of seventeenth- and eighteenth-century history. Readers will learn how Volta changed his world and why he remains so relevant today.

# Chapter One

## ROOTS AND ORIGINS

### VOLTA'S FAMILY

The world was rapidly changing in 1745. The Age of Enlightenment, a phase of European history that championed human reason, was flourishing. The Scientific Revolution was ongoing, and the Industrial Revolution was not far off. Much of Europe was in a state of turmoil. Nearly every European power was entrenched in the War of the Austrian Succession, and in addition, the Scottish revolt against the British, known as the Jacobite Rising, was just beginning.

Political events, however, were of little, if any, concern in the Volta household. The Voltas were more interested in the arrival of the latest member to their family, a baby boy they named Alessandro Giuseppe Antonio Anastasio Volta. Born on February 18, 1745, Alessandro was the youngest son of Filippo and Maddalena Inzaghi Volta, and was born into a family with four sisters and four brothers.

The Voltas lived in the town of Como in the Lombard region of what is now Italy. Located about twenty-five miles north of

Milan, Como rests near the Alps on the southwestern shore of the lake that bears its name.

When Alessandro was born, Como was a picturesque outpost of the Austrian Empire. The town, and the rest of Lombardy, had come under Austrian rule in 1714 during the Hapsburg regime. Except for a brief time of French rule, during the years of 1796 through 1815, the region remained under Austrian control. The city was a trade center with a large silk manufacturing industry that attracted salesmen from around Europe. This international activity, coupled with proximity to both France and Austria, would influence Volta's life, particularly as a young man.

Filippo Volta had spent eleven years in the Jesuit order by the time he married Maddalena Inzaghi. He was forty-one years old at that time; she was twenty-two years his junior. Volta's parents came from families of lesser nobility. Filippo's forefathers included Martino Volta, a successful Venetian wool merchant during the age of Christopher Columbus, while Maddalena came from a noble family in Graz, a city in modern day Austria. Though they each enjoyed a certain degree of prestige and privilege in their lives, they were not wealthy.

Not much is known about Filippo, but the little that is known isn't particularly complimentary. Described as an unreliable, possibly troubled individual, Filippo earned a reputation for his lavish spending, and not his business acumen. A well-known example took place at Como's 1750 carnival celebration, where Filippo organized two grand dinners for his friends and associates, even though his own large family of nine children was struggling financially. Late in his life, Volta wrote that his family had been left with a 17,000 lire debt when his father died while Alessandro was a young child.

Following Filippo's death, Maddalena took Alessandro and

two of his sisters, Chiara and Marianna, to live with Alessandro's uncle and namesake, Alessandro Volta. The elder Alessandro served as the Como cathedral's archdeacon and played a stepfather-like role in young Alessandro's life.

Volta didn't have a close relationship with either of his parents. His estrangement from his father is easy to understand given Filippo's irresponsible behavior, particularly in financial matters. That Volta was not close to his mother is more curious. When his mother was on her deathbed in 1782, Alessandro was in Milan, just twenty-five miles from Como. Instead of going home to be with his mother, Alessandro instead chose to stay in Milan and keep track of her health from there. She died several days later while he was still in Milan.

The Volta family's financial situation improved in 1756 when the Volta sons, principally Alessandro and his brother Luigi, received an inheritance from their wealthiest relative, great-uncle Nicolò Stampa, who bequeathed them a substantial revenue-producing trust. Luigi, who at age fifteen was four years older than Alessandro, was appointed the main heir while Alessandro was named in a secondary position. The two brothers consequently occupied an important role in their family. As beneficiaries of the trust they provided their family's main income source.

The Volta brothers would spend a good part of the year, from springtime to early winter, touring the family properties—approximately nine separate small estates and houses located across the regions around Como and Milan. They enjoyed the rental money that these properties provided and a certain amount of leisure that came from the inheritance and the rental revenue.

While the Voltas were more comfortable due to the

inheritance, they were not wealthy. In fact, Luigi remained the trust's primary heir, holding the reins of the family's financial affairs until Alessandro was well into middle age. It was only when Alessandro married in 1794, at age forty-nine, that Luigi ceded him fifty percent of the rents from the Stampa properties.

