The Tao of Miniature Painting

The Collected Edition

A complete theory and practice of figure painting at 32–54mm and beyond — from the first way of seeing to the mirror in the blade.

Form · Color · Light · Ground · Mirror

Five books, one method.

Contents

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Preface to the Collected Edition

These five books were written one at a time, each in answer to a question that the previous one opened. The first set out to be a complete treatise on miniature painting and found, in the writing, that it had a spine — an order of operations that governed everything: *value first, temperature second, chroma third, hue fourth, texture last, and design before all of them.* Each book that followed is that spine extended into a domain the first could only gesture at. *Color* is the discipline of choosing the hues the first book ranked last. *Light* is the single decision the first book demanded — choose the light source — taken seriously enough to fill a volume. *Ground* is the half of the object the figure stands on. *Mirror* is the one surface that breaks every rule the other four obey.

Collected, they turned out to be less a manual than a way of thinking, which is what prompted the name they now share. The recurring moves are not techniques but *habits of mind*: ask what a surface is before asking how to paint it; ration the loud things so the quiet things can speak; decide once and obey everywhere; draw the map before transcribing it; and ask, of every ambitious passage, the question the fourth book learned to call the demon question — *what here would cost the medal if fumbled* — while its answer is still a plan rather than a post-mortem. The same few principles recur in every book because they are, as far as the author can tell, the actual joints of the craft, and a reader who internalizes them will find that the specific recipes mostly derive themselves.

A word on how to read this. The five books are arranged in the order they were written and the order they are best learned, but they are not a staircase that must be climbed in sequence. **Book I — Form** is the foundation and should be read first and kept open; its laws are cited by all the others. The remaining four are deep dives that can be entered as a project demands — a reader facing a cloak chooses *Color*, a reader facing a sword chooses *Mirror*. Cross-references run throughout: when *Mirror* says "the lighting volume's law," it means **Book III — Light**, and the collected form makes those references literal — they are all here, under one cover.

Nothing in the practice is gatekept and nothing is mystified. Where the field genuinely disagrees — high-contrast rendering against ultra-smooth finish, true metallics against painted ones — the disagreement is named as a matter of style and judging culture, not settled as fact. The reader is trusted throughout to be serious, to want the reason beneath the rule, and to prefer a principle they can apply to a fix they must memorize.

The craft is large and a single lifetime is short. But it has joints, and the joints can be taught. What follows is one painter's map of them.

— *The Collected Edition*

The Five Books

Book I — Form. *On Seeing, Composition, Color, Sculpture, and the Painted Surface.* The foundation: how a miniature is actually looked at, the grammar of light on form, composition and the contrast budget, the three dimensions of color, the staged craft of sculpting, and the full apparatus of the painted surface — smooth application, the blending catalogue, and the placement of light, shadow, and highlight, including the special systems of metal and glow. Establishes the order of operations every later book obeys.

Book II — Color. *On Choosing Major Colors, Minor Colors, and the Smallest Features.* The discipline of selection: a scheme as a cast of roles — dominant, secondary, accent, the supporting neutrals, the fixed members — governed by two separate budgets, area and saturation. Where schemes come from, how to choose each role in turn, and the doctrine of the small features, where schemes are quietly finished or unravelled.

Book III — Light. *On Choosing the Light Before Painting It.* Lighting as a design discipline: the six parameters that fully specify any light, the mastery of a single key, the staffing of multiple sources, the color of light, the great environmental standards of time and weather, and the use of light as an instrument of focus and story. The reference rig that ends every argument: the figure photographed under a real lamp at the spec's address.

Book IV — Ground. *On Basing, Presentation, and the Junctions Where Medals Are Lost.* The five disciplines of the base practiced at once — composition, color, light, construction, and scale — under the judge's eye. Footprint and height, the materials and engineering, the arithmetic of scale, the painting and integration of the ground, the story it can carry, and the presentation layer that has no excuse to be less than perfect.

Book V — Mirror. *On Non-Metallic Metal, and Painting What the Metal Sees.* The summit discipline, and the one surface with no local color: the optics of metal, the environment model of sky, earth, and horizon, the value architecture of plateau and counterchange, the full library of metal ladders, finish and condition, metal under designed light, and the bench workflow that ends in the rotation audit. The capstone the other four books were building toward.

Book I — Form

On Seeing, Composition, Color, Sculpture, and the Painted Surface

Introduction — The Thesis of This Book

A miniature is a painting wrapped around a sculpture. That sentence carries more weight than it appears to. It means that every principle developed over five centuries of two-dimensional painting — value structure, edge control, color temperature, focal hierarchy — applies to the figure on your desk, with one complication and one gift. The complication: your canvas curves, turns, and is viewed from angles you do not control. The gift: the sculpture has already done half the lighting work for you, because real light falls on real form, and your job is partly to amplify what physics already provides and partly to overrule it where drama demands.

This book is organized around a single order of operations that governs everything else in it:

Value first. Temperature second. Chroma third. Hue fourth. Texture last.

Get the values right — the arrangement of lights and darks — and a miniature will read powerfully even with mediocre color choices. Get the values wrong and no amount of beautiful hue or flawless blending will save it. Temperature (the warm–cool axis) does more modeling work than most painters credit; chroma (saturation) is the spice you ration; hue is the dimension viewers consciously notice but which matters least to whether a piece *works*; and texture is the final layer of information, living almost entirely in the midtones.

A second thesis runs underneath the first: **technique serves design**. Smooth blending is not the goal. A perfectly smooth gradient placed in the wrong location, at the wrong value, with the wrong edge quality, is a beautifully executed mistake. The chapters on composition and color come before the chapters on brushwork deliberately. The painters who win at the highest level are almost never the ones with the smoothest transitions; they are the ones whose design decisions were correct before the first layer of paint went down, and whose execution was then good enough not to betray the design.

A third thesis: **control of water is control of paint**. Most application failures — chalkiness, streaking, tide marks, banding, lifted layers — are not failures of hand skill. They are failures of dilution, load, and timing. Part V treats paint as a material with physical behavior you can predict, rather than a substance with moods.

The book assumes a serious reader. It does not assume you have never held a brush, but it builds every advanced technique from its underlying principle, so that when something goes wrong on your bench you can diagnose it rather than memorize a fix. Where the field genuinely disagrees — high-contrast Spanish-school rendering versus ultra-smooth classical finish, true metallics versus NMM — the disagreement is flagged as a matter of style and judging culture, not settled as fact.

Read Parts I through III before a project. Keep Part V open during one.

Part I — Seeing Like a Painter

Chapter 1 — The Two Reads: How a Miniature Is Actually Looked At

Every miniature is experienced at two distances, and the requirements of the two are different enough that designing for only one is the most common structural failure in the hobby.

The three-meter read

At arm's length and beyond — across a table, inside a competition cabinet, in a photograph scaled to a phone screen — a miniature delivers exactly three pieces of information: its **silhouette**, its **value masses**, and its **color statement**. Nothing else survives the distance. Not your freehand, not your eyes, not your two-brush transitions. A judge walking a Golden Demon cabinet performs this read in roughly three seconds per entry, and the entries that fail it do not receive the second read at all.

The three-meter read is won or lost before detail painting begins. It depends on whether the silhouette is legible and dynamic, whether the value structure groups into large readable masses rather than fragmenting into noise, and whether the color scheme makes one clear statement rather than several competing ones. You can and should test it constantly: photograph the work-in-progress, shrink the image to thumbnail size, convert it to grayscale, and ask whether it still communicates. If a thumbnail-sized grayscale image of your figure reads as an exciting arrangement of shapes, the piece is structurally sound. If it reads as mid-gray mush, no quantity of subsequent rendering will repair it.

The thirty-centimeter read

Picked up, turned in the hand, examined under the cabinet lamp — this is where execution is judged. Transition quality, edge discipline, the cleanliness of the line where cloth meets skin, the micro-texture of leather against the satin of a cheek, whether the pupil sits correctly in the eye. The thirty-centimeter read rewards control, and it is the read most painters spend ninety percent of their practice on, which is why so many beautifully rendered figures fail: they were built for the close read alone.

Judges at major competitions perform both reads, in order. The cabinet pass culls; the in-hand pass ranks. Your design must survive the first to earn the second, and your execution must survive the second to place. Hold both in mind from the first sketch.

Contrast compensation at scale

Small objects need exaggerated contrast, and this is not a stylistic preference but a perceptual fact. The eye integrates value over visual angle: a transition that spans ten value steps across a half-meter canvas reads as dramatic, but the same ten steps compressed into a 32mm figure occupy so little of your visual field that the brain averages them toward the middle. Miniatures also lack the atmospheric cues — haze, depth of field, ambient bounce — that help a full-size scene read.

The working rule: **paint two steps further than feels correct at the bench**. When the highlight feels slightly too light and the shadow slightly too deep while you are working at fifteen centimeters under a daylight lamp, the figure is probably approaching correct for the distances at which it will actually be seen. The corollary is the "tabletop dip": figures painted to look right at bench distance lose roughly a third of their apparent contrast at viewing distance. This is also why so much of the

troubleshooting in this book returns to the same prescription — your darks are not dark enough, and your lights stop short.

The caution that accompanies the rule: contrast is decisive, but crushed midtones read worse than moderate contrast with the midtone band intact. The midtones are where texture and color information live (Chapter 17 develops this fully). Stretch the value range by deepening shadows and spiking highlights; do not stretch it by deleting the middle.

Tests you should run constantly

The grayscale photograph is the single most valuable diagnostic in miniature painting, because your eye lies about value whenever hue and chroma are present — a saturated red and a medium green can sit at identical values while appearing wildly different. Photograph, desaturate, evaluate. Do this at every major stage, not only at the end.

The squint compresses values the same way distance does and is the live version of the same test. The mirror and the upside-down photograph break your familiarity with the piece and expose balance problems and tangents your adapted eye has stopped seeing. The overnight rule — never judge a session's work until the next morning — exists because adaptation is real and your calibration at hour four of a session is untrustworthy.

Chapter 2 — Light on Form: The Grammar of Volume

Everything in this book derives from a single decision you make before opening a paint pot: **where is the light?** Choose the light source first — its direction, its elevation, its color, its hardness — and every subsequent decision about value, temperature, and edge placement becomes a consequence rather than a guess. Fail to choose it, and the figure becomes a committee of local decisions that never agree.

The primitive forms

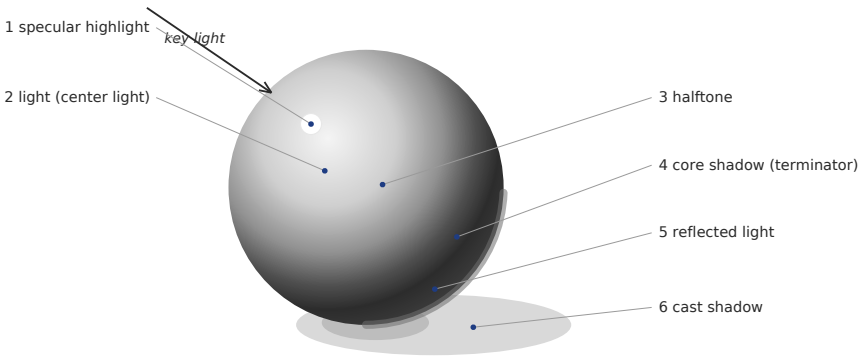
Complex anatomy is rendered by reducing it to primitives whose lighting behavior you know cold. A head is a sphere modified by planes; the brow, cheekbones, and jaw are where the sphere becomes a box. Limbs are cylinders. A torso is a box softened toward a cylinder. Cloaks and skirts are cones and curved planes. When a passage of a figure confuses you, the question is never "how do I paint a forearm" — it is "how does light fall on a cylinder oriented this way relative to my key light," and that question always has an answer.

The six elements of form

On a sphere lit by a single source, six distinct zones appear, and learning to see all six — most painters render only three — is what separates volumetric painting from coloring-in:

1. **The specular highlight** — the brightest point, where the light source itself reflects toward the viewer at the angle of incidence. It is small, it is placed by optics rather than by habit, and on most materials it carries the light's color plus pure white. It is distinct from the general light area, and conflating the two is why so many highlights look pasted-on.
2. **The light (center light)** — the broad zone of planes facing the source.
3. **The halftone** — the turning zone where planes angle away from the light. This is where most of a form's area lives, where color is most truly itself (neither bleached by light nor swallowed by shadow), and where texture should be concentrated.

4. **The core shadow (terminator)** — the darkest band of the *form* shadow, sitting just past the point where planes stop receiving direct light. It is darker than the shadow region beyond it, because the region beyond receives bounce.
5. **Reflected light** — illumination bounced back into the shadow side from the ground, nearby surfaces, or sky. It is the element that makes shadow areas feel transparent and alive — and it is governed by an iron rule: *reflected light must always remain darker than any halftone on the lit side.* The moment a bounce light competes in value with the lit planes, the form breaks. This is among the most common errors in ambitious miniature painting.
6. **The cast shadow** — the shadow the form throws onto other surfaces. It is hardest-edged at its origin point, softens as it travels, and is darkest in the **occlusion** zone where two surfaces nearly touch.



Six zones from one light. Reflected light (5) must stay darker than any halftone (3) on the lit side, or the form breaks.

Ambient occlusion: the shadow that ignores your light source

Independent of key direction, light cannot reach into deep crevices — armpits, under the chin strap, between fingers, where the belt compresses the tunic, the underside of every overlap. These occlusion shadows are the deepest darks on the figure and they belong in *every* lighting scheme, even flat ambient ones. Mapping them early — many painters establish them immediately after the zenithal stage, before any local color — anchors the entire value structure and makes everything painted afterward look grounded. A figure with correct occlusion shading and mediocre everything else still reads as solid; a figure with beautiful gradients and no occlusion reads as hollow.

Zenithal logic and when to break it

The default key for a miniature is the sky: light from above, slightly front, at roughly 45 degrees of elevation. It is the default because it is what human visual systems expect — we evolved under exactly one light source and it was overhead — and because it flatters faces and reads instantly. Zenithal priming (Chapter 17) is the mechanical encoding of this assumption.

Break the default deliberately, never accidentally. A low side key creates menace and drama at the cost of legibility. Underlighting is alarm and horror. A high back key (rim lighting) creates a glowing silhouette and demands that you paint most of the figure in shadow values — spectacular

when committed to, fatal when half-committed. Whatever key you choose, choose it once and audit every surface against it. The single most damaging lighting error on display figures is not a wrong key but an *inconsistent* one: a face lit from upper left and a sword lit from upper right, each locally pretty, jointly incoherent.

Edges carry information

Every boundary between two values has an edge quality, from razor-hard to fully lost, and edge quality tells the viewer what kind of boundary it is. Hard edges occur where form turns abruptly (a box corner, an armor bevel, a blade), at the near boundary of cast shadows, and at material changes. Soft edges occur where form turns gradually — the side of a cheek, the swell of a bicep, the roll of a cloak. Lost edges occur where two areas of similar value meet, and deliberately losing edges in shadow zones is one of the most powerful sophistication moves available: it groups masses, increases mystery, and forces the eye toward the sharp, high-contrast edges you have reserved for the focal point.

The practical failure mode is uniformity. A figure rendered with identical edge softness everywhere — the usual result of blending everything equally well — reads as rubbery and dead no matter how smooth the gradients are. Edge variety is realism. Decide the edge quality of every major transition the way you decide its value.

A working value notation

This book uses a 0–10 value scale: 0 is pure black, 10 is pure white. A typical well-structured display figure runs from roughly 1 (occlusion pits, deepest shadow accents) to 9.5 (specular spikes at the focal point), with the population of values distributed deliberately: large quiet masses in the 3–7 range, the extremes rationed and spent where they buy attention. When this book says "the gold's chroma peaks around value 7" or "keep reflected light below value 5," this is the scale in use. Internalize thinking in numbered values; it converts vague dissatisfaction ("the cloak feels flat") into a diagnosis ("the cloak occupies 4–6 and needs its shadow pushed to 2").

Part II — Composition

Composition is the discipline of deciding what the viewer looks at, in what order, and for how long. On a miniature it operates through five instruments — silhouette, value, chroma, edge, and detail density — deployed across a three-dimensional object and its base. Everything in this Part precedes paint. The strongest competition pieces are composed on paper, in thumbnails and value studies, before primer touches resin; the weakest are composed by accident, one pretty passage at a time.

Chapter 3 — Silhouette, Gesture, and the Primary View

The silhouette is the first sentence

Fill your figure with black in a photo editor, or simply backlight it, and look at the shape that remains. That shape is the first thing every viewer processes, and it must do three jobs: identify the subject (a knight, a beast, a duel), convey the action or mood, and be interesting *as a shape* — varied in its contour, with rhythm between mass and gap. A silhouette that fails any of the three cannot be repaired by paint.

Two qualities make silhouettes fail. The first is congestion: limbs, weapons, and accessories overlapping into an unreadable blob, usually because the pose tucks everything close to the torso or because basing elements rise into the figure's outline. The second is **tangency** — elements that *almost* touch or *barely* touch, kissing edges that flatten space and create visual static. A sword tip that exactly grazes the base edge; a raised hand whose contour just touches the backdrop ruin behind it; two figures in a duel whose blades cross precisely at their silhouette boundaries. The fixes are always the same: clearly overlap, or clearly separate. Audit for tangents from the primary view *and* from the camera height at which the piece will be photographed, because tangents are view-dependent.

Gesture and the line of action

Underneath every good pose runs a single dominant line — the line of action — that the spine, the weight-bearing structure, and usually the gaze all relate to. A straight vertical line of action is monumental, calm, authoritative: appropriate for a standing king, fatal for a charging berserker. A C-curve is graceful and dynamic. An S-curve (the classical *contrapposto* — weight on one leg, hips and shoulders counter-rotated) is the most alive of the static poses, and the reason it appears in five hundred years of figurative sculpture. Strong diagonals are speed and violence.

When evaluating or converting a pose, find the line of action first and strengthen it. The most common gesture failure in stock miniatures is the symmetrical stand — both feet planted, hips square, shoulders square — which has no line of action at all. A few degrees of head tilt, a hip rotation, a weight shift achieved by repositioning one leg (Chapter 12) transforms these figures. The second most common failure is the *contradicted* line: a dynamic lower body with a stiff vertical torso, which reads as a person glued together from two different figures.

The line of action should not stop at the feet. Let it continue into the base — a leaning figure on a tilted rock that continues the lean, a charging figure whose ground-work debris streams along the charge vector. The base is part of the gesture (Chapter 6).

The primary view and the 270-degree rule

Display miniatures are not viewed equally from all angles, and pretending otherwise wastes effort and weakens design. Every piece has a **primary view** — the angle from which the silhouette is strongest, the face is visible, and the story resolves — and the piece should be unapologetically optimized for it. Composition armatures (Chapter 5), focal hierarchy, and freehand placement are all designed against the primary view.

But judges pick pieces up. The practical standard is the 270-degree rule: the primary view plus roughly 45 degrees to either side must be excellent; the remaining arc must be *competent* — clean, consistent, free of unpainted surprises and lighting contradictions — without needing to compete. The rear of a cloak is an opportunity for a quiet, beautiful, low-stakes passage (or a freehand showcase, if the front is busy), not a second front. NMM in particular demands rotation planning: paint the metal from the primary view, rotate 90 degrees, re-plan the reflections, and repeat for all four orientations, because painted reflections that only work from one angle announce themselves instantly in hand.

Establish the primary view *before* basing. Mark it on the underside of the plinth. Every subsequent decision references it.

Chapter 4 — Focal Hierarchy and the Contrast Budget

One ruler, a few ministers, a quiet population

A composition needs exactly one primary focal point, ideally two or three secondary points arranged so the eye travels between them, and a majority of surface area that is deliberately subordinated. On a single figure the primary focal point is the face in perhaps four cases out of five — humans cannot help looking at faces — and when it is not the face, it is because the design has made something else (a glowing blade, a wound, a reaching hand) win the contrast auction decisively, in which case the face must be *deliberately suppressed* or it will fight.

The failure pattern is democracy: every element painted to maximum interest. A figure whose sword, face, shield heraldry, gem-studded belt, and freehand cloak all scream at equal volume has no focal point at all, and viewers report such pieces — accurately — as "busy" and "tiring" without being able to say why. Every passage you paint should be assigned a rank before you paint it, and most passages should rank low. Painting a deliberately quiet, slightly desaturated, mid-contrast passage *well* is a harder and more valuable skill than painting a loud one.

The five currencies of contrast

Attention is purchased with contrast, and contrast comes in five currencies. The focal point should be rich in at least three; subordinate areas must be kept poor in all five.

1. **Value contrast** — the strongest currency. The lightest light placed directly against the darkest dark is the single loudest event possible on a figure. Reserve this exact adjacency for the focal point: the value-9.5 specular on the brow against the value-1 shadow of the hood interior.
2. **Chroma contrast** — a patch of saturated color in a desaturated field. Far more powerful than hue contrast and far cheaper to control: simply ration saturation. A useful discipline, drawn from competition practice: allow yourself **two saturated colors in roughly a 70/30 dominance split, or three at an absolute ceiling of about 70/20/10** — and desaturate everything else toward gray, earth, or the dominant's neighbors. Schemes obeying this ratio read as designed; schemes ignoring it read as toy-like regardless of rendering quality.
3. **Temperature contrast** — a warm note in a cool field or the reverse. Subtler than chroma contrast and excellent for secondary focal points.
4. **Edge contrast** — the sharpest, hardest edges on the figure draw the eye. Keep transitions at the focal point crisp; let edges soften and dissolve in subordinate zones.
5. **Detail-density contrast** — fine information (texture, freehand, micro-highlights) concentrates attention; smooth emptiness releases it. A heavily textured focal passage needs quiet surroundings, and vice versa. This is also why texture lives in the midtones: shadows go dark and *smooth*, highlights go light and washed-out, and the detailed information sits in the middle band where the eye can read it.

Spending the budget

Think of each currency as a finite budget. Every unit of contrast spent on a buckle is a unit unavailable to the face. The audit, performed at the value-sketch stage and again at every grayscale checkpoint: *Where is my absolute lightest value? My darkest? My purest chroma? My sharpest edge? My densest detail?* If the answers do not all sit at or adjacent to the intended focal point, the design has a leak. Common leaks: pure white highlights scattered on every metal edge (spend value-9.5

only at the focal metal; the rest peaks at 8.5), saturated heraldic colors on a shield facing away from the primary view, and crisp edge highlighting applied uniformly around the entire figure like a wireframe.

The eye should enter at the primary focal point, travel along designed routes to the secondaries, and circulate — not exit. Exits are created by high-contrast events at the figure's outer boundary: a bright sword tip at the silhouette edge, a saturated base rim, a light-valued element pointing out of frame. Keep the perimeter quiet and the brightness inboard.

Chapter 5 — Compositional Armatures and Visual Flow

What the armatures are actually for

The rule of thirds, the phi grid, the golden spiral, the golden triangle: these are not magic ratios that confer beauty, and treating them as laws produces stiff work. They are *placement disciplines* — pre-tested arrangements that prevent the two default errors of untrained composition, which are dead-centering the subject and bisecting the frame. Use them as scaffolds at the planning stage, then trust your eye.

Applied to a miniature, the "frame" is the primary view of the entire presentation — figure plus base plus plinth, as it will sit in the cabinet and the photograph. This is worth a tool: photograph the assembled (unpainted) composition from the primary view and overlay the grids digitally, or use a planning app that lets you drag the figure against the overlays. Evaluating armatures by eyeballing the physical object is unreliable; the overlays make placement errors obvious in seconds.

Rule of thirds. Divide the frame into a 3×3 grid; place key elements on the lines and the focal point at an intersection. For a single figure on a plinth, the classic solution puts the head at the upper-left or upper-right intersection — which immediately implies an asymmetric pose or off-center mounting, and explains why dead-vertical, dead-center figures feel inert.

Phi grid. The same idea with the lines pulled toward the center ($1 : 0.618 : 1$ ratios). Its intersections sit closer in than the thirds grid, producing a tighter, more classical placement. For tall single figures the phi grid frequently fits better than thirds; try both overlays and keep whichever places the face more naturally.

Golden spiral. Less a placement grid than a *flow* model: the spiral's tight terminus marks where the eye should come to rest (the focal point), and its sweep suggests the route — typically entering along a large curve (a cloak's hem, the base's leading edge, an outstretched weapon) and coiling inward to the face. You are not painting a spiral; you are checking that the piece's major curves cooperate to deliver the eye inward rather than flinging it off the edge.

Golden triangle and dynamic diagonals. Divide the frame with a corner-to-corner diagonal and perpendiculars from the remaining corners; align major masses to the resulting triangles. This armature suits action poses and multi-figure scenes, where the dominant diagonal *is* the line of action and the perpendiculars locate the counterweights.

Leading lines, rhythm, and balance

Within whatever scaffold you choose, three mechanisms move and hold the eye.

Leading lines. Weapons, limbs, cloth folds, gaze direction, the grain of basing planks, the slope of terrain — every elongated element points somewhere, and the viewer's eye runs along it. Audit every pointer on the piece: each should aim at the focal point, at a secondary on the circulation

route, or harmlessly inboard. Gaze is the strongest pointer of all; viewers reflexively look where the figure looks, which makes the figure's eyeline a compositional steering wheel. A figure gazing at an object in its own hand creates a closed, intimate loop; a figure gazing out of frame creates tension and implies an off-stage actor — powerful, but it must be deliberate.

Rhythm. Repetition with variation — three echoes of the accent color at different sizes, a shape motif (the crescent of the shield recurring in the base's broken arch), an interval pattern in the placement of highlights — binds a composition together below conscious notice. One large, one medium, one small occurrence of any repeated element is the reliable recipe; two equal occurrences create a tie that splits attention.

Balance. Every element has visual weight, a product of its size, value contrast, chroma, and detail density. A composition need not be symmetrical — asymmetry is more alive — but it must balance around its vertical axis like a mobile. A figure lunging hard to the left, all mass and contrast on one side, needs a counterweight at right: a banner, a base element, a secondary figure, even a deliberately placed region of high-chroma quiet. Small-but-saturated balances large-but-dull. The mirror test and the upside-down photograph are the balance diagnostics; both defeat your familiarity and let you feel the lean.

Depth at scale. Miniatures sit in shallow real depth, but you can paint atmosphere into them. Elements intended to read as "behind" — the rear of the base, a backdrop ruin, the far figure of a duo — get reduced value range, reduced chroma, cooler temperature, and softer edges, exactly as atmospheric perspective dictates at full scale. Even a few millimeters of real depth, supported by painted depth cues, reads as a stage rather than a shelf.

Chapter 6 — The Base as Stage: Story, Balance, and Presentation

Pedestal or stage

A base does one of two jobs. As a **pedestal**, it presents the figure neutrally — clean groundwork, harmonized color, no narrative — and its virtue is restraint. As a **stage**, it participates: terrain that explains the pose, props that carry story, architecture that frames. Decide which job the base is doing before building it, because the failure mode between the two is the half-stage: a base with enough incident to distract but not enough to mean anything.

Either way, the base obeys the hierarchy. It is *never* the focal point. Its values stay in the middle band, avoiding both the figure's deepest darks and anything approaching its highlights; its chroma sits below the figure's dominant color (desaturated earths, grays, and muted complements are the reliable register); its detail density rises *near* the figure's ground contact and falls toward the rim. A useful inverse law: the busier the figure, the simpler the base, and the more austere the figure, the more the base may say. The rim itself — painted a near-black neutral or deep complement, cleanly finished — is a frame, and frames are quiet.

Two integration moves separate convincing stages from figures-glued-to-scenery. First, **painted contact shadow**: the figure must cast its shadow onto the groundwork, darkest and hardest-edged at the points of contact, consistent with the chosen key. A figure without a contact shadow floats, no matter how well the soles are glued. Second, **environmental reflection**: bounce a little of the base's color up into the figure's lowest shadows (a warm umber glow above sand, a cool green tint above moss), and carry a whisper of the figure's accent color into one or two basing elements. Many painters finish with an atmospheric tie — an extremely dilute airbrush tint, on the order of 90–95 percent water or thinner, passed over the lower figure and base together — which unifies the two the way air unifies a real scene.

Height, shape, and the extended line

Base and plinth height are compositional variables, not packaging. Raising a figure on a tall scenic spire or column emphasizes verticality, isolation, and monumentality, and extends the line of action; it also lifts the face nearer to a standing viewer's eyeline in a cabinet — worth real thought, since pieces are judged at cabinet height, not bench height. Low, wide bases read as grounded and intimate and suit horizontal, narrative scenes. The silhouette rules of Chapter 3 apply to the *combined* object: a base whose rockwork rises into the figure's outline congests it; a base whose mass leans opposite the figure's lean restores balance.

Shape carries connotation and, in competition, regulation — check category rules before committing. Round plinths suit organic, flowing compositions; squares and rectangles suit architecture and formality; irregular found-wood and stone suit wilderness. Whatever the shape, the figure rarely belongs at dead center: place it by the same armatures as everything else, typically a third back and a third to one side, facing into the larger open area rather than out of it. Figures facing the near edge of their own base read as about to fall off the world.

Storytelling: the moment, the props, the witness

Narrative on a miniature is told almost entirely through implication, and the strongest implication is **moment selection**. Of any action's three phases — before, during, after — the *instant before* is usually the most powerful: the sword drawn back but not swung, the scout's hand raised in halt, the duelists circling. It recruits the viewer to complete the action, which is participation, which is memorability. "During" is the most literal and most common; "after" — the lowered blade, the smoking ruin, the survivor — is the most melancholy and underused.

Props are sentences. A single child's toy in the mud beside a battle-worn knight outperforms a base full of skulls, because one specific object asks a question and twenty generic ones answer none. Ration narrative objects exactly as you ration chroma. And remember the witness principle: the figure's own attention — gaze, posture, the orientation of weapons — tells the viewer what matters in the scene. If the story object sits where the figure ignores it, the story misfires.

Titles are part of the composition. A name plaque ("The Last Dispatch") reframes everything the viewer has just seen and licenses a second look. Keep plaques typographically quiet — engraved brass or clean print, never decorative fonts — and physically on the plinth's front face, confirming the primary view.

Presentation

The plinth is the suit the piece wears. Dark, simply profiled hardwood — wenge, walnut, ebonized beech — in a cube or gently tapered form is the default for good reason: it adds formality, lifts the work to handling height, and disappears. Its proportions matter; as a starting point, plinth height between one-half and one times the figure's height suits most single figures, taller for deliberately monumental verticals. Finish matters too: satin or oiled finishes read as furniture; high gloss reflects cabinet lighting into the camera. The transition between scenic base and plinth top must be resolved — either the groundwork dies cleanly into a defined socket, or a thin shadow gap separates them — because an unresolved seam at the most-handled part of the piece undercuts everything above it.

Part III — Color

Color is three separate dials, and almost every color problem on a miniature comes from turning the wrong one. This Part establishes the dials (Chapter 7), the relationships between colors across a whole scheme (Chapter 8), and the bench-level mixing practice that turns theory into paint (Chapter 9).

Chapter 7 — The Three Dimensions of Color

Hue, value, chroma

Every color you can mix is fully described by three independent properties. **Hue** is the color's family — its position around the wheel: red, yellow-green, blue-violet. **Value** is its lightness, the 0–10 scale of Chapter 2, what remains when a photograph is desaturated. **Chroma** (saturation, intensity) is its purity — the distance from gray at the same value. A brick red and a pink can share a hue; a lemon yellow and a navy blue differ enormously in value before hue even enters the conversation; an olive and a pure green may share hue and value and differ only in chroma.

The Munsell framing — color as a three-dimensional solid you navigate, rather than a flat wheel — is the single most useful mental upgrade a painter can make, because it reveals that the dimensions are *not symmetrical in importance*:

Value does almost all the structural work. Two studies prove it permanently. First, render a figure in arbitrary, even ugly hues but with a correct value structure: it reads convincingly, and viewers will call the colors "stylized." Second, render a figure in exquisitely chosen hues with a flat or scrambled value structure: it reads as broken, and no one will notice the hues at all. The eye's luminance channel carries form, depth, and focus; hue and chroma are commentary. This is why the grayscale photograph is the master diagnostic, why the value plan precedes the color plan, and why "what color should I paint X" is always the second question. The first is "what value is X."

Chroma is the scarcest resource. Realistic and sophisticated schemes live at modest chroma — most of the natural world is closer to gray than beginners believe — with saturation spiked deliberately at focal points, per the 70/30 (or 70/20/10) rationing of Chapter 4. Beginner schemes fail by saturation inflation: every color at full intensity, producing the unmistakable toy-like read. When a scheme feels garish, the fix is almost never changing hues; it is pulling chroma out of the subordinate areas.

Hue is the dimension viewers discuss and painters should worry about least. Within a sound value structure and a disciplined chroma plan, an enormous range of hue choices works. Hue's real jobs are temperature (next chapter), association (crimson reads as different *meaning* than rust, at identical value and chroma), and harmony across the scheme.

Value planning at scale

Before paint, assign values. The reliable distribution for a display figure: the figure's large masses occupy distinct value *zones* that read at three meters — say, cloak at 2–4, armor at 3–8 (metals need wide ranges), skin at 4–7.5, with the base in a quiet 3–5. Adjacent masses should differ enough in their average value to separate when squinted. Then ration the extremes: values 0–1 only in occlusion pits and the focal adjacency; 9–10 only in specular spikes at the focal point. Remember contrast compensation (Chapter 1): the plan that looks slightly too contrasty on paper is approximately correct on the figure.

A two-value (notan) thumbnail — every surface assigned simply "light" or "dark" — takes five minutes and exposes structural problems nothing else will: masses that fragment, focal points that don't dominate, silhouettes that vanish into same-value bases. Do it before every serious piece. A three-value version (dark, mid, light) is the complete structural plan; everything after it is rendering.

Chapter 8 — Temperature, Harmony, and Gamut

Temperature: the second engine of form

Every color leans warm (toward red-orange-yellow) or cool (toward blue-green-violet), and the lean is *relative*: a violet is cool beside orange and warm beside cyan; a "cool red" like crimson sits cold beside vermilion. Temperature matters because the eye models form with it as readily as with value, and because it is the cheapest source of richness available — two passages at identical value and chroma, one warm and one cool, vibrate against each other in a way that monotemperature painting never achieves.

The governing principle is **temperature opposition between light and shadow**. A warm key light (sun, fire, candlelight) throws shadows that read cool, both physically — shadow areas are lit by blue skylight and cool ambient bounce — and perceptually, by simultaneous contrast. A cool key (moonlight, overcast sky, magical glow) reverses the relationship: cool lights, warm-leaning shadows. Pick the key's temperature when you pick its direction, and let the whole figure obey. The standard sunlight recipe — and the default for most display work — is: **shadows cool and blue-shifted, lights warm and yellow-shifted**, with the local color most truly itself in the halftone. In workflow terms: start dark and cool, finish warm and light.

Temperature opposition does fine-grain modeling work too. Within a single skin passage, the turning of form from light into halftone often passes through a *cooler* zone before the warm reflected light enters the shadow — the cool transition that makes painted flesh feel alive (Chapter 9). On NMM metals, temperature alternation between adjacent reflection planes does as much as value to suggest reflectivity (Chapter 19).

Harmony schemes

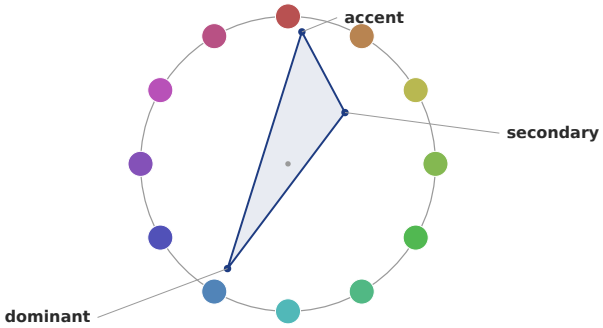
Harmony is the relationship among a scheme's hues, and the named schemes are simply the relationships that reliably work. **Monochromatic** (one hue, full value range) is the easiest to unify and the hardest to keep interesting; it lives or dies on value structure and temperature microvariation. **Analogous** (two to four neighbors on the wheel — blue, blue-violet, violet) is naturally harmonious and atmospheric; it usually wants one small contrasting accent to avoid monotony. **Complementary** (opposites: orange/blue, red/green) delivers maximum hue tension and must be managed with dominance — one complement rules at 70 percent or more of the area, the other serves as accent; at fifty-fifty they fight. **Split-complementary** (a hue plus the two neighbors of its complement) keeps complementary energy with less violence and is arguably the most forgiving scheme for figures. **Triadic** (three hues equally spaced) is vivid and difficult; it demands strict chroma rationing — one triad member dominant and near-pure, the others muted — or it collapses into carnival.

