Aristotle: His Life and School

Caesar, Life of a Colossus

Leonardo Da Vinci (Walter Isaacson)

Questions:

I Can Also Paint

- He had a good blend of imagination and skill. His imagination bordered on hallucination, since he abandoned lots of his works and never could build lots of what he imagined, but he had *just enough* skill to back this up.
- He tunneled his curiosity onto masters of his time. He would pick the brains of brilliant people around him: ask X about the proportions of Milan, ask Y about the walls of the cathedral, an more. He would also be curious about random shit: why does the tongue of the woodpecker look weird, why are the geese's feet that particular way? In other words, I need to de-institutionalize myself, and focus on *now*.
- The Renaissance, or "rebirth", is essentially a time of rapid scientific, cultural, political and artistic progress starting in Florence than diffusing throughout Europe from 1300-1600.
- He was a Kvothe, muscular, charismatic, good looking, but ultimately an inwards facing misfit —illegitimate, gay, vegetarian. It's interesting to note that he'd be the type of person who would be prescribed medications in today's world for ADHD or depression.
- He was not alone in being great. His peers in the Renaissance were Michelangelo, Raphael, Donatello, and other memorable figures; moreover, his time was one of Columbus and Gutenberg—of rapid, unprecedented innovation, much like today.

MERCANTILISM = economic practice of optimising for exports and minimizing imports
NOTARY = someone who draws up legal documents for a living

Childhood

- He was fortunate to be born a bastard. This meant he wasn't expected to follow a conventional career path (notary), yet the time was such that being a bastard wasn't looked down upon as it might be today. It gave him enough adversity to make him feel like an outsider, and freedom to not be expected to follow any conventional path, yet it didn't shackle him or ensure his failure.
- The printing press would ensure he had access to materials to teach himself with, and the money flowing into Florence due to trade success meant that patrons were willing to take a risk on him.

DELUGE = inundate, overwhelm
FABULISM = fantastical reality
IMPEL = force, compel, drive someone to do something

Apprentice

AUTOCRACY = a system of government with one ruler that has absolute, total power

- Leonardo wasn't innovating from scratch. Idols of his had already done good work in the fields he was interested in, and he was to build atop that. He made note of their styles, and really did try to emulate and copy them, in the same way I idolize Kvothe and Einstein.
- Florence was utopia for artists. Wealth flowing in meant that plays were performed on the streets nightly, there were extravagant festivals and celebrations of literature, humanism, and philosophy. The wealthiest Medici, a banking family—and, indeed, middle class families too—would routinely patronize artists, increasing demand and forcibly making the city competitively creative. Characteristics that made for a great community were: a population that appreciated intellect, great universities and thriving businesses, and absolute freedom of the individual. This suggests that great, untempered and meandering thoughtfulness is somewhat

orthogonal to business interests. Culture also made Italy great—people saw themselves as direct descendants of the Romans, and took it upon themselves to rebirth Roman thinking. Florence became the banking capital because bills/loans were invented there, and it had a strong river allowing for easy shipments and trade. You can see how somewhat random factors compound over time to create concentrated areas that have advantages over the rest of the world—no clear, easy-to-explain narrative.

- Unsurprisingly, young Leo's style was heavily inspired by Verocchio's, and indeed every other prominent artist of Florence at the time. He was like a sponge exposed to water at the right time, learning softening edges to add ambiguity to expression, mastering light dynamics by using insights from optics, and more. The illusion of depth is his art's hallmark trait. He also learned to see art and engineering as one, through welding by angling the sun's rays and using hydraulics to hoist a 2-ton ball atop a cathedral; all these are insights he consciously and subtly made use of later on in his career.
- His work in theatrics helped him learn to intuitively see art and engineering as two sides of the same coin. The benefit of these activities can only be seen in hindsight, and so it's impossible to plan out things you believe will help you achieve some future goal (which also changes)—and it's unclear whether these actually helped him at all, or that's just how we're over-interpreting things in hindsight.
- Art historians and critics think about art with questions and observations like these in mind: light dynamics, proportions of features, what emotions a certain style evokes in the observer's mind, how the nature of the strokes reveals the artist and influences of his teachers, etc.
- A lot of interpretation of art seems like complete bullshit. It makes sense when you read it because you can see how it can be interpreted that way, but it could also be interpreted a thousand other justifiable ways, leading to a breakdown of the narrative that makes the work of art so great in the first place. I should talk to a professor of art history and learn whether there is actually any nuance of the field.
- Leo's early works hinted at themes he came to employ in his magnum opus—the *Mona Lisa*—like masking emotion but revealing it on closer inspection and an understanding of the backstory, playing with depth and lighting in subtle ways. Much of this comes down to the oily nature of his paints and heavy use of fingers to smudge edges to add mystery to his subjects' looks.
- Under Verrochio, he experimented and pushed himself to the limit, as well as deeply imbibed all the experiences from the beautiful melting pot that was his city. He used his youth to work deeply and hone his craft, laying a foundation for future success with the added lens of maturity and experience.

SPINDLY = long, tall, and the
CYPRESS = type of woody evergreen tree with cones
SINEW = tough, fibrous tissue like tendon or ligament
GAUZE = thin, translucent fabric
LISTLESS = lacking energy, enthusiasm
PRESAGES = foreboding, foreshadowing ominously
MAGISTRATE = civilian officer who judges minor offenses
PALLOR = unhealthy, pale appearance
EFFUSIVE = warmly and brightly expressing gratitude, approval

On His Own

SODOMY = anal sex
BOTTEGA = studio/workshop of an artist in which others can work
ABROGATION = repeal, rescinding
CONSIGNED = send, deliver, dispatch

SUBLIMATED = channeled, controlled, refine an impulse into a higher, more acceptable state
SPECTRAL = ghostly
HAGGARD = exhausted, drained looking

- A big part of Leonardo's work was influenced by his sexuality—how he subconsciously drew men and women, being one of the first to imbue women with some depth and personality since he saw them so platonically yet drawing men with a subtle sense of erotic charge, both of which set his work apart.
- A large part of producing great art is not in translating a beautiful, emotive image from your mind to paper, but in constructing that image, in all its nuance and glory, in your mind in the first place. This is analogous to how great writers aren't great because they can translate images in front of them into text, but visualize stunningly moving images *within* their heads better than the rest of us.
- The renaissance is characterized by the fact that all of the famous paintings reacted or revitalized stories, tales or legends from Roman and Catholic antiquity.
- Leo left paintings unfinished for decades because he saw perfection in his mind, and often knew his limitations well enough to know he couldn't realize that after a certain point—with the lighting complexity of *Adoration of the Magi* or the anatomical complexity of the neck in *Sant Jerome* that he waited 2 decades to understand before painting. Art was pursuit of a higher beauty in the world, not trying to "go down in history'.

Milan

RETINUE = entourage, escort
EXULTATION = triumphant jubilation, rejoicing
WALLOWING = roll around to keep cool

- On moving to Milan, he promised Ludovico Sforza, new Duke of Milan, fantastical military inventions and urban architectures drawn in great detail, none of which society had the tools to build at the time. It was utopic, detailed thinking inspired by artistic beauty and symmetry, but grounded in scientific understanding and implementation details ahead of its time.