## THE EARLY EDUCATION OF A GENIUS

As a young child, Alessandro Volta showed no signs of becoming a brilliant scientist. In fact, his family feared that he might be mentally challenged because he did not speak a word in the first few years of his life, and appeared to be dim-witted. It was only after he turned four that Alessandro started to talk; his first word was "no!" Perhaps this was a sign of his against-the-grain nature that blossomed as he grew older.

Once young Alessandro found speech, his development accelerated. By the time he was seven, he was among the top students in his class. His family was surprised by their son's sudden and rapid intellectual growth spurt. His father said, "We had a jewel in the house, but did not know it."

The delayed developmental that Alessandro experienced is not unusual for youngsters who grow up to be highly intelligent adults. Albert Einstein, for example, did not begin talking until he was around age three, and noted physicists Richard Feynman and Edward Teller were also late talkers. Economist and social critic Thomas Sowell even coined the term "The Einstein Syndrome" for this type of late-talking child.

Not much is known about Volta's early formal education. Some scholars suggest that he was home-schooled as a child, which was not unusual in the eighteenth century. When Alessandro later became the superintendent of Como's public school,

he endorsed home schooling, and thought that it should be supported by the state.

Some believe that Alessandro entered a school of rhetoric in Como when he was seven, around the time that his father died in 1752. Wherever Alessandro received his early education, he became a quick and voracious learner. In 1758, at the age of thirteen, he entered Como's Jesuit College, a small but well-established institution that had been founded 200 years earlier. During his years there, young Alessandro received a classic Jesuit education, studying physics, rhetoric and philosophy.

## A YOUNG SCIENTIST AND A POET

While Alessandro Volta displayed an early curiosity about the sciences, he had many academic interests. He enjoyed the study of the humanities, and demonstrated an aptitude for languages. In addition to his native Italian, he learned Latin, French and English, and was able to read Dutch and Spanish. Alessandro's fondness for French tragedies and his desire to read French scientific scholarship have been noted as his motivation for learning the French language. His aptitude for linguistics served him throughout his professional life—he could read scientific literature in a variety of languages as well as communicate with scientists around Europe through letters and in person.

Poetry was another interest. Alessandro gravitated to epic poems, especially those written by the German poet Friedrich Gottlieb Klopstock (*der Messias*) and the English poets Edward Young (*Night Thoughts*) and John Milton, whose *Paradise Lost* he read in a French translation. He enjoyed reading Italian poets Torquato Tasso, Carlo Innocenzo Frugoni and Gabriello

Chiabrera. Alessandro was fond of contemporary and classic oratory; Cicero was one of his favorites.

Writing poetry presented Volta with an opportunity to combine his interests in science and the humanities. When he was about eighteen, the young Volta composed an epic poem—some 500 verses—that addressed contemporary discoveries in natural sciences and philosophies. In this untitled poem, Alessandro sought to rationally explain such things as gunpowder and fireworks, which were then viewed as magical. The poem also touches upon the topic of electricity, and mentions "philosophers" (scientists were considered to be in this group) such as Benjamin Franklin, Giovanni Battista (or Giambattista) Beccaria and Jean-Antoine Nollet, who all explored electricity to some extent, and would factor in Alessandro's later career. This poem hints that Alessandro performed experiments to provide evidence of his scientific theories. He planned to devote a specific poem to the topic of electricity, although no such poem, if he ever wrote it, survives today.

Writing poetry remained a lifelong passion. Alessandro described himself in a 1768 letter to the Swiss poet Salomon Gessner, as being "fond of everything poetic." To commemorate his friend and fellow electrical experimenter H. B. de Saussure's successful summit of Mont Blanc in the Alps, Alessandro penned a poem in 1787 comprising 199 verses.

