

Introduction

SINCE HIS OWN TIME AND FOR THE NEXT FIVE HUNDRED YEARS the name Leonardo da Vinci has been synonymous with “genius.” Others who have shared that title – Charles Darwin and Albert Einstein, for example – usually excelled in one particular field or area of science. Leonardo has seemed to loom above them all in his range of interests and apparent expertise, which included art, aerodynamics, anatomy, astronomy, botany, geology, hydraulics, optics, physics, and numerous technologies of warfare. However, our admiration for this omnivorous curiosity has led to some misconceptions about his legacy. The truth of the matter is that Leonardo’s scientific contributions, unlike those of Darwin and Einstein, were negligible, and many of his inventions, although clever and even prophetic, could not have actually functioned. Of his many scientific and industrial interests, he appears to have mastered only certain, basic aspects of engineering, and only in the practice of art did he exceed the accomplishments of most of his contemporaries. Only in art was he truly a successful innovator.

In pointing out this reality, our intention is not to “explode” the “mythology of Leonardo” – certainly, his brilliance and inspiring creativity should not and cannot be diminished. Rather, we are attempting to reconcile traditional accounts of the “Transcendent Genius,” who purportedly received his ideas from on high, with the life of a man who had more than his share of struggles with his world, his family, and, occasionally, with himself. Leonardo’s genius rested primarily in his powers of observation, in his ability to discern the subtle complexities of nature and to study with keen comprehension the works of others, making instant and optimal use of their contributions. More often than not, his artistic and mechanical inventions were reactions – to

natural phenomena that he found particularly inexplicable and intriguing or to those paintings and sculptures that he considered to be novel in some respect. Generally speaking, he responded much better to challenges than he did to contractual obligations and timetables. He rarely displayed the patient attitude and methodical approach of a scientist; it has been noted that he hardly ever devoted more than a page or two in his notebooks to the investigation of any particular problem or question.

Although Leonardo did little to advance the scientific fields in which he was engaged, the knowledge he gained through his research profoundly informed his artworks. His investigations into light and optics resulted in his creation of the evocative, smoky pictorial effect called *sfumato*. His study of the movement of water not only lent authenticity to his landscapes but also invigorated his renderings of hair, garments, and flora. His investigations of the cardiovascular system contributed to the physiological accuracy of his portrayals of human emotion.

Often exaggerating for expressive effect, he applied the underlying processes he perceived in nature to the world that he portrayed in microcosm in his art. There, rocky outcroppings seem to form, expand, and erode before our eyes. So exquisitely sensitive are his renderings of sky and skin that Leonardo suggests their molecular excitation. Such aesthetic manipulation also produced the controlled dynamism of his groundbreaking *Adoration of the Magi* and the timeless suspension of the *Mona Lisa*. Centuries before Darwin, Leonardo presented a natural world in evolution. And, believing in the divine design of that world, he sought, long before Einstein, a Renaissance equivalent to the modern, unified-field concept – the ultimate reconciliation of all contrasting forces and ideas. Leonardo tirelessly (and literally) drew analogies between the seemingly disparate phenomena of the visible realm.

In Florence, under the rule of the shrewd, mercantile Medici family, the young Leonardo found a life much at odds with the idealized existence that he imagined and painted. Then as now, politics tended to trump talent, and so the youth's obvious gifts did not guarantee a career or survival. Fortunately, his father's respected position as a Medici notary compensated to some degree for Leonardo's illegitimate birth and, consequently, inferior social status, and there are reasons to believe that he always enjoyed the support and encouragement

of his father as well as of his extended family and stepfamily. Although some of his early homosexual activities created problems for him in his adopted town, with time, Leonardo seems to have developed close, enduring relationships that sustained him.

Even in the most civilized of Renaissance cities, daily life was brutal and precarious. Violence and disease were ubiquitous. Power and allegiances continually shifted. The rurally raised Leonardo must have learned a few lessons of diplomacy and politics during his first period in Florence, but not enough to sustain a career or, more to the point, to ingratiate himself sufficiently with the Medici clan. His intellect, sharp wit, and charm only carried him so far. For him, those years were marked by valuable experience and training, small personal triumphs, and continual frustrations. Yet for his contemporaries, those years provided, in Leonardo's paintings and drawings, the germs of the exalted High Renaissance style and tenors of expression completely new to art. For us, his early years produced myriad beautiful artworks, which offer insight into a singularly fertile mind and the culture it would forever transform.