Leonardo's Notebooks

MANIFOLD = many, varied
IMPRESARIO = organizer, producer of a show or play
ENTHRALL = fascinate
MEDLEY = assortment, miscellany
EXTANT = surviving, still in existence

- Much like Kvothe and other greats, there was lots of deep work that goes on behind the scenes to make greatness happen. To really understand the human emotion he would draw, he would keep a notebook with him everywhere, and often go to crowded places and just sit and observe peoples' varied expressions to get a sense for the subtle anatomical happenings when people get mad. He would spend hours just making notes on how peoples' faces contort when they're angry, and how bodies react when in anguish, then employ these subtle second and third order realizations in his work.
- He's survived by thousands of pages of his mind at work, more so than Steve Jobs' emails from when he's alive. He was constantly in deep work. He'd find beautiful relations between arteries and trees and rivers and blend rigorous geometry into otherwise pedestrian shapes—he really saw the world through a double tinted lens of both form and function, art and engineering.

Court Entertainer

ALLEGORY = a story with a moral/political undertone
EDIFYING = providing moral or intellectual/philosophical instruction (eg, edifying literature)
TITULAR = important or powerful only in title, not reality

SOLICITOUSNESS = anxious desire
BEGUILE = charm, entrance, attract
DEBAUCHERY = excessive indulgence, vice
LIBRETTO = transcript of an opera or similar work
CAVALCADE = procession, parade
SERENADE = open declaration of love through song, usually by a man at the floor of a woman
PITHY = short and forcefully expressive comment
OSTENSIBLY = apparently, seemingly
FECKLESS = useless, wortlos
AQUILINE = like an eagle (of a nose, typically)
FACETIOUS = tongue-in-cheek, flippant, not serious
WREATHED = draped, covered in
DECLAMATIONS = words delivered emphatically and passionately
DUCAL = to do with dukedom
JUNIPER = evergreen shrub, small tree
LEVIATHAN = large sea creature
ASSAILED = attack, assault, criticism

- Even though people think his work on plays and pageants was useless, but really the wondrous displays laid the foundations for the scientific curiosity and understanding of wondrous mechanics that led to the Enlightenment period in the 18th century.
- He went even further than you might think when pursuing depth of work—he'd walk up to people he thought were comical looking, invite them for dinner, make them laugh and pay close attention to how they looked. Right after they left, he'd draw them, eventually codifying and making a system to draw comically looking people ('Grotesques'). This is the level of nuance that goes on behind the scenes to forge greatness.
- At times it can seem like he was blessed with genius, as while in Milan he served as the Sforza court entertainer, apparently being a prodigious director of plays and pageants, musician, instrument maker, improviser, writer of tales, and more. There doesn't seem to be enough time to get good at all these things.

Personal Life

EFFUSIVENESS = overwhelming, gushing gratitude or pleasure
LANGUID = relaxed, unhurried/frail, weak
ANDROGYNOUS = mixed gender in appearance
CRAGGY = rugged, strong, worn
EPICENE = asexual, sexless
SULTRY = humid stuffy/ (of a woman) attractive in a suggestive, passionate way

- His small amount of fame in Milan came from being at the right place with the right skillset at the right time—Milan had lots of plays and pageants, unlike other cities, and his legend for architecting these spread due to courtly gossip dynamics.

Vitruvian Man

- His interest in Vitruvius, a roman architect, came from wanting to design an extension to a cathedral in Milan. He was invited to consult for the construction of another cathedral, this time in Pavia. Here, he and other brilliant renaissance men, Di Giorgio and Bramante, got to brainstorm, have dinners, reflect on humanity's progress, art, problems, and became collectively interested in Vitruvius' works which were kept in the city.
- The key theme of this work was the connection between the micro—the human body—and the macro—the cosmic structure, which they believed was analogous, and would help them design a more symmetrical, symbolic cathedral layout. Vitruvius specific the proportions of the male body inscribed geometrically. All three men drew their own versions with Leonardo's not

only being, by far, the most precise mathematically and aesthetic artistically, but rigorously extended in anatomical detail and proportion informed by his *own* study of human anatomy and proportion, instead of copying Vitruvius. The key insight is that this is a *mathematical breakthrough* coupled with ideas of philosophy, religion, and aesthetics—we now have proof that you can't square a circle (construct a circle and square with exactly the same area using a compass and straight-edge only), but he approximated it to 99.8% accuracy, as well as unified the living world (square) with the divine (circle), with mankind at its centre.

- He took an ancient Roman idea, reinvented and extended it, producing one of his greatest works: uniting cosmic beauty and symmetry with human anatomy and structure in one fell swoop, making one of the most symbolic and memorable pieces of work of all time.

The Horse Monument

EASEL = wooden stand to hold a canvas

- Leo was unbelievably productive. In other words, he spent his time not planning or reflecting, but *doing the thing.* Even if he didn't finish many, the sum total of all the works the started/ worked on is so much more than any other artist.
- Example of seamlessly blending art and science/engineering is in the horse monument Ludovico Sforca commissioned—he had to dissect horses to learn anatomy, study behavior to understand how dynamic and emotive to make the monument, make a scale model in clay, and after he decided to cast it in one piece, he had to invent compounds to hold the weight with lustre, design a shell to hold the cast in place, design the heat distribution holes and mechanism, and more. All of this only for it to be left incomplete when France invaded Milan at the end of the 15th century.

Scientist

- Not having formal education, he had to teach himself everything from observation—definitionally first principles thinking. He understood the scientific method centuries before its formalisation, and would've been given credit if only he'd published his works.
- He was legendary and anomalous in the depth of his observation. He would practice improving his eyes' observatory ability to making a line on a whiteboard and trying to cut blades of grass to that length from varying distances. He would walk around at night, and deeply fixate on the wings of a butterfly; he was a huge proponent of breaking objects down in constituent pieces and understanding those. Observing the world is boring like looking at a page is boring—only if you're not reading the individual words.

On Birds and Flight

PRESCIENT = prophetic

INTIMATION = an indication or hint

- He'd apply his deep observatory skills to understand, intuitively and by analogy and relationship, how birds fly, then reason that humans can fly by mimicking the same physics. By constantly observing and fantasising, he spent a significant chunk of time in the future (flying took 500 years to become real), which made his life that much more interesting.

The Mechanical Arts

PURVIEW = scope of concerns, horizons, range of relevance or experience

- Reasoning by analogy is not bad. It is very hard to generate ideas and solve problems from first-principles thinking, but thinking about "Uber for X" can be an easy way of generating ideas. When done right, you start to make links between the mechanisms underlying different phenomena, physical but also cultural and business-oriented, which helps you generalize and unify things in a way that that first-principles-purists cannot always. Da Vinci lacked the mathematical tools to always reason from the ground up, and it served him well.

- Exploring crazy ideas was good because it showed him which were impossible as well as which were theoretically possible. Understanding why certain things are fundamentally impossible while still being a futurist and visionary is the goal.

Math

BEQUEATHED = leave something for someone else
VERNACULAR = everyday, colloquial speech
INEFFABLE = inexpressible, indescribable
MANIFEST = obvious, plain
TREATISE = essay, paper, work
LUNES = crescent shaped figure borne from overlapping circles

- One of the reasons he was so good at drawing nature's patterns is because they are literally based on physical (often geometric) laws, and he was obsessed with geometry—finding equal areas of shapes in different configuration. He spent years trying to square a circle, which he couldn't know isn't possible.