The pursuit of knowledge and intellectual inquiry, especially in natural philosophy—the study of natural and physical sciences—were keen interests of the teenage Alessandro Volta. During this period, he generated controversy in Como by arguing that animals, like humans, had souls. It was a position that ran against the prevailing opinion in his hometown. Among those who vigorously disagreed with him was his good

friend Giulio Cesar Gattoni. While he was interested in natural philosophy, Gattoni was also a staunch Catholic—his religious beliefs conflicted with Alessandro's ideas.

Alessandro's relatives removed him from the Jesuit College after just a year or two, even though the school offered free admission. His family worried about the political troubles that the Jesuits were encountering in some European states. They also believed that Alessandro's philosophy professor had attempted to persuade him to join the Jesuits and become a priest. The possibility of Alessandro being a priest troubled his family because the 1756 Stampa trust stipulated that the substantial inheritance from that the deed would go to a male descendent, and this would not happen if he were to become a priest. Since Alessandro's brothers were already in the church, the family needed Alessandro to marry and have children to preserve the deed of the trust. It was understandable why the Voltas would steer their sole remaining male heir away from priesthood, despite the fact that church was a strong presence and a source of income in their family (two of Alessandro's sisters became nuns.)

Alessandro's family, and particularly his uncle, pushed him to study law, and to get a financially stable job such as that of a magistrate. But this plan held no interest to Alessandro. He made it clear that he wanted to study philosophy. Eventually his family acquiesced and allowed him to pursue this area of study. His mother did not play a crucial role in the discussions about the career of sixteen-year-old Alessandro.

And so Alessandro Volta began to study philosophy rather than law or religion. He enrolled in a local seminary—most historians believe it was either Santa Caterina or Seminary Benzi—whose curriculum of philosophy, grammar and rhetoric did not differ markedly from that of the Jesuit College.

Significantly, however, this new school included many students like Alessandro, who intended to have lay careers unrelated to the church.

Alessandro was an avid, intense learner. His thirst for knowledge opened his mind to a broad spectrum of topics, including literature and languages and a variety of sciences. His interest and curiosity were driven by a sense of imagination and creativity.

He possessed an especially strong ability to concentrate, and he was known to be so consumed while working on an experiment that he would miss meals and skip sleep. He paid little attention to his clothing. His focus was solely on his studies; he had no interest in fashion or frivolity.

When he was faced with a scientific problem he could not solve, Alessandro doggedly sought out explanations. This was particularly true with problems related to nature. He employed the full force of his inquisitive mind and thorough, hands-on methodology until he reached understanding.

The budding "electrician," as scientists of electricity were often called at the time, read and engaged in ideas of physics, an influence from his earlier Jesuit College studies. In addition to his education in the classical tradition, Alessandro read seventeenth-century authors who reinforced his worldview and provided him with rich inspiration. Isaac Newton, Benjamin Franklin, Jean-Antoine Nollet, Giovanni Beccaria and Pieter van Musschenbroek were among his favorites.

## YOUNG VOLTA LOOKS BEYOND COMO

Alessandro was driven, both personally and intellectually, to create a life for himself that his provincial hometown could not

provide. The first step was to break away from his family's expectations. In his later years, Alessandro reflected that he found their routine life in Como, as comfortable as it was, to be mundane and stifling. It was simply too small. He desired a grander and broader life, and he vowed escape the isolating existence in Como.

His quest for learning took Volta beyond the walls of his home and school, and of his town. Through his scientific endeavors, as well as his writing interests, he sought to position himself for a cosmopolitan lifestyle. Volta's curiosity about the world outside Como, and even Italy, can be seen in the impressive list of continental writers, philosophers and scientists he admired in school. As a young man, Volta also caught a glimpse of the world at large by getting to know members of the local business community as well as clergy, academics, aristocrats and intellectuals around Lombardy.

Volta's broad group of associates contributed to his remarkable professional successes. Whether or not he did it consciously, Volta engaged in a creative cross-pollination that proved to be highly productive. By associating with natural philosophers, expert electricians, amateur electricians, university professors and medical instrument makers, he created an intellectually stimulating community that could be viewed as a scholarly version of the artistic salons that were popular during the second half of the eighteenth century.