FIGURE 1.
View of the town of Vinci. Scala/Art Resource, NY.

I. *Childhood*

FEW KNEW AND FEWER CARED TO KNOW ABOUT THE BOY'S BIRTH in a farmhouse in the tiny hamlet of Anchiano. The mother, an unwed rural girl, bore the oddly sentient child on a quiet Tuscan night in the spring of 1452 and then vanished into obscurity. Little more than her name, Caterina, has survived the centuries, part of the curious and marvelous legacy of her gifted son, Leonardo. Unlettered daughter of a nameless tenant farmer, vestige of medieval feudalism, she gave life to the most salient intellect of the Renaissance. What instincts or grace she imparted to him one cannot say. It is reasonable to believe, however, that she, as much as his notary father, Ser Piero di Antonio, was responsible for his naturally buoyant and restless spirit. Because of the circumstances, the boy was not given a patronymic or traditional family name. Instead, Ser Piero seems to have named him in honor of – or given him a similar name inspired by – Saint Leo, a fifth-century pope venerated for his repulse of Attila the Hun and for his potent sermons. Leo's feast day happened to be celebrated during the week of Leonardo's birth.

Caterina probably nursed the infant for many months, because her social stature – and Leonardo's – would not have merited a wet nurse. Any joy shared between mother and child was short-lived, however. She soon relinquished him to Ser Piero, who, in the next year, married Albiera di Giovanni Amadori, a young lady of adequate public standing, and established a proper family. To mitigate the scandal of the illegitimate baby, Ser Piero's parents seem to have arranged, within a year of the birth, for Caterina to wed another peasant, a farmhand and kiln worker of good repute. Issues of love and compatibility never entered into such affairs. However, in accord with contemporary mores, Leonardo's honorable family would have provided her with a sufficient dowry.

As was customary, the newlyweds, Ser Piero and Albiera, moved into the household of Ser Piero's elderly father and mother, Antonio di Ser Piero and Monna Lucia, in their native town of Vinci; five years later, Antonio, who had organized a baptism for Leonardo, would still claim his grandson as a dependent – a *bocca* or mouth to feed – on his taxes. Thus, Leonardo's earliest years were spent under the comfortable protection of the typical extended, rural family, with at least three generations of relatives, including an octogenarian grandfather and a teenaged uncle, Francesco, ensconced in the various pleasures of country life.

Somewhat isolated among the hills and not especially wealthy, the family could not offer the child a fine tutor or other advantages of civic life, but it could provide him with nearly constant attention and a warm appreciation for the rich botanical life of Tuscany's gently rolling landscape. He may have been given some responsibilities in the family's modest fields of wheat, buckwheat, and grapes. He also could have played, explored, and fished with local children and, occasionally, his maternal half-sisters, who were not much younger than he and lived with his mother in a nearby village. Leonardo appears never to have forgotten these early experiences, and even as he moved from one grand court to a loftier one, he seemed to have carried with him – and expressed in his art – a nostalgia for those intimate, mysterious aspects of nature that intrigued him as a child.

Despite its rural setting and mainly agricultural activities, Vinci had political, mercantile, and cultural connections to nearby cosmopolitan Florence. Dominating the town was the early-eleventh-century castle of the feudal Counts Guidi, which had fallen under the control of the Florentines in the mid-thirteenth century. From a distance, the long, horizontal building, with its stark, massive tower at one end, looked like a flexing, muscular arm. At closer range, the structure, one of many erected by the Guidi throughout Tuscany, appeared somewhat nautical, with the tower resembling the mast of a sailing vessel. This aspect inspired the name *Castello della nave* or "Ship's Castle." Crowding around the *castello* was a flotilla of much smaller buildings, including the church of Santa Croce, built of similar stone but in various shapes and orientations, the entire constellation remote and adrift in the endless terrain of hills, olive groves, and plowed and terraced fields. Once catering to the needs of Emperor Frederick Barbarossa through the Guidi family, in Leonardo's time, the castle served primarily as the

office of the town's chief magistrate (*podestà*) and a government center to coordinate and benefit Vinci's and Florentine commercial interests.