Two practices matter more than which scheme you choose. First, **dominance**: every scheme needs a majority shareholder. Equal-area color schemes read as indecision. Second, **echo**: each significant hue should appear at least twice at different sizes (the rhythm principle of Chapter 5). A single occurrence of a color is an accident; a large, a medium, and a small occurrence are a

design.

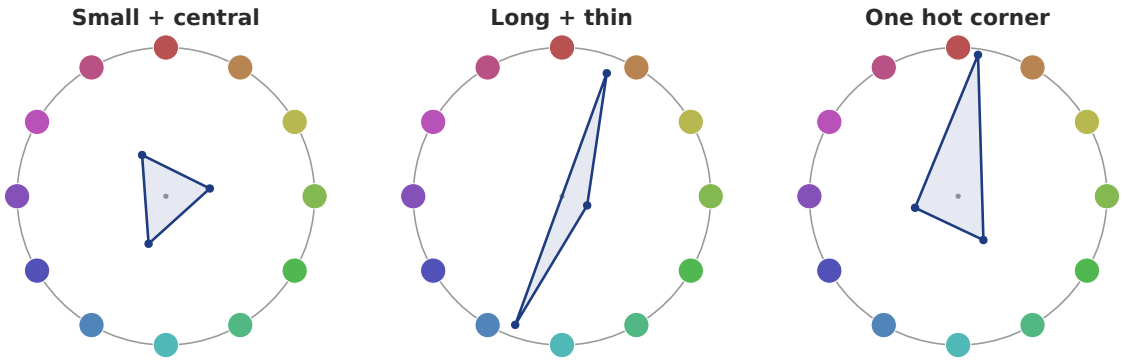
Gamut mapping: the professional's harmony tool

The most powerful color-planning method available draws a shape on the color wheel and refuses to mix outside it. Plot your chosen hues at their intended chromas on a wheel; connect them into a triangle or quadrilateral; that polygon is your **gamut**. Every mixture inside it is available; everything outside is forbidden for this piece.



Plot the chosen colors; connect them.
Center is neutral gray, rim is full chroma.
Inside the polygon is allowed; outside, forbidden.

The shape's geometry predicts the scheme's character: a small triangle near the wheel's center yields a muted, tonal, atmospheric piece; a long thin triangle yields a strong two-temperature scheme; a triangle with one corner at full chroma and two pulled inward yields exactly the dominant-plus-muted-accents structure Chapter 4 prescribes.



Gamut mapping solves the problem that destroys most ambitious schemes — drift. Forty hours into a piece, mixing on tired eyes, painters reach for "a bit of green for the shadow" or "warm the highlight with orange" and step outside the harmony one glaze at a time. The mapped gamut

converts every mixing decision into a yes/no check. Physically pre-mixing the gamut's corner colors and key internal points onto the wet palette at the start of each session enforces it effortlessly.

Simultaneous contrast: the color you paint is not the color they see

Every color is perceived relative to its neighbors. A neutral gray reads warm beside blue and cool beside orange; a muted red looks saturated in a gray field and dirty beside a pure red; identical values appear different against different surrounds. This is not a nuisance — it is a free tool. The most important application on miniatures: **neutrals borrow life from their context**. A gray NMM sword painted in pure neutral values will read as faintly *blue* beside an orange cloak — which is exactly what steel under sky should do, achieved without mixing a drop of blue. Likewise, the way to make a focal red read intensely saturated is not to find a hotter red but to cool and mute everything around it. When a color on the figure looks wrong, suspect its neighbors before remixing it.

Chapter 9 — Mixing in Practice: Shadows, Highlights, Skin, and Re-Saturation

The mixing palette

Whether you run a minimal CMY-plus-white palette, a curated set of single-pigment artist colors, or a drawer of two hundred hobby pots, the operational requirements are the same: know each paint's *value*, *chroma*, *undertone*, and *opacity* before you trust it in a mix. Single-pigment paints (the philosophy behind ranges like Kimera and behind artist tube colors) mix cleaner and shift more predictably, because every additional pigment in a mixture pulls chroma toward gray; convenience mixes and "shade-of-X" hobby colors are time-savers whose mixing behavior must be learned individually. Test every new paint the same way: a swatch ladder to white, a ladder to black, and a ladder to its complement, on the same card stock, labeled. An afternoon of swatching repays itself for years.

The undertone trap deserves its own warning. Two "blues" may be a green-leaning phthalo/cyan type and a violet-leaning ultramarine type; mixed with yellow, the first yields clean greens and the second yields mud, for the simple reason that the ultramarine mixture contains all three primaries. Most "mixing produced mud" complaints trace to undertone collisions, not to mixing complements per se.

Building shadows: deepen, cool, then bring it back to life

The instinct to shade by adding black is half-wrong, and understanding which half saves years. Black added to a color does two things: drops value (wanted) and crushes chroma while shifting hue unpredictably (yellow plus black turns olive-green; red plus black turns brick-brown). Pure black-shading therefore produces shadows that are dark but *dead* — and dead, gray shadow is the most common color failure on otherwise well-painted figures.

The professional shadow recipe has three moves, used in combination:

1. **Shift hue toward the cool, deep analogous neighbor.** Red shades through crimson into violet; yellow through ochre and burnt sienna toward red-brown or olive depending on the scheme's temperature; mid-blue through ultramarine toward blue-violet; green through viridian toward blue-green. This keeps the shadow chromatic — colorful darkness rather than gray darkness — and automatically supplies the cool shift the lighting model demands.

2. **Use neutralizers for depth where pure hue-shifting overshoots chroma.** The deepest shadow accents and occlusion pits *should* approach neutral; a transparent near-black mixed from deep complements (burnt umber plus ultramarine is the classic), or a small amount of true black, takes the last two value steps. The error is not using black at all; the error is using it for the *entire* shadow range.
3. **Re-saturate the transitions.** After shadows are placed — and especially after any black, gray, or zenithal-sketch process has desaturated them — glaze thin passes of pure primary-leaning color (cyan, magenta, yellow, or the scheme's equivalents) back into the shadow and halftone zones. This **CMY re-saturation** step is the difference between shadows that recede lifelessly and shadows that glow from within. A cool gray-shaded blue cloak comes alive under one or two magenta-then-cyan glazes in its core shadow; a sketch-style figure, gorgeous in grayscale and chalky in color, is rescued entirely by this pass. If a single habit from this chapter changes your work, let it be this one: *avoid gray shadows — shade cool, then re-saturate.*

Building highlights: toward the light's color, not just toward white

White added to any color raises value (wanted) but also drains chroma and *cools* the mixture — titanium white's slight blue cast turns warm reds chalky pink and rich yellows pastel. Highlights built on white alone therefore drift cold and dusty exactly where the figure should feel most alive.

The recipe mirrors the shadow logic in reverse. First, **shift hue toward the light source's color**: under a warm key, reds highlight through orange toward yellow, greens through yellow-green, blues toward cyan or warm gray, and the final steps approach a warm ivory rather than pure white. Under a cool key, everything climbs toward pale blue-white instead. Second, **substitute high-value chromatic paints for some of the white**: pale yellows, ivory, light flesh tones, and pale turquoise raise value while donating chroma instead of stealing it. Third, **ration pure white absolutely** — it appears only in the specular spike, the small optical reflection of the source itself, placed at the angle of incidence on the focal forms, usually as the light's color tipped with pure white at the very last touch. A figure with one or two true-white points reads as lit; a figure with fifty reads as frosted.

When a highlight has already gone chalky, the repair is the same re-saturation logic as shadows: a thin glaze of the local hue (or the light's hue) over the offending zone restores chroma and knocks back the dusty finish, often in a single pass.

Skin

Skin is the highest-stakes surface on most figures — it is usually the focal point, viewers are neurologically expert in it, and it obeys all the rules above plus two of its own.

First, skin is *translucent*, and reads as alive only when painted as if light enters it. The practical encoding: warm the thin-skinned, blood-rich zones — ears, nostrils, lips, knuckles, fingertips, around the eyes — with red-leaning glazes; let the halftones carry the most saturation on the face (cheeks especially); and run the form-turn through a subtly *cooler*, slightly gray-green or violet transition zone between light and shadow before the warm reflected light returns in the shadow core. That warm–cool–warm sequence across the form is the signature of living flesh in every tradition of figure painting, and its absence is why "smooth" faces can still look like plastic.

Second, skin's *finish* is satin, not matte and not gloss — Chapter 18 handles finish, but plan for it: dead-matte flesh reads dusty, and the gentle sheen of a properly satin face does half the work of

the painted highlights.

Recipes by complexion follow the same architecture with different anchors. Pale and ruddy European skins build from a desaturated orange base (think burnt sienna plus white plus a touch of yellow) with cool violet-gray shadow transitions and ivory lights. Olive and tan Mediterranean/East Asian skins shift the base toward yellow-ochre with green-leaning halftone neutrals. Deep brown and Black skins are *not* "dark versions of the above": their bases sit at genuinely low values built on rich red-browns and umbers, their chroma often runs *higher* than pale skin (avoid the gray-brown trap), their shadow shifts run toward cool violet and blue, and their specular highlights are stronger and sharper — deep skin's sheen is part of its character, and a pale cool-ivory or even faintly blue specular over a saturated warm form is the convincing rendering. In every complexion, the most common failure is identical: not enough chroma in the halftones and not enough value range overall.

Blacks, whites, and the colored neutral

Pure black and pure white are *events*, reserved for occlusion pits and specular spikes. Every "black" surface — coat, boot, raven — is painted as a colored dark: a base around value 1.5–2 mixed from deep chromatic darks (umber and ultramarine for a warm-or-cool-controllable black; deep violet for a cool black; deep red-brown for a warm one), highlighted not toward gray but toward the desaturated cool of its environment (blue-grays under sky), with its deepest accents only approaching true black. Every "white" surface is likewise a colored light: base around value 8–8.5, leaning warm (ivory) or cool (pale blue-gray) per the key, shadows that are *colored* mid-grays with clear temperature, and true white only at the topmost planes and spike. Painted this way, blacks and whites become some of the most colorful passages on a figure — which is exactly how they behave in life.

Part IV — Sculpting

Painters who sculpt — even at the level of gap-filling, re-posing, and small additions — control their compositions in a way painters who don't simply cannot. This Part covers the materials, the staged process that all epoxy work obeys, the specific craft of drapery and conversion, and the modern digital pipeline from sculpt file to cured resin print.

Chapter 10 — Materials and Tools

The putty shelf

No single putty does everything; the craft is matching material properties to the job. The properties that matter: working time, cured hardness, elasticity, sandability, ability to hold an edge, stickiness while wet, and how it responds to smoothing solvents.

Putty	Character	Best at	Watch for
Kneadatite "Green Stuff" (yellow + blue epoxy ribbon)	Elastic, slightly rubbery cure; very sticky wet; superb fine detail and crisp pull	Organic forms: cloth, straps, hair, flesh, fine detail	Nearly unsandable; elastic memory rounds carved edges; cut the ribbon's contact strip away (pre-cured)

Putty	Character	Best at	Watch for
Milliput (Standard / Superfine White)	Stone-hard cure; sandable, carvable, drillable; smooths beautifully with water	Hard surfaces, armor, bases, gap filling, anything to be sanded	Brittle in thin sections; slumps when fresh; less crisp on fine organic detail
Green Stuff + Milliput blend	The workhorse compromise — firmer than GS, finer than Milliput, sandable, still detailed	General figure work; many sculptors' default	Mix ratio tunes behavior: more GS for fabric and flexibility (e.g. ~60/40), more Milliput for armor and edges (~40/60)
Magic Sculpt / Apoxie Sculpt	Long working time; hard, very sandable cure; clay-like feel	Larger volumes, bases, intermediate detail passes, terrain	Coarser detail limit than GS; softer fresh state needs staged support
"Brown Stuff" (Kneadatite brown/aluminum)	Stiffer than GS, holds hard edges, semi-sandable	Blades, hard-edged mechanical detail	Less forgiving to push around; shorter useful window
Polymer clays (Super Sculpey, Fimo, Beesputty-type)	Indefinite working time until baked/heat-set	Busts and larger scales, long anatomical sessions	Fragile at 32mm part sizes; baking step; poor over already-painted or glued assemblies
Solvent/dissolved putties (Mr. Dissolved Putty, liquid green stuff types)	Brushable filler that shrinks as solvent flashes	Pinholes, micro-seams, print-line filling	Shrinks and "ghosts" in anything beyond hairline use — never gaps over ~0.5mm; multiple thin passes only

Two-part epoxies share a universal behavior: mix ratio tunes the cure. With Green Stuff, a yellow-rich mix cures softer, stickier, and more flexible; blue-rich cures firmer and more brittle. Equal parts is the default; deviate deliberately. All epoxies pass through a workability arc — sticky and slumping when fresh, firm and carvable at the "cheese" stage an hour or two in, locked at full cure — and Chapter 11's staged process is built entirely around exploiting that arc.

Lubrication controls stickiness. Wet tools (plain water for Milliput and Apoxie; water with a trace of dish soap, or a microscopic film of petroleum jelly, for Green Stuff) glide instead of grabbing. Too much lubricant, though, prevents fresh putty from bonding to itself — wipe down before adding new material to a lubricated pass. Milliput accepts an extra gift: a damp brush, or careful smoothing with 70 percent isopropyl on the harder epoxies, polishes the fresh surface to a near-primed finish and eliminates most sanding.

Tools

The serious kit is small. Silicone-tipped shapers ("clay shapers" or "colour shapers") in sizes 0–2, one taper-point and one chisel, do most smoothing and blending — firm gray tips for epoxy, soft white for polymer clay. One or two steel dental tools or a fine needle in a pin vise handle incising, undercuts, and texture. A sharp blade trims at the cheese stage. Beyond these: a small steel ruler and calipers (symmetry is measured, not eyeballed), fine wire and brass rod for armatures and pinning, superglue and accelerator, and texture-making oddments — a stiff brush for rough cloth, foil for stone, the putty's own fingerprint problem solved with a final water-glide pass. Expensive

tool sets add convenience, not capability.

Chapter 11 — Armature, Anatomy, and the Staged Process

The armature

Everything organic begins with wire. For 32–54mm figure work, two strands of 0.6–1.0mm soft wire twisted together make limbs and spine — the twist gives putty a mechanical grip a smooth wire never will — with the proportions laid out *against a gauge*, not by eye. Draw or print a proportion chart at working scale: the realistic adult is about 7.5 heads tall; heroic miniature proportion runs 6 to 7 heads with enlarged hands, feet, and skull so the figure reads at distance. Mark head-heights on the wire before bending. Set the line of action (Chapter 3) into the armature *now* — the gesture you fail to build in wire will not appear later — and check it in silhouette from the primary view before any putty.

Bulk follows. Wrapping the armature's mass zones in compressed aluminum foil, or laying a rough first pass of cheap hard putty (Milliput, Apoxie), saves the good putty and gives later layers a rigid foundation. Putty sculpts properly only over firm support; soft-over-soft is the universal beginner failure, every tool stroke transmitting through the fresh layer and wrecking the cured-looking surface beneath.

The staged process

All epoxy sculpting is the same loop: **add a little, shape it, let it set, repeat**. The discipline has three rules.

First, **work in anatomical order**: gesture, then masses, then planes, then surface. Get the big forms — ribcage block, pelvis block, the cylinders of the limbs — correct and *cured* before any muscle definition; get the major planes of the face placed before any eyelid. Detail added to a wrong mass is detail you will cut off.

Second, **respect the cure between layers**. The cheese stage is for carving, slicing parting lines, and pressing adjacent forms against; full cure is for building upon. Fresh putty against fresh putty smears both.

Third, **build slightly fat, refine by carving where the material allows**. Sandable putties (Milliput, Apoxie, blends) reward an additive-then-subtractive rhythm — overbuild a plane, cure, carve and sand it true — which is far easier than placing a perfect surface wet. Pure Green Stuff inverts this: it must be placed nearly final, in thin precise additions, because it will not carve cleanly. Choose the material for the workflow you want.

Anatomy without a medical degree

A figure sculptor needs landmark anatomy, not myology. The skeleton's fixed points — skull, clavicles, the angle of the ribcage, the iliac crests of the pelvis, elbows, knees, ankle bones — are the latitude/longitude of the figure; everything soft hangs between them. Learn the three masses (head, ribcage, pelvis) and the fact that *gesture is the relationship between them*: their tilts and rotations against each other are the pose. Hands and faces, the two zones viewers scrutinize, deserve dedicated study; everything else can be competently generalized. And steal constantly from reference — your own hand under the desk lamp, mirror selfies in the pose, the great figurative sculptors — because the memory of anatomy is always blander than anatomy.

Chapter 12 — Drapery, Detail, and Conversion Work

The logic of folds

Cloth is not random; it is physics, and it falls into a small vocabulary of fold families that recur everywhere. **Pipe folds** — parallel cylinders — drop from a single suspension point: a cloak from its clasp, a skirt from a belt. **Zigzag folds** appear where a pipe fold changes direction sharply, cascading triangles down the inside of a bent arm's sleeve. **Spiral folds** wrap compressed tubes of cloth around cylinders — sleeves and trouser legs — stacking toward joints. **Half-lock folds** are the sharp pocket where a tube of cloth bends past its slack, at knees and elbows. **Diaper folds** swag between *two* suspension points, the U-shapes of a cape pinned at both shoulders. **Drop/crumple folds** are what cloth does when fully slack, pooling at a hem on the ground. **Inert folds** lie flat where cloth presses against a form, telling the viewer where the body is underneath.

To sculpt drapery, identify the suspension points and tension lines first — where is the cloth pinned, pulled, compressed? — then lay in the few *major* folds those forces dictate, largest first, in firm cured-stage putty. Resist the universal temptation to add many small folds: real cloth at miniature scale reads through three to seven decisive folds per garment, exaggerated in depth (undercuts must be deeper than scale-true or paint and viewing distance erase them), with small secondary wrinkles only where compression genuinely concentrates. Fold *weight* characterizes the fabric: deep, few, slow curves for heavy wool; sharp, shallow, many for silk and linen; almost none for leather, which creases rather than folds.

Sculpt drapery for the painter you will be. Crisp fold ridges and clean valley floors take highlights and shadow glazes almost automatically; mushy, ambiguous folds force the painter to invent structure the sculpt should have provided. And where you plan freehand, leave smooth, gently curved cloth — freehand needs a canvas, not a battlefield.

Conversions, gaps, and seams

Most sculpting hours in this hobby are spent improving existing figures, and the craft splits into three operations.

Re-posing. Cut at the joints — neck, shoulder, elbow, wrist, waist, hip, knee — never mid-limb, because joints are where putty repair is anatomically plausible. Make the cut with a fine razor saw, adjust the angle, pin the joint (a brass rod in drilled sockets; friction-fit dry, glue only when the pose is confirmed from all angles), then rebuild the joint anatomy over the pin. A few degrees at neck, waist, and one wrist transforms a stock figure's gesture; full re-posing is the same operation with more nerve.

Gap filling. The standard for display work is invisibility under primer. Fill proud, cure, then carve and sand flush; or for hairline gaps, run a bead of blended putty along the seam and pull it flush with a damp silicone shaper in one pass. Match the filler to the surroundings — sandable putty on armor and smooth surfaces, Green Stuff where the fill must carry sculpted texture continuing across the joint (re-cutting cloth folds or fur across a filled seam is what makes a conversion vanish). Solvent putties are for pinholes only; in any real gap they shrink back and *ghost* — the seam reappearing through paint days later, the most demoralizing failure in finishing.

Seam and mold-line removal is sculpting's humblest discipline and the one judges check first. Scrape with a blade held perpendicular, sand progressively (400 then 800 then 1000 grit on visible surfaces), and *prime early as a diagnostic* — a coat of gray or black primer is the only honest reporter of surface quality, revealing every scratch, ghost, and missed line while repair is still

cheap. Competition pieces are primed, inspected under raking light, repaired, and re-primed as many times as it takes.

Chapter 13 — Digital Sculpting and Resin Printing

Sculpting in software

Digital sculpting (ZBrush, Blender's sculpt mode, and their peers) changes the economics of the craft, not its principles: gesture, masses, planes, then detail, exactly as in Chapter 11, with the additions of unlimited undo, perfect symmetry on demand — and the obligation to *break* that symmetry deliberately before finishing, because mirror-perfect figures read as dead. The two scale disciplines that matter: work with the final print size in mind from the start, exaggerating detail depth just as a traditional sculptor would (relief shallower than roughly 0.2–0.3mm at 32mm scale will vanish under primer); and design for the printer — minimum wall thicknesses around 1mm self-supporting (thinner is possible but fragile in brittle resins), no unsupported needle-spikes, parts keyed with sockets and pins where multi-part assembly serves painting access.

Printing: the variables that decide everything

A resin (MSLA) printer cures photopolymer layer by layer against a screen, and print quality reduces to a short list of controllable variables.

Exposure calibration is the foundation. Every resin–printer–temperature combination has a correct per-layer exposure window, and nothing else matters until it is found. Print a calibration model (the standard validation test pieces with their pillars, gaps, and text) and read it: fused gaps, bloated text, and lost negative detail mean over-exposure; soft corners, missing thin pillars, and layer adhesion failures mean under-exposure. Calibrate per resin, re-check when ambient temperature swings (cold resin needs more exposure; many failures blamed on settings are an unheated room in winter), and record everything.

Orientation and supports decide the surface. Orient the model 15–30 degrees off vertical so that no large flat face is parallel to the build plate (eliminating suction-induced layer lines and warping) and so that the most visible surfaces — face, chest, the primary view — face *away* from the supports, taking their tiny scars on the figure's back and underside. Support density and tip size are a negotiated trade: light tips (0.2–0.35mm) on detail surfaces leave near-invisible marks but fail under load; medium tips carry weight-bearing geometry, overhang leading edges, and large masses. Run the slicer's island detection religiously — every unsupported island is a guaranteed failure floating in the vat — and support every overhang shallower than about 45 degrees. When a print fails mid-body with clean supports below, the cause is almost always an undetected island, debris from a previous failure still in the vat (filter the resin after *every* failure), or a slipping exposure window.

Resin choice is a materials decision. High-detail "8K"-class standard resins capture astonishing surface fidelity and cure *brittle* — thin swords, spear hafts, and protruding fingers on figures printed in them snap under handling and during support removal. The standard remedies: blend in 20–40 percent of a tough/ABS-like resin to trade a little crispness for survivability, print fragile elements separately at heavier cross-section, or replace thin shafts with brass rod at assembly. For larger busts and display bases, hollow to 2–3mm walls with drain holes placed where they will be hidden — saves resin, reduces peel forces, prevents trapped-resin cracking.

Post-processing completes the cure. Wash in clean, high-concentration isopropyl (dirty wash fluid redeposits a tacky film that ruins primer adhesion), dry fully, remove supports — under

warm water if the resin allows, which softens tips and prevents divots — *then* UV post-cure in moderation. Under-cured parts stay tacky and leach; over-cured parts yellow and embrittle further; a few minutes per side in a cure station is the usual window, and small or thin parts need less than the brick-sized default suggests. Finish as you would any model: visible layer lines and support scars get filler primer or brushed solvent putty, sanding through the grits, and the same prime-inspect-repair loop as Chapter 12. And throughout, the safety rules are non-negotiable: liquid resin is a sensitizer — nitrile gloves always, ventilation always, no skin contact, nothing disposed of until UV-cured solid.

The payoff of owning this pipeline is compositional freedom: figures re-posed in software instead of at the joint with a saw, bases and plinth-toppers designed to the exact armature your composition needs, and the ability to print a piece at 110 percent when the competition category — or the face — would benefit from the room.

Part V — The Painted Surface

Everything to this point has been design. This Part is execution: what paint physically is, why it misbehaves, the complete catalogue of blending methods, and the placement systems — light, shadow, highlight, metal, glow — that turn a value plan into a finished surface. The governing idea throughout: paint is a predictable material. Every failure on the bench has a physical cause, and a painter who knows the causes stops having mysterious bad days.

Chapter 14 — Understanding Paint: Pigment, Binder, and Medium

What is actually in the pot

An acrylic paint is four things. **Pigment** — solid colored particles, ground fine — provides the color and the opacity. **Binder** — an acrylic polymer emulsion — is the glue: as water leaves, polymer particles fuse into a continuous film that locks pigment to the surface. **Vehicle** — water, mostly — makes the whole thing liquid. **Additives** — flow agents, matting powders (which is most of what makes a matte paint matte), preservatives — tune behavior.

This anatomy explains the single most consequential fact in miniature painting: **thinning with water dilutes the binder along with everything else.** Below a critical binder concentration, the dried film cannot fuse properly; the pigment sits on the surface under-glued. The symptoms are the familiar plagues — chalky finish, dusty texture, color that rubs away under a finger or lifts under the next layer. Roughly speaking, most hobby acrylics tolerate dilution to somewhere around one part paint to two parts water before the film weakens; beyond that, the missing binder must be replaced. Heavily matte, high-pigment ranges hit the chalk threshold sooner; more heavily bound, satin-finish ranges tolerate more water. Learn each range's limit by testing, and stop blaming your brush hand for what is a chemistry problem.

The medium shelf

Three additives, each doing one job, cover nearly everything:

Acrylic medium (matte or glaze medium) is binder without pigment. It thins paint's *opacity and viscosity while maintaining film strength*, which makes it the correct diluent for anything past moderate thinning — and the entire basis of glazing, where ratios run to one part paint in five or ten parts liquid. A working glaze mix is typically paint plus medium plus a little water; the medium carries the binder load, the water tunes the flow.

Flow improver is a surfactant: it breaks water's surface tension so thin paint sheets out and releases from the brush instead of beading. It is used in *drops*, not splashes — a trace in your palette water transforms behavior; an excess makes paint creep uncontrollably and slows drying. It adds no binder; it is not a thinner substitute.

Drying retarder slows the water's escape, extending open time for wet-blending. Two to five percent of the mix is the working range; beyond roughly ten percent, paint enters a tacky purgatory that can last hours and wrecks layering. Add it only when a technique demands open time, never as a default.

A fourth category — **inks and high-pigment liquid acrylics** — behaves differently from paint: intensely chromatic, transparent, often glossier-bodied, and *staining* (they bite into matte surfaces and resist lifting). They are superb for re-saturation glazes, candy effects over metallics, and deep shadow tints, and dangerous as basecoats, where their gloss and stain make corrections hard.

Knowing your ranges

Paint ranges are not interchangeable, and the differences are formulation, not quality. Dead-matte, very high-pigment lines (the Scale75 Artist/Scalecolor school) deliver superb coverage and a velvet finish but sit closest to the chalk threshold — they want medium in the thinning mix and reward it with the smoothest films in the hobby. Single-pigment artist-philosophy ranges (Kimera and artist tube acrylics) exist for *mixing*: every color shifts predictably because nothing in the pot is already a compromise. General-purpose hobby lines (Vallejo Model Color and peers) balance opacity, finish, and tolerance and remain the sensible spine of a collection. Self-leveling, thinner-bodied modern lines (AK's third generation and similar) flow out smoothly with less fuss and suit painters who layer fast. Some ranges ship with flow improver already in the bottle (Reaper's line famously) and need less added at the palette. None of this is loyalty material — strong painters run mixed shelves — but each pot's *behavior profile* (opacity, finish, chalk threshold, undertone) should be known before it appears on a competition piece.

A separate note on **lacquer-system products** — the Mr. Surfacer/Mr. Color family of primers and their leveling thinners, beloved for their self-smoothing, ultra-thin priming films. They are a different chemistry: thin them with their own leveling thinner (commonly in the neighborhood of 1:1.5 paint to thinner for airbrushing), clean with dedicated lacquer cleaner *immediately* (never leave lacquer to set in a nozzle), use synthetic brushes only (the solvents destroy natural sable), and respect the ventilation they demand. The reward is the best priming surface available; the price is solvent discipline.

The wet palette

The wet palette — a sealed tray, a water-saturated sponge or paper bed, a semi-permeable parchment sheet on top — is not a convenience but a *consistency stabilizer*. Paint on its surface receives moisture from below at roughly the rate it loses moisture above, so a mix made at the start of a session is still that mix two hours later, and the eternal enemy of smooth work — paint drifting thicker stroke by stroke — is simply removed. It also keeps mixed colors and gamut corner-mixes (Chapter 8) alive across days.

Its one vice is the reverse drift: left overnight, paint absorbs water from below and arrives the next morning thinner than you left it, sometimes separated. Re-mix and re-test consistency at the start of every session rather than trusting yesterday's puddle. And know when to leave it in the drawer:

drybrushing wants paint *drier* than a wet palette will ever allow, and metallics can separate on long wet-palette holds as flakes settle.

Chapter 15 — Smooth Application: The Physics of a Clean Coat

Smoothness is not a talent. It is the product of five controllable variables — consistency, load, stroke, timing, and surface — and every rough coat is a diagnosis waiting to be read.

Consistency: the ladder and how to test it

Descriptions like "milk" and "cream" gesture at the truth; behavioral tests on the palette are better, because ranges and humidity vary. The working ladder:

Basecoat consistency — paint thinned just enough to flow level: drag a brush track through the puddle and the track's edges soften but the track remains. Covers in two to three coats. (Many modern ranges are here straight from the pot or with a touch of water.)

Layering consistency — visibly fluid: the brush track closes slowly, over a second or two. A single stroke on the model deposits semi-opaque color that levels flat. This is the workhorse dilution, in the neighborhood of one-to-one with water (plus a drop of medium for chalk-prone ranges).

Glaze consistency — tinted liquid: the track closes instantly; a stroke on a white tile deposits a transparent wash of color with no body. One part paint to four-through-ten parts liquid, *medium-carried* as Chapter 14 prescribes. The test that matters: a glaze should be buildable — three passes producing a clearly deeper tint with zero surface texture.

Wash/juice consistency — thinner still, designed to flow into recesses and pool by gravity rather than sit where placed.

Whatever the target, mix it *on the palette and test it on the palette* — never adjust consistency on the model, and never paint with the first untested brushload.

Load: the brush is a reservoir, not a stamp

A round sable holds paint in its belly and delivers it through the tip by capillary action; the painter's job is regulating the flow. Full saturation floods; a too-dry brush drags and stutters. The standing procedure: load fully, then **wick the brush against the palette or a paper towel until roughly two-thirds of the charge remains** — enough that the tip feeds continuously for a full stroke, not so much that a bead chases the tip. Hold the brush with the **tip angled downward** relative to the handle so gravity keeps the belly's reserve from running forward and flooding the tip; this single grip habit prevents a remarkable fraction of blob accidents. Re-load (and re-wick) often — every two or three strokes for fine work — because consistency at the tip drifts dry continuously.

Stroke: pull, commit, and never re-enter

Paint is *pulled*, never pushed: the brush moves handle-first, bristles trailing, in strokes as long as the passage allows — long strokes self-level; short dabs leave a record of every landing. Each stroke gets committed once. The cardinal rule of acrylic application, worth printing above the bench: **never re-wet or re-work a stroke that has begun to dry.** Acrylic passes through a tacky half-dry stage during which any touch — a second stroke, a "fix," a smoothing pass — lifts the forming film and smears it into streaks and crumbs. The window is short (seconds to a minute, depending on dilution and humidity). Work is therefore rhythmic: stroke, move to a different area, return only when the first is *fully* dry. If a stroke lands wrong, the cheap fix is now — wipe

it wet, or let it dry completely and overpaint — because a flawed passage corrected immediately costs one unit of work and the same passage corrected after three more layers costs three.

Timing and the thin-coat doctrine

Opacity is built across coats, not within one. The target is roughly **seventy percent coverage per pass**: a coat thin enough that the layer below ghosts through, dried fully, then repeated two or three times. The result is a film that is *thinner in total* than one opaque coat, with no brush texture, no filled detail, and color of remarkable depth (the slight translucency of stacked thin coats is half of what makes hand-painted surfaces glow). Patience here is not a virtue but a material requirement; the alternative — one heavy coat — buys instant coverage at the price of ridges, soft detail, and a week of regret.

Surface: tide marks, beading, and the coffee-ring effect

Thin paint dries from its edges inward, and as it does, evaporation at the bead's rim pulls liquid — and suspended pigment — outward. The pigment strands at the perimeter as a dark ring: the **coffee-ring effect**, source of every tide mark and glaze halo. The countermeasures all reduce the bead or break the mechanism: carry less liquid (wick harder); after placing a glaze, *pull its edge* — chase the bead's perimeter outward with the brush until it feathers to nothing instead of standing as a wall; tilt the model so gravity drains the bead toward where you want density (into a shadow, along a fold valley); add medium, which slows the differential evaporation; and work in small sections so no bead is ever left to dry unsupervised. A drying glaze that starts to ring can sometimes be saved by immediately softening the rim with a clean, *barely* damp brush — but only within the wet window; once tacky, leave it and overpaint later.

Beading — paint contracting into droplets and refusing to wet the surface — is a surface-energy problem: gloss varnish, mold-release residue on resin, skin oils from handling, or simply hyper-smooth primer. The fixes: wash parts before priming, handle by the base, add a drop of flow improver, or lay a near-invisible coat of matte medium to give the next layer tooth. The opposite surface fault — primer applied dry and dusty, which drinks every glaze and blotches — is cured only by a smooth re-prime; no amount of technique paints well over bad primer, which is why Chapter 12's prime-inspect-repair loop is a painting instruction as much as a sculpting one.

Reading a failed coat

The diagnostic table in Appendix B expands this, but the core reads: **chalky and dusty** means under-bound — too much water, not enough medium, or a chalk-prone range pushed past its threshold; seal and re-saturate with a satin or glaze-medium pass, then continue with corrected mix. **Streaky** means too thick, too dry a brush, or — most often — a re-entered stroke; let it dry hard and unify with one correct layering pass. **Ringed and haloed** is coffee-ring; pull edges and reduce loads. **Grainy speckle** is dried paint redeposited — skin forming on a palette puddle or in a pot, broken up and carried to the model; re-mix fresh and strain the habit of painting from a drying puddle. None of these are mysteries, and none of them are your hands.

Chapter 16 — The Blending Catalogue

A blend is a controlled transition between two values or colors, and there are perhaps nine fundamentally distinct ways to make one. Strong painters use most of them — chosen per passage by

the size of the area, the texture of the sculpt, the finish required, and the time available — and routinely stack several on one surface. For each method below: the principle, the setup, and the way it fails.

Layering (feathered layering)

The foundation method. Mix a short ladder of steps between your shadow and light mixes — three to five intermediates is typical — and apply each at layering consistency in progressively smaller zones: shadow mix over the whole form, first step over all but the deepest zone, and so on up to the smallest patch of light. Each layer's semi-opacity softens the step beneath it; each boundary is placed with the stroke pulled *along* the transition's contour, edges feathered by letting the brush run dry at the boundary rather than stopping hard.

Layering's virtues are control and predictability — every value is decided on the palette, nothing depends on drying-time luck — which is why it remains the spine of display painting. Its failure mode is **banding**: visible stripes where steps were too far apart, too opaque, or hard-edged. The cures, in order: more intermediate steps; thinner paint per step; and the universal solvent of the next entry — a unifying glaze pulled across the finished gradient, which melts surviving bands invisibly. Layering plus corrective glazing will produce a competition-smooth transition on any surface, with no time pressure, every single time. It is the method to master first and trust forever.

Glazing

A glaze is transparent color — one part paint in four to ten parts medium-and-water — applied as a tint over dry work. It is less a blending technique than a *universal adjustment layer*, with four distinct jobs. **Smoothing:** a glaze of the midtone pulled across a banded transition optically merges the steps. **Shifting:** temperature and hue corrections — warming a highlight zone with yellow, cooling a shadow with blue-violet — without repainting anything. **Re-saturating:** the CMY revival passes of Chapter 9 that rescue gray shadows and chalky lights. **Unifying:** broad, very thin "filter" passes (sometimes called juice at higher dilutions) that pull a whole region toward one temperature, and the near-pure-water atmospheric tints that marry figure to base at the end.

Technique: wick the loaded brush until it is damp rather than wet, apply *directionally* — always stroking toward where you want the pigment to settle, shadow glazes pulled into the shadow core, never scrubbed back and forth — and build depth across multiple dried passes rather than one strong one. A glaze should be so weak that the first pass barely registers; its power is cumulative. Failure modes are the coffee-ring halo (Chapter 15 — pull the edges, load less) and the *patchy* glaze on a surface too matte or too glossy; a velvet eggshell surface takes glazes best, which is one more argument for healthy binder in every preceding layer.

Feathering and two-brush blending

Feathering softens an edge *while it is still wet*: lay a stroke of the new value at the transition, immediately rinse-and-wick the brush to clean-damp, and run it along the stroke's edge, dragging a whisper of paint outward into nothing. Two-brush blending is the same act with the logistics solved — one brush carries paint, a second clean damp brush waits in the off hand, and the soften happens within a second of the lay-in, no rinsing delay. Both demand the wet window and so suit small zones: a face's cheek turn, the last transition on an NMM plane, melting one deliberate edge without touching its neighbors.