Besides sharing many of his intellectual interests, a number of the men who Volta encountered as he started his professional journey aspired to be natural philosophers just as he did. Among these was his long-time friend Giulio Gattoni. A few years older than Volta, Gattoni came from a wealthy family. Sharing Volta's curiosity in electricity, he would often provide Volta with books,

and even let him work on experiments in the physics lab in his own house. Gattoni later received a good deal of recognition in northern Italy for setting up Como's first lightning rod, as well as for his collection of natural and antiquarian objects.

## A MAN WITH A PLAN

While Volta can be seen as a bit of an eighteenth-century rebel, he was not a true revolutionary, but rather a moderate with a rebellious streak. Volta's ambitions might have been restricted by social traditions, and his ideas certainly ran counter to the prevailing views at times. However, his unorthodox mindset did not lead him to form a hostile view of humanity or attempt to topple society. Just the opposite; Volta wanted to improve the world.

Similarly, Alessandro Volta would only go so far in breaking away from his own heritage and its teachings, though he was drawn to other cultures. His childhood upbringing and education grounded him in ways that led him to respect traditions even as he sought to free himself from their more restrictive aspects. In physics, Volta found a secular field of study that embraced the rational. The concept of electricity did not come charged with religious controversy on topics such as the age of earth or whether or not animals had souls like humans—ideas that Volta vigorously debated at one time, but later learned to avoid.

During the mid-seventeenth century, the work of the amateur scientist in cultural circles was celebrated much in the way as that of musicians and writers. Volta, however, was not willing to be viewed as an amateur philosopher; there were plenty of those in Lombardy and all around Italy. He wanted his work as an "electrician," to be taken seriously, and he did not care whether

or not it was fashionable. Natural philosophy, and particularly physics, was of great interest and provided him with the perfect outlet for his ambitions and worldview.

Because he came from lesser nobility and had chosen not to go into a career in law or in the church, both of which offered a steady income, Volta needed to achieve a different route to social and cultural standing. He aimed to become known as a serious natural philosopher, which he hoped would then build and spread his reputation beyond Lombardy and the Italian providences to greater Europe.

Volta exhibited impressive drive—and an ability to advance in the path he chose while still a teenager—to become an electrician and natural philosopher. Even without matriculating at a university, he began to formulate theories of electricity, experimenting on his own and promoting his ideas and findings.

In the early 1760s, the main Lombard scholar studying electricity was Carlo Barletti, but this man was just a decade older than Volta and not yet an established electrician. To find someone with the sufficient fame and authority necessary to help advance his career, Volta surveyed the leading electricians and natural philosophers, looking for those whose work he respected.

One such person was Benjamin Franklin; however, the distance between Como and Philadelphia was too far to make regular contact feasible. Volta instead chose a worthy Franklin substitute—Giovanni Beccaria. An acolyte of Franklin's, Beccaria lived only ninety miles from Como. The University of Turin professor of physics also enjoyed high standing among the electricians of Europe and the New World. Moreover, Volta was aware that the Austrian emperor, Joseph II, had visited Beccaria and attended an event in Turin where the distinguished professor demonstrated his electrical experiments.

In the mid-seventeenth century, communication options were limited. The best method was to send a letter, which Volta did to contact Beccaria in 1763. At first, the venerated scientist was a sporadic, and not particularly a well-tempered correspondent. His behavior is understandable considering that Volta was a relatively unknown scientist who was a generation younger than Beccaria.

By 1765, however, Beccaria had begun to reply to Volta regularly. He even sent Volta, in late 1766, the proofs of his forthcoming article for the prestigious journal, the *Philosophical Transactions* of the Royal Society of London. This gesture reveals that Beccaria viewed the much younger Volta as something of a professional equal, underscoring the value of Volta's persistence in writing to him. The significance of Beccaria's correspondence was not forgotten by Volta over the years. When he published his first treatise in 1769, Volta addressed it to Beccaria. He also would choose the same publication, *Philosophical Transactions*, to announce the invention of the Voltaic pile more than three decades later.