Leonardo seems to have profited as well from this exchange and proximity to Florence. Reportedly, when still a boy, Leonardo painted on a shield an elaborate image of a monster, a composite of many creatures, for a local peasant. Ready-mixed paint is a modern invention, and there were probably no artist workshops or well-stocked apothecaries (which, in the Renaissance, sold pigments) in Vinci from which Leonardo could have obtained his colors. If the shield story is true, we must probably assume that a supportive grandfather, father, or uncle purchased the relatively expensive materials in Florence while there on business and that one of them, or someone else in Leonardo's family, showed the youngster how to make tempera paint from eggs. The picture that emerges is of a privileged – even pampered – only child, whose talents had already become obvious. Nevertheless, the young Leonardo perhaps always felt an emotional sting from his illegitimacy, not simply because of societal disapproval, but because of his early separation from his mother.

Paternal affection for Leonardo, however great, could not nullify the social barriers imposed by illegitimacy, which probably prevented him from pursuing the family's traditional, notarial career. The stigma of Leonardo's birth may have caused Ser Piero to leave the boy behind in Vinci when he and Albiera moved to Florence at an unspecified date. The father evidently decided to wait (apparently for a number of years) until he attained sufficient status and employment in his adopted city before owning up to his bastard son. It also may have been that Albiera, unsuccessful in bearing children herself, did not wish to have Leonardo, her husband's transgression, live with them.

Social customs were such that had Leonardo been born a girl, the child, if not immediately put to death, would have been forever left in Vinci, in the family of her mother or placed in a nearby convent. Even a boy, under most circumstances, was relegated to second-class citizenry, without opportunity to hold public office, and was socially and professionally disadvantaged. Similarly, an illegitimate child's parents found their lives dishonored and disrupted. For this reason and perhaps because Leonardo may have helped to care for his elderly grandparents, the young man remained in Vinci until he had almost reached his teens. It is possible that Antonio and Monna Lucia insisted on keeping Leonardo with them, not only for practical

reasons but also because of the remarkable, rejuvenating effect a baby or young child can have on an older couple.

Only around the age of twelve, following the death in 1464 of his grandfather and of his stepmother, Albiera, in childbirth, did Leonardo finally leave his pastoral existence for Florence, where his father had successfully established himself as a notary. In the Renaissance, this profession required expertise in contracts. A notary was roughly equivalent to a modern corporate and estate attorney. Ser Piero had, in fact, landed himself a rather prestigious and lucrative position; his employer, the respected Cosimo de' Medici, called *Il Vecchio* ("the Elder"), was the patriarch of what eventually would become the most powerful family in all of Tuscany.

Arguably the most astute member of the entire Medici clan, Cosimo had extended the international banking empire that his father, Giovanni de' Bicci, had built through loan-sharking. With the pernicious stealth of a modern financial institution, Cosimo's enterprise amassed profits more from transaction and exchange fees than from interest. His banking and commercial conglomerate stretched across the continent to England and was forever in need of competent notaries, like Ser Piero, to secure monetary transactions and business deals. Cosimo managed to accrue political power as well through a brilliant strategy that involved elaborate cronyism and subtle manipulation of the Florentine voting system. Such power was necessary for self-preservation; a wealthy man who did not take a role in government could soon find himself and his family taxed into oblivion.

A low-key and unpretentious man of the people, Cosimo had relatively few rivals and many friends; his open, genial attitude would likely have brought him into frequent contact with Ser Piero and, occasionally, with his family. Unfortunately, unlike the young Michelangelo, who was virtually adopted by the Medici and shared their tutors, Leonardo never gained such special favor. He seems to have been largely an autodidact, with minimal formal schooling. His education probably commenced around the age of seven, when he entered the stage of life called *pueritia*. His father and grandparents would have inculcated basic literacy through the repeated reading of scripture and other religious books in the vernacular. Home-schooling manuals, with a broader curriculum, began to appear in Florence and its environs only in the sixteenth century – fifty years too late for Leonardo.