The Nature of Man

MIRTH = amusement, merriment

- When studying anatomy from cadavers and proportions from his artistic models and trying to understand where man fits into the universe, he was obsessed. The very same obsession I felt when writing essays for top schools, thinking about it in the bus, having inspiration strike me on long walks—much like how some days he would come in and paint from sunrise to sunset without any breaks, other days he wouldn't paint at all but instead come inside once to add once specific brush stroke to a part of the painting and then leave.

Virgin of the Rocks

ICONOGRAPHY = the content of an image
GROTTO = a small cave
STILTED = stiff, strained, forced
GARRET = attic, loft
COLLEGIAL = to do with shared responsibility or feeling, like between colleagues
PROCLIVITY = inclination, tendency, disposition towards something
DRAFTSMAN = someone who makes detailed technical plans/drawings
INCISE = carve, cut, chisel, mark
LUSTER = sheen, gloss, shine
HATCHING = shading with closely drawn parallel lines
GRADATIONS = range, scale, spectrums
Good phrase: 'she drinks you in' to describe, say, Mona Lisa

- He used to sit and watch deaf people communicate to get a better understanding of how humans instinctively use gestures and expressions to communicate emotion, because the deaf capture that in its rawest sense. Match this level of anti-mimetic thinking, preparation and curiosity.
- A 'study' in art is a draft of one part of the piece you will paint to experiment with, and get a better sense of, what style you'll go for and the unique challenges of painting that particular part of the fuller story. For example, da Vinci paints portraits of effeminate young women to experiment with the androgynous angels he wants to draw.
- He uses science tangibly in his work: most artists made things brighter by adding more white pigment, he realised, through studying optics, that light didn't merely affect whiteness/brightness of a hue, but also intensity and contrasts, and so made sure to make his colors richer—sometimes by adding *black*—and more vivid, as well as brighter, which creates a much starker and more realistic version of light hitting an object. Another example is in his study of geology to make his rocks look real. He studied the nature, construction, and detail

of different types/ages of rocks to make even his background—despite being *imaginary*—scarily realistic, down to the finest detail.

- X-ray/infrared analysis is often used to get a sense of the underdrawing and layers of oil to see how the painter's thinking changed over time as they added to the painting and what their original intentions were.

The Milan Portraits

STIPULATION = condition, prerequisite
BESOTTED = smitten by, infatuated with
BEREAVED = deprived of a relative through their death
FULSOMELY = excessive, ample, profuse (especially of a complement or flattery)
COCKED = tilted
WRITHING = twisting, squirming of the body
COIFFURE = elaborate hairstyle
HAPLESS = unfortunate, unlucky
OROTUND = full, powerful, deep/ pompous, pretentious writing
EXUBERANCE = excited, cheerful

- The level of detail which Leonardo includes is breathtaking. He dilates the pupils of his subject in his *Portrait of a Musician* to slightly different degrees based on his (mistaken) physiological theory that the eyes dilate separately in response to light, and he was trying to make the portrait seem more dynamic by being taken in an instant where light was sweeping across his face from side to side.
- Through a delicate combination of lighting, texture, poses, dynamism, detail, and a host of other subtle things we can't quite articulate (like dilation variances), the painting is one of the first ever portraits to actually convey emotion and depth to the subject, rather than being an accurate albeit lifeless reconstruction.
- Much of what we think about Leonardo is reasoned conjecture, since he didn't sign his works or make any record of them, we're left to observe many of them from their features and form—plus various other things (brushstroke style, dynamism, lighting dynamics, anatomical accuracy, carbon dating) to conclude whether or not they're really by him. Sometimes, as was the case for *La Belle Ferronniere,* there is controversy even amongst experts, involving advanced analysis by foresics (fingerprint matching) and artistic (look at radius of curls of hair and cuts on the edge of the paper to see whether it's plausible it was ripped from an obscure notebook from the time—there are companies that use ML to verify art). What's more, it's astounding that pieces of art, like this one, go from being worth a few thousand dollars to hundreds of millions when someone conjectures it's a Leonardo, despite no change in the actual work itself, which should be judged on its merits.

The Science of Art

POLEMIC = critical, hostile
EXALTED = high-ranking, prominent / elated, intensely happy
FESTOON = a chain of flowers or decorations hung at a celebratory event
TRUNCATED = shorten, cut
STYMIED = prevented, hindered progress of
ACUITY = sharpness, keenness of thought
BEHOOVES = it is incumbent, important, necessary for someone to do something—befits them

- One of the most powerful things about understanding the underlying science behind the art you're doing is that you can choose be flexible with it. Like in *The Last Supper,* da Vinci chooses to stretch and bend some laws of strict optical/shadow physics to make for a marginally and subtly more dreamy picture.

- The dichotomy between science and art is also manifested in that between reality and fantasy. The reason he believed painting was the purest art is because it starts with reality but then can include fantastical elements.

The Last Supper

CASTIGATION = severe punishment
SCOURGE = curse, bane, plague, menage, cause of suffering
MAUSOLEUM = tomb, crypt
REFECTORY = dining room in a church or school
CONFOUND = amaze, astonish / invalidate a theory / defeat or foil plans
BEREFT = past tense of bereave—to deprive someone of something
PUGNACIOUS = aggressive, belligernt
WILT = sag, flop
ROLLICK = act or behave jovially or enthusiastically
CORNICE = an ornamental molding around the wall of a room just below the ceiling
MONGREL =
GAMUT =

<u>History of Jesus and Christianity</u>: Most historians agree that Jesus was a real historical figure, born in Israel, and really was crucified. It's important to know that he was a Jewish preacher, and the birth of Christianity was in some sense a way of remembering this pure man who was unfairly punished. He was born, obviously, in the year 0, and crucified 30 years later. There is no consensus for why the Roman emperor had him killed, but theories borne from historical analysis include that he was deemed an 'enemy of the Roman state' because he said God predicted the end of the empire to the fact that he said God was against rapid Roman commercialization. The canonical Christian answer is that he is God's son that came on Earth to suffer for humanity's sins. His followers were all Jewish by birth, and it is from them that Jewish Christianity, then Christianity, as a religion, was borne—from them preaching his flavor of Judiasm (now coined Christianity), and these followers included Paul, John, and more, all saints now. What Judas is known for, is ratting Jesus out to the Roman authorities in exchange for a bag of silver, leading to his castigation and then crucifixion. In a vacuum, as Feynman said, it really is wack that an 'academic' studying the details (many probably fictional) of this one historical story can be as respected and well compensated as one who is understanding the objective nature of reality and others curing cancer.

<u>Analysis of the painting:</u>

- Important to note that he chose a water-based paint on dry plaster (cement wall), which meant he could work on it over a much longer period of time and add numerous layers, but also that it deteriorated much quicker.
- It's not fair to say that Leonardo had ADD—that's a cop out to suggest a significant biological difference. He went from art to anatomy to optics like I go deeper into a recursive stack when learning about something new—he wasn't diverting his attention from one thing to another, but focusing deeply and obsessively.
- The moment being depicted is when Jesus reveals to his disciples the fact that one of them will betray him, with varying responses (though not all art critics would agree with this). Important artistic features include:
  - Dynamic and varied hand gestures that are inspired by his theatrical background, and add his character sense of motion to the scene, making it come alive.
  - Lots of philosophical, political, religious subtleties and ambiguities, like Jesus reaching for the same plate as Judas, showing he's the traitor, or him reaching for his bread and wine symbolizing his flesh and blood will soon be gone.