While Volta corresponded with Beccaria, he also started writing to Jean-Antoine Nollet, who, like Beccaria, was then a well-established expert in the scientific community. The Paris-based Nollet also had the cachet of coming from that noted world city, which had a reputation as a glamorous center of learning. Moreover, when Volta contracted Nollet, the noted French physicist and electrical experimenter already had a twenty-five-year track record of visiting Italy and engaging with Italy's electricians. In fact, his status had increased in the Italian peninsula during the 1760s because two of his works appeared in Italian translation in 1761 and 1762.

While writing to Nollet, Volta expressed his idea that

electrical attraction was similar to Newton's law of gravitational attraction. Nollet responded enthusiastically, stating, "Your letter on the nature of electricity brought me great pleasure. I marvel that you were able to derive from Newtonian attraction the laws of electrical phenomena but I fear a successful outcome to be most difficult. I do not know another physicist with the daring to enter the path; the glory will be all yours if you succeed in accomplishing it laudably."

Nollet's words proved to be quite prophetic. Volta did find great success with his electrical experimentations, although not necessarily with what he wrote about in that particular letter. Over the years, Volta and Nollet continued to exchange letters as well as books. In writing to Volta in September 1767, only a few years before he passed away, Nollet also included the gift of a small book for his faithful correspondent.

The eighteen-year-old Volta demonstrated a youthful audacity by contacting Nollet and Beccaria out of the blue, especially since he lacked any bona fide credentials or even a mutual connection to justify doing so. Volta displayed daring and deference in equal measure by not only writing these recognized authorities, but by discussing his ideas about electricity, magnetism and related topics. Additionally, he showed persistence in communicating with both men, who had higher priorities than corresponding with this younger man whose letters they undoubtedly regarded—at least initially—with a healthy amount of skepticism. Volta succeeded in becoming a consistent correspondent with both Nollet and Beccaria.

In contacting these men, Volta also revealed a certain political savvy. At the time, Nollet and the Beccaria-Franklin camp were engaged in a high-profile intellectual debate regarding the theory of electricity. By corresponding with both

men, Volta consequently was able to share his views with two leading exponents of the two differing schools of electrical thought. Furthermore, he added some minor value to each side, since the two camps sought to gain additional supporters in their intellectual debates.

Volta's correspondence with Nollet and Beccaria, moreover, established a habit that lasted for years to come. Throughout his life, Volta reached out to highly regarded scientists and courted influential people outside the science community to cultivate his professional career.

Volta wished to become a member of the "Republic of Letters," a transnational, interdisciplinary community of intellectual Europeans who exchanged "Enlightenment" ideas and discoveries. For all his scientific theorizing and philosophizing, he also was very much a realist who knew and understood dynamics among powerful people. Consequently, he showed little hesitancy in establishing connections with royalty, high government officials and wealthy individuals, actively forming a useful network of international contacts, as he worked to create a career for himself and achieve his ambitions.

In the early 1770s, for instance, Volta began to correspond with Joseph Priestley, the Englishman who was a pioneer in modern chemistry, and more significantly for Volta, author of *History and Present State of Electricity*. Priestley classified his book as a compendium of current research on electricity, and Volta became familiar with this book when a French translation was published several years after the original English language version came out in 1767.

By writing to Priestley, Volta had more in mind than just wanting to share and exchange ideas of scientific content. Priestley initially promised updated versions of *History* based on the

latest research and discoveries in the field, and Volta hoped to be referenced in additional editions. While no such updates ever materialized, Volta's letter-writing exchanges with Priestley helped him in other ways. One case in point occurred in 1773. Following his discovery of alkaline air, Priestley mentioned it to a select group of private individuals before making it public in March 1774. The English scientist wrote about this new finding to Volta in a letter dated November 10, 1773, just weeks after he'd brought it to Benjamin Franklin's attention.

Priestley came to hold Volta in high regard and helped his younger colleague develop connections in the important English scientific community that would prove significant when Volta traveled to England in 1782.