The failure mode is the second brush being too wet (it floods and lifts, leaving a pale ghost) or too late (it drags tack into crumbs). The damp brush should feel barely moist against the wrist — and the moment a pass starts lifting paint instead of softening it, stop, dry, and finish the job with a glaze instead.

Wet blending

True wet blending mixes the colors *on the model*: lay shadow mix and light mix adjacent while both are wet, then work the boundary with a clean brush or the dirty tip until the gradient forms in place. It is the fastest route to large soft transitions and the closest acrylics come to oil-painting freedom — and it is a race against drying. The standing aids: a few percent of retarder in both mixes, slightly heavier consistency than layering (very thin paint dries before the second color lands), generous loads, and *sectioning* — wet blending one cloak panel at a time to fully dry edges, never the whole garment at once.

Two physics notes. Acrylics **dry darker and slightly duller** than they sit wet, so a wet-blended gradient that looks perfect while working will dry a half-step lower in value; anticipate it, and plan a glaze-and-highlight refinement pass on top — almost all professional wet blending is a *block-in* later sharpened by layering and glazes, not a finished surface in one act. And blending continues only while both paints are genuinely wet; the instant either turns tacky, the No Re-Entry rule of Chapter 15 applies absolutely.

The loaded brush

Charge a brush so that it carries a gradient internally — belly loaded with the base color, tip dipped in the highlight, one blending press on the palette — and a single stroke deposits a transition. This side-loading is a borrowing from decorative and folk painting that scales beautifully to banners, large cloak panels, feathers, and 54mm-and-up surfaces, where it lays a fold's entire light-to-shadow turn in one committed pull. It rewards a larger brush than instinct suggests (the belly is the machine) and deliberate, slow strokes. Its limit is repeatability — every stroke's gradient differs slightly — which makes it a block-in and texture method rather than a precision tool.

Stippling and speckling

Optical blending: transitions built from dots. Stippling taps a fairly dry brush tip to lay fields of fine points — denser and lighter-valued toward the light, sparser toward shadow — that the eye fuses into a gradient at viewing distance. It is the rescue technique without equal (any failed transition can be stippled back to coherence), the *correct* technique for inherently mottled materials — weathered leather, rough cast metal, stone, aged cloth — and a deliberate style in itself at high contrast, where visible directional speckle reads as painterly energy. Speckling with a flicked stiff brush adds randomized spatter for weathering. The failure mode is uniformity: dots of one size at one spacing read as machine texture. Vary the dot size with pressure, cluster irregularly, and stipple *with the form*, following the same zenithal logic as every other technique.

Drybrushing, rehabilitated

Classic drybrushing — scrub a nearly empty flat brush across raised texture — earned its rough reputation honestly: done crudely it chalks, frosts edges, and obliterates subtlety. The modern method is a different instrument. Use a soft, dense, dome-shaped brush (makeup-style); work

the paint into the dome and offload on a towel or dry palette until almost nothing transfers; then *stroke directionally with the light* — every pass pulled from the zenith downward, never scrubbed in circles — building luminous, perfectly form-following gradients in dozens of whisper passes. On heavily textured surfaces (chainmail, fur, rough stone, bark) it is simply the optimal tool, and on smoother forms a careful dome-brush pass lays a zenithal value sketch faster than an airbrush with none of the cleanup. Its boundary: it desaturates and cools as it lightens (dry pigment scatter always does), so it ends, like wet blending, under re-saturation glazes; and it remains the wrong tool for glass-smooth final finishes on focal surfaces.

The airbrush

An airbrush is a precision gradient machine, and on miniatures it does four jobs: priming and zenithal sketching; large soft gradients (cloaks, bases, sky-earth NMM foundations); underglow and atmosphere for OSL; and ultra-fine glazing — filters, atmospheric tints, re-saturation passes — that brushes cannot lay as evenly. A sensible two-tool stable splits the work: a robust general-purpose brush for priming, basecoats, and varnish, and a fine-nozzle instrument (0.15–0.2mm class) reserved for finishing glazes and volumetric blending, where its narrow pattern earns its temperament.

The variables, in the order to check them: **dilution** (airbrush paint runs thinner than brush layering — skim milk toward ink, with airbrush medium or the range's own thinner, never raw water alone for fine work), **pressure** (roughly 12–18 PSI for fine work, low enough for control, high enough to atomize the chosen dilution), **distance** (close for tight lines, backed off for soft fields), and **trigger discipline** — air on before paint, air off after paint, always, and paint volume feathered with the trigger's rearward travel. The fine-line stroke is the *dagger*: moving before paint starts, tapering by easing the trigger while pulling away. Tip dry — paint crusting on the needle, degrading the pattern — is managed by rhythm: a wipe or a clean-water blast every minute or two, accepted as part of the instrument.

Failure modes read like a checklist. **Spidering** (paint legs crawling outward) is too much paint for the distance — too close, too wet, or too much trigger. **Spatter** is dilution or pressure mismatch, or tip dry breaking the cone. **Pulsing** is moisture in the line (fit a trap) or pressure starvation. And the non-negotiables: strain or back-flush paint before fine sessions, never leave paint to set in the body — and never leave *lacquer* anywhere in the instrument at all (Chapter 14's solvent discipline applies doubly here, down to details like extracting a fine needle forward through the nozzle rather than dragging it backward through the seals, per the manufacturer's design).

Masking extends the airbrush from gradients to shapes: poster-tack worms and liquid frisket for organic boundaries, low-tack tape and paper shields for hard lines and protecting finished zones, and simple hand-held card shields — moved during the pass — for soft-edged cast shadows. Every mask gets sealed with light pressure passes first, heavy passes after, and removed while paint is fresh enough not to bridge and tear.

Oils over acrylic

A small chapter of its own in many display painters' practice: oil paints, applied thin over a *sealed* acrylic base (a satin or gloss varnish barrier), stay open for hours and blend with a dry soft brush into transitions acrylics cannot match for ease — faces, large smooth gradients, subtle filters and weathering pulled off again with a thinner-damp brush until exactly right. The costs are time (touch-dry in a day, fully cured in days more), solvent hygiene (odorless mineral spirits, ventilation,

no sable abuse), and the requirement that subsequent acrylic layers get a fresh barrier coat to grip. As a finishing instrument over an acrylic value structure — particularly for skin and for shading metallics (Chapter 19) — it is worth every painter's experiment.

Choosing and combining

The catalogue collapses into a decision habit: **size and texture pick the tool.** Large smooth surface — airbrush or wet-blend block-in, refined by layering. Mid-size form — layering, melted by glazes. Small focal transition — two-brush or feathered layering under final glazes. Textured surface — dome drybrush or stipple, deepened by directional glazes. Everything everywhere — corrective and re-saturating glazes, last. The masters' surfaces that look like one impossible technique are almost always four ordinary ones in the right order.

Chapter 17 — Placing Light and Shadow

Chapter 2 established the grammar — key light, the six elements of form, occlusion, edges. This chapter is the workflow: the sequence by which a chosen light becomes a painted value structure, and the systems painters use to keep a forty-hour project obedient to a decision made in hour one.

The sequence

First, choose the key completely. Direction, elevation, temperature, hardness, and how many sources (one, or one plus a defined secondary — never an undecided crowd). Write it down; sketch an arrow on a photo of the assembled figure. Every dispute the piece raises for the next month is settled by consulting this decision, not by re-litigating it per surface.

Second, build the value map. Photograph the primed figure from the primary view and produce a three-value plan — dark, mid, light — either digitally painted over the photo, or as a two-minute pencil thumbnail. Assign every major surface to a zone, place the occlusion darks, mark the specular points, and check the plan against Part II: does the lightest-light/darkest-dark adjacency sit at the focal point? Do the value masses group at thumbnail size? Ten minutes here saves the repaint that otherwise happens in week three.

Third, establish the map physically — the zenithal sketch. Prime dark, then mist a mid value from above-front at the key's angle, then a light value from steeper above, by airbrush for control, rattlecan for speed, or the dome-drybrush method of Chapter 16 for textured sculpts. The figure now wears its lighting as a monochrome fact. Immediately deepen the **occlusion shadows** — pits, undercuts, contact points — with thinned dark washes or careful brushwork; anchoring the absolute darks before any color is the single highest-leverage habit in this chapter, because everything painted afterward is automatically *grounded* against them.

Fourth, color over the map without destroying it. Two roads diverge here. The **glazing road** (sketch style proper) keeps the monochrome values visible through transparent color — fast, value-faithful, and chronically prone to the desaturated, slightly chalky finish that mandatory CMY re-saturation passes (Chapter 9) exist to fix; glazes also *darken* the sketch cumulatively, so sketch a step lighter than the target. The **repainting road** treats the zenithal as a reference layer and rebuilds each surface opaquely at layering consistency, matching the sketch's values by eye — slower, fully saturated, and the usual choice for focal surfaces. Most finished competition figures are both: glazed where the sketch was already right, repainted where chroma or precision demanded it.

Fifth, audit continuously. The grayscale photograph returns at every stage as the lie detector. Mid-project drift — highlights creeping around to the shadow side, a new element painted to

its own private key — is normal and detectable only by stepping back through the camera. The standing checks: one key, everywhere; reflected lights all darker than lit-side halftones; occlusion darks still the darkest darks (glazing tends to wash them out — re-cut them near the end); and the focal adjacency still winning the value war.

Texture lives in the midtones

A placement principle that organizes everything: **shadows go dark and smooth; highlights go light and simplified; texture and color information concentrate in the halftone band.** Optically this is just how vision works — detail drowns in darkness and bleaches in glare — but as a painting instruction it is liberating. Stop rendering chainmail links in the deep shadow under the arm; flood the zone dark and quiet. Stop preserving weave texture inside the brightest highlight; let it wash out. Spend the texture effort where the eye can read it, in the middle values, and both the realism and the focal control improve while the labor drops.

The dark foundation

Light reads as light only against dark. Practically: before placing any bright element — a highlight chain on a fold, an NMM spike, a glowing rune — make certain the values *around* it are deep enough to buy the contrast, and where a light element crosses a busy background (a pale plume against pale stonework), darken a soft halo of the background behind it. Painters reach instinctively for brighter highlights when a passage looks flat; the correct move, four times out of five, is deeper neighboring shadow. You cannot highlight your way out of a shallow value structure.

How far to push

The same value plan can be rendered at radically different contrast levels, and the choice is a genuine style decision the field does not agree on. The ultra-smooth classical finish — long gentle gradients, the full ladder of intermediates, contrast built more by composition than by local violence — reads as refinement and rewards the in-hand inspection. The high-contrast school associated with Spanish competition painting compresses transitions, slams chroma into the halftones, and accepts visible brushwork in exchange for three-meter impact that flatter styles cannot match. Judges differ; events differ; both traditions hold trophies. What is *not* negotiable is internal consistency — one piece, one contrast philosophy — and the floor set by Chapter 1: whatever the style, the values must survive the grayscale thumbnail. Crushed-mid contrast that deletes the texture band reads worse than moderate contrast with the midtones intact, in every school.

Chapter 18 — Highlight Placement and Material Logic

A highlight is information about two things at once: the *form* (where the surface turns toward the light) and the *material* (how that surface scatters or mirrors what hits it). Placement errors are usually form errors; character errors — a highlight that is too sharp, too white, too broad for the material wearing it — are material errors. This chapter is the system for both.

Form highlights: placed by the primitives

The volumetric highlight — the broad light zone of Chapter 2's six elements — is placed by reading each surface as its primitive. A **cylinder** (limb, spear haft, tree trunk) takes a stripe of light running parallel to its axis, positioned where the surface most directly faces the key — not along

the silhouette edge, a beginner default that flattens every cylinder it touches. A **sphere** (head, pauldron, pommel) takes an oval light zone offset toward the key, never centered. A **box** (armor plates, masonry, books) takes no gradient at all within a plane: each face receives one value by its angle to the light, and the modeling happens at the edges between faces. **Folded cloth** is read as half-cylinders and valleys: light stripes along each fold's crest where it faces the key, halftone down the flanks, occlusion in the valley floors — which is why crisply sculpted folds (Chapter 12) half-paint themselves.

Above the volumetric light sits the **specular** — the small, bright reflection of the light source itself, placed at the angle of incidence (where a mirror on that surface would show you the lamp), colored as the light's color and tipped with pure white only at the very point. One surface, one specular, at most; and per the contrast budget, pure-white-tipped speculars belong only on the focal materials. Counting the true whites on a finished figure should be possible on one hand.

Edge highlights: a real event, rationed

The edge highlight — a fine bright line along a form's corner — depicts something optically real: a hard edge presents a curved micro-surface that catches light from many angles and so reads bright from almost everywhere. On bevels, blade edges, armor rims, and box corners it is correct and crisp. The corruption is the default outline: every raised line on the figure traced in light regardless of its angle to the key, producing the wireframe glow that announces tabletop habits in a display cabinet. The discipline: edge-highlight only **hard** edges (soft form turns get gradients, not lines), weight the line by the edge's angle to the key — brilliant and unbroken on edges facing the light, thin and interrupted on side-facing edges, *absent* on edges in shadow save perhaps a whisper of reflected-light color — and break long lines into segments with tiny gaps, which reads as glinting reality where a continuous line reads as drawing.

Material logic: the finish ladder

Every material sits somewhere on a ladder from matte to mirror, and its position dictates its highlight character — and, just as importantly, its shadow character:

Matte (wool, rough linen, dust, chalk, unfinished wood): light scatters fully. Broad, soft, gradual highlights; *no specular at all*; the value range is modest and the transitions are the longest on the figure. Painting a matte material with a sharp bright spike is the most common material error in the hobby — it instantly reads as plastic.

Satin (skin, worn leather, horn, aged bronze, silk in its quieter moments): partial scatter. Defined but soft-edged highlights, a modest specular with no pure white, mid-length transitions. Skin lives here — Chapter 9's warm-cool-warm machinery plays out in satin, with the brow, nose bridge, cheekbones, and lower lip carrying gentle speculars.

Gloss (polished metal, gems, lacquer, wet anything, eyes): mirror behavior begins. Highlights become small, hard-edged, and intense; the value range explodes — true gloss pairs near-white speculars with deep dark reflections inches apart; transitions compress toward bands; and the surface starts reflecting *content* (sky above, ground below), which is the entire subject of Chapter 19.

The ladder converts directly into contrast and edge decisions: as a material climbs from matte toward gloss, its highlights get **smaller, brighter, and harder-edged**, its overall value range widens, and its transitions shorten. A figure painted with this ladder applied — long soft gradients on the

cloak, satin restraint on the face, violent compressed contrast on the sword — reads as an assembly of *materials*; a figure painted with one uniform highlight style reads as an assembly of paint.

Sheen can also be physically real rather than painted: the finishing varnish map (Chapter 21) assigns actual matte, satin, and gloss finishes by material, and the painted ladder plus the varnished ladder, agreeing with each other, is the full effect.

The texture-frequency rule

Sculpted texture and painted value detail are the same currency, and spending both in one place bankrupts the read. A surface dense with sculpted information — chainmail, fur, filigree, heavy weave — wants its *painting simplified*: zenithal-respecting drybrush or stipple, broad glazed shadow zones, highlights placed on the texture's masses rather than its every element. A smooth sculpted surface — a flat cloak panel, a polished cuirass — is where painted detail (freehand, NMM reflections, long virtuoso gradients) earns its keep. When both compete, the eye reads noise. Decide, per surface, whether the sculpt or the brush is carrying the information, and make the other one serve quietly.

Chapter 19 — Special Light Systems: NMM, TMM, and OSL

Three effects sit at the summit of the craft because each one *overrides* the default rendering rules: metal does not obey the six-elements model that governs diffuse surfaces, and a glowing object does not obey the single-key discipline. Painting them well means knowing exactly which rules they break and which they keep.

Non-metallic metal (NMM)

The principle. Metal has almost no diffuse local color. What you see when you look at steel is not "gray surface plus lighting" — it is a distorted mirror of the environment: sky above, ground below, bright sources as hard speculars, nearby objects as colored smears. NMM is the act of *painting those reflections* in ordinary matte paint. Everything difficult about it follows from that definition: the values come from the environment rather than from a base-color-plus-highlights ladder, the transitions are governed by the metal's polish rather than the form's softness, and the whole illusion is viewpoint-dependent in a way no other surface is.

The sky-earth model. The reflected environment simplifies to two zones divided by a horizon. Surfaces (or portions of surfaces) angled to reflect *upward* show sky: light values, cool temperature. Surfaces angled to reflect *downward* show ground: dark values, warmer and dirtier. On a vertical blade this produces the signature NMM move — a horizon line crossing the blade, light-cool above, dark-warm below, placed where the geometry says the reflection flips, with the gradient running *counter* to naive lighting (often darker toward the top edge of the lower zone, lighter toward the bottom of the sky zone, meeting at a crisp boundary). On curved surfaces — pauldrons, helmets, blade fullers — the environment compresses and stretches: a sphere shows a small bright sky-cap, a wide dark earth band, and a sliver of horizon wrapping its equator. When an NMM passage confuses you, stop painting and ask the only question that matters: *what is this plane angled to reflect?*

Value structure. Polished metal owns the widest value range on the figure — call it 1 to 9.5 on the working scale — with the mids *compressed into narrow bands* rather than spread as long gradients. This compression is the difference between metal and cloth: a steel gradient sprints from dark to light across a few millimeters, holds a plateau, and sprints again. The two canonical failures

are both mid-tone failures. **Gray-cloth steel** — soft, even gradients hovering around values 4–6 — is what happens when metal is painted with cloth's transition logic; the cure is violence: push the darks to 1–2, the lights to 8–9, and shorten every transition. **Mustard-cloth gold** is the same disease in yellow: a figure's gold rendered as yellow base, yellow-brown shade, pale-yellow highlight, all within three value steps. Gold is not yellow cloth; it is a *hue ladder* spanning the full range.

The recipes. Steel builds on cool neutrals: a deep blue- or violet-leaning near-black in the earth zones and occlusion, climbing through cool blue-grays, into pale cold near-whites in the sky zones, with pure white reserved for the speculars at the angle of incidence. Its life comes from temperature play laid on afterward — thin turquoise or blue sheen glazes across the sky zones, a warm umber or rust filter breathing into the earth zones, perhaps a stolen smear of an adjacent garment's color as a contact reflection — and from simultaneous contrast doing free work (Chapter 8: neutral steel beside warm surroundings reads blue without a drop of blue). Gold is the ladder: deep red-brown and chocolate in the depths, rising through burnt and raw sienna, ochre, into saturated warm yellow — **chroma peaking in the upper-middle values, around 7, not at the top** — then desaturating fast through ivory to the white spike. Gold's shadows tolerate and reward surprising guests: maroon, violet, even deep green reflected accents that read as environment. Bronze, copper, and brass are the same ladder re-anchored (copper toward red-orange, bronze toward olive-brown), and *brushed* or worn metal of any hue replaces the plateau-and-sprint structure with fine directional streaking in the mids — drawn striations along the grain — under softer, broader speculars.

Process and the rotation audit. NMM rewards planning above improvisation: sketch the reflection map (even literally, in pencil on a photo) before paint; consider chrome and polished-spoon reference constantly; block the zones hard-edged first and soften only the transitions that polish says should soften (sharper transitions read as higher polish — softening everything reads as pewter). Then the audit no other surface demands: **paint from the primary view, rotate the figure ninety degrees, and re-plan; repeat for all four orientations.** Painted reflections are fictions told from one seat in the theater; the rotation pass is how you make the fiction hold up when a judge turns the piece in hand. Where two angles genuinely conflict, the primary view wins — but the losing angles must still be *plausible*, which usually means keeping the sky-earth logic intact even where the specific speculars are tuned for the front.

SE-NMM and the airbrush foundation. The sky-earth model airbrushes beautifully: gradient the whole metal region — cool light field from above, warm dark field from below, hard horizon masked or freehanded — then resolve planes, speculars, and contact reflections by brush. On large armor figures this hybrid saves tens of hours and yields a luminosity that is hard to match purely by brush. Gems, finally, are NMM's one-evening training ground: each stone a transparent sphere painted *inverted* — dark at the top where a diffuse sphere would be light, glowing bright at the lower window where light exits the stone — plus one white spike at the upper rim. Every principle in this section, in four square millimeters.

True metallic metal (TMM)

Metallic paints carry real reflective flakes, so the surface produces genuine speculars — which means TMM's craft is *controlling physics* rather than simulating it. The flakes lie flattest and mirror best over a smooth, dark, ideally glossy foundation: the classic stack is gloss-black or deep-brown underpainting, then thin, level coats of metallic (thick coats stand the flakes up and read as glitter; fine-flake ranges matter enormously at 32mm, where coarse flake is confetti). Shading must

preserve the sparkle: transparent media — inks, oil washes and filters, "candy" glazes of transparent color over the metal — darken and tint while light still reaches the flakes, where ordinary matte paint mixed in simply kills the metal. Highlights run up through brighter metallics (silver over steel, silver-tipped gold) and, at the very top, a hybrid move: tiny *painted* near-white speculars, NMM-style, on top of the metallic — because even real flakes max out below the brilliance a painted spike can claim.

That hybrid generalizes: many of the strongest metal finishes in modern competition are TMM bases carrying an NMM value structure — sky-earth zoning glazed over working metallic, painted horizon lines, painted contact reflections — taking real sparkle from the flakes and compositional control from the brush. The style question (pure NMM's total control and photograph-perfect consistency versus TMM's angle-shifting life) is a genuine fork with partisans and trophies on both sides; the only firm rule is coherence — one philosophy of metal per piece, or a deliberate, consistent hybrid — because a true-metal sword beside an NMM breastplate reads as two different figures sharing a base.

Object-source lighting (OSL)

OSL paints a light source *inside the scene* — a torch, a blade's glow, a spell, a lantern — and it is the effect with the highest failure rate in the hobby because painters render the glow and skip the lighting. The discipline, in five commitments:

The source is the brightest thing. Value 9–10 *at the emitter*, hottest and most desaturated at its core (a glowing core reads near-white, its color saturating just outside the core) — if anything else on the figure outshines the source, the effect is dead before it starts.

Falloff is steep and exaggerated. Real intensity falls with the square of distance; painted falloff should fall faster than feels generous. The lit zone is smaller than instinct wants. Within it, every surface is lit by position and angle: planes *facing* the source take its color and light strongly; planes angled away take less; surfaces behind blocking geometry take none, with hard shadow boundaries — self-shadowing is half of what sells the physics.

The rest of the model pays for the glow. This is the commitment that separates working OSL from colored haze: the ambient key is *suppressed* — global values dropped, saturation muted, contrast flattened — everywhere the source doesn't reach, so the glow owns the value structure. The standard temperature contract sharpens it further: a warm source against a cool, dim ambient scene (or the reverse), the complementary surround making the glow ring. An OSL figure is mostly a *dark* figure; painters unwilling to sacrifice the rest of the paintjob should not order the effect.

Lit color = local color × light color. A red cloak under green spell-light goes dark and gray-brown (red reflects little green); white and pale surfaces take the glow most strongly; the glow's own hue appears pure only on near-white surfaces. Glazing the source color over pre-lightened zones approximates the multiplication honestly — which is also the execution recipe: airbrush or drybrush a *value* underglow first (pale, near-white, correctly falling off), then candy-glaze the color over it, then rebuild the unaffected zones opaquely dark. Glow glazed directly over dark paint produces dull stains, never light.

Verify in grayscale. The final OSL exam is the same camera trick as everything else: desaturate the photo. A working OSL still reads — the source zone clearly lighter, falloff visible, the suppressed remainder clearly darker. If the grayscale shows a uniform figure with no lighting event, what you painted was tinted air, and the fix is value, not more color.

Chapter 20 — Textures and Freehand

Materials are recognized by three signatures working together: their position on the finish ladder (Chapter 18), their characteristic value pattern, and their micro-texture. This chapter is the bench reference for the common surfaces, followed by the craft of freehand — painting on the painting.

The material bench

Eyes. At 32mm an eye is three or four marks: a warm off-white sclera (never pure white — it is the fastest route to the thousand-yard doll stare), a large iris placed touching the upper lid (floating irises read as shock), a dark pupil or simply a dark iris mass, and a fine dark line re-cutting the upper lid to seat the eye in shadow. A single tiny catchlight, identical corner on both eyes, is optional at this scale and mandatory above it. Paint eyes early — before the surrounding skin's final layers — so corrections cost nothing.

Hair. Hair is painted as *ribbons, not strands*: read the sculpt as a dozen locks, light each lock as a curved form with the zenithal key, and place a collective sheen band — a lighter value crossing all the locks at the same height, where the head's curve faces the light — rather than highlighting each lock to its own private logic. Individual strand-painting is reserved for silhouette edges and flyaways. Color behaves like everything else: blondes are not yellow but warm desaturated ladders into cool shadow; black hair is the colored-dark doctrine of Chapter 9 with blue or violet sheen.

Cloth. Wool and linen sit matte: long gradients, modest range, texture stippled or glazed into the midtones only. Silk and satin invert the energy — high contrast, compressed transitions, and a *directional* sheen that follows the fold crests in bright bands with near-reversals into shadow, the value pattern doing what real anisotropic reflection does. Velvet is the connoisseur's trick: it reflects strongest at grazing angles, so its **edges and fold-turns go light while its centers stay deep** — inverted form lighting — and a velvet cloak painted this way is unmistakable. Patterned cloth (plaid, brocade) is freehand first, lighting second: paint the pattern as if the cloth were flat midtone, then shade and highlight *over* the pattern with glazes and opaque lights so the pattern dives into folds and washes out in highlights with the cloth itself.

Leather. Satin finish, mottled life: base in desaturated browns (or any color — leather dyes), stipple and sponge subtle value variation across the midtones, glaze color shifts zone by zone, then the wear story: edges, high-rub points, and strap holes lightened and slightly desaturated, creases cut in as fine dark lines with a light kiss on their lower lip. Old leather is gray-brown and matte; polished leather compresses toward gloss with small sharp speculars.

Wood. Mid desaturated brown base; grain drawn as fine, slightly waving liner-brush lines in a darker translucent mix, *following the form* around cylinders and breaking at cut ends into ellipses; knots sparingly; then a near-dry directional highlight along the grain and an occlusion wash in the joints. Weathered wood desaturates toward silver-gray with the grain cut deeper; painted or lacquered wood is just colored satin with grain ghosting through.

Stone. Sponge or heavy stipple builds the mineral mottle over a mid base; cracks are the wood-crease move at larger scale — dark line, light lower edge; chips and arrises catch fine edge highlights; lichen, water-stain, and mineral-vein glazes sell age. Stone's range stays modest and its chroma low (Chapter 6's basing register) unless the stone *is* the show.

Fur and feathers. Directional layered strokes, dark to light, each layer shorter and lighter than the last, always following growth direction, with the zenithal key governing which masses lighten at all. Break the silhouette with a few flicked tip-strokes. Feathers add the spine-and-barb read: one fine line per feather, barbs implied by edge lighting, never individually drawn below 54mm.

Wet, blood, and glow-adjacent. Wetness is a finish event, not a color: gloss medium or gloss varnish placed exactly where liquid sits, over slightly darkened and saturated base color (wet things darken). Blood is dark — far darker and browner than instinct — glossed, and rationed like the narrative prop it is.

Freehand

Freehand — painted designs, heraldry, banners, tattoos, micro-illustration — is composition's instrument and obeys composition's law: it appears where the hierarchy wants detail density, at the focal point or a designed secondary, never scattered as decoration. The craft in five moves:

Design flat first. Work the motif out on paper or screen at several times final size, simplify it until it survives shrinking (test by photographing your sketch small), and decide its values — a freehand needs its own internal value plan that *cooperates* with the surface's lighting.

Transfer honestly. Grid method (light grid on surface and sketch, copy square by square), graphite trace for flat panels, or direct sketching with a watery mix that wipes clean. For banners and bordered panels, **paint the border first** — it locks the geometry, and a true border forgives a wobbling interior far better than the reverse.

Build like a print. Block the motif's complete silhouette in its midtone, opaque and clean-edged, before any internal detail; then shade within the shape; then light it. Detail added to an unresolved silhouette is rework waiting to happen.

Marry it to the form. The design must *belong* to the cloth: distort it over every fold (a stripe dives into a valley and compresses on a crest), then run the garment's own shadow glazes and highlights *across* the freehand so the lighting owns it. A crisp undistorted emblem floating on a shaded cloak is a sticker; the same emblem folded and re-lit is painted silk.

Suggest below the threshold. Damask, embroidery, and pattern at the smallest scales are painted as *suggestion* — the motif resolved at one or two focal patches, decaying into rhythmic marks and tone elsewhere. The eye completes patterns gratefully; full coverage at micro scale buys noise with hours.

Chapter 21 — Finishing, Photography, and the Competition Cabinet

Varnish: protection, then truth

The finishing stack has two jobs in strict order. First **protection**: one or two thin coats of gloss varnish (airbrushed for evenness) over the completed paint — gloss because its film is the hardest and clearest. Then **truth**: the *varnish map*, matte and satin finishes applied by zone to realize the finish ladder of Chapter 18 — matte over cloth and groundwork, satin over skin and leather, gloss retained or reapplied on gems, eyes, wet effects, and (if true-metal) blades. A figure under one uniform finish, however well painted, loses the material story; the mapped finish restores it physically. Brush-apply the zone finishes where zones are small; mask and airbrush where they are large.

Matte varnish's one demon is **frosting** — a white haze from moisture trapped in heavy coats or high humidity. Prevention: thin coats, dry weather, distance. Recovery: a coat of gloss redissolves the haze optically almost every time; re-matte more carefully after. And before any varnish at all: the final unification passes — the near-pure-water atmospheric tints tying figure to base (Chapter 6), the last re-cut of occlusion darks (Chapter 17), a fiber-and-dust inspection under raking light with tweezers and a damp brush.

Photography

Most competitions, juries, and audiences now meet the work as photographs first, so the photograph is part of the craft. The reliable setup: two diffused daylight-balanced lights (5000–6500K) at roughly 45 degrees left and right, slightly above; a third light or a white card filling from below the face; a seamless neutral gradient background (mid-gray flatters more schemes than white or black); camera or phone on a tripod at the figure's eye level, *backed off* and zoomed/cropped rather than close (proximity distorts proportions); exposure locked on the figure, white balance set against a gray card. Depth of field is the technical hurdle — a single frame at a wide aperture blurs the sword tip; shoot at f/8–f/11, or focus-stack several frames, or accept the phone's computational stacking from a stable mount. Then the honesty rule: edit to *match the object* — white balance, exposure, dust spots — and nothing more. Judges handle the piece eventually, and a photograph that over-promises is a debt collected in person.

The cabinet

Competition logistics are part of finishing. Transport: the figure pinned or magnetized to a rigid carrier inside a rigid box, *nothing* touching the paint — foam pressed against a finished surface will polish matte to shine in one car ride. At the venue: a final dust pass, plaque straight, primary view oriented to the cabinet's sightline, and the quiet 270-degree walk-around you have done a hundred times at the bench. Then it is out of your hands, which is the point of the whole discipline: every decision this book describes was made so that the piece can speak in that cabinet without you standing next to it.

Practice architecture

Skill compounds under three habits. **Isolate variables**: study pieces that exercise *one* thing — a sphere of NMM, a two-color wet-blend panel, ten painted eyes on a sprue — because project pieces are too expensive a place to learn fundamentals. **Benchmark on a constant**: repaint the same bust or figure at long intervals; it is the only honest progress meter you will ever own. **Close the loop**: structured critique — from better painters, from judges' feedback, from your own grayscale-photo audits against the checklists in this book — turns hours into improvement; unexamined hours merely turn into habits. Copying passages from masters (a fold from one, a face from another, openly, as study) remains what it has been for five hundred years: the fastest teacher in figurative art.

And the order of operations, one last time, because every chapter has been an application of it: **value first, temperature second, chroma third, hue fourth, texture last — and design before all of them.**

Appendices

Appendix A — Paint Consistency Reference

Task	Approximate dilution	Palette behavior test	Notes
Priming (airbrush acrylic)	Per range; skim-milk flow	Sprays in an even cone at ~20 PSI	Lacquer primers: use their own leveling thinner (~1:1.5), solvent cleanup immediately
Basecoat (brush)	Pot to 2:1 paint:water	Brush track edges soften, track remains	2–3 coats to opacity; never one heavy coat
Layering	~1:1 with water (+ drop of medium)	Track closes in 1–2 seconds	The workhorse; ~70% opacity per pass
Glazing	1:4 to 1:10 in medium+water	Track closes instantly; transparent on white tile	Medium carries binder; wick brush damp; directional strokes
Wash / juice	Thinner than glaze	Flows to recesses on its own	Pin washes for recesses; control with brush after placing
Wet blending	Slightly thicker than layering	Stays open 30s+ (with 2–5% retarder)	Section the work; expect darker dry-down
Drybrush	No added liquid; offloaded	Almost no mark on towel	Soft dome brush; stroke with the light
Airbrush color	Skim milk to ink	Even cone, no spatter, 12–18 PSI fine	Airbrush medium/thinner, not water alone, for fine work
Atmospheric tint	~90–95% liquid	Barely visible per pass	Final unification of figure and base

Appendix B — Troubleshooting Matrix

Symptom	Likely causes (in order)	Fix
Chalky, dusty finish	Over-thinned with water (under-bound); chalk-prone matte range; dried-paint redeposit	Seal with glaze-medium/satin pass; re-saturate with hue glaze; thin with medium thereafter
Streaks in coat	Re-entered a tacky stroke; paint too thick; brush too dry	Dry fully; one corrected layering pass; enforce no-re-entry rule
Tide marks / glaze rings	Coffee-ring effect: bead too large, left unattended	Smaller loads; pull edges to nothing; tilt model; add medium; small sections
Paint beads / crawls	Gloss or oily surface; mold release; over-flow-improved	Wash model; matte medium tooth coat; fewer flow drops
Banding in gradient	Steps too far apart / too opaque / hard-edged	More intermediates; thinner steps; unifying midtone glaze
Layer lifts when overpainted	Under-bound layer beneath; scrubbing; staining inks disturbed	Seal with varnish/medium; lighter touch; let layers cure fully
Gritty speckle in paint	Skinned palette puddle; dried pot edges; unstrained airbrush paint	Fresh mix; strain; abandon drying puddles
Matte varnish frosting	Humidity; heavy coat	Gloss coat to clear; re-matte thin in dry conditions

Symptom	Likely causes (in order)	Fix
Airbrush spidering	Too close; too thin; too much trigger	Back off; reduce paint volume; rebalance dilution/pressure
Airbrush spatter / stutter	Tip dry; dilution-pressure mismatch; moisture in line	Wipe needle rhythmically; re-tune; fit moisture trap
NMM reads as gray/yellow cloth	Mids too broad; range too narrow; no temperature play	Push values to 1–2 and 8–9; compress transitions; sheen + warmth glazes
OSL reads as colored haze	No value underglow; ambient not suppressed; source not brightest	Rebuild: light underglow to candy glaze to darken everything else; verify in grayscale
Seam ghosting through paint	Solvent putty used in a real gap; uncured filler	Cut back, refill with epoxy putty, sand, re-prime
Figure looks worse than yesterday	It usually doesn't	Grayscale photo; overnight rule; trust the checklist, not hour-six eyes

Appendix C — A Deliberate Practice Syllabus (Twelve Weeks)

Weeks 1–2: consistency and coats — paint flat panels to perfect smoothness at basecoat and layering dilutions; ten-minute coffee-ring drills with glazes on tiles. Weeks 3–4: the sphere — one primitive painted six times: diffuse warm key, diffuse cool key, satin, gloss, NMM steel, NMM gold; grayscale-audit each. Weeks 5–6: blending catalogue — the same cloak panel rendered by layering, wet blend, two-brush, stipple, and airbrush; compare honestly. Weeks 7–8: the face and the eye — five speed-faces emphasizing value zones and the warm-cool-warm turn; eyes on a sprue until boring. Weeks 9–10: one complete small figure executed strictly by the workflow of Chapter 17, value map on paper first, grayscale checks at every stage. Weeks 11–12: the stretch piece — one effect you fear (OSL, freehand, SE-NMM) on a figure planned with a full Part II composition pass — then a written self-critique against the audits in this book, and the date in the calendar for the benchmark repaint.