- He manages to create a clearly sacred moment in the emotion it evokes without making explicit use of any divine imagery, blurring the lines between reality and religion.
- Brilliant use of perspective, which by then he had mastered from a scientific point of view. It's a huge painting elevated off the ground, and so he has to make adjustments—perspective *sfumato* (blurring), if you will—to ensure people who walk by and enter and view it from asymmetrical angles still get a great, symmetrical view.
  - The tapestries painted on the left are aligned to seem like extensions of those in the actual room, making the supper seem like it's actually happening in front of you.
  - He optimized it for viewers entering from the left side, taking into account how the viewers walks around the room.
  - The cornice (lining) at the top disguises the accelerated perspective of the ceiling, giving additional depth without revealing that the ceiling doesn't extend over the table.
  - Huge attention to detail—the right wall is bathed brighter than the left, suggesting the angle of the sun outside the windows at the back—and how the middle window at the back resembles a natural halo for Christ.

Personal Turmoil

POSTERITY = future generations, descendants
ENSCONCED = settle somewhere, park yourself
TENUOUS = weak, thin, slight
VAULTED = arched, curved
CAPRICE = whimsy, fanciful, easily changed
MISSIVE = long, official message
VEX = to annoy, anger

Florence Again

VANGUARD = a group of people leading the way with some idea or movement
TRANSGRESSION = offence, crime, sin
BESIEGED = surround and captured by armed forces
ENTREATIES = a humble plea or request
BELEAGUERED = besieged / troubled
DILATORY = slow, unhurried / delaying, stalling
SCION = descendant, hier
FLOTILLA = a fleet of ships
DECRY = publicly denounce
BODICE = close fitting, upper part of a dress
BENEDICTION = blessing, prayer, grace
EXACTITUDE = accuracy, rigor

- A lot of stuff that happened then really is out of a fairy-tale. Because humanism hadn't evolved as an important cultural value, and because there was lots of money that people wanted to spend (and finance hadn't evolved to have it be used on investing or VC), rich people allowed art to flourish. People were publicly burned, quartered, hung, and individuals were bright, ostentatious and elegant in a way that seems fantastical now, but was pedestrian then.

- You really can see the meaningful evolution of Leonardo's art over time, if you compare his early Madonna's to that of the Yarnwinder, you can see a real development and improvement in depth and dynamism, so his gradual and repeated experimentation really did have excellent results.

- Even then, influence had to do with distribution channels. The success of *Madonna of the Yarnwinder* was to do with extensive distribution across France, leading to lots of copies and students mimicking his style, like Raphael.

Saint Anne

VARIEGATED = varied
- An important stylistic feature of Leonardos is dynamism—by that, I mean the fact that he believed that the outer physical state of peoples bodies should reflect inner mental movements.

Paintings Lost and Found

NUZZLE = nudge, prod, push
LITHE = agile, graceful, supple figure
DEMURE = (of a woman or her behavior) meek, modest
SALACIOUS = too sexual
SINUOUS = having many curves and turns / lithe and supple
FECUNDITY = ability to produce lots of offspring
DISPOSITIVE = settling an issue or legal quarrel
PENTIMENTO = visible trace of earlier layers of painting

Cesare Borgia

TREACHERY = betrayal, disloyalty
WANTON = deliberate, vicious act of violence
DEBAUCHERY = hedonism
LIBELED = defame, slander
LIBERTINE = playboy / religious free-thinker
PREDILECTION = a preference for something
PIETY = devoutness, quality of being religious
CAPITULATED = surrendered
WILY = shrewd, cunning
LACONIC = concise, terse
CHANCERY = a type of legal court
BEHEST = instruction, bidding
SUBDUED = muted, low-spirited
INTRIGUERS = co-conspirator, collaborated
AMORAL = unprincipled
UNREMITTING = incessant, relentless
APHORISM = truism, maxim, platitude
WRY = ironic, satirical humor / (of a persons face) twisted with disgust and offense

- He literally lived like Kvothe—he spent 8 months traveling with Cesare Borgia, watching tyranny and war from the front lines, including extensive bloodshed, and whispering into Cesare's ear just as Kvothe had Maer Alveron on lock.

<u>A short aside on Niccolo Machiavelli:</u>

- based on pragmatic understanding of *human nature, which he believes to be ungrateful and not always good*
- therefore being generous can 1) go unrecognized 2) make you look weak to those that don't have good intentions—it's only a tool to get the public to like you
- if you're optimizing for keeping the state safe from outside threat and stability, you want to crush resistance—*"it's better to be feared than loved"*—just make sure it doesn't turn into hate
- a convenient, elegant lie is better than a harsh truth and easier for people to believe
- inspired by Cesare Borgia, a ruthless ruler—*"the end justifies the means"*
- church banned it and it opposed Plato's *Republic*, where the ideal ruler is a "philosopher king" who appreciates the value of wisdom, and is an intellectual idealist
    - plato wanted to replace democracy, after observing how people don't think about who they're voting for, and so wanted to make sure that the electorate was

philosophically, morally, and politically educated, and thus started 'the Academy'. It was thus that he decided he wanted a king that was a philosopher, or a philosopher that was king.

A short aside on Renaissance & Florence:

- plague caused labour restructuring caused political shifts in electorate desires
- focus on humanism and human desires and nature as opposed to the gods and cosmos
- "wealth supports the institutions that legitimize it"
- was there really "a renaissance"? For intellectuals and rich people, sure, but not so much for the common man
- classical style is that of the Romans and Greeks, whose empire and cultural value extended over a thousand years. Neoclassical is therefore a revival, like the renaissance.
- while romans depicted idealized humans and gods, the renaissance depicted more human, flawed characters—see Leonardo's support for variety in human form

A short aside on the Medici:

- rose through merit of trade, not war or lineage
- one guy, Giovanni, rose through ranks as bank employee, then started local bank in Florence
- his sons, Lorenzo and Cosimo, the main people remembered, grew the bank into a European force, dealing in favors as much as money, having influence all around the continent, including with the pope
- the family spent >$450M on the arts and culture throughout their reign
- after exile in 1494 because of exhaustion of funds they fought their way back, and became popes and unofficial rulers of Florence, which continued for centuries peacefully

Hydraulic Engineer

SILTED = become filled with silt

- The way to do experiments is to literally do them. He'd throw rocks and fruit into the ocean and observe whether things move fast when in the center compared to the edges, and same with depth, and take extensive notes. Take-away: think more, and actually come up with theories to test, then test them.

Michelangelo and the Lost Battles

EXALT = glorify, hold someone in high regard
PARABLE = story, moral tale, fable
COMMEMORATION = remembrance
LURID = vivid in color, fluorescent
FURROW = trench for planting seeds
INIMITABLE = unique, distinctive, cannot be copied
REQUISITION = purchase order, demand, claim, application paper
PETULANT = childishly sulky, moody, irritable
CONTENTIOUS = controversial, disputable
URBANE = suave, sophisticated, debonair
DANDYISHLY = a man excessively concerned with his appearance
ASCETIC = abstinent, self-denying
LIONIZED = celebrated, glorified
QUIDDITY = a quirk, distinctive feature

- When making a painting on the side of the inside of a church, racing Michelangelo on the other side, he studied horse anatomy and dust dynamics to get the war ethos perfectly correct. You would think with modern resources studying these things would be trivial and so many people could paint like Leonardo, but despite the fact that he had to seek out violent scenes to study dust dynamics, he has done better than any modern artists, which shows that the very greats are not simply a little better than the majority, but orders and orders of magnitude.
- He left Florence to go back to Milan because he didn't like competing (with Michelangelo) and became drawn into land disputes with this half-siblings over his parents' possessions, and also that Milan simply deified and supported him more, and had a more diverse talent pool.
- The success of good art ultimately came down to patrons with taste—if the palette of the Medicis was for a different type of art, the history of culture might have turned out differently.