## HIS FIRST SUCCESS

Volta was just twenty-four in 1769 when he published his first treatise on electricity: "*De Vi Attractiva Ignis Electrici, Ac Phaenomenis Inde Pendentibus,*" or "On the Attractive Force of Electric Fire and Related Phenomena." In this seventy-two-page paper, written as a letter to Beccaria, Volta presented his ideas on electrical attraction. Although he made references to his experiments with generating an electrical charge by rubbing different metals together, these mentions were more speculative in nature.

Four years later, Volta published his second paper, "Novus ac simplicissimus electricorum tentaminum apparatus," or "New and Very Simple Apparatus for Electrical Tests," which showed that he favored more practical investigations into electricity over philosophical ones. It would be an overstatement to say that these works launched him into the elite of the European scientific community. But these papers did raise Volta's profile—his

description of his all-wood electrostatic machine, in particular, drew the attention of colleagues.

Professionally, Volta's next steps occurred primarily in the academic world, a field where natural philosophers could find financial support during that era. In 1774, Volta took an appointment as superintendent of Como's secondary schools, and the following year he started teaching experimental physics in Como's public grammar school. He held this job until 1778, at which point he became a professor of physics at the University of Pavia, where he taught for forty years.

His career as a professor was highly successful. His students were said to have idolized him, and he seemingly loved to teach. Volta remained a professor even after he found great professional triumphs, and after he stopped his active career as a scientific inventor.

Volta's first big career breakthrough arrived in 1775, when he announced the invention of the electrophorus, which means "electricity bearer" in ancient Greek. An early pioneering type of an electrical induction device, it could generate, as well as store, electricity. The machine retained an electric charge through the then-unique concept of "electrostatic influence" instead of the standard way during that era of direct electrostatic friction.

Historian Joyce Chaplin described how Volta's invention, sometimes called the electrophone, worked in this way:

> *Volta's 'electrophore' sandwiched an electrostatic cake (a blend of turpentine, resin, or wax) between a fixed metal plate below and a rotating wooden shield covered with tinfoil above. When the cake was rubbed (while the lower plate was grounded), it generated and condensed a charge (like a Leyden jar), but its fixed metal plate also retained a charge—it did not decay.*

Volta wrote to Priestley to tell him about the electrophorus. He not only wanted to let his English colleague know about his latest invention, he also sought to find out from his knowledgeable mentor whether anyone else might have been working on a similar invention. In fact, the Swedish electrician Johannes Wilcke had actually invented a similar electrical apparatus in the 1760s. Volta, working independently of Wilcke, was totally unfamiliar with this other device when he created an electrophorus.

Surprisingly, Volta was not upset over this news. Instead he was quite pleased to find out about Wilcke's device because it provided additional support for his own concept of "spontaneous electricity." Furthermore, Volta's invention was viewed as improving upon Wilcke's because it brought a new, important ingredient to perpetual electricity devices. Volta's electrophorus was simple to construct as well as easy to transport, so it was welcomed by scientists looking to display their electricity experiments. Up until that point, electrical devices had been of the experimental variety, while Volta's had practical uses. As a result, he felt justifiably triumphant that he had devised a better version of this type of machine.

Volta was not shy about demonstrating his electrophorus device. One reason for this was because it took nearly a year for Priestley's reply to reach Volta. His demonstrations, consequently, served to publicize both his invention and himself. Volta showed off the electrophorus to audiences of important public figures, professors and amateur scientists around the Milan area, and news of the invention eventually made its way to Vienna. The device was so well received that many were built through the rest of the year, including some as large as seven feet in diameter.

This invention gave Volta, who was then just around

thirty years old, a major boost in stature within the scientific community. He had demonstrated intelligence and cleverness by inventing a device that improved upon previous advances like the and existing knowledge of static electricity. In doing so, he also challenged the prevailing theories of Benjamin Franklin, then a legendary figure in the science of electricity for inventing the lightning rod in 1752 and his subsequent contributions to this field of study. The electrophorus constituted a rejection of Franklin's notion that electricity was something fluid that could move within an equilibrium. Although the device may not have any practical purposes today, it played a significant role in eighteenth-century electrical research and in the evolution of our understanding of electricity.