Appendix D — Glossary

Ambient occlusion (AO): shadowing in crevices and contact zones where light cannot reach regardless of key direction. **Banding:** visible stripes in a layered gradient. **Candy glaze:** transparent color over a metallic or light base. **Chroma:** a color's saturation/purity. **Coffee-ring effect:** pigment migration to a drying bead's rim; the cause of tide marks. **Contrast budget:** the discipline of rationing value, chroma, hue, edge, and detail contrast toward the focal point. **Core shadow / terminator:** the darkest band of form shadow at the edge of direct light. **Edge highlight:** fine bright line on a hard physical edge. **Feathering:** softening a wet edge with a clean damp brush. **Gamut mapping:** restricting all mixes to a planned polygon on the color wheel. **Glaze:** transparent, medium-carried tint layer. **Grisaille / sketch style:** rendering values in monochrome, then coloring with glazes. **Halftone:** the mid-value turning zone of a form; home of texture and truest local color. **Juice:** a very dilute glaze/filter mix for broad tinting. **Key (light):** the scene's dominant light source. **Line of action:** the single dominant gesture line of a pose. **NMM:** non-metallic metal; painting metal's reflections in matte paint. **Notan:** a two-value structural study. **OSL:** object-source lighting; a painted in-scene light source. **Primary view:** the angle a display piece is optimized for. **Re-saturation (CMY):** restoring chroma to desaturated transitions with primary-leaning glazes. **Specular:** the small bright reflection of the light source itself, at the angle of

incidence. **Tack window:** the half-dry stage during which paint must not be touched. **TMM:** true metallic metal; metallic-flake paints. **Value:** lightness, 0 (black) to 10 (white). **Zenithal:** priming/sketching light from above to encode the default key.

End. Paint the values; the rest will follow.

Book II — Color

On Choosing Major Colors, Minor Colors, and the Smallest Features

Introduction — Why Selection Is the Hard Part

The parent volume argued that value does the structural work of a miniature and that hue is the dimension that matters least to whether a piece functions. Both claims stand. And yet ask any strong painter where their projects stall, and the answer is rarely "I couldn't blend the transition" — it is "I couldn't decide on the colors." Selection is hard precisely *because* hue is so free: within a sound value structure, hundreds of palettes would technically work, and the painter must choose one and then defend it with sixty hours of labor.

This treatise exists to convert that open-ended freedom into a closed, reasoned procedure. Its central claim: **a color scheme is not a list of colors but a cast of roles** — a dominant that owns the piece, a secondary that gives the dominant something to be in relation *to*, an accent that directs the eye, a supporting population of neutrals and fixed members that hold the stage — and choosing colors well means casting those roles deliberately, in order, against criteria you can name. When a finished scheme looks inevitable, as the best ones do, it is because every member of the cast can answer the question *why are you here* — and the small features, the straps and gems and trims that most painters color by reflex in the final week, can answer it too.

A note on what this volume is not. It is not a mixing manual; the parent volume's Part III covers shadow construction, re-saturation, and the chemistry of paint, and those pages are assumed rather than repeated. This is the book of the decisions *before* the palette is wet: which hues, at which chroma, in which amounts, in which places, and — always — why.

Chapter 1 — What a Scheme Is: Roles, Hierarchy, and the Two Budgets

The cast of roles

Strip any successful display figure to its color logic and the same five roles appear:

The dominant — the color that owns the piece's identity. Name the figure ("the green knight," "the plague thing," "the woman in white") and you have named its dominant. It is usually, but not always, the largest mass; what it must always be is the color the scheme is *about*.

The secondary — the dominant's counterpart. It supplies what the dominant lacks: the opposite temperature, a different value zone, a second voice that turns a statement into a chord. A scheme without a real secondary is a monologue, and monologues on miniatures read as primer with opinions.

The accent — the smallest, loudest member. Highest permitted chroma, least permitted area, stationed at or beside the focal point, echoed once or twice along the eye's route and nowhere else. The accent is not decoration; it is the scheme's pointing finger.

The supporting neutrals — leathers, woods, ropes, horn, stone, the grays and browns that occupy real estate without competing for it. They are the stage crew, and Chapter 5 will argue they are

the most consequential colors nobody thinks they are choosing.

The fixed members — colors the figure brings whether you invite them or not: skin, which on most figures is a warm, mid-value, desaturated orange the entire scheme must flatter; and metal, whose choice (warm gold versus cool steel) is itself one of the largest color decisions on the piece. Chapter 6 treats both at length; for now, mark that no palette is chosen on a blank page. Two members are pre-cast.

The two budgets

Hierarchy among the roles is enforced by rationing, and here a distinction matters that most discussions of "60-30-10 rules" blur: there are **two separate budgets**, spent in different currencies.

The **area budget** governs surface coverage. The reliable proportions: the dominant and its tints, shades, and close variants hold roughly sixty to seventy percent of the visible area from the primary view; the secondary family holds twenty to thirty; the accent and all its echoes together hold ten or less. These proportions are what make a scheme readable at three meters — the cabinet glance must be able to say what the piece's color *is*.

The **saturation budget** governs chroma, and it is the stricter ledger. The working law, drawn from competition practice: **two colors may be saturated, in roughly a 70/30 split of the scheme's total chromatic energy — or three at an absolute ceiling of about 70/20/10 — and everything else on the figure is desaturated toward gray, earth, or a quiet relative of the dominant.** Note that the two budgets need not assign the same ranks: the area-dominant is frequently a *muted* color, while the tiny accent owns the piece's peak saturation. A figure can be seventy percent desaturated sea-green by area while its chromatic 70 is a deep teal cloak lining and its screaming 10 is one vermilion tassel. Confusing the budgets — assuming the biggest color must be the brightest — produces the toy-soldier read; separating them is most of what people mean by "sophisticated color."

A scheme is a value plan and a temperature plan wearing hue names

The third structural truth: when you "choose blue," you are not primarily choosing blue. You are choosing a *value zone* (blue lives natively dark — Appendix D), a *temperature pole* (the scheme now has its cool anchor and must find warmth elsewhere), and a *chroma posture* (is this blue jewel-like or ash-like?). Every hue decision is secretly three decisions, and schemes fail far more often on the hidden three than on the named one. Throughout this treatise, every "choose X" instruction will therefore be unpacked into its value, temperature, and chroma consequences — because that unpacking *is* the skill.

The count discipline

How many colors does a finished figure need? Fewer than the bench believes. The complete cast of a typical strong scheme: **two saturated hues, one to two neutral families, skin, and one metal.** Six or seven palette identities, total — out of which dozens of *mixtures* arise, since every shadow, highlight, and glaze is a variant of a cast member rather than a new hire. The audit that follows from this: late in a project, list every distinct hue visible on the figure and assign each to a role. Any color that cannot name its role — that appears once, relates to nothing, and serves neither focus nor connection — is an *orphan*, and orphans are removed or echoed, never tolerated.

The count discipline is not minimalism for its own sake; it is what makes a scheme feel designed by one mind rather than accumulated by many sessions.

Chapter 2 — Where Schemes Come From: Story, Reference, and the Sculpt's Vote

A palette can be derived from four directions, and the strongest schemes usually triangulate from at least two. What follows are the four sources and the method for extracting a usable palette from each.

Story first: from subject to mood to palette characteristics

The default route for display work. Begin with the figure's fiction — who, where, what moment — and compress it into **three mood words** written at the top of the project page: *weary, devout, cold*; or *opulent, predatory, serene*. Mood words translate directly into palette *characteristics* before any hue is named: a value key (high-key airy, mid, or low-key grim), a temperature lean, a chroma ceiling (how saturated is this world allowed to be?), and a contrast level. Only then are hue families auditioned against the characteristics. The full translation table lives in Appendix A, but the method matters more than the table: *characteristics before hues*. A painter who decides "low key, cool, chroma capped at moderate, one warm event permitted" has done eighty percent of the selection while the painter who started with "maybe purple?" has done none of it.

The sculpt's vote: the surface inventory

The sculpt is not a neutral canvas; it votes. Before any palette is sketched, take the **surface inventory**: list every distinct material area on the figure — cloak, cuirass, tunic, hood lining, boots, belts, hair, base — with an estimated percentage of visible area from the primary view and a note on its sculpted texture. The inventory constrains the casting directly. The dominant can only live on surfaces large and contiguous enough to carry it: an armor-clad figure with a small tabard cannot make cloth the dominant no matter what the mood board says — its scheme logic must run through the metal (Chapter 6) and the tabard becomes secondary or accent. Heavily textured surfaces (fur, chain, rough weave) resist flat saturated color and lean naturally toward muted, broken hues, which may disqualify them from carrying a jewel-toned dominant. And the inventory reveals the *gaps*: a figure offering no natural home for a secondary (one garment, head to toe) tells you now — while the fix is cheap — that the secondary must live in a lining, the heraldry, the hair, or the base.

Reference first: stealing palettes correctly

Nature, the masters, and the cinema have already balanced more palettes than any of us will live to design, and taking them is not cheating; it is literacy. **Nature**: birds, insects, minerals, reef fish, autumn hillsides — evolution and geology produce schemes with built-in hierarchy (a kingfisher is a 70/20/10 lecture: dominant teal, secondary rust-orange breast, white accent at the throat). **The masters**: pull a figure painting you love into an image editor, posterize or eyedrop it, and notice what the pigment counts always show — enormous areas of near-neutral, chroma concentrated in tiny zones, temperature doing the work you assumed hue was doing. **Film and textiles**: color grading and historical costume are applied palette design with budgets attached.

The method for stealing: sample the reference's **values and chromas, not merely its hues**, and record its *proportions*. A palette is hues-at-strengths-in-amounts; copying the hue list while in-

flating every chroma to hobby-paint maximum is how reference-derived schemes die. Build a five-swatch strip from the reference — dominant, secondary, two neutrals, accent, each at its sampled value and saturation — and design from the strip, not from memory of the picture.

Constraint first: mandated colors

Faction schemes, commissions, heraldic requirements, an army's existing livery: sometimes the hue list arrives pre-written, and painters experience this as a loss of authorship. It mostly is not, because of the secret-three-decisions principle of Chapter 1: **a mandate fixes hues, but value, chroma, temperature, and proportion remain yours**, and those four are where schemes are actually won. "Red and white" can be executed as scarlet-and-cream at full chroma in equal halves (the toy read), or as a deep oxblood dominant at moderate chroma, ivory rationed to the heraldry and one plume, the white's shadows pulled warm, the red's shadows cool, browns and steel as connective tissue — same mandate, entirely different piece. When constrained, spend your authorship on the budgets, the temperature ledger, and the smalls.

The light as a source

One more origin, easily missed: sometimes the *light* is the idea — a sunset piece, a moonlit piece, a figure lit by its own lantern — and in those cases the key's color is effectively the first cast member chosen, tinting every other member's painted appearance (Chapter 6 returns to this under "the pot color is not the painted color"). Choosing a strongly colored key early is one of the fastest routes to a unified, atmospheric scheme, because it forces every subsequent choice through the same filter — literally.

Chapter 3 — Choosing the Dominant

The dominant is chosen first because every later choice is relational — the secondary is chosen *against* it, the accent *for* it, the neutrals *around* it. Five criteria, applied in order, narrow the field from "any color" to two or three candidates worth testing.

Criterion one: mood fit

The dominant carries the piece's emotional register more than any other single decision, because it is the color the viewer will name. Run the candidates against the mood words from Chapter 2 and against the associations the audience actually holds — deep greens read as wilderness, poison, or old wealth depending on their chroma and company; reds run from martyrdom (deep, cool, muted) through aggression (pure, hot) to festivity (light, warm); whites carry purity in one costume tradition and death in another. These associations are levers, not laws, and Chapter 8's worked examples pull them deliberately. What disqualifies a candidate at this stage is not "wrong meaning" but *no* meaning — a dominant chosen because the pot was nearby.

Criterion two: inherent value compatibility

Here is the criterion that separates trained selection from guesswork. **Every hue has a native value** — the lightness at which it reaches full saturation. Yellow is inherently light (its pure form sits near value 8); orange around 6.5; red near 5; green 4 to 5; blue near 3.5; violet darkest of all, near 3. The full chart is Appendix D, and its consequence is this: *a hue fights any value zone far from its native one.* A yellow that must serve as a deep-shadowed cloak spends its life being darkened,

and darkened yellow leaves the yellow family entirely — toward olive with black, toward ochre and brown with its analogous neighbors. A violet asked to be the bright, high-key dominant of an airy piece must be lightened into lavender pastels and surrenders most of its chroma on the way.

So the criterion: take the value plan from your notan — *what value zone do the dominant's surfaces occupy?* — and prefer dominants whose native value sits in or near that zone. Dark, brooding cloak occupying values 2–4: blues, violets, deep greens, oxbloods are at home; yellow is a fight. Sunlit robes at 6–8: yellows, warm whites, pale oranges, desaturated pinks thrive; pure blue must become powder blue to attend. You *can* fight the chart — a convincingly deep yellow cloak is a virtuoso piece precisely because the hue-shifted shadow ladder it requires (yellow through ochre, sienna, into umber and violet-brown) is hard — but fight it knowingly, with the ladder planned, never by accident in week three.

Criterion three: chroma posture

Decide now whether the dominant is **muted or saturated**, because the two postures build opposite schemes. The *muted dominant* — a desaturated teal, an ashen violet, a gray-green — is the sophisticated default for display work: it occupies its sixty-plus percent of area without shouting, leaves the entire upper chroma range free for the secondary and accent to spend, and flatters skin and metals effortlessly. The *saturated dominant* — a true crimson, a royal blue at strength — is the iconic posture: heraldic, heroic, instantly legible, and expensive, because a saturated dominant consumes the 70 of the saturation budget by itself, forcing everything else on the figure toward neutrality (which is exactly how classic heroic schemes work: one blazing color, steel, leather, white, done). Both postures win medals. What loses them is the unchosen middle — a dominant at halfhearted saturation with everything else at the same halfhearted saturation, which is the recipe for the mid-chroma mush that reads as "nice paint, no idea."

Criterion four: harmony with the fixed members

Audition every candidate against skin and metal, the two cast members hired before you arrived. **Skin** is a warm, desaturated, mid-value orange, and it sits at the focal point: a dominant adjacent to the face must frame it, not fight it. Cool dominants — blues, teals, greens, cool violets — frame warm skin by complementary contrast, which is the quiet reason so many great face-forward figures wear cool garments; large *saturated* warm dominants near the face compete with skin on its own temperature and steal the focal warmth (mute them, cool them, or interpose a collar of neutral). **Metal** is a temperature vote: committing to gold adds a warm, low-chroma yellow member to the cast and pushes the whole ledger warm; steel adds a cool neutral and frees the warm budget. The elegant pairings fall out automatically — cool dominant with gold gains its temperature counterpoint built-in; warm dominant with steel gains the same service mirrored; warm dominant with gold *can* work but must find its coolness somewhere else, deliberately.

Criterion five: rendering affordance

Last, the practical question: how much room does the candidate give you to *paint*? Mid-value dominants (4–6 native) offer headroom in both directions — full shadow ladders down, full highlight ladders up — which is why reds, greens, and mid-blues are generous to render. Extreme-value dominants compress one side: a near-black dominant has almost no down and must be modeled in its top half against a deliberately lighter environment; a white dominant has no up and is modeled entirely in its shadows. Neither is wrong — black-dominant and white-dominant schemes

are striking precisely because of the compression — but the labor and the lighting plan must be budgeted with eyes open.

Auditioning the survivors

The criteria should leave two or three candidates. Do not choose among them in your head; **test digitally**. Photograph the primed figure from the primary view, and in any image editor lay each candidate over the dominant's surfaces (a color layer over the zenithal photo takes minutes and inherits your real value structure). Place the fixed members — a skin swatch at the face, the metal's tone on its surfaces — and look at the three mockups at thumbnail size, in grayscale, and at full size, against the mood words. One will usually declare itself; when two tie, prefer the one whose native value fights the plan less. The hour this audition costs is the cheapest hour of the entire project.

Chapter 4 — Choosing the Secondary: The Interval

The chord, not the partner

Borrow a term from music: the relationship between dominant and secondary is the scheme's **interval**, and the interval — not either color alone — sets the scheme's emotional temperature. A close interval (analogous neighbors: blue with blue-violet) is consonant, calm, unified, and risks monotony. A wide interval (true complements: teal with rust-orange) is maximally vibrant and risks violence. The intervals between (split-complement, the muted complement) are where most display schemes live, harvesting the complement's energy at a survivable voltage. Choosing the secondary therefore begins not with "what color goes with X" but with "what *relationship* does this piece want": serenity, tension, ceremony, unease. Decide the interval, then cast it.

The analogous interval — secondary within one or two steps of the dominant on the wheel — buys unity cheaply: shadows, glazes, and mixes flow between the two families without mud, and the scheme reads as one atmosphere. Its requirement is *separation by the other dimensions*: analogous hues sitting at the same value and chroma fuse into one mass, so an analogous secondary must take a distinctly different value zone and ideally a different chroma posture (a deep saturated blue-violet cloak against a pale, grayed blue tunic). Its other need is rescue from monotony, which the accent supplies — analogous schemes lean hardest of all on their accent.

The complementary interval — secondary opposite the dominant — buys vibrance: each color intensifies the other by simultaneous contrast, and the scheme has built-in temperature opposition. Its requirements are sterner. *Inequality*: complements at equal area and chroma fight to a draw, so the budgets must visibly favor one (the dominant's 70 against the secondary's 20–30, and rarely both at full saturation). *Refereed borders*: where saturated complements physically touch, the boundary vibrates — interpose a neutral (a strap, a trim line, a shadowed fold, the device Chapter 5 names the referee) or let one side fall into shadow at the meeting. And *mixing discipline*: complement pairs neutralize each other in the pot, which is a gift for chromatic grays and a hazard for careless glazes.

The split-complement and the muted complement — the working compromises. Split-complement (the dominant plus a neighbor of its complement: blue-violet dominant, *gold-orange* rather than pure yellow secondary) keeps the wide interval's drama while sidestepping the head-on collision. The muted complement — the complement admitted at sharply reduced chroma — is perhaps the single most common structure in winning display schemes: a saturated teal dominant against a *desaturated* rust-leather secondary, a rich oxblood against a grayed sage.

The energy is complementary; the volume is conversational; the saturation budget stays solvent.

The three separations

Whatever the interval, enforce the rule that makes a secondary *function* as one: **the secondary must differ from the dominant on at least two of the three dimensions — value, temperature, chroma — and the strongest schemes differ on all three.** A different value zone, so the masses separate in the grayscale check (this is the notan speaking: dominant masses dark, secondary masses mid, or the reverse). The opposite temperature carriage, because every complete scheme holds both poles somewhere, and the secondary is the natural bearer of whichever pole the dominant declined. And usually a different chroma posture — muted secondary under a saturated dominant, or the inversion. A "secondary" that matches the dominant's value, temperature, and saturation is not a secondary at all; it is the dominant wearing a different name, and the scheme remains a monologue.

Area, placement, and the echo

The secondary's area budget is twenty to thirty percent, and its placement does compositional work. Stationed *adjacent to the focal point* — the hood lining behind the face, the sash crossing the chest — it frames; distributed as the **echo** (one large mass, one medium, one small, per the rhythm principle of the parent volume) it binds the figure top to bottom and licenses the eye's circulation route. A secondary that appears in exactly one place reads as an accident of the sculpt; the same color echoed at three scales reads as a decision.

When the sculpt offers no home

Single-garment figures, monolithic armor, robes head to toe: the inventory of Chapter 2 sometimes shows no natural secondary surface. The secondary then lives in the margins the sculpt *does* offer — the lining revealed at a cloak's turn, the heraldic field, the hair (large enough on many figures to carry a minor color outright), the gradient of the garment itself (its shadow family pulled far enough toward a second hue to function as one — a green robe whose depths are honestly blue is a two-color scheme wearing one garment), or the base, which on such figures is promoted from stage to second voice. The role is non-negotiable even when the real estate is scarce; only the address changes.

Chapter 5 — Accents and the Small Features

The small features — straps, buckles, gems, trims, pouches, plumes, scroll cases, the flowers at the base — occupy a few percent of a figure's area and receive, on most benches, a few percent of its thought: colored by reflex in the final week, each one "what it would be" (brown belt, gold buckle, red gem) with no reference to the scheme. This chapter's argument is that the smalls are where schemes are *finished or unraveled* — that every small element holds one of exactly three jobs, and that assigning those jobs deliberately is the difference between a figure that resolves and a figure that merely ends.

The accent proper

First, the loudest small. The **accent** is the scheme's third voice — the 10 of the 70/20/10, or where only two hues are saturated, the dominant pair's permitted spike — and it is defined by

an exchange: *maximum chroma for minimum area.* The exchange works because of a perceptual reciprocity worth stating plainly: **the same color reads louder the more area it covers.** A vermilion that would be unbearable as a cloak is perfect as a tassel; chroma that large areas cannot afford is precisely what small areas require to register at all. This is *why* accents are small — not modesty, but physics. Inflate an accent's area and you have not strengthened it; you have hired a third major color and bankrupted the saturation budget.

Choosing the accent's hue. Three reliable derivations. The *complement of the dominant* is the classic: it delivers maximum pop per square millimeter and arrives pre-harmonized, since the complement relationship is itself the harmony (the muted-complement secondary of Chapter 4 often shares its hue with the accent at full strength — rust secondary, vermilion accent — which is tidy and strong). The *light's color* is the atmospheric choice: where the key or an in-scene source is strongly colored, the accent can simply *be* that light — the candle-flame gem, the glow at the blade — making the accent and the lighting one system. And the *discord* is the gambler's choice: a hue deliberately outside the scheme's harmony — the single magenta orchid in an olive-and-umber swamp — admitted at tiny scale and exactly once. Discords are electric when they work and fatal when echoed or enlarged; if you cannot say why the discord is *there* (story usually licenses it), choose the complement.

Placement law. The accent sits at or immediately beside the focal point, where its chroma spike joins the value spike and edge spike the parent volume already stationed there — the contrast currencies converging on one address. It is echoed once or twice, smaller each time, along the circulation route, and *never* placed at the silhouette's perimeter, where a saturated note becomes an exit sign. Count the accent's appearances on a finished figure: three is a design; six is a rash.

The triage: three jobs for every small thing

Now the doctrine. Take the surface inventory's long tail — every element under roughly a centimeter — and assign each to one of three roles:

Accent carriers hold the scheme's peak chroma: the gem, the eyes, the heraldic charge, the single flower, the potion's glow. Carriers live at or on the route to the focal point, and their census is strict — *countable on one hand*, because each additional carrier dilutes all the others.

Neutral connectors are the leathers, woods, ropes, horn, bone, cord, and undyed cloth — desaturated warm browns and quiet grays whose job is to *separate, buffer, and rest*. Connectors do three kinds of structural work. They referee: where dominant and secondary would otherwise collide at a vibrating border, the belt, the trim line, the strap crossing the boundary gives the eye a neutral landing between the voices — interpose a connector at every saturated-meets-saturated frontier. They rest: a viewer's eye fatigues in unbroken chroma, and the connector zones are where it recovers before the next event. And they ground: browns and grays read as *material* — leather, timber, hemp — lending the saturated members physical credibility by association. Here is the claim made earlier: **browns are the most important colors nobody chooses.** They will cover more of most figures than the accent ever will, and a painter who selects them deliberately — this strap a warm chestnut, that one a cool gray-umber, the pouch two values lighter, all of them low-chroma relatives of the scheme rather than the same pot of "leather brown" six times — builds connective tissue with internal life. Vary the connectors in value and temperature; never in saturation.

Echoes are smalls that repeat a major color at reduced scale: the trim picking up the cloak's teal, the bedroll matching the sash, the gem restating the lining. Echoes distribute the majors

through the figure, complete the one-large-one-medium-one-small rhythm, and — critically — *adopt orphans*: any small that wants a color outside the cast is recast as an echo of a member, or cut.

The assignment heuristics, by location: smalls **near the focal point** become carriers and echoes (they are on stage); smalls **at the perimeter and rear** become connectors (they are crew); smalls **on the border between majors** become referees by definition. And one census across the whole figure at the end: every small can name its job, carriers number five or fewer, and no hue appears exactly once unless it is *the* accent.

A walk through the usual suspects

Eyes are micro-carriers by birthright — the focal point's focal point — which is why their whites are *warm* off-whites (a pure white eye outshines its own specular) and why an unusual iris color is one of the cheapest legitimate accents available. **Lips and inner ears** are skin's own saturation peak; let them carry the face's chroma rather than adding it elsewhere. **Gems** are the classic carriers: paint them as the parent volume's inverted transparent spheres, hue them as the accent or as a *cool note on warm metal* (the sapphire in the gold pommel is a temperature referee in jewel form), and ration them — one lit gem outranks nine painted stones. **Trims and piping** default to echoes; their special case is metallic trim, which does double duty as echo and metal and must keep a clear value separation from the field it borders or it vanishes (gold trim on yellow cloth needs the cloth muted or the trim's shadows deepened). **Belts, straps, pouches, scabbards, grips** are connectors almost without exception — the brown republic — with their buckles and fittings as metal echoes; resist the urge to "interest them up" with saturation, and give them interest through value variety, wear, and temperature lean instead. **Plumes, sashes, ribbons, and feathers** are the sculpt's gift to the accent: small, high, mobile surfaces with no material obligation to any particular color — natural carriers, and the traditional address of the scheme's one pure red. **Hair** is the borderline case: at miniature scale it is often large enough to be a *minor color outright*, and should be cast as secondary (a copper-haired figure in teal has hired its complement), as connector (the brown-to-black majority), or — rarely, deliberately — as carrier (white or unnatural hair as the scheme's event). **Freehand** splits its allegiance: the field belongs to whichever major it decorates; the motif's inks are echoes or the accent, never new hires. **Base flora and dressing** follow the perimeter rule — connectors nearly throughout, with the licensed exception of *one* carrier echo (the single bloom, the one lit mushroom) placed where it supports the sightline to the figure, per the base chapter to come.

The quiet conclusion of the triage: when the smalls are cast well, a viewer never notices them — and notices instead that the figure feels *finished*, bound, inevitable. That sensation is the connectors refereeing, the echoes binding, and five carriers, no more, all pointing at the face.

Chapter 6 — The Supporting Cast: Skin, Metals, Neutrals, and the Base

Skin: the member you did not choose

On any figure with visible flesh, skin is a major scheme member — frequently the literal focal point — and its color is only narrowly negotiable: a warm, desaturated orange family, mid-value for most complexions, lower-value and *richer* for deep skin (the parent volume's Chapter 9 holds the rendering recipes). For the selector, skin imposes three audits. *Frame it*: the colors physically adjacent to the face — collar, hood lining, pauldron rims — should contrast it in temperature or value (cool or dark frames around warm mid-value skin), which is why hood linings run to deep

teals, viridians, and near-blacks in so many strong portraits. *Don't outwarm it*: a large saturated warm mass beside the face competes for skin's own signal; mute it, cool it, or interpose a connector. *Count it in the warm ledger*: a scheme's temperature balance includes the skin — a cool-dominant figure with a visible face already owns a warm event, and may need less additional warmth than the wheel suggests.

Metal is a color decision

Choosing gold versus steel is choosing a palette member, not a finish. **Gold** is a warm, low-chroma yellow citizen: it pushes the ledger warm, harmonizes effortlessly with reds, browns, and greens, supplies the warm counterpoint to cool dominants (the blue-and-gold instinct is temperature theory, not habit), and — because it is *yellow* — competes with yellow cloth and warm light for the same register, wanting separation in value when they share a figure. **Steel and silver** are cool neutrals: they frame without spending chroma, give warm dominants their cool counterpoint, and recede obediently behind whatever the scheme wants forward. **Bronze, copper, and brass** sit between — warmer than steel, redder and dirtier than gold — and suit earthen, aged, and martial registers. The selection heuristics: cool scheme, warm metal; warm scheme, cool metal; and where the scheme runs monotemperature by intent (the all-warm desert piece), let the metal carry a *deliberate* lean against it or accept that the temperature counterpoint must come from the light. One more ledger note for NMM painters: non-metallic metal is painted in ordinary pigments, so its sky tones and reflection colors are *also* scheme members — a steel NMM's blue sheen glazes should be the scheme's blue, not a stranger's.

Neutrals that belong

The grays, blacks, whites, and browns of a scheme are mixed, not bought. A neutral from the pot — flat gray, dead black — belongs to no scheme because it belongs to all of them; a **chromatic neutral** mixed from the scheme's own members (the dominant and its complement crossed toward gray; the parent volume's umber-and-ultramarine near-black warmed or cooled to order) carries the scheme's DNA into every quiet zone. Assign every neutral a *lean* — this gray is a cool citizen, that brown a warm one — and enter it in the temperature ledger like any other member. The parent volume's doctrine of colored blacks and colored whites is the same principle at the value extremes, and it bears repeating in selection terms: "black" boots and "white" tabards are *hue decisions* (a blue-black or a red-black; an ivory or a blue-white), and choosing their leans by the ledger is part of casting, not rendering.

The base: the darker, quieter relative

The parent volume set the base's compositional law — never the focal point, values in the middle band, chroma below the figure's dominant. Its *selection* law follows: the base palette is a **muted, darkened relative of the figure's scheme**, derived by one of three safe strategies. The *muted-complement ground* — earth tones leaning opposite the dominant (warm umber ground under a cool-blue figure) — makes the figure ring by simultaneous contrast and is the default for single display figures. The *darker-analogous ground* — the dominant's own family, dropped in value and chroma (deep gray-greens under the green knight) — buys atmosphere and unity, the figure rising out of its own world. The *neutral stage* — chromatic gray-browns owing allegiance to neither pole — serves busy or multi-colored figures that need silence below. Whichever strategy, two riders: the base may host **one** accent echo (the single bloom, a glint of the scheme's red in scattered debris)

placed on the sightline to the figure and nowhere else; and the base introduces **no new hues** — its every color is a darker, grayer citizen of the existing cast. A base that debuts a fresh green has hired an orphan at the worst possible address.

Unification: making one scheme out of many decisions

Four devices bind a cast into a family, and the strongest schemes use at least two. **One shadow family**: mix a single deep shadow color — the scheme's own chromatic near-black — and glaze it into the depths of *every* surface, cloth and skin and metal and base alike; nothing unifies a figure faster, because it makes every member share blood in the dark. **One light**: a single key temperature applied everywhere (the parent volume's start-dark-and-cool, finish-warm-and-light, under a warm key), so that every highlight on every material leans the same way. **The mother color**: a small amount of one chosen paint — often the dominant or the key's color — tipped into every significant mix on the palette, tinting the whole cast toward kinship; subtle, old, and effective. And the **atmospheric tint**: the end-stage airbrush pass at ninety to ninety-five percent thinner, the key's color or the base's, breathed over the figure's lower third and the groundwork together — the painted equivalent of air, and the final signature that figure and base were always one scene.

A closing principle for the whole supporting cast: **the pot color is not the painted color.** Every member is chosen to be seen *under the scheme's light and beside the scheme's neighbors* — the teal that swatches perfectly may paint cold once the warm key shifts every highlight, the connector brown that looked dull on the palette comes alive between two saturated masses. Selection ends not at the swatch but at the mockup and the test surface, which is where the next chapter begins.

Chapter 7 — The Selection Workflow

Everything preceding compresses into a procedure. Run in order; each step's output is the next step's input. On a serious piece the whole sequence costs an evening — against the sixty hours it governs.

Step 1 — Surface inventory. List every distinct material area with its estimated percentage of visible area from the primary view, its sculpted texture, and whether it faces the front. This is the casting sheet: it shows where a dominant *can* live, whether a natural secondary surface exists, and the full census of smalls awaiting triage.

Step 2 — Three mood words. Write them at the top of the page. They are the contract every later choice is audited against.

Step 3 — The notan. Two-value thumbnail, then three. Assign every inventory entry a value zone; station the lightest-against-darkest adjacency at the focal point. The value plan now exists *before any hue is named* — which is the entire point of doing it third, not seventh.

Step 4 — Choose the key. Direction, elevation, and above all temperature. The key is a scheme member: warm key means cool-leaning shadows everywhere and warm-shifted lights everywhere, and every swatch after this step is judged "under the key," not in the abstract.

Step 5 — Cast the dominant. Run Chapter 3's five criteria against the mood words, the notan's zones (inherent value!), and the fixed members. Emerge with two or three candidates — then audition them digitally: color layers over the primed photo, judged at thumbnail, in grayscale, and against the mood words. Pick one.

Step 6 — Choose the interval, then the secondary. Decide the relationship first (analogous calm, complementary tension, the muted-complement middle), then cast it, enforcing the three separa-

tions: different value zone, opposite temperature carriage, distinct chroma posture. Confirm the address — which surfaces, what echo at three scales.

Step 7 — Seat the fixed members and neutrals. Skin family per the subject; metal per the temperature ledger (cool scheme takes warm metal, and the reverse); every neutral mixed chromatic and assigned a lean. Update the ledger: both poles must now be represented somewhere, in proportion.

Step 8 — Place the accent and run the triage. Derive the accent (complement, light's color, or licensed discord), station it at the focal point, plan its one or two echoes. Then walk the inventory's long tail and stamp every small: carrier (five or fewer, near the focal), connector (the brown republic, with planned variety in value and lean), or echo. Mark every saturated-meets-saturated border and assign its referee.

Step 9 — Gamut-map it. Plot the full cast on the wheel at intended chromas; draw the polygon; everything outside is forbidden for this piece. Pre-mix the corners onto the wet palette at the start of every session thereafter — the map is how the scheme survives week four.

Step 10 — Swatch under the key. Paint the cast — dominant, secondary, accent, two connectors, skin, metal — as adjacent patches on a test surface (a sphere, a shoulder pad, a spare shield), *with their planned shadow and highlight directions*, under your actual lamp. Adjacencies that vibrate, neutrals that die, a dominant that turns cold under the warm key: all of it surfaces here for the price of an hour.

Step 11 — Write the recipe card. Every surface, one line: role, base mix, shadow family, highlight direction, saturation rank, finish (matte/satin/gloss, for the varnish map later). The card is the scheme's constitution; week-five improvisations are checked against it.

Step 12 — The standing audits. From here to varnish, three recurring checks: the grayscale photo (is the notan still true?), the budget check (does the 70/30 — or 70/20/10 — still hold, or has saturation crept?), and the orphan check (list every visible hue; every one names its role). The overnight rule applies to color exactly as to everything else: no scheme verdicts at hour six of a session.

Chapter 8 — Four Schemes Reasoned in Full

Procedure is best taught running. Four figures, four registers, the chain shown whole each time: subject, mood, key, inventory, the cast with its reasons, the smalls triage, the base, and the risks worth watching.

I. The penitent crusader (armor-heavy, grimdark)

Mood words: devout, exhausted, cold. *Key:* overcast cool gray, low elevation — a battlefield morning. *Inventory:* plate armor 45%, tabard and cloak 30%, leathers and straps 10%, heraldry/shield 8%, skin (bared head) 4%, base 100% beneath.

The armor's 45% would dominate by area, but steel is cast as what it is — a **cool neutral mass**, NMM in grayed blues, holding the figure's middle values and spending no chroma. The *chromatic* dominant (the 70) is the tabard and cloak: **deep oxblood red**, native value near the notan's 2–4 cloak zone (inherent value obeyed), chroma moderate — devotion and old blood, not parade scarlet. The secondary (the 20) is a **muted gold-ochre**, address: the heraldry field and the cloak's worn embroidery — a split-complement interval against the oxblood, carrying the warm pole the steel and the cool key both refuse. The accent (the 10): **one warm candle-flame note** — a small reliquary lamp at the belt painted as the piece's OSL event, its glow the only saturated warmth on

the figure, stationed a hand's width from the face it underlights. Smalls triage: straps, scabbard, pouches — connectors in two browns (warm chestnut, cool gray-umber, stepped in value); buckles and mail — steel echoes; the rosary — carrier number two and last, beads picking up the oxblood. Skin: pallid, cool-shadowed, the warm lamp-light its only flush. Base: darker-analogous — wet gray-brown mud and shattered masonry in the scheme's own neutrals, one oxblood banner scrap half-buried on the sightline (the licensed echo). *Risks:* the lamp's OSL must own its zone or the cool scheme reads merely drab; and the gold-ochre must stay muted, or the heraldry hijacks a face already fighting a low key.

II. The elf magistrate (cloth-heavy, regal)

Mood words: serene, opulent, untouchable. *Key:* cool moonlit silver from high left. *Inventory:* layered silk robes 60%, sash and lining 15%, hair 10%, jewelry 5%, skin 6%, staff 4%.

A muted dominant posture: the robes take **ashen blue-violet** — silk's high contrast painted within a restrained chroma, native value at home in the 3–5 zones the notan assigns, the cool key flattering rather than fighting it. The interval is the **muted complement**: sash and lining in **desaturated antique gold**, the warm pole at conversational volume, echoed large (sash), medium (lining at the collar framing the face), small (slippers). Metal follows the ledger — **gold** jewelry, the cool scheme's built-in counterpoint, kept low-chroma so it reads as the sash's metallic cousin. Hair is promoted to minor color: **silver-white**, a value event near the face rather than a hue event, doubling the moonlight. The accent: **one saturated carmine** — a single gem at the staff's head, complement-adjacent to the robes, the magistrate's sole concession to heat — echoed once, tiny, as the ring stone. Smalls: embroidery on the robe hems — echoes (the gold, two values off its field); the book's cover and cords — connectors (cool gray-brown leather); eyes — pale carrier irises, the cheapest legal strangeness. Base: neutral stage — pale cut stone in chromatic grays, colder than the figure, no flora. *Risks:* analogous-adjacent violet and blue zones in the robes fusing — enforce the value separation between layers; and white hair beside pale stone — keep the base a full zone darker than the hair or the head loses its frame.