A short aside on Michelangelo:

- Craggy, ugly, asshole who preferred to work alone than collaborate. Gos to show that genius comes in all shapes and forms—you don't need to be charismatic or collaborative.

- A more traditional painting style (he was actually a sculptor) focused on clear outlines and no sfumato, which juxtaposed Leonardo (and Raphael and others).

- had to aggressively seek out the opportunity to be a painter against the will of his family, and a friend connected him to an apprenticeship—disposition for visual beauty & the status/position artists occupied seems to be genetics and temperament as a consequence of childhood experiences, respectively

- kicked out of his apprenticeship for giving his master the middle finger, but found patrons because of his talent sculpting

- pieta was his big hit and gave him commission from all the big names in Europe, it took him two years to build this

- it took him 3 further years of work to finish David, his magnum opus, where he has to work with constraints including the fact that the fact that the slab he was given wasn't big enough to craft the traditional pose with Goliath's head at his feet, and so he had to invent a new pose for David, the giant slayer.

- despite not being a painter, he painted the ceiling of the sistine chapel, masterfully employing perspective and coolest with the same obstinance and obsession as da Vinci—but he didn't even like doing it.

- it was unheard of for artists to sign their names at that point, but since people didn't believe that he made it as he wasn't famous at the time, he signed his name, pioneering the ownership of a piece of art. He was strong headed, stubborn, and hard to get along with—so much for all visionaries having one charismatic personality in common.

Return to Milan

INTESTATE = adjective for someone without a will
AMANUENSIS = an assistant that takes dictation
ESTRANGED = alienated from a family member
EXHORTATIONS = urging, encouragement to do something quickly
PLAINTIVE = sad and mournful sounding
INCOMMODE = inconvenience
SOJOURN = a temporary stay
FERMENT = (of a group's behavior) furor, frenzy

- He lived in a time where people valued his work. People were willing to pay for the arts, just as now it's common place to take risks with the newest technological innovations—we live in the computation equivalent of Florence in the age of the visual and fine arts.

- Leonardo was not a naive painter. He made friends in powerful places and knew how to pull those strings to get things he wanted done, and had no shame about it whatsoever.
- When visiting a place, he still used his time productively. When he came back to Florence from Milan to simply sort out some legal matters, he dissected a corpse of a centenarian, planned a test of a flying machine, began a treatise on geology, swam underwater to compare fish to birds, and more. He *did the thing*. This would be analogous to me arranging meetings and things to do (visit a landfill, talk to school districts, entertainment tech founders) when in LA.
- Sometimes, like with Leonardo spending time on military engineering, you have to choose between posterity and enjoying your life? Which would I pick given the trade-off? Probably the latter.

Anatomy, Round Two

CENTENARIAN = >100 years old
FIXATIVE = something used to stabilize things
IRRESOLUTE = uncertain, indecisive
GRIMACE = frown, wince
TRANSVERSELY = lying across, spanning something

- At 58, he would spend his days dressing like a pimp and painting, then his evenings dissecting things and talking to patients about signs and symptoms. In other words, he would think full time aside form his job. Similarly, at Harvard, I need to set aside time to think full time; 2 days a week where I just meet people, think about problems and tinker on projects.
- He made discoveries relating to the aortic valve, fossil record, geology, the heart, brain, lips, smile, face, spine, and more, centuries before others did, but never published. If he did, we'd know many things as "the Leonardo valve" or "Leonardo flow", but don't. He could've been the single most prolific and famous thinker in history—Einstein is famous because he wasn't just very productive, but outspoken and took credit for his work (see GR) and is thus remembered for it. Take-away: if you made an important contribution to a work, make sure you publicize it and people know you did the thing that changed the world.
- He discovered the fluid dynamics of aortic valve closure by studying eddies and vortices in little streams—shows how reasoning by analogy can be a powerful tool if done carefully, where you know the limits of your reasoning by analogy.
- The fact that Leonardo had al these discoveries first but we didn't know about them makes you think about all the thinks that may have once been thought of before or pondered before but no-one either took action on or was discovered as have knowing that are lost to antiquity and we give the wrong person credit for.

The World and its Waters

VIRTUOSITY = skill, mastery
PENNANTS = flag (like the triangle college)
EMANATE = emerge, flow, exude

- He was guided by beauty and symmetry but not blinded by it. He looked for ways in which the world mimicked the human body, Burt knew enough to know when experiment contradicts this, theory must be revised. When the analogy between the heart and water cycle didn't hold up to experiment, he abandoned it. He was great because he understood models well enough to know that sometimes you have to bend them or that they don't always work.
- His life was one of true scholarship and curiosity. Th way a child plays and ponders, except more rigorously, and done throughout his whole life. Developing this sort of mentality, except with the charisma and rigor to commercialize this stuff would lead to legendary gains. You need to develop an eye for beauty, a childish curiosity, and a playfulness for projects, all three of which I don't quite have right now.

Rome

EXPROPRIATION = (the state) seize, take away land or property
WARD = district, zone of a city / young protege, pupil, trainee
FOLIO = page number
RUEFULLY = expressing sorrow in an ironic, humorous way
MINGLED = mixed, blended
GUSTO = enthusiasm, delight
BENEFICE = a permanent church appointment
RELINQUISH = renounce, give up
ERRATIC = sporadic, unpredictable
UNHINGING = going mad
ACOLYTE = an assistant in a religious procession or event
LIVERY = uniform or dress worn by a servant or assistant

Pointing the Way

ELEGIAC = mournful, melancholic
SENSUOUS = aesthetically pleasing, pretty
LEERING = ogling, staring in a predatory way
SFUMATO = blending edges without sharp outlines
CHIAROSCURO = stark contrast between dark and light, careful use of shadows
FRISSON = a sudden, strong feeling of excitement or fear
DISJUNCTURE = a gap, separation, or disconnect
LUSTROUS = shiny, glossy
LEWD = inappropriate, debauched, dirty
CATAMITE = a boy kept as a sexual companion (by a man engaging in pederasty)
DIAPHANOUS = thin, delicate (fabric)

The Mona Lisa

PIECE DE RESISTANCE = masterpiece, magnum opus
POPLAR = thin tree that looks like a corndog
PURVEY = provide, sell, supply
COMPORT = behave, hold oneself in a particular way
BILLOW = a large, undulating (waving, bobbing) mass of something, like smoke or clouds
PLEAT = fold, tuck at the edge of fabric
GOSSAMER = silky, cobweb-y
RINGLET = corkscrew-shaped lock of hair
IMMUTABLE = fixed, set, rigid

- It was his magnum opus that he kept retouching over time. He would add strokes and modify it every few weeks for years on end, tweaking and having it constantly on the back of his mind—just as how I was so obsessed with college essays that I would dream about them, take notes, have ideas pop up in conversation, and notes and more. That's what it feels like to be obsessed, and that's the state you have to put yourself in to successfully solve a problem.