He would struggle with rudimentary Latin throughout his life and, so far as we know, had no facility in Greek. This despite the fact that, under the Medici, the University of Florence became widely regarded as the best institution in Europe to learn the Hellenic language and writings of the ancient philosophers Aristotle and Plato. His poor Latin indicates that after his arrival in Florence, the twelve-year-old Leonardo received only a truncated, vernacular education. Usually, the sons of notaries and other professionals, such as lawyers and physicians, attended a Latin school. Given Leonardo's illegitimacy and relatively advanced age, however, Ser Piero evidently opted for what had become a common alternative for young Florentine men aged eleven to fourteen, especially those destined for an apprenticeship with an artist or artisan: two years of vernacular reading and writing and, concurrently, two years of *abbaco*, that is, commercial mathematics. This was in keeping with the influential *I libri della famiglia* (*Books on the Family*), written in Florence in the 1430s by the art theorist and practical philosopher Leon Battista Alberti. Illegitimate himself, Alberti strongly advocated that fathers ensure their sons learned mathematics and geometry. Once in Florence, Leonardo had only a brief time to prepare for his chosen vocation in art, because young men normally began their apprenticeship at age twelve or thirteen. He may have had less than the requisite two years of formal education.

Supplementing Leonardo's home-schooling in Vinci, the Florentine vernacular curriculum would have acquainted him primarily with standard religious texts, including the *Fior di virtù* (*Flowers of Virtue*). This medieval book illustrated virtues and vices through engaging stories about biblical and classical heroes and various legends of animals. He would also have read the *Epistole e Evangelii* (extracts from the Epistles and Gospels read daily at mass) and the thirteenth-century *Legenda aurea* (*Golden Legend*) of Jacobus da Voragine, a popular compendium of saints' lives. He would have encountered nothing very scholarly or esoteric. However, he would have found in the *Golden Legend's* biography of the sixth-century Saint Leonardo a fanciful etymology of his name, which was bound to have struck a chord. It also proved prophetic; Jacobus claimed that a source for "Leonardo" was the Latin *legens arduus*, or "he who chooses that which is difficult." As we shall see, the artist did precisely this, taking a painstaking approach to any project before him, reveling in intricacies and intellectual problems. Where written expression was concerned, however, Leonardo

cleverly chose what was easier. In some classes, he would have been offered opportunity and guidance to refine his writing skills. But his reversed, mirror-image penmanship was his own invention, a way for a left-handed person to write – and draw – quickly, hand preceding quill, without smearing the ink.

His *abbaco* classes would have entailed training not only in accounting and bookkeeping but also in advanced algebra and geometry, which would have been of practical necessity for a young man entering a late-fifteenth-century Florentine artist's workshop, where knowledge of perspective and some engineering skills had become de rigueur. It is also possible that Ser Piero determined this course of study for his son for reasons of prudence; should a career in the arts not pan out, Leonardo would possess sufficient mathematical skills to find other employment in the robust economy of Medicean Florence. As it turned out, the rigorous mathematical education came in handy for Leonardo's various endeavors, particularly as a designer of military and other machinery; these sometimes required long columns of calculations. A reference in one of his manuscripts to a *Benedetto de l'abbaco* suggests that he may have consulted with his former instructors when he needed assistance with his math.

Throughout his life, Leonardo was rather defensive about his limited schooling. He confessed in one notebook:

I am fully aware that the fact of my not being a man of letters may cause certain arrogant persons to think that they may with reason censure me, alleging that I am a man ignorant of book learning. Foolish folk! Do they not know that I may retort by saying, as did [the ancient Roman general] Marius to the Roman patricians: "They who themselves go about adorned in the labor of others will not permit me my own?" They will say that because of my lack of book learning I cannot properly express what I desire to expound upon. Do they not know that my subjects require for their exposition experience rather than the words of others?

In another place, he reiterates, somewhat angrily:

if indeed I have no power to quote from authors as they have, it is a far bigger and more worthy thing to read by the light of experience, which is the instructress of their