III. The bog horror (organic, decayed)

Mood words: bloated, ancient, wrong. *Key:* sickly green-amber from low behind — rim light through swamp canopy. *Inventory:* hide and bulk 70%, exposed under-flesh 15%, bone and tusk 8%, the base effectively continuous with the figure.

Monstrous subjects license the rare *figure-base merger*: one world, one palette, the creature rising out of its own ground. Dominant: **decayed olive-green** hide, heavily muted, value 3–5, texture-rich (the inventory's warning — broken color and stipple country, no jewel tones here). Secondary: **putrid flesh** — a desaturated, bruised pink-tan at the under-belly and wounds, the warm pole as biology, separated from the dominant on all three dimensions (lighter, warmer, slightly higher chroma). The accent is the gambler's: an **acid yellow-green** — the dominant's own family pushed to discordant saturation — at the eyes and the bile glisten only; an analogous accent working by chroma spike rather than hue contrast, and the piece's single licensed violence. Bone and tusk: colored whites, warm ivory, the value events that keep a low-key figure legible. Smalls triage runs short on a monster — the snapped spear in its flank is a connector (gray driftwood) with one echo (a scrap of the *victim's* red cloth, the storytelling orphan adopted as accent's cousin… and held to one appearance, exactly). Base: darker-analogous to the point of fusion — black-green water, the figure's own olives grayed and dropped, one acid-green glow echo in the water's sheen below the

eyes. *Risks:* monochrome mud — the flesh secondary and ivory bones must hold their separations or the whole piece compresses into one olive mass; check the grayscale weekly.

IV. The shieldmaiden at the ford (mounted, historical-fantasy)

Mood words: windswept, resolute, golden-hour. *Key:* warm late-afternoon sun, low from front-right — the key chosen first, the scheme built under it. *Inventory:* horse 40%, rider's cloak 20%, gambeson and skirt 12%, shield 8%, tack and saddlery 10%, hair 4%, base 100% beneath.

The light leads: a warm amber key means cool-leaning shadows everywhere and the warm pole partly *pre-funded* by the sun itself. Dominant: **deep forest green** cloak and skirt — native value at home in the cloak's zones, the classic cool seat for warm-lit, warm-skinned subjects, and the green that golden light rims beautifully. The horse is cast as the great connector: **bay** — warm brown body, black points — forty percent of the figure spent as the brown republic's capital, varied across flank and mane in value and lean exactly as Chapter 5 prescribes for connective tissue. Secondary: **russet** — the gambeson and the shield's field — the muted complement of the green, kissing the horse's browns without fusing (one value lighter, distinctly redder, slightly higher chroma). Metal: **aged gold and bronze** at the shield boss, brooch, and bridle fittings — the warm ledger's metallic citizens under a warm key, kept dark enough to glint rather than glow. The accent: **one clear red** — the embroidered band at the cloak's edge where it crosses the chest, carmine at full voice, echoed tiny at the bridle's tassel and the shield's central device. Hair: pale gold, the sun's own echo, streaming on the wind toward the focal face. Smalls: every strap of tack — connectors, deliberately varied (the census here is long, and its discipline is the piece); buckles — bronze echoes; the single carrier beyond the red: her eyes, lit by the low sun. Base: muted-complement ground — gray river stones and dust leaning faintly violet-cool against all that warmth, splash and heather in the scheme's own grays and greens, one red echo permitted: a fallen ribbon at the ford's edge, on the sightline, half in the water. *Risks:* russet, bay, and bronze crowd the same warm register — hold their value steps ruthlessly; and golden-hour pieces drown in their own warmth — the cool shadow family (a blue-violet near-black, glazed into *every* member's depths) is what keeps this one breathing.

Four registers, one procedure. Note what repeated each time: characteristics before hues, the budgets enforced, both temperature poles seated, the smalls stamped with jobs, the base a relative, and every risk named *before* the first session — which is the only time naming it is cheap.

Chapter 9 — Failure Patterns and Their Repairs

Scheme failures are as diagnosable as chalky paint. The recurring patterns, each with its signature, cause, and repair — most repairable late, a few only preventable early.

The rainbow. *Signature:* six-plus saturated hues, no nameable dominant; viewers call it "busy." *Cause:* every element painted "what it would be" at full chroma — selection never happened. *Repair:* choose the dominant retroactively from what exists; glaze its competitors down with chromatic-gray and complement filters until the budgets hold; re-cast the smalls by triage. Severe cases repaint the secondary surfaces outright; the dominant usually survives.

Monochrome mud. *Signature:* one hue family wall to wall, technically harmonious, emotionally inert; grayscale shows one fused mass. *Cause:* analogous safety with the separations unenforced — no second value zone, no opposite pole, no accent. *Repair:* split the family's surfaces into distinct value zones (darken some masses wholesale); pull the shadow family far enough toward a second hue to function as one; install the missing accent at the focal point. Often fully recoverable, since

the harmony was never the problem.

The fifty-fifty duel. *Signature:* two strong colors at equal area and equal chroma; the eye ping-pongs; neither owns the piece. *Cause:* the area budget ignored — complements especially. *Repair:* demote one. Glaze the loser toward gray or toward the winner's temperature across most of its territory, leaving it full-voiced only where the echo rhythm wants it; referee every shared border.

Accent inflation. *Signature:* the "accent" appears nine times; nothing pops because everything does. *Cause:* the carrier census was never taken — each small was made "interesting" in isolation. *Repair:* the cheapest fix in this chapter. Choose the three appearances that serve the circulation route; glaze every other instance down to connector or echo status in an evening.

The orphan. *Signature:* one hue, one appearance, no relatives — the lone purple pouch on an autumn figure. *Cause:* a session-four whim. *Repair:* adopt or evict. Echo it twice at small scale if it earns a role (it rarely does), or repaint it as a connector in the brown republic.

Skin upstaged. *Signature:* a beautifully painted face nobody looks at. *Cause:* a saturated warm mass beside the head, or peak chroma stationed far from the focal point. *Repair:* mute and cool the offending neighbor by glaze; re-aim the accent's echoes so the route ends at the face; deepen the frame (hood lining, collar) behind the head to buy back its value contrast.

The competing base. *Signature:* the eye drops to the groundwork and stays. *Cause:* base saturation or value extremes rivaling the figure, or a new hue debuting below. *Repair:* unify downward — gray-and-darken glazes over the offending elements, the atmospheric tint pass to push the whole ground back, and evict any hue without papers from the figure's cast.

Saturation creep. *Signature:* week one's restrained scheme is week five's carnival; no single session did it. *Cause:* tired-eye remixing without the gamut map — every "bit more punch" a half-step outward. *Repair:* re-mix the original corner colors from the recipe card; audit each zone against them; filter the drifted zones back inside the polygon. *Prevention* is Chapter 7's Step 9, which exists for exactly this disease.

Pot-color literalism. *Signature:* every surface correct in isolation, the whole strangely disjointed — colors that ignore one another and the light. *Cause:* members chosen and painted as swatches, never as neighbors under a key; no shared shadow family, no light temperature, no mother color. *Repair:* the unification devices, applied late: one chromatic near-black glazed into every member's depths, one warm (or cool) pass over every member's lights, the atmospheric tint at the end. This is the failure the swatch-under-the-key step exists to preempt — and the one most often curable in two sessions.

The heraldry trap. *Signature:* mandated colors executed at full chroma over full areas "because that's the scheme"; the toy read on a competition piece. *Cause:* forgetting that a mandate fixes hues only. *Repair:* re-assert authorship over the unmandated dimensions — drop the dominant mandate-color's chroma and deepen its values, ration the second mandate-color toward heraldic fields and echoes, seat connectors between them, and let one small element carry each mandate hue at full voice so the livery still *declares* itself. The mandate survives; the toy does not.

The meta-pattern across all ten: schemes fail by **unmade decisions**, not wrong ones. Every repair above is the late, expensive version of a cheap early step — which is the last argument for the workflow, and the close of the treatise. Choose the cast; name the jobs; enforce the budgets. The colors were never the hard part. The deciding was, and it yields to procedure.

Appendices

Appendix A — Mood-to-Palette Translation Table

Mood register	Value key	Temperature lean	Chroma ceiling	Contrast	Dominant families that fit
Heroic / noble	Mid to high	Balanced, warm focal	Moderate; accent high	Strong	True blues, crimson, ivory + gold
Grim / menacing	Low	Cool	Low; one warm event	Hard, compressed	Oxblood, charcoal, cold gray-greens
Ethereal / mystical	High	Cool	Low-moderate	Soft	Pale violets, silver-blues, moon-grays
Decayed / horror	Low-mid	Sick warm-green	Low; acid spike	Mid, murky	Olives, putrid tans, bruise violets
Regal / opulent	Mid	Warm-cool interplay	Mod-high in small areas	Strong	Deep violet, emerald, garnet + gold
Wild / feral	Mid	Warm earth	Low-moderate	Mid	Umbers, russets, moss, bone
Melancholy	Mid-low	Cool, desaturated	Low	Soft	Slate blues, faded teals, ash violet
Festive / folk	High	Warm	High but rationed	Bright, crisp	Vermilion, saffron, leaf green + cream
Arcane / cold magic	Low + one glow	Cool; glow warm or acid	Low; glow maximal	OSL-led	Near-blacks, deep teals + the glow hue
Infernal	Low	Hot	Mod; embers high	Hard	Black-reds, scorched umber, ash + flame

Use as a starting vocabulary, not a law: the table's job is to convert mood words into *characteristics* (columns two through five) before any hue is named.

Appendix B — Twelve Proven Scheme Formulas

Each formula: dominant / secondary / neutrals and metal / accent — and the reason it works.

1. **Oxblood & Bone** — deep muted red / warm ivory / cool browns, steel / gilt edge accent. Warm-cool split carried by value extremes; ivory frames faces beautifully.
2. **Teal & Rust** — desaturated teal / rust-leather / gray-umber, bronze / vermilion spike. The muted-complement classic; rust doubles as connective leather.
3. **Forest & Brass** — deep green / warm tan-khaki / chestnut leathers, brass / one carmine note. Nature-balanced; brass supplies warmth a green scheme lacks.
4. **Plum & Moss** — muted violet / gray-green / cool grays, steel NMM / pale gold accent.

Near-complement at low voltage; steel keeps it cold and stately.

5. **Midnight & Amber** — near-black blue / warm candle amber (often as OSL) / cold grays, iron / amber is the accent. The arcane-glow architecture; the dark buys the light.
6. **Ivory & Crimson** — warm white dominant / deep crimson / gray-browns, gold / crimson's own pure spike. White-dominant discipline: all modeling in colored shadows.
7. **Olive & Dust** — gray-olive / pale dust-tan / bone, blackened bronze / scarlet thread accent. The campaign palette; one red thread carries the whole chroma budget.
8. **Cerulean & Terracotta** — mid blue / earthen orange-red / warm sand neutrals, gold / turquoise gem. Complement pair pre-muted by earth; Mediterranean register.
9. **Charcoal & Acid** — chromatic near-black / cold mid-gray / steel / one acid green-yellow carrier. Monochrome plus discord; the census must hold at one carrier.
10. **Sage & Wine** — gray-green / muted burgundy / cream and walnut, pewter / rose-gold glint. Soft complementary interval; reads aged, literary, calm.
11. **Sand & Lapis** — warm pale sand dominant / saturated deep blue rationed small / leather browns, gold / vermilion bead accent. Inverted budgets: the *secondary* owns peak chroma.
12. **Moonlight Monochrome** — silver-blue value scheme throughout / no hue secondary / cold neutrals / a single warm candle or skin note as both poles' meeting. The monochrome done deliberately: the warm event is the design.

Appendix C — The Selection Checklist

Run before the first session; re-run at the grayscale checkpoints. One line each: ☐ Surface inventory written, with area percentages and texture notes. ☐ Three mood words at the top of the page. ☐ Notan done; focal adjacency placed. ☐ Key chosen — direction *and* temperature. ☐ Dominant passes all five criteria (mood, inherent value, chroma posture, fixed members, rendering room). ☐ Interval named; secondary differs on at least two of value / temperature / chroma. ☐ Both temperature poles seated somewhere, in proportion. ☐ Metal chosen by the ledger, not by habit. ☐ Accent stationed at the focal point; echoes at most 2; perimeter clean. ☐ Every small stamped: carrier (at most 5 total) / connector / echo; referees posted at saturated borders. ☐ Neutrals chromatic, each with a named lean. ☐ Base palette a darker, muted relative; one accent echo max; no new hues. ☐ Gamut mapped; corners pre-mixed. ☐ Swatch test painted under the actual key. ☐ Recipe card written. ☐ No orphans.

Appendix D — The Inherent Value of Hues

Hue	Native value (0–10)	Selection consequence
Yellow	~8	Lives in light. As a dark dominant it must hue-shift (ochre to sienna to umber); cheap to use high-key, expensive low-key.
Orange	~6.5	Comfortable mid-high; darkens gracefully into the brown republic — the bridge hue.
Red	~5	The flexible middle: full ladders both directions; equally at home as muted dominant or pure accent.

Hue	Native value (0–10)	Selection consequence
Green	~4.5	Mid-low native; deepens convincingly; high-key greens drift mint and lose authority.
Blue	~3.5	Lives in shadow; natural dark-cloak dominant; pale blues spend most of their chroma to climb.
Violet	~3	Darkest native hue; superb for depths and colored blacks; as a light dominant it becomes lavender pastel and surrenders saturation.
(Browns)	2–6 by mix	Not a wheel hue but the working family: darkened oranges and reds — which is why they connect warm schemes so naturally.

The rule the chart encodes: **prefer dominants whose native value matches the value zone their surfaces occupy in the notan — or budget, in advance, for the hue-shifted ladder that fighting the chart demands.**

End. Two colors, well cast, outpaint twenty.

Book III — Light

On Choosing the Light Before Painting It

Introduction — The Painter as Cinematographer

A miniature carries its lighting with it. The figure on the table sits under whatever fluorescent wash the room provides, but the *painted* light — the drama, the hour, the weather, the mood — was decided at a bench months earlier and travels inside the paint. This is the strange privilege of the craft: the cinematographer lights a set once and the camera records it; the miniature painter lights a set permanently, in pigment, and every viewer in every room sees the same golden hour forever.

The parent volume established the mechanics — the six elements of form, occlusion, edge logic, the rendering of highlight and shadow. The palette volume established the key as a scheme member. This volume is about the layer above both: **lighting as a design discipline**, with its own vocabulary, its own decision sequence, and its own failure modes. Its thesis is an extension of the first book's first commandment. *Light source first* meant: choose before you paint. This volume adds: **choose completely**. A light source is not a direction. It is a direction, an elevation, a hardness, a color, an intensity ratio against everything else, and a count — six parameters, every one of which changes what your brush must do on every surface of the figure. Most lighting failures on ambitious pieces are not rendering failures; they are *specification* failures — a key chosen one parameter deep ("from the upper left") and improvised five parameters wide.

The reward for specifying completely is the same reward the first volume promised for choosing at all, multiplied: every subsequent decision becomes a consequence. Where does the rim light go? The spec answers. How sharp is the cast shadow's edge? The spec answers. What color is the bounce under the chin? The spec answers — and forty hours of painting become the patient execution of one good evening of design.

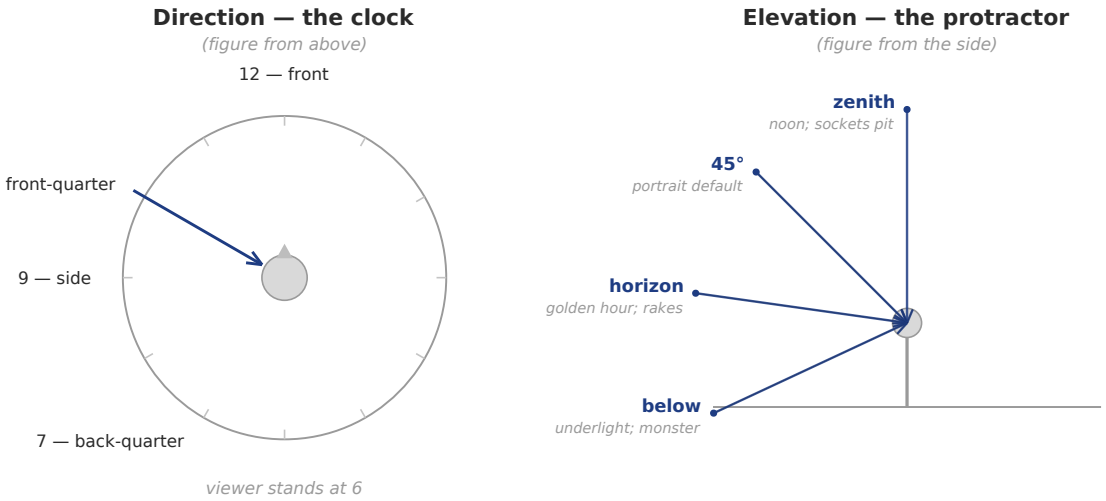
Chapter 1 — The Vocabulary of Light: Six Parameters

Every lighting design, from a noon saint to a candle-lit conspirator, is fully described by six parameters. Learn to specify all six and you can both design a scheme from nothing and reverse-engineer the light of any painting, film frame, or photograph you admire.

Direction and elevation

Direction is the source's compass bearing relative to the primary view — front, front-quarter, side, back-quarter, back — and elevation is its height, from the zenith straight overhead down through the standard 45 degrees, to the horizon, to *below* horizontal. Together they are the light's address, and the convenient notation is a clock and a protractor: "key at 10 o'clock, 45 degrees" says in six words what the whole figure must obey. Direction governs *which planes light and which shadow* — the structural split of the value plan — while elevation governs the character of the modeling: high light digs the eye sockets and pools shadows under every overhang; low light rakes across

texture, stretches cast shadows long across the base, and turns every fold into a sundial. Chapter 2 walks the full range; Appendix B tabulates it.



"Key at 10 o'clock, 45 degrees" fixes the light's whole address in six words.

Hardness

Hardness is the most under-specified parameter in the hobby, and it is set by a single physical fact: **the apparent size of the source relative to the subject.** A small or distant source — the sun's tiny disc, a bare candle flame, a spotlight — is *hard*: its rays arrive parallel, the terminator between light and shadow is abrupt, cast shadows have razor edges, and speculars are tight and brilliant. A large or close source — an overcast sky, a window with daylight, light bounced from a wall — is *soft*: light wraps around forms, the terminator becomes a long gradient, cast shadows blur and may vanish, speculars spread broad and dim. Hardness is therefore an **edge specification**: declaring "hard key" commits you to crisp terminators and sharp-edged cast shadows everywhere; declaring "soft key" commits you to wrapped, gradual turns and form built more from occlusion than from the terminator. It is also a mood specification — hard light is noon, interrogation, desert, judgment; soft light is overcast, intimacy, mercy, fog — and the most common hardness failure is incoherence: soft wrapped faces above razor-edged cast shadows, two weathers on one figure.

Color

The key's temperature and hue, covered as a scheme member in the palette volume and given its own chapter here (Chapter 4), because at design level it brings obligations: a colored key recolors every local color it strikes, demands an opposing temperature in the fill or shadows, and needs a neutral anchor somewhere on the figure from which the viewer can *read* the light's color at all.

Intensity and falloff

How bright, and how fast it dies. For a distant source (sun, moon, sky) falloff across a 32mm figure is nil — the boots receive what the brow receives. For a *near* source — candle, torch, glowing blade — intensity falls with the square of distance, and at miniature scale this is the entire drama:

a flame at chin height can light a face at value 8 and leave the same figure's knees at value 3. Specifying falloff is what separates an in-scene source that feels physically present from a vague warm glow; the parent volume's OSL doctrine (exaggerate the falloff beyond what feels generous) is the rendering of this parameter.

Ratio

The single number that controls a piece's contrast philosophy: **how dark is the unlit side relative to the lit side?** Photography speaks of key-to-fill ratios; painters do better to speak in value steps. A gentle ratio — shadow side one to two steps below the lit side — is open, soft, documentary: the overcast portrait, the high-key fairy tale. A dramatic ratio — three to four steps — is the standard display-figure register, contrast that carries across a cabinet. A severe ratio — five steps and beyond, lit planes at 8 against shadow masses at 2 — is chiaroscuro: the candle-lit Baroque register where most of the figure is dark and the light is an event. The ratio decision *is* the contrast decision the parent volume's Chapter 17 called a style choice; here it gets its number, written into the spec, and held — because ratio drift (shadows creeping lighter session by session as the painter "rescues" detail) is how chiaroscuro designs decay into mush. And the standing caveat travels with it: whatever the ratio, the midtone band that carries texture and color must survive. A severe ratio compresses the *area* the midtones occupy; it does not delete them.

Count — and the law of motivation

How many sources, with the discipline that governs the answer: **every light on a painted figure must be motivated** — traceable to something the scene contains or implies. The sun, the sky's ambient, the ground's bounce, a window, a torch, a spell: all legitimate. A second bright light from nowhere, added because the shadow side "needed something," is the most common multi-source failure and reads exactly as what it is — a painter's lamp leaking into the fiction. The default count is one key plus its natural entourage (ambient fill, ground bounce), which Chapter 2 masters; Chapter 3 adds sources one motivation at a time. The committee of unmotivated keys — face lit from the left, sword from the right, base from the front — remains the most damaging lighting error in the display hobby, and it is a *count* error before it is anything else.

Chapter 2 — One Light: Mastering the Single Key

One motivated key, its ambient fill, and the ground's bounce will carry ninety percent of all display figures, and a painter who can *design* with a single light — not merely default to one — owns the foundation every multi-source scheme builds on. This chapter walks the key around the figure and up and down the sky, because every address it can occupy is a different design.

The face decides

Design the key for the face and let the rest of the figure inherit it — the face is the focal point, the surface viewers are neurologically expert in, and the only place a lighting choice can *ruin* rather than merely weaken a piece. The classical portrait keys, translated to the bench:

The 45/45 key — front-quarter, mid elevation — is the default for the same reason it has been the portraitist's default for four centuries: it models every facial plane while keeping both eyes readable. Its signature is the **Rembrandt triangle** — the small lit patch on the shadow-side cheek,

framed by the nose's cast shadow and the cheekbone — and that triangle is a calibration target: if your painted face shows it, the key's address is true.

The high front key (the *butterfly*, elevation raised, direction nearly frontal) lights symmetrically, drops a small moth-shaped shadow under the nose, carves the cheekbones, and flatters — the glamour key, right for nobility and wrong for menace.

The side key (the *split*, 90 degrees, mid elevation) halves the face into lit and dark — duality, conflict, interrogation. It is the strongest single-key drama available and the most demanding: the dark half must stay genuinely dark (the ratio held), modeled only by bounce and occlusion, with edges deliberately lost.

The profile or rim key (back-quarter) gives the face to shadow and draws its edge in light — anonymity, fate, the figure leaving. A design for silhouettes, covered properly with the rim craft of Chapter 3.

The elevation ladder

Hold direction at front-quarter and ride the elevation down, and the same figure tells four different stories. At the **zenith** — straight overhead — light is noon or heaven: brows, nose, cheekbones, and shoulders blaze; sockets, philtrum, and everything under every overhang pits into shadow. It is monumental and punishing, the saint's key and the corpse's, and figures designed for it want either sculpts that cooperate (raised chins, open brows) or a deliberate front bias of ten or twenty degrees to put light back into the eyes. At **45 degrees** the standard portrait modeling of the previous section applies — the sky's default and the painter's. At the **horizon** — golden hour, dawn, a fire across the room — light *rakes*: every texture on the figure casts its own miniature shadow, fold crests ignite while fold valleys go black, and cast shadows stretch long across the base, becoming compositional shapes in their own right (a low key effectively hands you free dark masses to aim — Chapter 6 spends them). And **below the horizon** — footlights, lava, the torch held low — light inverts the world the visual system evolved under: nose shadows climb, brows glow from beneath, sockets light bottom-up, and the face becomes wrong in the precise, pre-rational way underlighting has meant *monster* in every culture with campfires. The inversion is a tool, not a taboo — Chapter 8's candle-lit scholar tames it with angle and softness — but it is never neutral: any light below 0 degrees is a loud design choice and must be meant.

The ambient decision

A single key is never truly alone; the question is what the *rest of the sky* contributes, and that is the ratio parameter made concrete. Specify the ambient as a value: under open sun, the blue sky fills shadows generously (a two-to-three step ratio, shadows cool and alive); under a bare bulb in a cellar, the ambient is almost nothing (five-plus steps, shadows near-black, the chiaroscuro register); under overcast, the ambient *is* the key (one step, form carried by occlusion alone). Writing the ambient's value and color into the spec — "shadow masses sit at 3, tinted toward the sky's blue" — is what makes the shadow side of the figure a designed region rather than leftover space.

Designing the cast shadows

The single key's last gift is the one most painters leave unopened: **cast shadows are free composition.** They are dark masses whose shape, length, and direction you control by where you put the source — and on a display figure they should be *placed*, not merely permitted. Aim the figure's

shadow across the base toward the visual entrance, so it leads the eye in; let a raised weapon's shadow fall across the torso to quiet a busy passage; stretch a low key's shadows to triple the figure's presence on the groundwork. The rendering rules come from the parent volume — darkest and hardest at the contact point, softening and lightening as the shadow travels, the occlusion core under the boots non-negotiable — but the *design* rule is this volume's: before painting, draw the cast shadows onto the base in pencil, as shapes, and judge them as shapes. A figure whose cast shadow has been composed sits in its scene; a figure without one floats above it, however beautiful the boots.

Chapter 3 — Designing with Multiple Sources

Every source after the first is hired help: it must be motivated, it must be subordinate, and it must do a job the key cannot. This chapter is the staffing manual — the three legitimate roles a second light can hold, and the ratio discipline that keeps the household in order.

The three-point system, translated

Cinema's classic vocabulary — key, fill, rim — survives the trip to the bench with one important translation. The **key** is the key. The **fill** is almost never a second lamp at miniature scale; it is the *environment* — sky ambient and ground bounce — already specified by Chapter 2's ratio decision. Painters who import a literal second fill light usually create the unmotivated leak Chapter 1 warned against. Which leaves the genuinely new hire:

The rim

A rim (or back light) is a source behind the figure — the low sun behind the duelist, the doorway behind the assassin, the sky itself behind a ridgeline silhouette — whose job is **separation**: it draws the figure's edge in light and lifts it off the background and base. On a display figure it is the single most cinematic tool available, and it has a craft:

Placement: the rim appears only on edges that actually face the rim source — the back-quarter contour, the tops of shoulders, the crown of the head, the upper line of a raised arm — never traced around the full silhouette, which produces the outline-glow that announces the effect was copied rather than understood. *Width:* a sliver — at 32mm scale a line a few brush-hairs wide, broadening only where a surface genuinely turns toward the source (the round of a shoulder, the flat of a blade). *Continuity:* broken, always — interrupted where hair, cloth, or overlapping forms block it; the gaps are what make it read as light rather than drawing. *Value:* bright — a rim may legitimately spike near the figure's highest values, even above the key side's halftones, because it is a near-direct view of a source — but its *total area* stays tiny, so it never competes for mass. *Color:* the rim is the classic carrier of the design's second temperature — the cool blue rim against a warm key, the warm doorway rim against a moonlit figure — which is the painted form of cinema's oldest color contract and the cheapest complementary energy a scheme can buy. And *count:* one rim. A double rim (two back sources, one per side) exists, reads as studio glamour or science fiction, and should be specified as deliberately as any other exotic.

The bounce, designed

Ground bounce was the parent volume's reflected-light element; this volume promotes it to a *designed source* — because you choose the base, and the base is a lamp. A pale sandstone ground

throws warm light up into every down-facing plane: the underside of the jaw, the brow's shadow side, the under-folds of the cloak — and a figure painted with that warm under-glow inhabits its desert. Dark moss bounces almost nothing, and its figure's under-planes go correctly dead. Snow bounces so much that it functions as a genuine second key from below — soft, cool-white, and strong enough to halve the design's ratio. The selection consequence runs both directions: the base's value and color belong in the lighting spec (the palette volume chose the base for harmony; this volume also chooses it for *wattage*), and the discipline travels unchanged — bounce light, however designed, stays below the lit side's halftones. The moment the under-glow competes with the key, the form breaks, and no motivation excuses it.

Practicals and the subordination law

The last legitimate hires are **practicals** — sources inside the scene: the lantern, the spell, the forge, the window. A practical may be a micro-event (a candle's catchlight in armor, a kicker glinting one cheekbone) or a full OSL system commanding a region of the figure; either way it joins a household with one law: **no two sources at equal strength.** The key keeps a clear majority — as a working number, every secondary's effect sits at least two to three value steps below the key's effect on any surface both can reach — and where a practical is meant to *dominate* a zone (the candle owning the face while the moon owns the cloak), the design declares a local handover rather than letting the two fight: this region answers to that source, the border between jurisdictions falling along real geometry (the hood's edge, the table's shadow). Two equal keys is not twice the drama; it is the committee, and the committee always paints mush. When in doubt, demote — the strongest multi-source pieces read at three meters as *single*-source pieces, their secondaries discovered with pleasure at thirty centimeters.

A worked ratio stack

A complete multi-source spec, to show the arithmetic: *moonlit courtyard.* Key — moon, back-quarter left, 60 degrees, hard-ish, cool blue-white, lit planes to value 7. Ambient — night sky, fills shadow masses to 2.5, cool. Bounce — wet flagstones, faint cool up-glow to 3 on under-planes, plus speculars (the gloss map's business). Practical — a window, warm amber, front-right, lighting the face's near side to 5.5 and dying by the shoulder (steep falloff: it is close and small). Read the hierarchy in the numbers: moon 7, window 5.5, bounce 3, ambient 2.5 — one ruler, one minister, the crowd in its place. Every number in that paragraph is a brush instruction, which is the entire argument for writing specs.

Chapter 4 — The Color of Light

The palette volume seated the key as a scheme member; this chapter gives it the full portfolio. Light's color is not a tint applied at the end — it is a multiplier applied to everything, and designing under it means knowing the multiplication, the contracts, the limits, and the anchor.

The multiplication, as design

A surface's painted color is its local color *times* its light's color: warm light on white cloth makes cream; warm light on blue cloth makes a grayed, dulled blue (blue reflects little of warmth); green light on a red cloak makes near-black. The parent volume taught this as OSL rendering; at design level it runs *backward* — **the palette must be chosen to survive its light.** Under a strongly warm

key, the scheme's cool members will paint duller and darker than their pots; under a green swamp key, anything red is committing to darkness. This is not a problem to fix but a budget to spend: choose local colors near the key's hue and they sing; choose them opposite and they go dark and quiet — which can be exactly the design (the near-black red of a cloak under moonlight is moody on purpose). What cannot work is the unexamined middle: a palette chosen in pot-color daylight and then surprised, in week three, by its own key. The swatch-under-the-key step exists for this multiplication, and under a strongly colored key it is not optional.

The standard contracts

Three light-color systems cover most of painted civilization, each a complete warm-cool contract:

Sun and sky — the default. A warm key (the sun) against a cool fill (the blue sky): highlights shift yellow-warm, shadow masses shift blue-cool, and the parent volume's *start dark and cool, finish warm and light* is this contract in workflow form. The warmer and lower the sun, the harder the contract pulls — golden hour is sun-and-sky at full voltage.

Moon and flame — the inversion. A cool key (moonlight, painted always dimmer and bluer than the eye insists it remembers) against warm practicals (candle, window, fire): highlights shift cool, shadows lean warm wherever flame-fill reaches, and every warm event becomes precious — which is the design's point.

Overcast — the truce. A vast soft neutral-cool key with almost no opposing fill: ratios collapse to a step or two, form survives on occlusion, and — the compensation few painters use — **local color reads truest and most saturated under overcast**, because no strong key is bleaching the lights or recoloring the shadows. Overcast designs are where a palette itself is the show; the figure becomes a fabric-and-skin still life lit like a Dutch interior with the window everywhere.

Within all three, the double temperature system of the parent volume keeps operating at the form scale — the warm-cool-warm turn across a cheek under sun, its mirror under moon — so that the design's *global* contract and the form's *local* alternation nest inside each other.

How far a colored key can be pushed

Push the key's chroma and two things happen on schedule. First, the multiplication compresses the visible hue range — under deeply red dawn light, the whole world is reds, oranges, and darks, and a figure painted honestly under it approaches a duotone. This is a legitimate and striking register (the palette volume's monochrome-plus-event formula is usually a colored-key design in disguise) but it must be *chosen*, because it spends most of the hue wheel to buy atmosphere. Second, **skin needs a survival plan**: faces are the one surface viewers will not forgive going dead, so under any strongly colored key, route a warm pathway to the face — a practical, a bounce, the key's own hue mixed into a flush — or commit knowingly to stylization. The working limits: keys up to a *strong lean* (clearly warm, clearly cool, clearly green-cast) cost little and buy unity; keys at *full saturation* are duotone commitments and should be entered the way Chapter 1 enters underlighting — loudly, on purpose, with the consequences written down.

The neutral anchor

A viewer cannot see a light's color directly; they infer it — and they infer it from whatever on the figure they believe is *actually* neutral. This is the anchor principle: **give the eye one known-neutral material — bone, linen, steel, white hair, pale stone — and tint it honestly with**

the key, and the viewer reads the entire light system from it. The warm cream of a tabard announces the sunset; the blue-gray of the same tabard announces the moon; and every other color on the figure is then *interpreted through* that calibration, gaining coherence for free. A figure with no near-neutral anywhere gives the eye nothing to calibrate against, and strongly colored designs on such figures read as "the painter used odd colors" rather than "the light is doing this." When the palette has no natural anchor, hire one — it is among the best jobs a small feature can hold, and a quiet amendment to the palette volume's triage: on colored-key designs, one *connector* is promoted to instrument.

The chroma map

Last, the saturation geography that every light design implies, assembled here from doctrines the earlier volumes planted: chroma peaks in the **halftones**, where local color is neither bleached by the key nor swallowed by the ambient; the **lights** desaturate toward the key's own color (and toward white at the specular, which is the source itself); the **shadows** desaturate toward the ambient's color — and are then pulled back from gray by the re-saturation glazes, so they read as colored darkness, not absence. Drawing this map onto the value plan — *here the values, here the temperatures, here the chroma peaks* — completes the design triad, and a figure with all three maps drawn before priming is, in every sense that matters, already painted.

Chapter 5 — Environments: Time, Weather, and Atmosphere

An environment is a pre-assembled lighting design — direction, hardness, color, ratio, and bounce already negotiated by physics — and painting one convincingly means honoring the whole bundle, not quoting one parameter. This chapter specifies the great standards. Appendix C compresses them to a table; here, the reasoning.

The hours

Noon is the zenith key at full commitment: hard, neutral-to-warm white, ratio high under clear sky (the blue fill is generous but the sun is brutal), cast shadows short and dense, pooled directly beneath — the figure stands on its own darkness. Texture flattens on upward planes and pits into every overhang. Noon reads as exposure, verdict, desert; it is the least flattering hour and chosen for exactly that.

Golden hour is the painter's hour for the same reasons it is the cinematographer's: a low warm hard key (5–15 degrees of elevation) rakes texture into relief, stretches cast shadows into compositional assets, ignites rims on every back-quarter edge, and runs the sun-and-sky contract at maximum — deep warm lights against shadow masses filled blue by the entire remaining sky. Its ratio is dramatic but not severe (the sky fill is strong), its chroma generous, and its one discipline is restraint in the warmth: golden-hour pieces drown in their own amber unless the cool shadow family is enforced everywhere (the palette volume's shieldmaiden carried this exact warning).

Blue hour and dusk invert the budget: the sky becomes a vast soft cool key — low ratio, wrapped forms, blue-violet cast over everything — and every artificial source in the scene is promoted to a warm practical that reads at three times its daytime importance. Dusk is the natural home of window-glow and lantern designs: the world supplies the cool field; the story supplies the warm event.

Night and moonlight are painted, not photographed: the honest spec is a *low-key value design* (most masses at 2–4) under a cool, slightly hard key, with the eye's memory of "silver light" sup-

plied by a few confident value-7 planes rather than an overall lightening. The classic failure is painting night at day's values with blue glaze over it — moonlight as tint rather than as darkness. Commit to the dark, ration the lit planes, let warm practicals carry the life, and keep one anchor (Chapter 4) teaching the viewer the blue.