<u>Analysis of what makes it great:</u>

- Painted it for the wife of a normal upper class man, she is nothing special but he liked her wicked, eerie smile and the fact that she wasn't royal meant he could have his way with moulding her image and being unconcerned about experimenting.
- Number of firsts. She sits in 3/4 pose as opposed to profile, he paints her structure like a pyramid guiding out gaze to her face
- He used lead white, a carbonate, as his base layer on the wood over which to paint, as opposed to the conventional combination of setting pigments, which reflect and absorbed light differently, giving a vibrant underflow to the image, as well as painted up to 30 layers atop each

other on the painting, and made a custom chemical mix of pigments and oils to give a certain finish. It was almost alchemy.

- She started with eyebrows, but those have been worn out over time.

- Her right pupil is slightly more expanded than her left—perhaps she's happy to see us, or he documented the natural asymmetry present in 20% of people?

- The beauty lies in the details. He took the care to make a soft fold over her cleavage to add dimensionality, and painted the background behind her veil before painting the veil to make it more realistic.

- The background is detailed yet misty, blurring the line between fantasy and reality. It's almost set in a prehistoric nature setting, and we're shocked out of that and reminded of his time period on seeing the bridge over the river in the corner.

- He represents the relationship between man and cosmos through the same winding curls being present in her dress and hair as in the water flow behind her and winding of rivers and paths in nature.

- He designed the smile based on anatomy of the lips and understanding of optic focus such that the closer you look/focus on it, the more mysterious it seems, seeming most clear when you're focusing on another part of the painting, as then the thin curls and shadows dancing on her lips become less conspicuous.

- Despite her hands being roughly as close to us as her face, they're much clearer, with less sfumato, making her face and gaze seem distant, literally, even when they aren't, again—blurring the line between fantasy and reality.

- General use of sfomato, particularly with her veil, hair, eyes, gives the painting a vaguely smoky feel, compounding the fact that she's real, but also fantastical and dynamic, like a fairy dancing in your dreams.

- Because of all of this, and more that we cannot even fathom—and perhaps he couldn't either—the portrait is *alive*, imbued with a palpable sense of *consciousness*, which was (and is) unprecedented in artwork. Even if you can't formally describe the artistic details or know the social/historical context, you can catch her gaze as if she's sitting in front of you.

- It must be said though, that while the painting is a masterpiece, it's relevance in popular culture is not proportional. Millions flock to see it and take selfies with it without understanding the first thing about it, just because it is ubiquitous as a symbol plastered on mugs and cards and present in movies as a symbol of genius and mystery and antiquity. It's interesting to see how art and indeed ideas become famous—if the Mona Lisa hadn't been stolen—then people wouldn't be able to weave mythical and coherent stories about it, and it'd be less interesting. It's a real life connection to movie tales. Pater, an art critic, wrote a waxing panegyric about it, making for great soundbites for people who can't understand it to interpret it, and when it was stolen, that meant someone cared enough to steal it. It *must* have some greatness I can't comprehend, then, right? What a story! It's fascinating to see what makes things famous, how reputations can be manipulated and legacies can be handwritten.

France

BEQUEST = inheritance, will, endowment, legacy
CURRY (favor) = ingratiate yourself w/ someone, put yourself in their good books by sucking up
BEVY = a large group of a particular kind, gang, troupe
INCULCATE = instill, infuse (a trait, for example)
LASCIVIOUS = lewd, lustful
RAPPROCHEMENT = reconciliation, understanding between two parties
VERNACULAR = everyday language
PROFUSION = abundance, gluttony of something
BUFFETED = (of wind and wave) to batter and pound / (of trouble or pain) to afflict

FRAY = battle, engagement, intense situation
BOOKEND = to position at the end of something
PENITENT = regretful, apolagetic
PAROXYSM = a sudden attack of a particular emotion of behavior

- Surround yourself with, and engage deeply with, great mentors. Francis I made old Leonardo his patron, and siphoned tons of knowledge out of him, to in turn, go down as an erudite and charismatic king. Same with Alexander the Great and Aristotle.
- "Just as a well-spent day brings happy sleep, a well-employed life brings a happy death"

Epilogue

CROSSCURRENTS = a process in conflict with another ("crosscurrents of debate")
PURVIEW = within the scope or jurisdiction of something

- "Talent hits a target no-one else can hit, genius hits a target no-one else can see."
- Take-away: indulge fantasy. When imaging futuristic waste management and K-12 education systems, make notes, toy with ideas, dream like a child. This is how revolutions begin.

Never at Rest: A Biography of Isaac Newton

Napoleon: A Life

Einstein, His Life and Universe (Walter Isaacson)

The Light Beam Rider

- Einstein was not a standalone genius. He was nurtured by the prevailing contrarian attitude of his time, with Joyce, Picasso, Stravinsky, Freud being the other greats of his time.
- It's interesting to think about what makes great people go down in history. No doubt, the fact that Einstein was eclectic, irreverent and free-spirited helped him look, outwardly, to be a genius who was also beautifully human—much like Steve Jobs. It may be in your interest to be eccentric if optimizing for going down in history—you're simply more memorable that way.

His Childhood

- Raised by scientist parents, a city of mathematicians, with a genetic contempt for authority. He would be very good at not just wondering deeply about simple things, but actually reconciling and finding unifying answers to those puzzling questions.
- His childhood circumstances sent ripples through his future. He was treated as an outsider growing up because of his religion, which made him come closer to Judaism than ever before. His parents nurtured his strong math skills by get him textbooks and tutors.
- Einstein had no clear cultural and religious identity. He termed himself a citizen of the world, and dropped out of high school at 16 to self-study before university. He left Germany to go to Italy then Switzerland, renouncing his citizenship having always felt like an outsider. He was bewitched by Italian wit, elegance and beauty—both in culture, upbringing and education—contrasted with the mechanized way Germans thought.

The Polytechnic

- Einstein was taught by, and in intimate contact with, legends of modern science—his lecturers and personal friends include Weber, Siemens, Minkowski, and more. He also collaborated with Riemann, Bohr, Heisenberg, and more. Greatness is often very concentrated in small pockets of society—constantly ask yourself where the people that will be remembered most by history are right now, and how you can work with them.
- Einstein is a real-life Kvothe. An outsider of ill-birth, prodigious at two things (math, music), contempt for authority, sharp wit and sarcasm along with striking looks that make him a womanizer, yet somehow spends lots of time alone, thinking, and has a quietly antisocial streak.

The Lovers

- He really struggled to get a job for years, resorting to tutoring. If he had sold his soul to engineering, he'd have been good, but not legendary. And he easily could have—one extra push here, or pull there, and he'd have become an engineer out of necessity. Small decisions can have important impacts on your life.
- He applied for, and was rejected from, an academic post with almost every physicist in Europe. His job as a patent attorney gave him 1) the close friend group that inspired his philosophy of physics 2) a job that encouraged him to find flaws in the reasoning of people that apply for patents 3) a job that meant he could go deep on certain topics, without being pressured to publish or conform in any way.
- He was an asshole in his personal life. He had multiple affairs, neglected his first child, left his wife feeling lonely, and more. This is not remembered in the annals of history, however.