The weathers

Overcast — the giant softbox — was specified in Chapter 4's contracts: ratio of a step or two, terminators long and gentle, cast shadows nearly gone, form carried by occlusion, and local color at its truest. Add here its design use: overcast is the *fabric* light, the *face* light, the choice when the figure's own surfaces — an embroidered robe, a portrait head — are the show and drama would be noise.

Fog is overcast plus a participating atmosphere: value range compresses with distance (the figure's far edges and the base's rear lose contrast and chroma), edges dissolve toward lost, and any practical grows a halo — **halation**, the soft bloom of light scattered by the air itself, painted as a gentle value-and-chroma gradient surrounding the source before any surface is struck. Fog is the gift environment for edge design: it licenses more lost edges than any other weather, and a figure walking out of fog is half silhouette, half revelation, composed almost entirely in edge quality.

Rain and wet change the *materials*, not the key: every surface slides up the finish ladder — matte cloth to satin, satin leather to gloss, stone to mirror — which multiplies speculars, deepens and saturates local colors (wet things darken), and hands the gloss map (Chapter 7) the leading role. The sky above rain is overcast's spec; the drama below is all reflection: streets and armor pick up every practical, and a rain design is mostly the discipline of placing those reflected lights where the composition wants events.

Snow is the bounce environment: the ground becomes a soft white source from below, halving the design's ratio, lighting under-planes that are dark in every other weather (the underside of the jaw, gently, coolly lit — the signature), while the sky's blue fills shadows hard toward cyan. Snow's trap is washing out: with light arriving from above *and* below, form survives only through disciplined occlusion darks and a key kept clearly dominant over its own bounce.

Dappled light — sun through canopy — is the patterned key: hard small spots of full sun scattered across a figure otherwise in soft green-tinted shade. The spots are *shapes*, and they are composed like any other shapes: aimed at the focal point (one clean dapple on the face, the design's whole argument), scaled irregularly, edges soft-hard (penumbra at their borders), and conformed to the surfaces they land on — a dapple bends over a shoulder exactly as a freehand stripe would. Machine-gunned uniform spots read as disease; three to seven composed ones read as forest.

Firelight interiors make a practical the key: a small warm hard source inside the scene's dark field, falloff steep and exaggerated, every lit value an inverse-square consequence of distance to the flame, the rest of the room at chiaroscuro ratios. The whole OSL apparatus of the parent volume applies — with the promotion that here the glow is not an accent on a daylight design but the *entire* design, and Chapter 8's candle study runs it in full.

Atmosphere as a layer

Across all environments, the air itself is the last design layer: aerial value-and-chroma compression toward the base's rear (even millimeters of painted atmosphere stage a scene), halation around practicals, dust and spray catching low keys as visible shafts where the story can afford the theater — and the bench-level instrument for most of it is the atmospheric tint pass, the 90–95 percent

thinned airbrush breath of the key's or the air's color over figure-meets-base, which the first volume prescribed as unification and this volume re-prescribes as *weather*.

Chapter 6 — Lighting for Focus and Story

Composition decides what the viewer looks at; light is how the decision is enforced. This chapter is the design payoff — the use of every parameter so far as an instrument of attention and narrative.

The pool of light

The simplest and strongest focal device in painting's entire history: put the brightest light where the eye must go and let the rest fall away. On a miniature this is the deliberate intersection of the lighting design with the parent volume's contrast budget — the key aimed so its fullest expression (highest values, sharpest terminators, the speculars) lands on the focal point, the ratio spent so that everywhere else sits visibly lower, and the lightest-against-darkest adjacency stationed at the face. Designing the pool means auditing the key's address against the focal plan *before* priming: a 10-o'clock key on a figure whose face turns to 2 o'clock has, by specification, shaded its own protagonist — sometimes the design (see below), usually the accident.

Shadow as a writing instrument

What light reveals, shadow withholds, and withholding is half of storytelling. The designed uses: **the half-lit face** — split or Rembrandt keys leaving one eye in darkness — for duality, doubt, and threat; **the lost lower figure** — legs and base dissolving into shadow mass — for weightless menace and for quieting sculptural passages that would otherwise chatter; **the hidden object** — the weapon, the wound, the second figure held at values 1–3, discovered only at thirty centimeters — which converts a viewer into a participant; and **the composed cast shadow** as narrative shape: the shadow of the noose the figure has not yet seen, the looming shape thrown across the wall by something off-base. Every one of these is a *ratio and edge* decision — darkness deep enough to genuinely conceal, edges lost rather than outlined — and every one fails if the painter loses nerve and lifts the shadows to show the work.

Light vectors and gaze vectors

Two arrows cross every figure: where the light comes from and where the figure looks, and their geometry is a story machine. *Gaze into the light* — the face turned toward the source — is revelation, hope, address: the figure sees what illuminates it, and the viewer is invited to wonder what that is. *Light from behind the gaze* — figure looking into darkness, lit from its back — is pursuit and dread: the figure cannot see what the viewer can. *Light from the viewer's side* is theater — the figure on stage, the audience in the dark — the default and the least charged. And *light from the off-stage actor* is the deepest trick in the kit: a strong motivated source whose origin sits beyond the base — the dragon's glow from the left, the doorway's lamplight from behind the viewer's shoulder — makes the composition larger than its physical object, implying the scene's other half. The parent volume called gaze the strongest pointer in composition; add now that light is the second strongest, and that aiming the two arrows — parallel, crossed, or opposed — is a design decision as consequential as the pose.

The symbolic register

Lighting carries meanings older than painting, and a designer uses them on purpose: light from **above** is sanctity, judgment, noon truth; from **below**, the monstrous inversion; from the **side**, the divided self; from **behind**, anonymity, fate, the unknowable; **soft** is innocence, intimacy, mercy; **hard** is exposure, verdict, desert. **Warm** is life, hearth, flesh; **cool** is distance, death, the eternal. None of these are laws — playing against the register (the saint underlit by the hell she is refusing; the executioner in soft window light) is exactly how the register stays alive — but a design that contradicts the symbolism *unknowingly* sends two messages at once, and viewers feel the static without naming it. Check the spec against the story; where they disagree, one of them is wrong.

Lighting more than one figure

Duos and dioramas add a rule and an instrument. The rule: **one weather** — every figure under the same key, ambient, and contract, because nothing shatters a scene faster than two actors lit from different worlds. The instrument: **ratio as billing.** The protagonist takes the key's pool — fullest light, the speculars, the face at the design's brightest legal values; the second figure takes a visibly lower allotment — rim-lit, half-pooled, or a step down across the board; the crowd, if any, lives in the ambient. The viewer reads the hierarchy instantly and correctly, the same way an audience reads a stage. Where the *story* inverts the billing — the kneeling king in shadow, the headsman in light — the inversion is the design, and it must be total enough to read as choice.

OSL as a design decision

The parent volume rendered object-source lighting; the palette volume noted glow as an accent strategy; this volume's contribution is the *when*. Add an OSL source when the design needs what only it buys: a focal pool the natural key cannot deliver to the right address, a story actor (the spell, the forge, the held flame) the composition wants physically present, or a color event the palette could not otherwise afford. And add it knowing the price, which is global: the rest of the figure darkens and desaturates to fund the glow, the key demotes or contracts its jurisdiction, and the piece becomes *about* the light — OSL is never a garnish. The test before committing is the same grayscale exam the parent volume prescribed after: if the design's value plan does not already show the glow as the brightest event and its surroundings paying for it, the OSL is decoration, and decoration-grade glow is the effect's signature failure. One light, fully obeyed — even when the light is a candle in the figure's own hand.

Chapter 7 — From Design to Paint: The Lighting Plan Workflow

The procedure, parallel to the palette volume's Chapter 7 and meant to run beside it (the steps interleave: this volume's spec is written between that volume's notan and its dominant). One evening, twelve steps, and the design exists before the primer does.

Step 1 — Read the sculpt for light. Before choosing anything, audit what the geometry offers: where the sculpt's deep undercuts will pit into occlusion regardless of key; which way the face tilts (a downturned face fights every high key; a lifted chin invites the zenith); what large planes exist to carry a terminator; what edges could take a rim. The sculpt votes on lighting exactly as it voted on palette.

Step 2 — Mood words to parameters. The same three words from the palette workflow now answer the six parameters of Chapter 1: *weary, devout, cold* drafts itself toward a soft-ish cool key

at low ratio… or a hard low one at high ratio — the words narrow the field; the next steps decide.

Step 3 — Write the spec. Appendix A's sheet, filled completely: key direction and elevation (clock and protractor), hardness, color, the ambient's value and color, the ratio in value steps, every secondary with its motivation and its subordinate number, the bounce (what the base contributes, in value and hue), and the cast-shadow sketch. An unfilled field is a decision deferred to week four, where it costs ten times more.

Step 4 — Shoot the reference. The decisive technique of the whole workflow, and it costs twenty minutes: **put the primed (or even bare) figure under a real lamp at the spec's address and photograph it.** A single desk lamp, positioned by the clock-and-protractor numbers, hardness tuned by distance or a paper diffuser — and the sculpt demonstrates its own truth: every terminator, every occlusion pit, every cast shadow's actual shape on the actual base, free of the painter's guesswork. Photograph it from the primary view and the quarter views; this set of images *is* the value plan, shot rather than imagined. Supplement where the scene outruns the desk (colored keys via phone-screen light or gels; faces via the mirror and your own head under the lamp; multi-source via two lamps at the spec's ratio), and keep the images pinned at the bench for the duration. No painter's internal render engine competes with a five-dollar lamp.

Step 5 — Value-map from the reference. Three-value plan over the lamp photo, focal adjacency confirmed, the ratio's numbers assigned to the masses. The chroma map and temperature map (Chapter 4) are drafted on the same image.

Step 6 — Prime the design, not the habit. Here the workflow corrects the hobby's deepest reflex: zenithal priming encodes *one specific spec* — top-front key, moderate ratio — and matches only designs that share it. For every other design, **prime directionally**: the airbrush sketch laid from the spec's actual address — side-primed for the split key, back-primed bright for the rim design, under-warm for the candle piece — so the monochrome foundation tells the truth the paint will keep. Zenithal autopilot under a side-lit design means spending week two painting *against* week one, and it is the most common self-inflicted wound in ambitious lighting.

Step 7 — Anchor the occlusion. Design-independent, always first after the sketch: the pits, contacts, and crevice darks, per the parent volume. Every design shares them; no design survives without them.

Step 8 — Draft the edge map. From the hardness parameter: where terminators are abrupt (hard key, sharp form turns), where wrapped (soft key, round forms), where cast-shadow edges run razor and where they blur with travel, where edges are lost outright (shadow merges, fog). Mark the handful of *hardest* edges — they belong at the focal point, by the contrast budget — and the regions of deliberate loss.

Step 9 — Draft the gloss map. Speculars are the source made visible, so their character comes from the spec (hard small source: tight bright points; soft broad source: dim spread sheens) and their *placement* from materials and angle of incidence. The map assigns every surface its finish-ladder position under this light — and feeds the varnish plan at the end.

Step 10 — Swatch under the key. The palette volume's Step 10, run jointly: the scheme's members painted as adjacent patches with their planned shadow and highlight directions, judged under the reference photos. The multiplication of Chapter 4 either passes here or fails cheaply.

Step 11 — Paint by jurisdiction. Execute region by region under the spec, each surface answering to its assigned source (Chapter 3's handovers), the reference photos arbitrating every dispute. The parent volume's rendering machinery — sketch, glaze or rebuild, re-saturate — is the labor; the spec is the law.

Step 12 — The standing audits. Grayscale photo against the value map at every stage; the ratio

check (have the shadows crept up?); the *stranger test* — show the work-in-progress to any willing human for three seconds and ask one question: *where is the light coming from?* A correct answer in one gesture is the design holding. Hesitation is drift, and drift caught at week two is an evening's repair.

Chapter 8 — Four Lighting Designs Reasoned in Full

Four figures, four specs, the consequences traced through face, cloth, metal, and base. Each begins with the sheet, because that is where each began.

I. The pilgrim at noon

Spec: key — sun, 12 o'clock, 80 degrees (zenith with a ten-degree front bias); hard; neutral-warm white. Ambient — clear blue sky, shadow masses to 3.5, cool. Ratio — four steps. Bounce — pale dust road, warm, up to 4 on under-planes. Secondaries — none. Cast shadow — short, dense, pooled at the feet, hard-edged.

The reasoning. Noon is the verdict hour, and a pilgrim is a figure under verdict. The ten-degree front bias is the design's one mercy: it returns a sliver of light to the eyes that a pure zenith would bury — and the sculpt cooperates, the head lifted as if just hearing something. The strong dust bounce is the second mercy and the desert's signature: the jaw's underside, the brow's shadow, the under-folds of the robe all glow faintly warm from below, so the four-step ratio reads as heat rather than gloom. *Consequences:* the face models almost entirely in its upper planes — brow, nose, cheekbones at 8–9, sockets held at 4 and saved from black by the bounce; the robe (the palette's dominant) becomes horizontal geography, every upward fold-plane blazing, every vertical flank in halftone where its color and weave live; the staff's brass takes one furious specular and otherwise stays quiet; the base carries the design's darkest mass — the pooled shadow — directly under the figure, anchoring it to the road like a nail. *Risks:* socket blackout if the bounce loses its nerve, and monotony — a one-source, one-temperature noon needs its cool sky shadows enforced everywhere or the piece bakes into uniform amber.

II. Duel at first light

Spec: key — rising sun, 9 o'clock, 8 degrees; hard; deep warm gold. Ambient — dawn sky, masses to 3, cool violet-blue. Ratio — four to five steps. Bounce — negligible (dark trampled grass). Secondaries — rim on the far duelist only: the same sun, catching his back-quarter (he stands beyond the protagonist, nearer the source). Cast shadows — enormous: both figures thrown left-to-right across the entire base, hard at the boots, softening over distance.

The reasoning. A raking key turns a duel into geometry. The protagonist, nearer the viewer, takes the sun full on his right side — split-lit, the far half of his face in violet shadow, the divided-self key for a man at the edge of killing. The antagonist, placed up-light, is *rim-dominant*: a dark mass drawn in one burning gold contour, the anonymous fate the protagonist faces. Billing by ratio, exactly as Chapter 6 prescribes — and the cast shadows do the composition's heavy lifting, two long dark diagonals binding the figures and aiming the eye between them. *Consequences:* every texture on both figures rakes into relief (the design flatters gambeson weave and chainmail and punishes any soft sculpting); the blades run the parent volume's NMM horizon logic under a *low* sun — warm sky-zone low on the blade, cool dark above, the inversion that announces dawn; the cool shadow family (blue-violet) is glazed into every member's depths to hold the contract. *Risks:* the rim outlining into a drawn glow if traced continuously — it must break at the shoulder, the

elbow, the blade's cross-guard; and ratio cowardice — lift the violet masses toward visibility and the entire hour evaporates.

III. The cartographer's candle

Spec: key — a candle on the desk, 5 o'clock from the face, *minus* 25 degrees (below the chin, front-quarter); hard source, steep falloff — face to 8 at the near cheek, value falling a full step per centimeter of distance; deep warm amber. Ambient — the room, masses to 1.5–2, near-black warm umber. Ratio — six steps: chiaroscuro. Secondaries — a moonlit window, 10 o'clock high, cool blue rim along the far shoulder and hair, four steps below the key's effect. Cast shadows — the candle throws the inkwell's and the figure's own hands' shadows *upward and outward* across the maps; the window throws nothing that survives.

The reasoning. Underlighting without the monster: the inversion is tamed by *angle* and *intimacy* — front-under at 25 degrees rather than straight beneath, close enough that the falloff wraps the face in a small warm world, the scholar bent toward his own light. The nose's shadow climbs, the brow glows from below, and it reads as devotion, not horror, because the geometry says *leaning over his work* and the softness of the near-flame transition says *close*, not *footlights*. The window rim is the design's second temperature and its clock — blue on the shoulder says how late it is. *Consequences:* the face is the piece — painted in the candle's hue ladder (umber through amber to a near-white flame-side spike), its far half lost at 2; the hands and the map take the next jurisdiction, every painted contour-line of the chart picking up the glow by distance; the figure below the desk barely exists, a 1.5–2 mass with one cool rim; the candle flame itself, per OSL law, is the brightest object in the design, white-cored. *Risks:* falloff generosity — light the knees and the candle dies; and the haze failure — every amber value must be earned by an under-glow value plan, or the piece is brown soup with a bright dot.

IV. Moonlit rooftop

Spec: key — moon, 7 o'clock high *behind* (back-quarter left, 65 degrees); hard-ish; cool blue-white; this is a **rim-dominant design** — the key's jurisdiction is the figure's edge. Fill — night sky ambient, front masses to 2.5–3, cool. Ratio — five steps between rim and front masses. Bounce — wet slate tiles: faint cool up-glow plus a *specular field* (the gloss map leads). Secondary — a window in the street below, warm amber, lighting the figure's lower right edge and the underside of the cloak's hem to 4.5, steep falloff, motivated and subordinate. Cast shadows — the figure's own, thrown *toward the viewer* down the tile slope, soft-edged in the night.

The reasoning. An assassin is a silhouette with a profession, so the design gives the key to the silhouette: the moon draws the figure in one broken silver line — crown, shoulder, the long edge of the blade — and concedes the entire front to near-darkness, where the viewer must come close and the figure prefers it. The warm window below is story (the destination), color contract (amber against the blue), and the face's survival plan in one hire: its up-glow grazes the jaw and the underside of the hood, the only warmth on the piece, two-and-a-half steps under the moon's rim. *Consequences:* the front of the figure is painted almost entirely in the 2–3.5 band — the parent volume's lost-edge doctrine at full deployment, cloak merging into night, form suggested by the rim and the wet-tile reflections rather than shown; the blade's NMM is moon-jurisdiction sky-tone above, window-amber below — two reflections, one weapon, the whole design restated in steel; the tiles carry tight cool speculars laddering away toward the eaves, the gloss map as groundwork. *Risks:* the outline-glow rim (break it at every overlap); fear of the dark (the front

masses *must* hold at 2.5–3 or there is no night); and the anchor — the hood's gray lining at the jaw is the design's neutral instrument, tinted honestly amber-below, blue-above, teaching the viewer both lights from one square centimeter.

Four hours of day, four ratios, four jurisdictions — one method. The spec wrote each piece before the primer did, and every consequence traced above was legible in Step 4's lamp photographs, for the price of an evening and a desk light.

Chapter 9 — Failure Patterns and Their Repairs

Lighting failures, like color failures, are diagnosable — and most of them are specification failures wearing rendering costumes. The recurring patterns:

The committee of keys. *Signature:* face lit from the left, sword from the right, base from the front; locally pretty, jointly incoherent; the stranger test returns a shrug. *Cause:* no spec — each surface painted under its own most flattering light. *Repair:* elect one key (usually the face's), and re-audit every other surface against it by lamp photo; the losers take glaze demotions — their wrong-side highlights cooled, darkened, and re-assigned as bounce or rim where motivation allows. Expensive late; one evening early.

Zenithal autopilot. *Signature:* the spec says side key or under key; the figure says top-light, because the priming did. *Cause:* habit executing before design. *Repair:* if caught at the sketch stage, re-prime directionally — minutes. If caught in paint, treat the misplaced zenithal values as false information and rebuild the value structure opaquely by jurisdiction; and adopt Step 6 permanently.

The floating figure. *Signature:* a beautifully painted figure hovering a millimeter above its world. *Cause:* no contact occlusion, no designed cast shadow. *Repair:* the cheapest major fix in the book — glaze the contact darks under every point of touch, then paint the cast shadow as a composed shape consistent with the key's address. Twenty minutes; transformative.

Bounce wars. *Signature:* shadow sides as bright as lit sides; form gone rubbery; the figure lit from everywhere. *Cause:* reflected light painted above the halftone ceiling — usually fear of dark shadows. *Repair:* re-establish the ratio: glaze the shadow masses back down wholesale, then re-place the bounce as a *restrained* warm or cool note well below the lit side's halftones. The discipline is one sentence; holding it is the craft.

Rim abuse. *Signature:* a continuous bright line around the entire silhouette — the figure wearing its own outline. *Cause:* rim applied as edge highlighting rather than as a source with an address. *Repair:* erase the rim everywhere it faces away from the rim source; break what remains at every overlap; let its width vary with the surface's turn. A rim should be discoverable, not legible from orbit.

Ratio cowardice. *Signature:* a "dramatic" design whose shadows sit two steps under its lights; chiaroscuro announced, mush delivered. *Cause:* session-by-session rescue of detail from designed darkness. *Repair:* re-read the spec's number; glaze the shadow masses back to it in one disciplined pass; recover the lost detail *only* in the midtone band, where it always belonged. (And re-read the standing caveat: the midtones survive at every ratio — the repair compresses their area, never deletes them.)

Specular spam. *Signature:* tight white spikes on cloth, wood, skin, stone — every material at gloss. *Cause:* speculars placed by habit rather than by the gloss map; hardness ignored. *Repair:* strip speculars from every matte citizen (a local-color glaze erases them); re-issue them per the finish ladder and the source's size — and count the survivors on one hand.

The two-weather figure. *Signature:* soft wrapped face transitions above razor-edged cast shadows; overcast skin under noon shadows. *Cause:* hardness never specified, so each passage guessed. *Repair:* declare the hardness now, and conform the minority: soften the cast-shadow edges by feathered glaze (toward soft) or re-cut terminators crisper (toward hard). Edges are cheap to move; incoherence is expensive to ignore.

The palette the light killed. *Signature:* week three — the scheme's cool members gone dull and dirty under the warm key, or the whole figure dim under a colored one. *Cause:* the multiplication unexamined; no swatch under the key. *Repair:* accept the physics and redesign the casualties' *roles* — the dulled blues become the design's quiet members, their lost chroma re-budgeted to surfaces near the key's hue — or re-route warmth to the casualties that cannot be spared (the face) via a motivated practical. Prevention costs one swatch hour.

Glow without payment. *Signature:* OSL as colored haze — the parent volume's classic, restated as design: the glow brightened nothing and darkened nothing; it merely tinted. *Cause:* the source added as garnish, the global suppression never funded. *Repair:* run the grayscale exam; if the glow is not the value event, rebuild — under-glow values first, candy color second, and the *rest of the figure glazed down* to pay for it. Or remove the source entirely, which is sometimes the honest verdict.

The unmotivated source. *Signature:* a second light with no citizenship — no window, no flame, no sky to issue it. *Cause:* "the shadow side needed something." *Repair:* give it papers or deport it. Motivate it retroactively (add the practical to the scene — a base lantern, an off-stage implication) or fold its effect back into legitimate bounce at legal values.

The meta-pattern, identical to the palette volume's: failures of **unmade decisions**. Every repair above is the costly form of a cheap early step — a spec field left blank, a lamp photo never taken, a number never written. Choose the light once, completely; obey it everywhere; and let the audits, not the hours, tell you it is holding.

Appendices

Appendix A — The Lighting Spec Sheet

One page, filled before priming. The fields, with the question each answers:

Key — direction (clock) and elevation (degrees): *where does the light live?* · Hardness (hard / medium / soft, with the source named — sun, sky, flame, window): *what are my edges?* · Color and temperature: *what multiplies every local color?* · Lit-plane target value: *how bright is bright?*

Ambient — value of the shadow masses, and their color: *what does the rest of the sky contribute?*

Ratio — lit side minus shadow side, in value steps (1–2 open / 3–4 dramatic / 5+ chiaroscuro): *what is my contrast philosophy, as a number?*

Bounce — the base's contribution: its value, its hue, which under-planes it reaches: *what is the ground's wattage?*

Secondaries — each with: motivation (what in the scene issues it), address, color, target value, and subordination (steps below the key), plus its jurisdiction if it owns a region: *who else is hired, and why?*

Cast shadows — a thumbnail sketch of their shapes on figure and base, with edge notes (hard at contact, softening with travel): *where do my free dark masses fall?*

Edge map — the figure's hardest edges (few, focal) and its deliberate losses: *where is crisp, where is gone?*

Gloss map — each material's finish under this light; specular size per the source: *where does the source itself appear?*

The anchor — the near-neutral surface that will teach the viewer the key's color: *what calibrates the eye?*

Stranger test answer — one sentence: *"The light comes from [source] because [reason]."* If the sentence is hard to write, the design is not done.

Appendix B — Direction and Elevation Effects Matrix

Key address	Face behavior	Mood register	Chief uses	Chief risks
Front, mid (flat)	Even, minimal modeling	Plain, documentary	Showing pattern/freehand	Formless; avoid for drama
Front-quarter, 45 degrees (Rembrandt)	Full modeling; triangle on far cheek	Classical, alive	The default portrait key	None — hence its rule
High front (butterfly)	Symmetric; shadow under nose; cheekbones	Glamour, nobility	Beauty, authority	Flattery where menace is wanted
Side, 90 degrees (split)	Half lit, half dark	Duality, threat	Conflict, interrogation	Dark half must stay dark
Back-quarter (rim)	Face in shadow; edge in light	Fate, anonymity	Silhouettes, departures	Outline-glow; front mush
Zenith, 80–90 degrees	Brow/nose blaze; sockets pit	Verdict, divinity, noon	Saints, deserts, judgment	Raccoon eyes; needs bounce or bias
Low, 5–15 degrees (raking)	Long shadows; texture relief	Golden hour, dawn, embers	Texture, long cast shadows, rims	Warmth drowning; enforce cool fill
Below 0 degrees (under)	Inverted shadows; the wrong face	Monstrous — or intimate at front-under angles	Horror; candle and forge scenes	Never neutral; must be meant

Appendix C — Scenario Quick-Specs

Scenario	Key (address / hardness / color)	Ratio	Signature consequences
Noon, clear	Zenith / hard / neutral-warm	4	Short pooled shadows; socket management; sky-blue fills
Golden hour	5–15 degrees / hard / deep warm	3–4	Raked texture; long cast shadows; rims; cool violet shadow family
Blue hour	High all-sky / soft / cool	1–2	Practicals promoted; warm events precious
Moonlit night	High back or side / hard-ish / cool blue	4–5	Low-key value design; few value-7 planes; warm practicals carry life

Scenario	Key (address / hardness / color)	Ratio	Signature consequences
Overcast	Everywhere / very soft / neutral-cool	1–2	Form from occlusion; truest local color; the fabric-and-face light
Fog	As overcast + atmosphere	1–2, compressing with depth	Lost edges licensed; halation around practicals
Rain / wet	As overcast above	2	Gloss map leads; speculars multiply; colors darken and saturate
Snow	Sky key + ground as soft white under-source	2	Lit under-planes; cyan shadows; occlusion holds the form
Canopy / dappled	Hard spots in soft green shade	Spot-local 4	Compose 3–7 dapples; one on the face; conform to form
Firelit interior	In-scene flame / hard / deep warm	5–6	Steep falloff; chiaroscuro field; OSL law: flame brightest

Appendix D — Glossary of Lighting Terms

Ambient: the environment's non-directional contribution; sets the shadow masses' floor. **Anchor (neutral):** a known-neutral material tinted by the key, from which viewers read the light's color. **Bounce:** light reflected from the ground or nearby surfaces into shadow planes; always below the lit side's halftones. **Falloff:** the rate light dies with distance; steep for near sources, nil for celestial ones. **Halation:** the painted bloom of light scattered by atmosphere around a bright source. **Hardness:** edge character of a light, set by the source's apparent size; hard = abrupt terminators and tight speculars, soft = wrapped forms and dim broad sheens. **Jurisdiction:** the region of a figure assigned to a given source in a multi-source design. **Key:** the dominant light; the design's first and largest decision. **Motivation:** the in-scene justification every painted source must have. **Practical:** a source that exists inside the scene (candle, window, spell). **Raking light:** a low-elevation key skimming surfaces, maximizing texture and shadow length. **Ratio:** lit-to-shadow difference, in value steps; the contrast philosophy as a number. **Rim:** a back source drawing the figure's edge in light; broken, narrow, and singular by default. **Spec sheet:** the one-page complete description of a lighting design (Appendix A). **Stranger test:** the three-second audit — *where is the light coming from?* — that a holding design passes in one gesture. **Terminator:** the boundary where planes pass from direct light into form shadow.

End. One light, fully obeyed, outshines five.

Book IV — Ground

On Basing, Presentation, and the Junctions Where Medals Are Lost

Introduction — Where Medals Are Lost

Bases rarely win medals. They lose them constantly.

This asymmetry is the organizing fact of the whole discipline, and it deserves to be stated plainly before anything is built. A judge at a major competition almost never elevates a piece *because* of its base — the figure is the argument, and the cabinets are full of figures. But judges demote pieces because of their bases routinely, and usually silently: the groundwork that competes with the face, the scale error that breaks the fiction, the resin that climbed a boot, the rim with slop on it, the figure that floats a half-millimeter above its own world. None of these appear in the feedback as "the base was the problem." They appear as a piece that felt slightly less resolved than its neighbor — and a bronze that should have been gold.

The reason basing fails so quietly is that it is not one discipline but five, practiced simultaneously at the exact moment a long project's patience is thinnest. A base is a *composition* problem (the parent volume's Chapter 6 set the laws: never the focal point, the silhouette rules apply to the combined object, the stage versus the pedestal). It is a *color* problem (the palette volume's Chapter 6: a darker, muted relative of the figure's scheme, no new hues, one accent echo). It is a *lighting* problem (the third volume: the base as bounce source, the cast shadow as composed shape, one weather for figure and ground). And it is two things no previous volume has covered: a *construction* problem — materials, structure, adhesives, water, attachment, transport — and a *scale* problem, the discipline of making every grain and blade agree about how large the world is. This volume assumes the first three as settled law, cites them where they bind, and supplies the missing two — then assembles all five into the workflow, the worked examples, and the failure catalogue that close the book.

One reframe governs everything in it, and it is the judge's reframe: **there is no such thing as a figure on a base. There is one object — figure, groundwork, plinth — and the piece is judged to its lowest-resolved component.** The painter who spends three hundred hours on a face and a weekend on the ground has built a piece whose quality is set by the weekend. The figure ends at the boots; the piece ends at the plinth.

Chapter 1 — What a Base Is For: The Judge's Eye

The hierarchy of jobs

A base holds four jobs, in ascending ambition, and declaring which jobs *this* base holds is the first design decision. At minimum it is a **platform** — physical support, stable, transportable, finished. Above that, a **pedestal** — the parent volume's term — presenting the figure with composed restraint: harmonized groundwork, no narrative, the frame around the painting. Above that, a **stage** — terrain and props that participate in the figure's story, explain the pose, extend the moment. And at full ambition, a **world** — the diorama register, where the environment carries meaning equal

to the figure and the categories change accordingly. Every job includes the ones below it: a world that fails as a platform (wobbles, sheds flock, can't survive the drive) fails entirely. The classic mistake is the unchosen middle the earlier volumes keep finding in their own domains — here, the *half-stage*: enough incident to distract, not enough to mean. Choose the job; build to it; stop.

What the judge actually checks

Watch experienced judges handle pieces and a consistent inspection emerges, worth internalizing as a pre-flight list because it is the audit your base will face:

The integration pass. Does the figure inhabit the ground or sit on it? Contact shadows under every point of touch; the transition where boot meets earth (a hard glue-line silhouette is the giveaway); the ground's bounce in the figure's under-planes and the figure's dust on its own boots. Floating is the most common integration failure and the most damning, because it announces that figure and base met late in life.

The rim and the underside. The plinth and base rim are the most-handled surfaces on the piece and the first thing inspected at thirty centimeters: clean painted edge, no groundwork slop, no fingerprints in the finish, and — yes — a finished underside, because judges turn pieces over and an underside with dried glue and raw cork says *afterthought* about everything above it.

The scale audit. Chapter 4 in one judging instant: does every element agree with the figure about how big the world is? One pet-shop boulder, one tuft like a shrub, one tsunami ripple, and the fiction drops.

The hierarchy check. Squint: does the eye go to the face or to the ground? Saturation, value extremes, and detail density on the base are measured against the figure in three seconds, and a base that wins the auction has lost the medal.

The finish census. Glue shine in the grass, gloss spots where matte was meant, a stray static-grass fiber varnished to a greave, resin meniscus on an ankle, dust in the recesses. None of these is a composition error; all of them are resolution errors, and resolution is what separates the top of a category from its middle.

Restraint, the master virtue

Every volume in this series has ended a chapter by rationing something — chroma, sources, speculars — and basing is where the rationing instinct is tested hardest, because basing materials are *fun*: the tufts, the resins, the powders, the seventeen kinds of moss. The parent volume's inverse law stands as the budget: **the busier the figure, the simpler the base; the more austere the figure, the more the base may say.** Add this volume's corollary for competition work: when in doubt between two basing ideas, build the quieter one and spend the saved hours on the junctions — the contact shadows, the rim, the socket — because junctions are where the judge's five checks live, and no judge has ever demoted a piece for a base that was merely clean, scaled, and harmonized.

Chapter 2 — Designing the Base: Footprint, Mass, and Height

Footprint: shape, size, and the rules

The footprint is chosen against three masters. The **competition regulations** come first and are read first — categories cap footprints, some restrict plinth dimensions, and discovering this in week ten has cost more painters more conversions than any artistic error; check the current rules of the

specific event, in writing, before cutting anything. The **figure's stage presence** comes second: too small a footprint cramps the pose and forces tangents at the rim (the sword tip kissing the edge — the parent volume's classic); too large strands the figure in dead ground it must then fill or apologize for. The working proportion for a single figure: the footprint comfortably contains the figure's cast-shadow sketch and its line of action's landing zone, with margin — typically one-third to one-half the figure's height in clear ground on the open side — and not much more. The **shape** carries the parent volume's connotations: rounds for organic flow, squares and rectangles for architecture and formality, irregular cuts for wilderness — with the addition that shape should echo something in the piece (the square plinth under broken masonry, the oval under a wheeling rider) rather than merely contain it.

Placement: the figure stands off-center, facing in

Restated from the composition laws because it is violated on half the bases in any cabinet: the figure is placed by the armatures — a third back, a third to one side as the default — facing and moving *into* the footprint's larger open area, never out of it. The mock-up makes this cheap: tack the figure to the candidate base, photograph from the primary view, and run the grid overlays (thirds, phi) over the image. Ten minutes of overlay work settles arguments that eyeballing never will, and it settles them before glue.

Height architecture

Elevation is the base's most powerful and most abused variable. What height *buys*: drama and monumentality; extension of the line of action (the lunging figure on the rock that continues the lunge); separation of the silhouette from the cabinet's clutter; and — the unglamorous decisive one — **eye-line**: pieces are judged at cabinet height, and a plinth-plus-base that lifts the face toward a standing viewer's eye is worth real consideration in the design arithmetic (Chapter 7 does the math). What height *costs*: stability and transport risk, rising with every centimeter; a column of vertical surface that must now be designed and finished to the same standard as everything else (the tall spire with a beautiful top and four boring sides is a common casualty); and compositional stakes — a raised figure's silhouette is more exposed, so the pose must deserve the pedestal.

The architectures, in ascending commitment: **flat ground**, the pedestal register, all virtue in surface and finish; the **raised element** — a single rock, stump, step, or ruin fragment lifting one foot or the whole figure a few millimeters, the cheapest drama available and the natural home of the weight-shifted pose; **terraced levels** — two or three plateaus stepping up to the figure, leading the eye on a designed diagonal and providing addresses for story props at each landing; and the **spire or column** — the figure flown well above the plinth on rock, masonry, or trunk, maximal drama, maximal exposure, and a standing requirement that the column itself obey the silhouette and tangent laws (the vertical mass leaning *against* the figure's lean for counterweight, per the balance doctrine).

The combined silhouette

Design the base's mass as part of the figure's outline from the first sketch, because the judge's first read sees one shape. The base may rise *behind* and *beside* the figure's silhouette as counterweight and frame; it must not rise *into* it — rockwork merging with a leg, foliage tangent to a blade, the ruin's edge kissing the elbow. Audit from the primary view and the photograph height, exactly as

the parent volume's tangent discipline prescribes, and audit again after every construction stage, because bases grow in the building and tangents arrive uninvited.

Design the shadows before the ground

The lighting volume's instruction lands here with full force: before construction, sketch the figure's cast shadow — and every major base element's — onto the footprint plan, at the spec's key address. The sketch determines real decisions: where the ground must stay smooth enough to *carry* a painted shadow (a cast shadow across hyper-textured rubble reads as noise), which side of a raised element falls into designed darkness, and whether a planned prop sits uselessly inside the figure's own shade. The lamp-photo technique transfers whole: tack the mock-up together, light it at the spec, photograph — and the base demonstrates its own shadows, gratis, before a grain of sand is glued.

Chapter 3 — Materials and Construction

The construction chapter the series has not needed until now. Organized by element — ground, stone, wood, vegetation, water, snow, architecture — then by the engineering that holds it all together. Appendix B compresses the selections to a table; here, the reasoning and the failure modes.

Building the mass

The core of most raised bases is **cork** — sheet and chunk — because it stacks fast, tears into convincing strata, carves with a blade, takes pins and glue happily, and weighs nothing. Torn cork edges read as sedimentary rock at 32mm with almost no help; the technique is layering (stacked sheets with deliberate overhangs and setbacks, the strata running consistently — geology has a grain, and cork stacked with its layers tilted *one* direction reads as an uplifted formation while randomized tilts read as rubble). Its rival is **XPS foam** (extruded insulation board): carvable into anything — blended rock faces, cut masonry, sweeping slopes — light, cheap, and with two cautions: it dissolves under solvent sprays and superglue accelerants (seal with acrylic medium or use PVA and acrylic paints), and it compresses under clumsy handling, so it wants a hard shell of paste or paint before fine work. **Epoxy putties and air-dry clays** sculpt the transitional ground — the parent volume's Chapter 10 table governs the choices; for groundwork specifically, the sandable epoxies and cheap air-dry clays do the bulk shaping, with the figure's feet *pressed into the soft material* during the fit stage so the ground receives the boots rather than meeting them flat (half of figure-base integration is mechanical, and it happens here). **Plaster and casting compounds** fill molds for repeated masonry and pour over carved forms for a stone-hard shell.

Stone

The standard worth stating once: **real stone is the gold standard for painted stone, because it is stone.** Slate and shale split into scale-true strata with fractal texture no sculpting matches; small pieces glue with thick CA or two-part epoxy (pin anything heavy — a brass rod into a drilled socket, both sides), and the weight that makes slate a transport consideration also makes it ballast that steadies tall designs. Behind real rock: **cork bark** (lightweight cliff faces with dramatic texture, slightly soft-edged — best for weathered formations), **carved XPS** (full control of form, needs painted texture to earn its surface), and **cast rocks** from rubber molds (repeatable, consistent,

slightly generic — best in supporting roles). Whatever the material, obey the geology: one rock species per formation, strata agreeing in direction, fracture faces sharp where freshly broken and rounded where ancient.

Earth and ground texture

Convincing earth is **graded, not uniform**: real ground sorts itself into a distribution of particle sizes, and the recipe follows — a binder layer (PVA, acrylic paste, or a commercial texture paste) seeded with two or three grades of grit (fine sand through small talus), the coarse fraction placed deliberately in the lees of rocks and the low spots where water would deposit it, the fine fraction dominating open ground. Commercial texture pastes (the acrylic earth and mud ranges) are legitimate and fast — their failure mode is *uniformity*, the spreading of one homogeneous crunch edge to edge, cured by seeding and by varying the application thickness. Two engineering notes: texture everything *before* priming so the whole ground shares one surface chemistry; and keep a clean margin at the rim — a few millimeters of untextured edge that will become the painted border, because grit migrating over the rim is the slop the judge's finger finds first.

Wood

Real twigs fail as trees — bark texture does not miniaturize, so a twig reads as a log wearing the wrong skin — but real wood succeeds everywhere its *grain scale* is honest: **seafoam branches** (the dried beach plant) are the standard for bare trees and roots at 32mm, delicate to fragility (reinforce trunks with wire and CA); **driftwood and root fragments** make weathered deadfall; and **carved basswood or balsa** makes every plank, beam, door, and palisade — scribed with a stiff brush or razor saw along the length for grain, edges distressed, nail holes pricked in honest rows, because lumber is a manufactured object and reads as one only when its marks of manufacture (sawn ends, regular widths, joinery) are present. Plank width discipline belongs to Chapter 4's scale audit; the construction note here is sequencing — build woodwork as sub-assemblies, paint them nearly to completion off the base, and marry them late, since groundwork and grass make terrible neighbors for the airbrush.

Vegetation

The restraint budget applies double here, because vegetation products are seductive and additive. **Static grass** (2mm, 4mm, 6mm fibers, planted with an electrostatic applicator so they stand) is the ground cover; its craft is *patchiness* — real grass grows where water and light allow, in colonies with bare earth between, never as broadloom; plant in irregular patches, vary the length mix, and shade the planted grass afterward with the airbrush (a zenithal pass and a cool shadow glaze) because raw grass fiber is one flat color and reads it. **Tufts** (pre-made bundles) are accents, not lawns: torn into irregular fragments rather than placed as the perfect domes they ship as, seated in crevices and against stones where a plant would actually root, and trimmed — a tuft straight from the sheet is a signature the judge knows. **Leaves** — punched from real dried leaves with a craft punch, or birch seed scales, which are perfectly scaled fallen leaves by accident of botany — scatter in the lees and corners where wind deposits them, glued individually where they show. **Flowers** obey the palette volume to the letter: the licensed single accent echo, one species, placed on the sightline, and nothing else blooming. Moss powders, lichen, and foliage clumps fill the texture between — with every green chosen as a *muted citizen* of the figure's scheme, never from the packet's raw chroma.

Water

Water is the highest-risk material on the bench, and its disasters are famous enough to deserve their engineering up front. The ladder, by depth: **gloss varnish or gloss gel** for damp ground, puddles, and shallow films — multiple thin coats, zero risk, underrated; **UV resin** for shallow features a few millimetres deep — cures in seconds under the lamp, no mixing, slight tack if under-cured (finish with a gloss coat), excellent for streams and spill effects; **two-part epoxy resin** for real depth — and here the discipline. Pour in lifts of a few millimetres, never one deep flood (deep pours overheat, yellow, and crack); dam every edge with a taped or clay-sealed wall and *test the seal with water first*, because resin finds the leak you did not, overnight, onto the plinth; tint in the cup (transparent inks, a drop — depth multiplies tint), eliminate bubbles with a heat pass; and accept the cure time. The two finishing crafts: **the meniscus** — resin climbs every vertical it touches, so anything standing in the pour (legs, stones, reeds) gets its waterline planned, masked, or designed (a painted wet-darkening band above the line turns the climb into realism); and **movement** — ripples, wakes, and falls are built *on top* of cured flat resin with gloss gel and water-effects paste, sculpted in the direction the scene's physics demands, then tipped with the lighting volume's speculars. Painted depth belongs underneath it all: the bed painted dark in the deeps and warm in the shallows *before* any pour, because resin is glass, not water — the water is painted, the resin is its surface.

Snow

Snow is a mixture, not a powder: the standing recipes combine a white medium (heavy gel or PVA) with a fine bright filler (microballoons or a commercial snow powder) — stiff mixes sculpt into drifts and cornices, loose mixes brush into dustings — with **water-effects gloss blended in where snow goes wet** (footprints, the splash line, anything near the figure's heat). Application follows wind and gravity: drifts in the lees, accumulation on every upward-facing plane per the zenithal logic, thin crusts at exposed edges. The two restraint rules: sparkle additives at homeopathic doses or not at all (glitter scale-breaks instantly), and the figure participates — snow kicked at the toes, compressed in the footprints, dusted on the shoulders at the same density the ground claims is falling.

Architecture and the printed base

Masonry is carved (XPS scribed into coursing, mortar lines pressed not cut, individual stones varied a half-millimetre in projection), cast (plaster from molds for repeated elements), built (plasticard for crisp engineered forms), or — increasingly — **printed**: the parent volume's resin pipeline closing its loop, because the printer turns the base into designed sculpture. Custom architectural fragments at the exact angle the composition wants, broken edges modelled rather than improvised, coursing and ornament at true scale, the column that continues the figure's line of action drawn in CAD against the actual figure scan — this is the strongest argument the series has made for the digital chapter, and the discipline that travels with it is the same: print lines filled and sanded to the same standard as any surface, because architecture's flat planes show layer artifacts more cruelly than any organic form.

The engineering: attachment, structure, transport

Last and least negotiable. **The figure is pinned** — a brass rod (1–1.5mm) deep into the leg, deep into the base, the joint dry-fitted through every stage and glued at final assembly; figures attached by boot-sole adhesion alone do not survive the hobby, let alone the drive to the venue. **Sub-assemblies and magnets** extend the principle: figure painted off the base and married late; tall or fragile elements (the banner, the seafoam tree) socketed or magnetized for transport and re-seated on arrival; for heavy slate-and-resin builds, the base itself magnetized or bolted to a transport board so nothing rattles. **Structural honesty**: tall designs get their weight low (slate ballast in the plinth, foam up high), every cantilever gets a hidden pin, and the finished piece passes the tip test — fifteen degrees in any direction without drama — before it is allowed near a paintbrush. The parent volume's transport rule closes the chapter because it begins here, at construction: *nothing touches the paint*, which is achievable only if the piece was engineered, from the first pin, to be carried by its plinth and nothing else.

Chapter 4 — Scale Discipline

Scale is the fiction's load-bearing wall. A figure can survive a weak color choice or a soft transition; it cannot survive standing next to a blade of grass the size of its leg, because the viewer's depth-and-size machinery — older and faster than any aesthetic judgment — flags the contradiction before conscious thought begins. Scale errors are the basing failures judges describe as "something off," and they are entirely preventable by arithmetic.

The arithmetic

A 32mm-class figure stands in for a human of roughly 1.8 metres, putting the world at about **1:56**; a 54mm figure sits near **1:32**. Two divisions, memorized or kept on a card (Appendix C is that card), convert any real-world dimension into the only honest question basing materials face: *how big is this thing pretending to be?* Knee-high grass (40–50cm) is 7–9mm at 32mm scale — which convicts most 6mm tufts of being thigh-high meadow and most 12mm "wild grass" of being a cereal crop. A cobblestone (10–15cm) is 2–3mm. A floorboard (12cm wide) is 2mm. A liftable boulder is 5mm — which is why the pet-shop gravel that *feels* rock-sized in the hand reads as a one-tonne glacial erratic on the base, and why coarse sand, whose grains run 1–2mm, reads not as sand but as a field of melons. Sand at scale is *dust*; the finest grades and ground pigments play sand, while "sand" plays stones.

The fractal exemption and the real-material paradox

Why is real slate always in scale while real twigs never are? Because some natural materials are **fractal** — statistically self-similar across magnification — and some are not. Stone fracture, earth, dust, and water surfaces look like themselves at every zoom: a hand-sized shard of slate photographed close is a cliff, honestly. Biological materials are built of fixed-size units — bark plates, leaves, grass blades, wood grain — that do *not* shrink with the specimen, so a thin twig wears the bark texture of a thin twig, which at 1:56 is a tree wearing the bark of a pencil. The rule that falls out: **real materials are admitted by texture scale, not by overall size.** Slate, sands, soils: in by default. Twigs as trees: out (seafoam in). Dried plants as plants: audited piece by piece — the question is always whether the *smallest visible feature* (a leaf, a fiber, a pore) divides down to something a 32mm world contains.

The frequency match

Beyond individual sizes sits a subtler audit: **texture frequency** — the visual busy-ness per square centimetre — must be continuous across the boot line. A figure sculpted and painted with fine, high-frequency detail standing on coarse, low-frequency groundwork reads as a photograph pasted on a cartoon; the reverse reads as a toy on a film set. Match the grain: the ground's texture density steps up near the figure (where inspection happens) and may relax toward the rim, but it never jumps registers. This is also the scale logic behind the parent volume's texture-frequency rule arriving at the base: heavily textured ground wants simplified painting (drybrush and glaze country), smooth ground can carry painted incident — and both must agree with what the figure itself is doing.

The cliche crimes, by size

The recurring convictions, for the pre-build audit: oversized grass (the single most common error in competition cabinets); gravel-as-boulders; flowers at head diameter (a rose is 8cm — 1.4mm here; the licensed bloom is a *dot* of color, not a blossom); water ripples at storm-swell wavelength around a standing figure (ripple spacing at scale is sub-millimetre — suggest, don't sculpt); snow clumped in meringue peaks no flake distribution produces; brick courses at double height (a course is 1.3mm — carve fine or read as cyclopean); and bark, always bark. The repair for every one is the same: measure the real thing, divide, and believe the number over the eye that has normalized the error across a hundred hobby photos.

Chapter 5 — Painting the Ground

The ground is painted under the same laws as everything above it — same key, same palette citizenship, same finish ladder — plus three duties all its own: it must *receive* the figure, it must *bounce* like the material it claims to be, and it must stay quiet while doing both.

One weather, enforced downward

The lighting volume's single-spec law governs the base without amendment. The ground takes the key from the same address: upward-facing planes light, every crevice and overhang pits into occlusion, the raised rock's shadow side agrees with the cloak's. The directional priming pass that sketched the figure sketches the base in the same session — there is no faster way to guarantee agreement — and the figure's **cast shadow is painted onto the groundwork** as the composed shape Chapter 2 sketched: masked or freehanded, darkest and hardest at the contact points, softening and cooling as it travels, glazed in passes so the ground's texture survives inside it. A painted cast shadow is the single highest-leverage stroke on any base; its absence is the floating-figure conviction, and its presence makes even a modest pedestal sit inside a world.

The palette, executed

The palette volume's selection law — the base as a darker, muted relative; the three strategies (muted-complement ground, darker-analogous, neutral stage); no new hues; one accent echo — converts at the bench into a short execution doctrine. Mix the ground's colors *from the figure's palette*: the scheme's chromatic near-black plus its earths and grays, leaned warm or cool per the chosen strategy, so the base shares blood with the figure by chemistry before any glaze unifies them. Hold the values in the middle band — the working ground lives around 3–5, beneath the figure's

lights and above its pits — with two deliberate exceptions: the **contact darks** under the figure (the deepest values on the base, by law) and a gentle **vignette** toward the rim, the outer centimetre dropping a half-step in value and chroma so the footprint's edge recedes and the eye stays inboard. Saturation obeys the budgets from above: the ground spends almost nothing, holding its chroma below the figure's *secondary*, and the licensed accent echo — the one bloom, the dropped ribbon, the glinting case — is placed on the sightline and rationed to one.

The workhorse sequence

For textured ground — earth, stone, rubble — the reliable stack: prime directional; base the masses in the mixed scheme-earths; **heavy drybrush** with the lighting volume's dome-brush method, stroked strictly from the key's address, which models a thousand grains an hour and is simply the correct tool for high-frequency texture; **glaze** the variation in — moisture darks in the low spots, mineral and soil shifts zone by zone, the cool shadow family into every shaded face; re-cut the occlusion pits; then place the few *painted* events (edge chips on stone arrises, the wet ring at the puddle, individual stones picked out near the figure) where inspection-distance viewing will find them. Smooth ground — flagstones, boards, sand sheets — inverts the labor toward the parent volume's material recipes (stone, wood) executed broad and clean, with the base's flatness exploited as the quiet the figure needs.

Earth recipes, briefly

Dry dust: pale warm grays and buffs, high-key for ground, matte to dead-flat, contrast low — dust fills its own shadows. *Wet mud*: dark warm umbers glazed glossy in the ruts (the gloss map arrives at the ground), color saturated — wet earth is rich earth — with drag and splash directionality where the scene moved. *Forest loam*: cool dark humus base, leaf-litter mids, moss accents in scheme-greens, the most value-quiet of grounds. *Sand*: graded fines, warm pale base, long soft drybrush from the key, shadow sides of every ripple cooled — and the discipline of almost no events, because deserts are about emptiness. *Ash and burn*: chromatic near-blacks with warm ember glazes deep in the texture, the one ground that legitimately runs darker than the figure's midband, and therefore wants a figure designed for it.

Boots first: the integration stack

The chapter's reason for existing. A figure inhabits its ground when material travels *both directions* across the boot line, and the finishing sequence builds the exchange:

1. **The mechanical seat** — done back in construction: feet pressed into the soft groundwork, the earth displaced around the soles, no flat-meets-flat.
2. **Contact occlusion** — the near-black core under every touch point, glazed first and re-cut last.
3. **The painted cast shadow** — the composed shape, as above.
4. **Bounce exchange** — the lighting volume's doctrine executed: the ground's color glazed faintly up into the figure's under-planes (warm dust under the jaw and hem above a pale ground; cool green lifting into the cloak's depths above moss), and a whisper of the figure's dominant reflected into the ground's smoothest surface beside it — wet stone and water do this honestly; dry ground takes only a breath.
5. **The figure wears the world** — dust gradient up the greaves in the ground's own pigment (weathering powders or dry-pigment glazes, densest at the sole, gone by the knee); mud

where the mud is, in the mud's gloss; snow kicked at the toes and dusted on the shoulders at the falling density; the hem darkened with wick where it drags the wet. This step is where most otherwise-excellent competition pieces stop short — the pristine boot on the weathered ground — and it is a thirty-minute step.

6. **The atmospheric tie** — the series' standing finisher: the 90–95 percent thinned airbrush breath of the air's color over the lower figure and ground together, the painted weather that closes the seam.

Run the stack and the judge's integration pass finds one object. Skip it and two beautifully painted strangers share a plinth.

Chapter 6 — The Story on the Ground

The parent volume's narrative doctrine — moment selection, the one specific prop, the witness principle — was written for the whole piece. This chapter is its ground campaign: what the base alone can say, and the discipline that keeps it from babbling.

The base is evidence

A figure shows the moment; the ground shows *everything before it*. This is the base's unique narrative power — it is the scene's memory — and it works through evidence, not declaration: the drag marks that say something heavy was moved, the older arrow already weathered in the post beside the fresh one, the worn path that says this crossing is used, the char that says the fire was last night, not last year. Designing story groundwork means asking the archaeologist's question — *what happened here, and what would it leave?* — and then planting two or three findings, no more, each one specific enough to be read. The parent volume's prop law scales down intact: one child's shoe in the mud outranks a battlefield of skulls, because a specific object asks a question and generic ones answer none.

Time, place, and season

The ground is also where a piece declares *when and where* it is, almost for free. Season: the birch leaves down and brown (autumn), the snow rotten at the edges (thaw), the grass gone to straw (late summer) — one consistent seasonal signal across every organic element, because mixed seasons read as a parts-bin. Climate and place: the ground's moisture (the gloss map again), the plant species' sparseness or riot, the stone's geology. Civilization: the cut edge — any sawn plank, dressed stone, or fence post instantly places humans in the world, and its *condition* (maintained, abandoned, ruined) dates them. These are cheap signals with high yield, and they are the legitimate way to make a pedestal-register base quietly rich: no story incident at all, just a ground that knows its own latitude and month.

The edge as implication

The footprint's edge is a frame, and frames can cut *meaningfully*. A bridge that breaks at the rim implies the chasm beyond; the cobbles that end mid-arch imply the rest of the gate; the shadow entering from off-base implies the lighting volume's off-stage actor standing just outside the world. Cutting an element at the edge — decisively, at its strongest cross-section, with the cut face finished as part of the rim — converts the base's physical limit into compositional reach, and it is the diorama's power available at single-figure scale. The failure mode is the timid cut: an

element that merely peters out at the rim reads as ran-out-of-base, while one that exits *confidently* reads as a window onto more.

Ground reaction: the moment, witnessed by the earth

Action poses make physical demands the ground must answer or the fiction stalls. The charging figure's push-off foot throws spoil; the landing splashes; the dragged cloak hem leaves its wake; the planted lance butt has dug in. Audit the pose for every force it applies to the world and let the world respond — kicked stones airborne only where the engineering can pin them invisibly; otherwise the *aftermath* of force (the gouge, the scatter, the splash crown in water-effects) which is cheaper, sturdier, and usually reads better than the freeze-frame. A dynamic figure on an inert ground is half a sentence.

The cliche audit

Some basing vocabulary has been spent into worthlessness, and competition work should treat it as radioactive unless redeemed by specificity: the skull pile (a skull is a *prop* — one, placed, meaning something — not a texture), the generic gothic rubble, the randomly planted sword, the tuft-ring around the boots, lava under everything. The test is the same one the parent volume applied to props: can this element answer *why are you here* with something other than "the bits box"? An archetype answers with story; a cliche answers with habit. When an element fails the question, the repair is not always deletion — sometimes it is specification: the skull becomes *the helmeted skull still wearing the figure's old regiment's colors*, and the cliche is suddenly the best sentence on the base.

Chapter 7 — Plinths, Sockets, and the Cabinet

Everything below the groundwork is presentation, and presentation is scored — informally, silently, in the judge's hands and the cabinet's sightlines. This chapter is the layer that has no excuse to be less than perfect, because none of it is hard; it is merely last, when patience is gone.

The plinth

The parent volume set the defaults: dark, simply profiled hardwood, cube or gentle taper, satin or oiled finish, proportions from one-half to one figure-height for most singles. Add the selection refinements. **Profile carries register**: the plain cube is modern-gallery neutral and suits almost everything; the taper adds lift and classicism; turned and ornate profiles spend attention the figure paid for — reserve them for pieces whose register is itself ornate. **Wood and finish are palette members**: walnut and wenge are warm darks, ebonized finishes are neutral darks, and the plinth's tone should sit with the scheme's neutrals — a cool slate-and-moonlight piece on a glowing red-brown plinth has hired an orphan at the foundation. **Height is arithmetic, not taste**: know the venue's cabinet shelf heights if they are knowable, and size the plinth so the figure's face arrives near a standing viewer's sightline on its likely shelf; two pieces of identical quality, one read straight-on and one read down onto its scalp, do not place identically, and that margin is purchasable in timber.

The socket: the most-handled junction on the piece

Where groundwork meets plinth-top is the joint every judge's thumb finds, and it resolves in one of two honest ways. **The integrated die-out**: the groundwork ends in a clean, deliberate margin — the painted border of bare earth or cut stone meeting the timber in a crisp line, sealed, with no grit migration and no paint on the wood. **The socketed inset**: the scenic base sits *into* a recess or atop a defined step, with a fine shadow gap — a deliberate dark seam a half-millimetre wide — reading as a designed reveal rather than a fit error. What is not honest is the third thing the cabinets are full of: groundwork lipping over the plinth edge, texture paste feathering onto timber, the joint caulked with hope. The engineering from Chapter 3 closes here: the brass rod runs figure-through-groundwork-into-plinth where the design allows, the base bolts or magnetizes for transport, and the whole junction is finished — including the underside, felted or sealed and *clean*, because it will be looked at.

The rim

The base rim and plinth sides take more handling than any painted surface, so their specification is finish-first: the rim painted in the scheme's near-black neutral or deep complement (the palette volume's frame doctrine), masked to a razor edge against the groundwork, in a satin-hard finish that survives thumbs — and inspected under raking light for the slop census: grit over the edge, varnish drips, fingerprints in matte, the stray static-grass fiber lacquered mid-rim like a fly in amber. Ten minutes with tape at the right stage, or an hour of remediation at the wrong one.

The plaque

Typography is part of the piece. The standing rules: the title chosen as the parent volume prescribed (a reframe, not a label); engraved brass or cleanly printed plate in a quiet face; mounted level, centered on the plinth's front — thereby *certifying the primary view* to every judge who picks the piece up and wonders which way it faces; and proofread, because a medal-grade piece above a misspelled plaque is a tragedy with a punchline.

The cabinet, the case, and the kit

The venue is part of the design brief. **Cabinet light is usually top-light** — which quietly rewards the zenithal-consistent designs and taxes the exotic keys; a piece designed under a low side key should at minimum be *checked* under a hard top light before submission, because that is the light it will testify under, and its occlusion structure must survive the cross-examination. **Glass and distance** mean the three-metre read is the read for most viewers: the silhouette, the value masses, the base's restraint all re-audited at final assembly through a phone photo at arm's length, squinted. **The case** executes Chapter 3's engineering: the piece carried by its plinth in a rigid, fitted container — foam relieved so nothing touches paint, tall elements socketed out and re-seated on site — and the **kit** travels with it: CA and accelerant, the spare tuft and matched ground pigment, tweezers, a brush, the touch-up paints for the rim and the contact darks. Pieces are damaged at venues at a rate every veteran knows; the difference between a disaster and an anecdote is the kit.

And the last act, on site, after the dust pass and the plaque check: set the piece, walk three metres, and run the judge's five checks from Chapter 1 yourself — integration, rim, scale, hierarchy, finish — because for the next two days, the base will be answering those questions without you.

Chapter 8 — Four Bases Reasoned in Full

The series' four standing figures return — the shieldmaiden from the palette volume, the rooftop assassin and candle-lit cartographer from the lighting volume, the bog horror from the palette volume — each now built from the ground down. Four construction registers: water, architecture, organic merger, interior. Each walk-through runs design intent, construction sequence, scale audit, paint and light integration, presentation, and the demon question — *what here would cost the medal if fumbled.*

I. The ford (water)

Intent. Stage register. The crossing explains the moment — the horse mid-stride in shin-deep water, the long golden key raking the splash — and the base's job is to be a river that has always been there: bedded stones, a worn bank, the water moving because the figure moves it. Oval footprint, the long axis on the charge diagonal, figure a third from the left edge, riding into the open two-thirds.

Construction. Plinth recess as the watercourse's basin; the bed built first and finished first — graded gravel and fines sorted as a current sorts them (coarse in the lee of the larger stones, fines in the slack), two real slate steppers pinned and epoxied, the bank in epoxy putty receiving the bank-side hoof at the fit stage. The bed painted complete before any pour: dark cool depths at the channel's center, warming and lightening into the shallows, every submerged stone finished, because the resin will seal the record permanently. Dams taped and *water-tested overnight*. Epoxy resin tinted a breath of cool green-umber, poured in two lifts; the meniscus at each leg planned as the wet-darkening band painted up the cannon bones before the pour. Movement after cure: gloss-gel bow waves at each submerged leg, the wake shearing downstream, the splash crown at the striking hoof built in water-effects paste on a hidden wire armature — aftermath and crest, not freeze-frame spray.

Scale audit. Ripple wavelength sub-millimetre — suggested in gloss texture, never sculpted as swells; bed gravel topping out at 3mm (liftable stones), the two steppers at honest boulder scale; bank grass in 2mm and 4mm patches gone to late-summer straw, matching the figure's golden hour and season.

Paint and light. The water is the gloss map's showpiece: the warm key's speculars laddering across every gel crest at the angle of incidence, the cool sky filling the slack water, the figure's forest-green dominant reflected broken in the smoothest reach beside the horse — the bounce exchange running through a mirror. The red ribbon — the palette volume's licensed accent echo — half in the water at the ford's edge, on the sightline. Contact shadows at the dry-bank hoof; in the water, the legs' shadows painted *on the bed* before the pour, refracted a few degrees off true.

Presentation. Resin pieces ride flat and buffered; the kit carries gloss varnish for transit scuffs on the water.

The demon question. The pour. A leak onto the plinth, a meniscus climbing an unpainted leg, a bubble field locked in the channel — water is the one material where a construction error is unrepairable after the fact, which is why every discipline in this entry happens *before* the resin leaves the cup.

II. The rooftop (architecture)

Intent. Stage register, vertical. The assassin's world is geometry: a tiled roof pitch, a chimney mass, the implied street below. The base's jobs — give the rim-dominant lighting design its dark architecture, counterweight the figure's lean, and cut the building at the rim so the night continues past the edge. Square footprint (the architectural shape), figure high on the pitch at the phi intersection, chimney behind and opposite the lean.

Construction. The pitch as an XPS wedge sheeted in printed tile sections — the resin printer earning its chapter: tile courses modelled at true scale with two broken and one slipped tile *designed in*, the ridge line, and the chimney's coursing printed as a hollow shell over a slate-ballast core (weight low, per the tip test). Print lines filled and sanded to paint-grade — flat architecture forgives nothing. The street side of the building cut clean at the rim, the cut face finished as part of the border: the confident edge, implying the four storeys below. Figure pinned through a tile into the wedge; the chimney's cap magnetized for the case.

Scale audit. Tile units at roughly 5×9mm (the 30×50cm clay tile), course overlap honest; chimney bricks at 1.3mm courses — printed, because carving that fine is a war; the slipped tile's displacement a single course, not a landslide.

Paint and light. The moon's jurisdiction: tiles in cool blue-slate chromatic neutrals, the wet-roof gloss map laddering tight cold speculars down the pitch toward the eaves — the groundwork as the design's reflection field. The window practical from below paints its warm amber up the chimney's street face and the underside of the eaves *only*: a hard jurisdictional border at the ridge, exactly as the spec subordinates it. The figure's moon-shadow runs down-pitch toward the viewer, soft-edged in the night; the contact darks under each foot read against the tiles' sheen. Vignette: the rim courses drop a half-step and lose their speculars.

Presentation. Plinth tall — the rooftop should arrive *above* the cabinet's mid-shelf eye-line, selling the altitude; ebonized timber, the cool neutral.

The demon question. Print-line ghosting under the raking moon speculars. Gloss across flat tiles is a raking-light test the lighting volume warned about, and every layer artifact left unsanded becomes a stripe of false reflections at exactly judging distance.

III. The bog (organic merger)

Intent. World register at single-figure scale — the palette volume licensed the merger: one organism, creature and ground, the figure *rising from* rather than standing on. The base's job is to make the boundary unfindable.

Construction. No boot line exists, so the integration stack inverts: the creature's lower mass is pinned to the plinth first and the ground built *up its flanks* — putty mud-flows modelled over the join, root systems (wired seafoam, reinforced) gripping both creature and hummock so ownership is ambiguous, the surface textures (hide ridges, mud cracks) deliberately continued across the frontier in both directions. Shallow black water in UV resin pooled in the lows — depth is painted, the pour is millimetres — with gloss-gel slicks and one ring of disturbance where something just sank. Sub-assembly discipline relaxes here by necessity: this piece is largely built married, and painted with the airbrush planning that implies.

Scale audit. The merger's special hazard — the *creature's* texture frequency must seed the ground's: hide-ridge spacing flowing into mud-crack spacing without a register jump. Reeds at 12–18mm (chest-high), bog cotton as the single pale accent species, no tuft domes anywhere in a landscape with no gardeners.

Paint and light. One palette by construction — the olives, putrid tans, and chromatic black-greens mixed once for both jurisdictions; the sickly low back key rimming the creature and laying long hummock shadows toward the viewer; the acid eye-glow's echo in the water sheen below, per the spec. The atmospheric tie is promoted from finisher to feature: two or three thinned green-umber passes hazing the lower third, the air the bog breathes.

Presentation. Low, wide, dark plinth — the horizontal register; the title doing narrative work the restrained groundwork declined to.

The demon question. The boundary. One visible glue-line, one place the texture vocabulary switches mid-flank, and the merger collapses into a model glued to scenery — the exact failure the register exists to transcend, discovered at handling distance.

IV. The study (interior)

Intent. Pedestal-plus-story: the cartographer at his desk, the base *is* the furniture, and the room is implied rather than built — the chiaroscuro spec keeps the world small. Rectangular footprint, the desk's geometry; figure and chair a third from the right, the candle's pool defining the inhabited zone, the left third falling into the dark.

Construction. The desk built as cabinetry at scale: basswood planked top (2mm boards, scribed grain, breadboard ends), legs printed for the turning, every joint a real lap or butt because furniture is joinery and reads as it. Props by the evidence doctrine: the chart in work (printed sepia on tissue-thin paper, edges curled by breath and a damp brush), one rolled chart, the inkwell, the dividers mid-stride on the map, the candle — wax drips built in layered gloss gel down a brass-rod wick mount. Floor as three dark planks dying into shadow and a confident cut at the rim. Figure-and-chair pinned as one sub-assembly through the floor.

Scale audit. Interiors are the cruelest scale test because every object is man-made and known: the desk top at 14mm height (78cm), the chart at credible chart size, the inkwell at 1.5mm — the audit is a furniture catalogue divided by 56, and any prop that fails is rebuilt, because a viewer who has sat at a thousand desks cannot be fooled at one.

Paint and light. The candle's jurisdiction painted *on the props*: the chart's contour lines warming by distance from the flame, the inkwell's single hard specular, the desk grain glowing amber within the pool and going umber-black past the falloff line — the inverse-square law executed in furniture. The figure's shadow and the hands' shadows thrown *up and outward* across the chart, per the under-key. The window's cool kicker grazes one chair rail and the floor's far plank: the second jurisdiction, two strokes wide. Everything past the pool holds at 1.5–2 — ratio courage, on the groundwork as on the figure.

Presentation. Mid-height warm walnut plinth (the scheme's warm neutral, for once); plaque essential — the title is half this piece.

The demon question. Ratio cowardice on the props. The instinct to *show* the lovely joinery and the second chart will lift the dark third value by value across the project, and with it the candle dies — the lighting volume's failure pattern, lost or won entirely on the base.

Four registers, one method: the job declared, the shadows sketched before the glue, the scale arithmetic believed, the integration stack run, and the demon question asked at the start — when its answer is a plan instead of a post-mortem.

Chapter 9 — Failure Patterns and Their Repairs

The basing failure catalogue, in the series' standard format — signature, cause, repair — ordered roughly by how often each one is, in the judge's silent ledger, the medal.

The floating figure. *Signature:* the figure hovers; boot meets ground as a hard glue-line silhouette; no shadow owns the contact. *Cause:* figure and base built as strangers and married flat-to-flat at the end. *Repair:* the integration stack, retrofitted — contact occlusion glazed under every touch point, the cast shadow painted as a composed shape, ground pigment dusted up the boots, a putty fillet worked under a lifted sole where the mechanical seat was never made. The full stack is thirty minutes of work and the single highest-leverage repair in this volume.

The upstaging base. *Signature:* the eye drops to the groundwork and stays; the squint test finds the base winning the auction. *Cause:* the contrast budget never extended below the boots — saturation, value extremes, or detail density spent on ground the hierarchy cannot afford. *Repair:* unify downward, per the palette volume — gray-and-darken glazes over the offenders, the vignette deepened at the rim, the accent census on the base cut to its licensed one, the atmospheric tint pass pushing the whole ground back a half-step.

The scale crime. *Signature:* "something off" — the boulder-gravel, the shrub-tuft, the melon-sand. *Cause:* materials admitted by feel instead of arithmetic. *Repair:* identify the convicted element by the divide-by-56 audit and replace it; scale errors are rarely paintable-around, because the viewer's size machinery cannot be glazed into agreement. Prevention is Appendix C taped inside the materials drawer.

The afterthought slab. *Signature:* a museum-grade figure on a weekend of texture paste; the resolution cliff at the boot line. *Cause:* the schedule — basing landed in the project's exhausted final week. *Repair:* structural, not technical: schedule the base as a parallel project from week one (designed with the lighting spec, built during paint-drying intervals, its own recipe card), so it arrives at final assembly as a peer. The piece is judged to its lowest-resolved component; budget accordingly.

The kitchen sink. *Signature:* tufts, skulls, mushrooms, a puddle, two ruins, and a crystal — every drawer represented. *Cause:* materials are fun, and each addition was locally pretty. *Repair:* the role census from the palette volume's smalls doctrine, applied to terrain — every element names its job (story evidence, scale anchor, palette echo, quiet texture) or comes off; then rebuild the quiet zones the clutter consumed. When in doubt, the restraint corollary: remove until it hurts, then remove one more.

The resin disaster. *Signature:* the leak onto the plinth, the cloudy pour, the bubble field, the meniscus halfway up a shin. *Cause:* water's engineering disrespected — undammed edges, deep single pours, unpainted beds, unplanned waterlines. *Repair:* mostly none — which is the lesson; resin failures are prevented in the cup or lived with. Salvage at the margins: a meniscus painted into a wet-darkening band; a dull or scratched surface revived with gloss coats; cloudiness, leaks, and locked bubbles are rebuilds. Every discipline in Chapter 3's water section exists because of a specific famous corpse.

Glue shine and the finish census. *Signature:* PVA gloss in the grass roots, a varnished flock fiber on a greave, matte ground with random satin patches. *Cause:* adhesives and finishes applied past the stage where they could be controlled. *Repair:* targeted matte varnish on the shine, tweezers and touch-up on the strays, the raking-light inspection adopted as a standing final pass — it is the same lamp the judge's eye brings.

The rim slop. *Signature:* texture over the edge, paint on the plinth timber, a caulked socket. *Cause:* the junctions finished last, with the project's last patience. *Repair:* re-mask and recut the

rim line; scrape and refinish the timber; if the socket is irredeemable, the shadow-gap reveal can sometimes be *introduced* — a deliberate scribed seam where an accidental one festered. Junction time is cheap early and ruinous late.

The two-world piece. *Signature:* figure and base technically excellent and visibly from different planets — palettes unrelated, light from different addresses, texture frequencies a register apart. *Cause:* the base built outside the specs — its colors from the drawer, its light from habit. *Repair:* the unification arsenal at full strength — one shadow family glazed into both worlds, the bounce exchange, the figure dusted with the ground's pigment, the atmospheric tie — and where the light disagrees outright, the ground repainted to the spec, because the figure cannot be.