The Miracle Year

- Einstein was a master at reading across topics (thermodynamics, relativity, quantum theory) and synthesizing insights he had from reading papers by different authors and meshing them into something new and interesting. This is where much of his success in thermo/atomic physics came from—just blending an approach one guy took in thermo to a problem someone else was having in stat mech.

Special Relativity

- Relativity came about because of a deep, intuitive discomfort Einstein had in reconciling Galilian relativity with Maxwell's equations. The equations derived the speed of light, but did not specify *relative to what*. While the rest of the world assumed that meant "the ether", Einstein threw away traditional beliefs and set the invariance of light as a postulate for a new theory for how the speed of light and relativity can be reconciled.
- "Intuition is merely the outcome of earlier intellectual experience"
- It's important to understand how much harder it is to come up with a new theory than to learn it. Einstein had to adventure down misleading dead-ends, spend years in fruitless thought, before he could get the crucial insight while talking to Besso.
- Because humans are so good at internalizing examples, his ability to weave confusing edge cases then reconcile how they worked gave him a very, very deep understanding of topics.
- Philosophy was important insofar as informing his view for how the world *should* be and how you should approach/*think about* physical problems—for example, disregarding anything that cannot be experienced by the senses was a Humian way of thinking, but that's what caused him to feel uncomfortable with the idea of absolute space and time.

The Happiest Thought

- Einstein had a bunch of close friends who were physicists interested in philosophy, and so spent much of his time drinking coffee while discussing physics and philosophy, playing the violin, sailing and reflecting on physics. A life of true scholarship and beauty.
- Einstein was characteristically bothered by analogous phenomena that are not explained by a general, unifying theory—conductors and coils' relative motion during SR, gravity and falling in an elevator.
- The equivalence principle states how flying in an accelerating rocket ship and being confined to earth in an identical gravitational field cannot be distinguished by the person involved, and therefore should, intuitively, be explained by the same underlying physical phenomenon. He wanted to generalize special relativity to reconcile invariance of the speed of light with accelerating reference frames, and this thought started him on his way.

The Wandering Professor

- The Solvay conference was organized by a chemist of the same name to figure out the "quantum problem". It brought together over 10 Nobel laureates into the same room to hash ideas out. He really was surrounded by some of the smartest people in history.
- He had a rough, nomadic personal life, having an affair on his wife with his cousin, having his first marriage break down into a business affair then divorce, crying over losing his children, and moving between Germany, the Czech Republic, Austria several times for different academic posts. He escaped emotional turmoil by turning to science.

General Relativity

- The holes in SR included that the speed of light as a speed limit contradicted Newton's formulation of instant gravitational affect, and it applied to constant-velocity frames of reference. The equivalence principle was importance because it hinted that when he reconciled one of those inconsistencies, the other would fix itself. One first leap was realizing that the equivalence principle implied that strong gravitational fields curved light because light entering one side of an accelerating space ship would leave at a lower point because of the intermediate motion of the ship, giving it a curved path.
- This curving of light reminded him of the shortest path through a curved surface, hinting that his theory may need non-Euclidean geometry, so he turned to Grossman, a childhood friend, who taught him Riemannian geometry.
- He approached developing the theory from both a purely mathematically formal, and physically intuitive perspective, with the latter initially leading him astray, and the formal

eventually causing him to succeed, after a race with David Hilbert, which led to the most intense, scientifically creative and productive 4 weeks of his life, at age 36.

- He did all this despite the overwhelming anti-Semitism of his time, which caused World War I and made all other German scientists become used in the pro-war effort, like Planck and Haber, his personal friends.
- He cried and mourned the fact that "his children were being turned against him" by his wife and that he didn't get to see or mentor them as they grew up into young men.

The Divorce

- Einstein was an asshole to his "first family" and used his second wife (whose daughter he considered marrying) as an instrument of logistical convenience. Not a loving, considerate, generous or deeply kind person at all—not that history will remember that.
- This man lived, ate, breathed physics, for decades on end. Part of the reason he could contribute so much was because he "worked" so damn much. Literally almost all of every day from late teens to old age was spent reflecting, brooding, intensely grappling with questions of physics, whether that's while having coffee with physicist friends, going on hikes, sailing, or even eating meals with his family.

Einstein's Universe

- GR has profound implications for, and indeed birthed, cosmology, since we now had the mathematical basis for studying the nature of space and time, in extreme conditions. It predicted black holes, and was verified by Eddington's eclipse experiment testing the bending of light. While Einstein was well known in European scientific circles before this, afterwards he became an international celebrity by overthrowing Newton.

Fame

- The reason for his huge success was a combination of his genius, his showmanship, the circumstance in which he succeeded (end of a World War, where everyone wanted good news bringing people together).
- His physics changed the world's intellectual atmosphere, sparking relativism and the populations' philosophy at large, since many people misunderstood what he said. His contributions coincided with the magnum opuses of James Joyce, Stravinsky, Freud, and other intellectual giants of the time, all of whom he came to know and meet due to his fame.

The Wandering Zionist

- In the midst of rising anti-semitism in Germany after WWI, some tried to assimilate, but Einstein was pushed into vocal Zionism, feeling like a Jew, through and through, when shunned as an outsider because of his heritage. Part of his celebrity in the US came from the strong Jewish community who clamored over the opportunity to meet him, almost as if they were Catholics about to meet the Pope, not entirely from his science.

The Nobel Laureate

- Einstein had a very powerful ability to concentrate deeply, even in chaotic situations.
- The Nobel was for the photoelectric effect because relativity, at the time, was seen as more philosophical than physical, and the committee was comprised of experimentalists.
- Philosophy is important to theoreticians because it determines the beliefs they have about what physical theories are correct and complete, as well as how they approach problems. Einstein reading Mach and Hume made him want to do away with absolute space and time, since they couldn't be physically observed.

Unified Field Theories

- Einstein hated QM because it didn't mesh with his deterministic, local, realist philosophies of how God would have constructed the universe, and spent his whole life trying to poke holes in it and pursue unification in other ways, making no significant headway.

- Einstein's physics lost intuition as he got older, and became a lot more about the mathematical formalism that led him to complete GR.

Turning Fifty

- Throughout his life, indeed continuing until he was older than 60, he was a playboy. Despite being in marriages, he would have "companions"—ranging from secretaries to daughters of women he knew. His wives always suspected, but accepted it as part and parcel of being with a famous genius.
- As he aged, his mission became just as much about activism, political advocacy and philosophy as it did about physics. Part of the reason he was so famous was because he had strong opinions on politics and war that he voiced, making him relatable to millions.
- He strongly advocated pacifism and refusal of military service. If even 2% of the public refuse to conscript, they can't jail them all, and wars will cease to exist. This opinion of his changed when Hitler came to power, where he acknowledged the European need to re-arm, and his opinion on Machian philosophy also changed over time. He was good at adapting his opinions in the face of new evidence.

Einstein's God

- Einstein was critical of atheists' unfounded arrogance, and believed in Spinoza's God—terming the sense of wonder and awe he had about the elegance and complexity of the universe as "religious", but not believing in any supernatural being concerned with mankind.
- He was a determinist, who didn't believe in free will. "Man can do as he wills, but not as he wills he wills", he said.

The Refugee

- Einstein thought that Americans were materialistic and lacked depth of thought, but lauded their freedom of expression and individuality, and cherished the revolutionary thinkers who called the country home.
- As the Nazis came to power, Einstein fled, holding visiting professorships at Caltech, Princeton, and Oxford, before settling down at IAS.

America

- He lived unpretentiously, enjoying the quiet of sailing, and entertaining everyone from little girls struggling with math homework to Nobel laureates in his Princeton home. He genuinely didn't need much in life.
- The US took advantage of an intellectual arbitrage opportunity. When Germany shunned the best scientists in the world because of their Jewish nature, American welcomed them (and indeed actively recruited them), working well to their war advantage when Einstein, amongst others, helped build the atom (fission) bomb. Perhaps diversity in tech is a similar arbitrage opportunity?

Entanglement, The Bomb

- Einstein launched the atomic bomb project when Szilard showed him it was possible, worrying that the Germans had moved in that direction already. Funnily, the FBI didn't let him take part because enemies he had made earlier had incorrectly suggested he was a Commie, and the government didn't want to take any risks. He lamented his decision to help launch the project when the bombs were dropped on Japan.

One World

- He strongly advocated for one central, armed and authoritative, world government, perhaps informed by his nomadic lifestyle making him think of himself as an internationalist. Like the LoN, but with much more power than it actually has, and in a position above countries and in a position that has authoritative rather than advisory power.

- The Civil War is a nice structural analogy to how difficult it is to integrate geographically and culturally disparate states under the United States, but equally, the dangers of not doing so and the proof that it is possible at all.

WRESTED = wrestled from, snatched from with great difficulty
CIRCUMSPECT = cautious, wary

Landmark

- Einstein was mainly an individual contributor, not a leader, a landmark, but not a beacon.
- The triplet queen intellectual achievements of the 20th century were all German—Einstein's relativity, Heisenberg's uncertainty, and Gödel's incompleteness, each intensely mathematical, but also deeply philosophical about what they told us about the universe. The first told us that time and distances are relative, the second that there is no underlying reality until we measure it, the third that there is a lot we will never be able to know about the universe.
- Gödel was a close friend of Einstein. The ability to become close to intensely introverted logicians and also be a womanizer is rare, and it has to do with being able to be generous with your time/attention, and understand what people have to give the world.
- Einstein took on a moral duty to "wastefully" spend time searching for a grand unified theory, as well as making controversial political statements, because a younger, less-established scientists wasn't afforded this luxury, and so Einstein took it upon himself.
- In short, Einstein was generous, gentle, and charismatic to all those around him, but still silently distant, and would wall off people who tried to get too close, constrict him, or cause him emotional pain, like Mileva and even his own son, Eduard.

Red Scare

- In the midst of the cold war, he took objectively moderate stands calling out for the preservation of intellectual liberty, which made him unpopular amongst the public. He was worried American hatred towards people with socialist bents would remember 1932 Germany where there was a witch-hunt for the Jews.

The End

- Einstein was wholly devoted to both his physics and his lovers quite literally, until his last days. He was seeing women at the age of 76 (he was with Konenkova, a USSR spy, after Elsa's death), and scribbling equations when on his deathbed. He chose and modified his philosophical principles very thoughtfully and rigorously, and then stuck to them stubbornly. He chose not to get an operation that would extend his life because "it is tasteless to prolong life artificially. My time has come, and I will go elegantly".
- Even in the end, days would be marked by, alongside his mathematical assistant, pursuing certain avenues of theory, hitting a dead end, modifying the approach, trying another approach, hitting a dead end, and repeating.
- He describes how at the end of life, you start to feel less immersed with day-to-day happenings, and at once more reflective about what has been, and are "one" with the universe, where you get a little perspective on the beauty of life, more generally.

Einstein's Brain and Mind

- We extracted and kept his brain for study, but nothing useful came of it as the doctor distributed extracts poorly, stored it poorly so DNA couldn't be extracted, and we had no points of comparison age-wise or genius-wise, and also couldn't tell which parts of the brain were important in cause or effect of his genius.
- In the end, his brilliance came not just from his biological advantage, but from his ability to recognize the wonder all around us, and to relentlessly persist at grappling with problems until he understood it. Most of us walk around everything hiding behind abstractions, knowing that ideas break down if you push them too hard, whereas he wanted to figure out why, and

what the real truth was, abstractions aside. In short, curiosity, nonconformity, and humility were the cornerstones of his intellectual approach. Poincare and Lorentz came close to SR before him, and Hilbert with GR, but none of them had the audacity to overthrow Newtonian physics easily like Einstein.

Churchill: Walking With Destiny
Steve Jobs (Walter Isaacscon)

Overall Insights: What Makes Someone Enormously Productive and Memorable in the History Books?

- Passionate curiosity: the act of questioning simple, "obvious" things deeply, but perhaps even more importantly, having the patience and grit to stick with these confusing questions and dead ends until you deeply understand the answers to the initial curiosities you had. Da Vinci, Einstein.
- Deep excellence across disciplines and skills, and making links across them: Einstein was heavily philosophical and mastered the violin despite his spike in math and physics. Da Vinci was the quintessential polymath. Jobs fused calligraphy and design with circuitry, Franklin was equal parts diplomat, writer, and scientist, inventor.
- Visceral humility, even if they might not show it: Einstein, da Vinci were in love with the wonders of the cosmos, and they suffused this love for nature's harmony into their work.
- Contempt for authority and suspicion of dogma: da Vinci had no formal education and had to teach himself everything in a way that made logical sense—epitome of anti-mimetic thinking. Einstein dropped out of high school at 16 to teach himself physics.
- A lot of success, measured by money, intellectual productivity, or anything else, comes down to circumstance, to some unknown but reasonably large, degree. Da Vinci's father knowing Verocchio and him being illegitimate, etc.
- Twenties: this was when many greats did some of their greatest work, but often weren't recognized for it. They often ended their 20s feeling like failures, when really they done great work that would bear fruits in the years to come and establish their notoriety.
- By scaling education, it necessarily loses beauty to the individual, because it's bland, monotonous, work. A teacher with a class of 40 cannot go on a field trip and get all 40 to feel curious and amazed about nature, but he certainly can with a class of 4. Both Einstein and da Vinci did not have formal schooling until much later than usual—near 9 or 10, and so grew up as people who didn't have that curiosity beaten out of them.
- At their peak productivity, they weren't seen as greats that would go down in history, only towards the ends of their lives did people start to realize and appreciate these peoples' greatness.
- Michelangelo was a craggy, ugly, asshole who preferred to work alone than collaborate. Gos to show that genius comes in all shapes and forms—you don't need to be charismatic or collaborative. Michelangelo was also religious while Leonardo was scientific, and Leonardo is greater only perhaps because of the Mona Lisa hysteria. It shows that greatness is often a social construct out of the hands of the great, and great people have wide-ranging personalities.
- Great rivalries that make for compelling stories often forge history. Gates/Jobs, Michelangelo/da Vinci, Einstein/Hilbert, these also push history forward by leaps and bounds by forcing these 10x innovators to outdo each other and push each other to their physical limits.

- Leonardo never quite figures out the mechanics of how the heart and circulation works, because he was too blinded by book learning. He had read too much about the topic and couldn't overthrow conventional wisdom. This harks back to how the Stanford art professor had a math background and how Cory's friend has no background in entertainment but is surrounding himself with smart people in the industry and has a strong general tech entrepreneurship background. Learning a little bit about a topic and thinking actively about it can generate revolutionary ideas—I need to do more of this.