Height without purpose. *Signature:* a figure flown on a spire that adds drama nowhere and four boring vertical faces everywhere. *Cause:* elevation chosen as a default gesture of seriousness. *Repair:* honest triage — either give the column its job (line-of-action extension, eye-line arithmetic, silhouette counterweight) and finish its verticals to standard, or take the figure down; a strong figure at honest height beats a strong figure on an apologetic tower.

The transport casualty. *Signature:* the venue-morning snap — the tree, the banner, the splash crown — and the matte rubbed shiny where foam pressed paint. *Cause:* engineering deferred; the piece carried by hope. *Repair:* on the day, the kit (which is why it exists); structurally, Chapter 3's law retrofitted — pins where glue gambled, magnets for the fragile verticals, the case relieved so the plinth bears everything. The piece that survives the drive is designed to in week one.

The meta-pattern completes the series' set: basing fails by **deferred decisions** — the spec unwritten, the arithmetic unrun, the junctions left for last — and every repair above is the expensive form of a cheap early step. The figure ends at the boots. The piece, and the placing, end at the plinth.

Appendices

Appendix A — The Basing Spec Sheet

Filled before construction, beside the lighting spec. **Job** — platform / pedestal / stage / world: *what is this base for?* · **Regulations** — the event's footprint and plinth rules, checked in writing: *what is legal?* · **Footprint** — shape, dimensions, figure placement (armature overlay photo attached): *where does the figure stand, facing what?* · **Height architecture** — flat / raised element / terraces / spire, with the eye-line arithmetic: *what does elevation buy here?* · **Combined silhouette** — the figure-plus-base outline sketch, tangents audited: *one shape, no kisses?* · **Shadow plan** — cast shadows sketched on the footprint at the key's address: *where do the free dark masses fall?* · **Materials bill** — every element with its material and adhesive (Appendix B): *what is this built from?* · **Scale audit** — each element's pretended real size /56 (or 32), passed: *does the world agree on its size?* · **Palette derivation** — strategy (muted-complement / darker-analogous / neutral stage), mixes from the figure's cast, the one licensed accent echo: *whose relative is this ground?* · **Story inventory** — the two or three pieces of evidence, each answering *why are you here*: *what happened before the moment?* · **Integration stack** — the six steps scheduled: *how does the figure inhabit it?* · **Engineering** — pins, magnets, ballast, the tip test, the case plan: *does it survive the drive?* · **Presentation** — plinth spec, socket type, rim color, plaque text: *what does the judge's hand find?*

Appendix B — Materials Selection Table

Element	First choice	Alternatives	Watch for
Bulk / elevation	Cork sheet and chunk	XPS foam; air-dry clay	Foam vs. solvents and CA fumes; seal before fine work
Rock	Real slate / shale (pinned, epoxied)	Cork bark; carved XPS; cast plaster	Weight (ballast vs. transport); one geology per formation
Ground texture	Graded grits in PVA / paste	Commercial texture pastes	Uniformity; rim margin kept clean; texture before primer
Bare trees / roots	Seafoam (wire-reinforced)	Twisted wire + bark putty	Real twigs read as wrong-bark logs
Planks / beams	Scribed basswood / balsa	Printed lumber	Width /56; nail holes in honest rows; build as sub-assembly
Grass	Static fiber 2–4mm, applicator	Tufts torn and trimmed	Patchiness, not lawns; shade after planting; 6mm+ is thigh-high
Leaves	Birch seed scales; punched leaves	Commercial laser-cut	Scatter in lees; glue the visible ones individually
Flowers	One species, one bloom	—	The palette volume's single licensed echo; 1–2mm heads
Still water	Two-part epoxy (lifts, dams tested)	UV resin (shallow)	Leaks, deep pours, meniscus; paint the bed first
Moving water	Gloss gel / water-effects over cured resin	—	Ripple wavelength sub-mm; speculars per the key
Damp / puddles	Gloss varnish coats	Gloss gel	Underrated; zero risk
Snow	Microballoons or snow powder + gel/PVA	+ gloss medium where wet	Sparkle restraint; figure participates (footprints, dusting)
Masonry	Carved XPS; printed elements	Plasticard; cast plaster	Course height 1.3mm; print lines sanded to paint grade
Attachment	Brass pin 1–1.5mm, deep both sides	+ magnets for sub-assemblies	Sole-glue alone never survives; dry-fit through all stages

Appendix C — Scale Reference: Real World to 32mm and 54mm

Divide real size by **56** (32mm class) or **32** (54mm class). The working card:

Real thing	Real size	At 1:56	At 1:32
Lawn / short grass	3–8 cm	0.5–1.5 mm	1–2.5 mm
Meadow grass	20–40 cm	3.5–7 mm	6–12.5 mm
Reeds / wheat	~1 m	18 mm	31 mm
Fallen leaf	5–10 cm	1–1.8 mm	1.5–3 mm
Rose / large bloom	~8 cm	1.4 mm	2.5 mm
Cobblestone	8–15 cm	1.5–2.7 mm	2.5–4.7 mm

Real thing	Real size	At 1:56	At 1:32
Liftable boulder	~30 cm	5.4 mm	9.4 mm
Brick course (height)	7.5 cm	1.3 mm	2.3 mm
Floor plank (width)	10–15 cm	1.8–2.7 mm	3–4.7 mm
Step riser	17 cm	3 mm	5.3 mm
Door (height)	2 m	36 mm	62 mm
Desk / table (height)	75–78 cm	~14 mm	~24 mm
Fence post	1.2 m	21 mm	37 mm
Mature trunk (diameter)	~1 m	18 mm	31 mm
Roof tile	30 × 50 cm	5.4 × 9 mm	9.4 × 15.6 mm

Appendix D — Glossary

Combined silhouette: the single outline of figure plus base plus plinth — the shape the three-metre read sees. **Contact occlusion:** the deepest darks under every point where figure touches ground; non-negotiable in every design. **Die-out:** the deliberate, clean margin where groundwork ends against the plinth. **Fractal exemption:** the property of stone, soils, and water of looking like themselves at any magnification — why real slate is always in scale and real bark never is. **Ground reaction:** the earth's physical answer to the pose's forces — spoil, splash, gouge, drag. **Integration stack:** the six-step finishing sequence (seat, occlusion, cast shadow, bounce exchange, the figure wearing the world, atmospheric tie) that makes one object of two. **Job (of a base):** platform, pedestal, stage, or world — the declared ambition that scopes everything else. **Meniscus:** resin's climb up any vertical it touches; planned as a painted waterline or suffered as a scar. **Shadow gap:** the fine deliberate seam at a socketed base-to-plinth joint, reading as a designed reveal. **Tip test:** fifteen degrees in any direction without drama — the structural pass required before paint. **Vignette:** the half-step drop in value and chroma at the footprint's outer margin that keeps the eye inboard. **The demon question:** asked of every design at the start — *what here would cost the medal if fumbled* — when its answer is still a plan.

End. The figure ends at the boots; the piece ends at the plinth.

Book V — Mirror

On Non-Metallic Metal, and Painting What the Metal Sees

Introduction — The Summit Discipline

Non-metallic metal sits at the top of the craft for one structural reason: it is the only surface that breaks the rendering rules every other surface obeys. The whole apparatus built across this series — the six elements of form, the halftone where local color lives, the long soft turn of a cylinder — describes *diffuse* surfaces, materials that scatter light and therefore have a color of their own. Metal scatters almost nothing. It has, for practical purposes, **no local color to render**. What you see when you look at a polished breastplate is not "gray, lit" — it is the world around the breastplate, bent and compressed and thrown back at you. To paint metal in matte pigment is therefore not to paint a material at all. It is to paint a *mirror's contents*: the sky, the ground, the light source, the red cloak standing beside it.

That reframe is the entire discipline, and everything in this volume unpacks it. It explains why NMM values run wider and turn harder than anything else on the figure (the environment contains both the sun and the shadowed earth, inches apart). It explains why NMM is viewpoint-dependent in a way no cloth ever is (a mirror's contents change when you walk around it — Chapter 7's rotation audit exists because of this). It explains why the grayscale test is NMM's final exam rather than one check among many (a mirror's contents are mostly *values*; hue is the tint of the metal and the color of the world, decoration on a value machine). And it explains the choice between NMM and true metallics honestly: TMM borrows real physics and surrenders control; NMM forges the physics and keeps it. A painted reflection obeys your composition, your key, your palette, in every photograph forever. That control is what the summit buys, and the price is that nothing is free — every glint must be reasoned.

This volume assumes the series. The parent volume's Chapter 19 seeded the model; the palette volume seated metals as scheme members; the lighting volume built the keys and speculars this volume will place in steel; the basing volume contributed the demon question, asked here of every blade. What this volume adds is depth: the optics, the full value architecture, the complete ladder library, finish and condition, the multi-source blade, the bench workflow — and the failure catalogue of a discipline whose failures are famous enough to have names.

One promise before the work begins, for every painter who has produced gray cloth and called it steel: **NMM is a system, not a gift.** Every convincing painted mirror in every cabinet was reasoned from the same short list of questions — *what does this plane reflect, at what value, with what edge* — and the questions are learnable. Paint what the metal sees, not what it is, and the seeing can be taught.

Chapter 1 — The Optics of Metal

Why metal looks like metal

Every surface reflects light in two ways, in some proportion. **Diffuse** reflection scatters light in all directions, carrying the surface's own color — this is how cloth, skin, stone, and paint itself behave, and it is why those surfaces look the same from every angle. **Specular** reflection bounces light at the mirror angle, carrying an image of the environment. Most materials are overwhelmingly diffuse with a specular garnish (the sheen on leather, the highlight on a cheek). Metal inverts the proportion almost completely: conductors reflect specularly across their whole surface, with nearly no diffuse component at all. The practical translations, each one a painting instruction:

Metal has no resting color. Remove the environment and a steel plate is nothing. Its apparent "color" is the environment's colors, multiplied by one thing the metal *does* own —

Colored metals are tinted mirrors. Gold, copper, brass, and bronze reflect selectively: they return the world through a warm filter, which is why gold's "color" is really *the sky and the lamp, rendered in yellows and browns.* Silver, steel, aluminum, and chrome reflect nearly neutrally, returning the world as it is. This single fact organizes Chapter 4: every metal is an environment map passed through that metal's tint, and the tint — not a base coat — is what distinguishes gold from steel.

Reflectivity rises toward grazing angles. Surfaces seen edge-on return more of the environment than surfaces seen square-on. On a figure this licenses the brightness of rims, edges, and the steep turns of curved armor — the places a plate is seen at a glance are legitimately its liveliest — and it is half the physics behind the edge highlighting that metal, unlike cloth, genuinely earns.

The roughness dial

The second great control is surface roughness, and it is best understood as a single dial running from mirror to matte. A **polished** surface reflects coherently: the environment appears sharp, transitions between reflected zones are hard, and the light source returns as a tight brilliant specular. **Satin** metal scatters slightly: the same environment, blurred — transitions soften into short gradients, speculars broaden and dim. **Brushed** metal scatters *directionally*, along its grinding grain: reflections smear into streaks parallel to the grain (the anisotropic signature — a brushed pot's highlight is a stripe, not a point). **Rough** cast or forged metal scatters broadly: the environment dissolves into mild, mottled value variation, and the surface begins to behave almost diffusely.

Here is the consequence that reorganizes a painter's whole approach: **the roughness dial is the transition-sharpness dial.** When this series has said "harder transitions read as higher polish," this is the mechanism — edge softness on metal is not a stylistic preference or a blending skill display; it is a *physical claim about the surface's finish*, and it must be set deliberately, per surface, before the first layer (Chapter 5 walks the dial's full range). The pewter problem — every transition softened equally because soft blending felt like good painting — is a roughness claim nobody meant to make.

The spoon

One piece of standing homework underwrites everything in this volume: **study a real polished object, often.** A soup spoon, a chrome ball bearing, a knife blade — held at arm's length, turned slowly, under the room's actual light. Watch the world compress into its curves: the window as a white shape, the table as a warm dark mass, your own silhouette as the central darkness, the

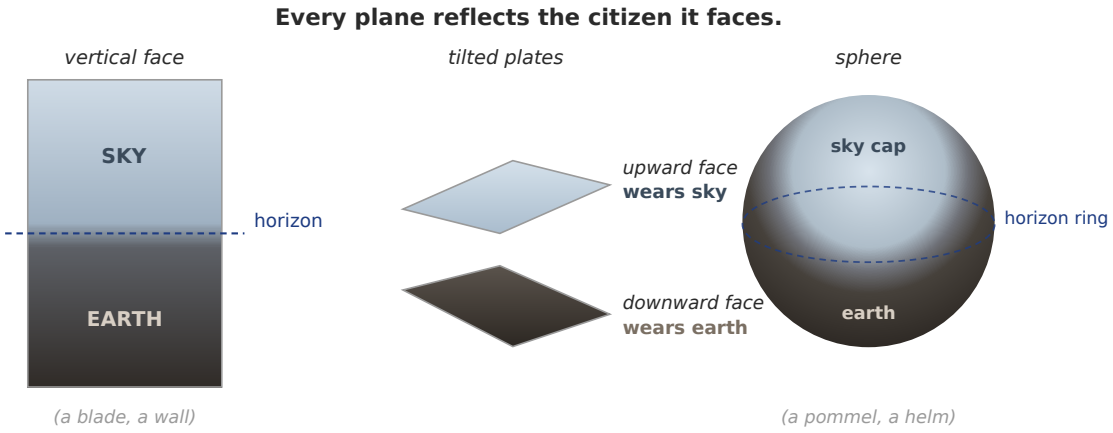
horizon of the room wrapping the bowl. Every convention in the next chapter is visible in the spoon in thirty seconds, and no diagram replaces the habit of checking the spoon when a painted plate stops making sense. The painter's version of the lighting volume's lamp photograph — the chrome ball *photographed at the figure's position under the design's key* — returns in Chapter 6 as the most literal reference technique in the entire series.

Chapter 2 — The Environment Model: Sky, Earth, and the Horizon

A real mirror reflects everything; a painted one reflects a *model* — a simplified world chosen for legibility. The standard model, refined across decades of competition painting, has three citizens and one law.

The three citizens

The sky: everything above — light in value, cool in temperature under the default key (the lighting volume's blue fill made visible). **The earth**: everything below — dark, warmer, dirtier; the ground, the table, the floor of the world. **The horizon**: the boundary between them, and the single most recognizable mark in all of NMM. The law: **every plane reflects the citizen it faces.** A surface tilted upward wears sky. A surface tilted downward wears earth. And a *vertical* surface wears the horizon itself — sky in its upper region, earth in its lower, the line between them placed where the geometry and the composition agree it should fall. (The why, in one sentence: a vertical mirror at your eye height returns the sky above your eyeline and the ground below it — stand before a dark shop window and check.) The painter sets the horizon's height as a design decision: high on the blade for a figure imagined in open country, low for one looming over the viewer, *consistent across the whole figure* — because a sword wearing its horizon at one height and a pauldron wearing it at another have been issued two different worlds, and the eye files the discrepancy as wrongness without naming it.



Light cool above, dark warm below; the line between them is the horizon.

Reading any surface

The working method is interrogation, plane by plane: *what does this plane face?* A breastplate's upper chest tilts back toward the sky — light, cool. Its lower belly curves under toward the earth

— dark, warm. The flat of a vertical blade — the horizon gradient, light over dark. The underside of a vambrace — pure earth. A gorget's upward shelf — pure sky. Where a single surface *curves* through orientations, it collects the citizens in sequence, compressed by its curvature:

The sphere (a pommel, a dome, a pauldron's crown) is the world in a fisheye: a small bright sky-cap offset toward the zenith, a thin horizon band wrapping its equator like a ring, and a broad warm-dark earth zone below — plus, dead center of the earth zone on a true mirror, the dark silhouette of the viewer, which painters omit or abstract into the deepest accent. **The cylinder** (a haft, a barrel, an armored limb) stretches the horizon into a stripe running parallel to its axis, sky banding one side, earth the other, the whole map elongated along its length. **The concavity** (a fuller, a fluted plate, a bowl) is the advanced citizen: concave mirrors *invert* — the gradient inside a fuller runs counter to the flats beside it, dark where they are light, and that deliberate reversal, one groove painted against the grain of its blade, is among the most convincing single moves available, because nothing but a mirror behaves that way.

The fourth citizen: the key

Onto the environment map, the lighting volume's machinery lands intact. The designed key appears in metal as the **specular** — the source itself, returned at the angle of incidence: small and furious on polish, broader and dimmer down the roughness dial, colored as the source and tipped pure white only by the spike discipline. The key also *grades* the citizens: under the default high warm sun, the sky zones brighten toward the reflection of the source's quarter and the earth zones deepen opposite; under the exotic keys of Chapter 6, the citizens themselves are recast. The map is the stage; the key is the performance on it.

The fifth citizen: the neighbors

A mirror reflects the figure it belongs to. The red cloak smears warm into the breastplate beside it; the gold trim breathes yellow into the steel it borders; the base's grass tints the greave's earth zone green — these **contact reflections** are the environment model's local news, and they do two jobs at once. They sell proximity (nothing says *these objects share a world* like one appearing inside the other), and they execute the palette volume's law that NMM's hues are scheme citizens: the blue in the steel is the scheme's blue, the smear in the blade is the dominant's own color, and a metal that reflects strangers has hired orphans. The discipline is the usual one — a contact reflection is a *smear*, soft-edged, value-true, one or two per surface — not a portrait of the cloak in the chest.

Map first

The chapter's method compresses to a habit that Chapter 7 will formalize: **draw the map before painting it.** On a photograph of the primed figure, or in pencil on the primer itself, mark every metal surface's zones — sky here, earth there, horizon at this height, specular at this point, contact smear from that cloak — and only then mix paint. The map converts NMM from improvised bravery into transcription, and transcription is repeatable. Every failure in Chapter 9 that is not an execution failure is a map that was never drawn.

Chapter 3 — Value Architecture

If the environment map is NMM's geography, value is its engineering — and the engineering differs from every diffuse surface on the figure in three structural ways. Get these three right in

monochrome and the metal already works; everything in Chapter 4 is tint.

The widest range, the narrowest middles

Metal owns the figure's full value range — on the working scale, **1 to 9.5** on a single polished surface — because a mirror's contents include both the brilliant sky and the shadowed earth, and the mirror does not average them. But the *distribution* inverts cloth's: where a diffuse gradient spends most of its area in long mid-value ramps, polished metal spends almost nothing there. Its profile is **plateau and sprint**: broad zones holding steady at their citizen's value (a sky plateau at 7.5, an earth plateau at 2.5), connected by transitions compressed into bands a few brush-widths wide. The mids exist — the horizon gradient, the turn of a curve — but as *narrow passages*, not residences. Painters trained on cloth instinctively widen these passages, and the widening is precisely the gray-cloth disease: the values are present but the *profile* is diffuse, and the eye reads finish, not metal. The audit is mechanical: trace any line across a painted plate and graph the values; metal graphs as a staircase with steep risers, cloth as a hill.

Counterchange: the alternation signature

The second structure is the one that makes metal legible at three meters, and it deserves its name in every painter's vocabulary: **counterchange** — the value *flip* across edges. Because a few degrees of tilt swings a mirror's contents from sky to earth, adjacent planes on real metal routinely alternate: this facet light, its neighbor dark, the next light again; the upper bevel of a blade bright where the flat below it runs dark, the relationship reversing along the blade's length as the surfaces twist. Diffuse surfaces never do this — a cloth fold's faces shade gradually around one key — so the alternation *is* the metallic signature, readable in silhouette, in grayscale, at distance, before any sheen glaze arrives. Designing counterchange is a map decision: at every edge between metal planes, ask whether the values flip, and let them flip often. A harness painted with all its plates politely agreeing — light tops, dark bottoms, everywhere, like shaded cloth — has refused the signature; a harness whose plates argue reads as steel from across the room.

Maximum local contrast, by appointment

Third: metal is where the parent volume's loudest event — the lightest light against the darkest dark — occurs *naturally and repeatedly*. The specular sits directly beside a deep reflection; the bright horizon edge cuts against the earth zone with no diplomatic gradient between. Place these collisions deliberately: the hardest, highest-contrast adjacency on each metal surface goes where that surface's focal logic wants the eye (the blade's gleam at the tip that aims the composition, the pauldron's spike nearest the face), and the contrast budget still governs — the figure's single brightest white-tipped specular belongs to the focal metal, with every other surface peaking a half-step lower. Edge highlights, meanwhile, receive their full legitimacy here and only here: hard metal arrises genuinely catch light from everywhere (the grazing-angle physics of Chapter 1), so the bright broken line along a blade's edge or a plate's rim is honest reporting — weighted by orientation to the key, interrupted at overlaps, and never the *substitute* for plane-painting that the wireframe failure makes of it.

The monochrome exam

Because metal's hue is decoration on a value machine, NMM has a private final exam: **paint it as if it will be photographed in black and white, because it will be.** The grayscale check that audits other surfaces *verifies* this one — a converted photo of a working NMM passage still shows plateau-and-sprint, counterchange, the horizon, the speculars, the whole machine; a passage that needed its golds and blues to read as metal was never reading as metal. Many painters formalize this by building the value structure first in neutral grays (the sketch road, Chapter 7) precisely so the machine is proven before tint complicates the judgment. Whether or not you paint that way, *audit* that way: every metal surface, in grayscale, at thumbnail size, must answer "steel" or "gold" with its values alone.

Chapter 4 — The Metals: Anchors, Ladders, and Guests

Every metal is the same machine wearing a different tint, so every recipe in this chapter has the same anatomy: an **anchor** (the hue family the tint multiplies the world into), a **ladder** (the sequence of mixes from deepest earth to the spike), the **guests** (the borrowed colors that live legally in its shadows and sheens), and the **signature failure**. Mixes are described generically — a near-black of ultramarine and burnt umber, an ochre, a cadmium-leaning yellow — per the series' habit; Appendix B compresses the chapter to a card.

Steel and silver

Anchor: none — the neutral mirror. Steel's "color" is the environment unfiltered, which makes it the purest test of the value machine and the metal most dependent on its guests for life. *Ladder:* a deep cool near-black (ultramarine plus burnt umber, leaned blue) in the earth zones and accents; rising through cool blue-grays — mixed chromatic, never tube gray, per the palette volume — through a pale cold gray; to a near-white with the faintest blue; spike pure white at the speculars only. *Guests:* the sheen glazes that turn structure into steel — thin turquoise and blue passes over the sky zones (the scheme's own blue, always), a breath of warm umber or rust into the earth zones, and the contact smears of whatever the scheme placed beside it. Simultaneous contrast works for free here: neutral steel beside the warm members reads blue without a drop applied. *Failure:* gray cloth — the profile widened, the counterchange declined, the guests never invited; the repair is Chapter 3 re-run, not more blending.

Gold

Anchor: the warm filter at full strength — gold returns the world in browns, ochres, and yellows. *Ladder*, in full, because gold lives or dies by it: a deep chocolate or maroon-brown in the earth zones and pits; rising through burnt sienna; raw sienna and ochre; into a saturated warm yellow whose **chroma peaks in the upper-middle values, around 7** — this is the load-bearing fact of the entire recipe; then desaturating *fast* through pale yellow-ivory; spike near-white, warm-tipped. The peak placement is what separates gold from yellow: yellow cloth saturates toward its highlight; gold saturates *below* it and pales toward the light, because the brightest zones are the sky and the source, not the metal's tint. *Guests:* gold's shadows are famously hospitable — deep violet, bottle green, and dried-blood red all sit legally in its earth zones as environment, and a cool green or violet contact note in a gold shadow is half of what reads as richness. *Variants by anchor lean:* rose gold slides the ladder toward copper's reds; green gold leans the mids olive; aged gold mutes the peak and browns the ladder (the palette volume's antique register). *Failure:*

mustard cloth — three value steps of yellow-brown with the chroma peak at the top; the repair is the ladder's full length and the peak moved down.

Copper

Anchor: red-orange — the warmest mirror. *Ladder:* near-black red-browns; rich burnt sienna into saturated orange-reds (peak around value 6); pale salmon-orange; warm spike. *Guests:* copper's celebrated companion is its own corrosion — verdigris blue-greens seated in the recesses (Chapter 5) — and the complementary tension between the orange metal and its green patina is a complete two-color scheme living on one surface. *Failure:* terracotta — copper painted as matte clay; the cure is the counterchange and the speculars that clay never has.

Bronze and brass

The in-between metals, distinguished by anchor lean: **bronze** browner and quieter (an olive-brown anchor — earth zones of deep umber-green, mids of muted ochre-brown, restrained pale-straw lights; the metal of age, statues, and the basing volume's buckles), **brass** yellower and louder (a green-leaning gold, its mids toward yellow-olive, brighter than bronze and cheaper-looking than gold — which is sometimes exactly the register a fitting wants). Both take verdigris guests; both peak their modest chroma in the mids; both fail by impersonating their neighbors — brass painted as gold outshines its station, bronze painted as brown loses the mirror entirely.

Iron, gunmetal, and blackened steel

The low-key mirrors: the value machine compressed into the bottom half of the scale. *Anchor:* near-neutral, leaned cold (charcoal-blue) or heat-treated warm (Chapter 5's blueing). *Ladder:* chromatic near-blacks through dark steel-grays, topping out around value 6 across whole surfaces — with the discipline that makes dark metal read at all: the few permitted lights (edge catches, one specular per surface) spike *hard* against the darkness, the maximum-local-contrast principle carrying the entire legibility burden. *Guests:* oil-sheen violets and blues glazed across the flats; rust at the wear points. *Failure:* the black hole — dark metal with the spikes withheld, reading as primer.

Aluminum, chrome, and the pure mirror

At the dial's polished extreme with a neutral anchor, the metal disappears entirely and the painting becomes *pure environment*: chrome is sky, earth, horizon, source, and neighbors at maximum contrast and maximum edge hardness, with essentially no "metal-colored" paint anywhere in the recipe. It is the least forgiving register — every mapping error is published — and the best teacher, which is why the chrome ball and the spoon anchor the practice ladder. Paint chrome once a year on a study piece; everything else gets easier.

One machine, many tints

The chapter's compression, worth keeping where the wet palette can see it: *decide the values by Chapter 3, the zones by Chapter 2, and then ask only — through what tint does this metal see the world?* Steel: none. Gold: warm, peak at 7. Copper: hot, peak at 6. Bronze: warm-olive, muted.

Iron: cold, compressed. Chrome: none, and everything. The ladders are not separate skills; they are one skill, refracted.

Chapter 5 — Finish and Condition: Polish, Wear, and Age

A metal surface tells two stories at once: what it is (Chapter 4) and what has happened to it. Finish and condition are the second story, and they are where NMM stops being a rendering exercise and becomes characterization — the difference between *a sword* and *this sword*.

The roughness dial, executed

Chapter 1 established the dial; here is each stop as brushwork. **Mirror polish:** the full environment at full contrast — hard-edged zone boundaries (blocked, not blended), the sharpest speculars on the figure, contact reflections legible. Transitions exist only at the horizon and across curvature, and even those are short sprints. This is parade armor, the ceremonial blade, the magistrate's jewelry. **Satin:** the same map with every edge softened one register — zone boundaries become two-brush gradients a millimeter wide, speculars broaden and drop a half-step, contact smears blur toward suggestion. Working armor lives here, and most figures want most of their metal here, reserving true polish for the focal pieces (a polish *hierarchy* across the harness is itself a focal tool). **Brushed:** the anisotropic register — the map's zones survive, but every transition and every specular smears *along the grain*: fine directional liner strokes in the mids, the highlight a drawn streak rather than a point, the whole surface combed one way. Gun barrels, tooled fittings, the flats of utilitarian blades. The discipline is the grain's consistency — one direction per surface, following manufacture (along the blade, around the turned haft). **Rough:** cast and forged surfaces, the dial's diffuse end — the environment dissolved into stippled, mottled value variation at modest contrast, painted with the texture tools (stipple, sponge, dome drybrush) under the map's broad zoning, with only the worn high points climbing back up the dial.

That last clause is the key to most real objects, which are not one finish but a *history of finishes*:

Wear: the dial worn through

Use polishes the places hands and the world touch. **Edge wear** is the master move: along arrises, rims, raised details, and handling points, the surface's finish climbs the dial — a rough-cast pommel with mirror-bright wear on its high points, a blackened plate with cold bare steel breaking through at every edge. Executed as the basing volume executes everything: by evidence — fine bright lines and points exactly where contact happens, sponge-flecked at the busiest zones, absent where nothing reaches. Two-finish metal (rough field, polished wear, or blackened field, bright wear) is more convincing than any single finish, because it shows time. **Battle damage** follows the incised-line logic the series has used since the basing cracks: a nick is a dark notch with a bright catch on its lower lip; a gouge is a dark trough with polished walls; a dent is a shallow value disturbance in the map — the reflected zones *bending* around the deformation, which is the advanced and devastating version, because only a mirror's damage warps the world.

Age: the chemistry

Rust is iron's biography: a stippled progression from orange through red-brown to dark brown, seated where water sits (recesses, under-edges, around rivets), bleeding downward as thin streaking glazes below its sources, with the texture rising as the corrosion deepens — and with the

metal's own machine *retreating* as rust advances, since corroded zones leave the dial entirely. **Verdigris** is copper's and bronze's: blue-green deposits in the recesses (a cool turquoise leaned per the scheme), thin and waxy, the high points wiped clean by handling so the patina maps the *negative* of the wear — patina in the valleys, bright metal on the peaks, the two-finish principle as chemistry. **Tarnish and oil** are the subtle registers: silver warming toward sepia in its recesses; the blue-violet sheen of oiled or heat-blued steel glazed across dark flats. **Heat color** is the connoisseur's detail: steel raised to tempering heat takes a sequence of oxide tints — pale straw, deep straw, brown, purple, blue — and a fine banded run of those hues along a blade's spine or around a forge-worked fitting, a millimeter wide and ordered correctly, reads as metallurgy to anyone who has seen the real thing and as beauty to everyone else.

The engraved and the inlaid

Surface decoration on metal obeys two rules at once. **Incised work** (engraving, etching) is the crack-logic again: each line a fine dark stroke with a light catch on the edge the key favors — and, on polished metal, the lines *interrupting* the reflections they cross, the sky zone's gradient ticking dark at every cut. **Inlay** (gold in steel, silver in iron) is two metals cohabiting: each obeys its own ladder, mapped to the *same* environment — one horizon height, one key, the gold's sky zone aligned with the steel's — with the inlay sitting a breath proud and catching its own edge light. The shared-environment rule is what makes two-metal work sing or collapse: the moment the gold inlay reflects a different world than its steel field, the surface delaminates into sticker and substrate. **Pattern-welded (Damascus) steel** is the same principle at micro scale: fine, wavering, parallel value bands flowing along the blade and swirling around the fuller — painted as a low-contrast liner pattern *underneath* the blade's main reflection map, the big sky-earth machine running over the top at full authority. Pattern first, mirror second; reverse the hierarchy and the blade becomes wood grain.

Gems in metal

The parent volume taught the stone (the inverted transparent sphere); this volume adds the setting. A gem and its bezel are a two-material event: the metal collar obeys its ladder and catches edge light on its rim; the stone obeys its inversion; and each appears *in the other* — the bezel's warm tint glowing in the stone's lower window, the stone's color smeared faintly into the metal beside it. The cool-stone-on-warm-metal pairing (the palette volume's referee in jewel form) remains the reliable register, and the count discipline holds: one lit gem per region, the rest painted quieter, because every gem is a specular spike with a salary.

Chapter 6 — Metal Under Designed Light

Everything so far assumed the default world — high warm key, blue sky, brown earth. But this series builds lighting designs, and metal is the surface where a design becomes *visible*: a mirror reports its world verbatim. This chapter recasts the environment model under the lighting volume's keys, because the citizens are not fixed; they are whatever the spec says surrounds the figure.

The key in the metal

First, the constant: under any design, **the key appears in the metal as its brightest event** — the specular at the angle of incidence, sized and edged by the source's hardness (the lighting volume's

law: hard small source, tight brilliant point; soft broad source, dim spread sheen), colored as the source, white-tipped by the spike budget. Metal is also where the key's *temperature* is most legible: a warm sun returns as a warm gleam even in cold steel, and the neutral-anchor metals (steel, silver, chrome) thereby become the figure's most honest light meters — which makes them, on colored-key designs, prime candidates for the palette volume's *neutral anchor* role. The viewer reads the light's color from the steel.

Recasting the citizens

Then the variables, by design. **Golden hour:** the sky citizen warms — the blade's upper zones go amber-gold rather than cool blue, the earth zones deepen toward violet-brown (the cool shadow family arriving in the mirror), and the horizon contrast peaks; low-key raking light is metal's most flattering hour, and the dawn duel's blades were specified this way in the lighting volume. **Overcast:** the sky becomes a vast soft source — metal under overcast loses its hard zone boundaries and tight speculars (the environment itself has gone soft), compressing toward satin behavior regardless of polish; a deliberately quiet register, correct for the gray field of a somber piece. **Moonlight:** the default map, transposed cold and dark — sky zones in dim blue-silver topping out around value 6 except where the moon itself spikes, earth zones near-black, the whole machine low-key with the lighting volume's ratio courage; and warm practicals (the window, the lamp) entering as the second jurisdiction. **Interior and firelight:** the environment model's hardest reset, because *there is no sky.* The candle-lit room's citizens are the flame (a furious warm point), the dim warm room (a low murmur), and darkness — so metal indoors goes nearly black, carrying one steep amber ladder per surface where the flame's reflection lands, falloff-graded by distance exactly as the lighting volume's inverse-square law demands. The cartographer's inkwell — one hard specular in a dark room — is the entire interior model in three brushstrokes.

Multi-source metal: the jurisdiction blade

Where a design runs two sources, metal is where they *meet*, because a mirror reports both. The protocol is the lighting volume's jurisdiction law executed at blade scale: each source claims the zones angled to reflect it, the claims are mapped before paint, and the subordination ratio holds *inside the metal* — the moon's silver zones a clear step above the window's amber zones on the assassin's sword, the boundary between them falling along real geometry (the blade's central ridge, a bevel change), hard-edged at high polish. A two-source blade mapped honestly is among the most spectacular objects in the craft — two worlds in one edge — and unmapped it is the committee of keys forged in steel.

Glow in the mirror

OSL and metal are natural conspirators: a glowing source is, to every polished surface near it, the brightest citizen in the environment, and *painting the glow's reflection* is half of what sells the glow at all. The runed blade reflects its own runes — each glyph's glow returning as a soft bright smear on the adjacent bevel; the reliquary lamp lands in the crusader's breastplate as a warm vertical gleam; the spell in the raised hand rims every plate that faces it. The rendering follows the OSL laws (the reflection is bright but *below* the source itself; falloff applies; the unaffected zones pay), and the design payoff is integration: glow that appears only on the glowing object is a sticker, while glow that the armor *witnesses* is an event in a world.

The chrome ball at the bench

The chapter's technique, promised since Chapter 1: when the design is exotic enough that the standard map fails — the interior, the two-source night, the colored key — **photograph a chrome sphere (or the trusty spoon) at the figure's position under the lighting volume's lamp setup.** The sphere returns the actual environment map for that exact design: where the horizon falls, what the practical's reflection looks like, how dark the room-citizen really is. It is the lamp-photo method completed — the reference rig that ends arguments — and it costs a ball bearing. Between the spoon, the lamp, and the map sheet, there is no lighting design in this series whose metal must be guessed.

Chapter 7 — Execution at the Bench

The workflow chapter, in the series' twelve-step form — with the warning that earns its place at the top: **NMM punishes execution flaws more than any other surface.** High contrast and hard edges publish every ridge, every chalky patch, every coffee-ring; the smooth-application disciplines of the parent volume are not advisable here, they are structural. Glass-smooth basecoats, thin coats built patiently, the binder maintained with medium on the chalk-prone matte ranges (a chalky film on a sky zone reads as corrosion nobody ordered), and the no-re-entry rule absolute. Metal is where paint handling is graded in public.

Step 1 — Inventory the metal. Every metal surface listed: which metal (Chapter 4), which finish (Chapter 5), which condition, which jurisdiction (Chapter 6), and its rank in the polish hierarchy — the focal piece named, the supporting cast demoted a register.

Step 2 — Set the world. One horizon height for the whole figure, written down. The key's address imported from the lighting spec. The scheme's citizens assigned: which blue is the sky, which umber is the earth, which neighbors will smear into which plates.

Step 3 — Draw the map. Per surface, on the primed-figure photograph or in pencil on the primer: sky, earth, horizon, specular points, counterchange flips at the edges, contact smears, concavity inversions. The map is the piece; everything after is transcription.

Step 4 — Consult the mirror. The spoon for the default world; the chrome ball under the lamp rig for designed light. Photograph; pin at the bench.

Step 5 — Choose the road. Two honest builds. The **monochrome road**: the full value machine executed first in neutral grays (the sketch logic), proven by grayscale audit, then tinted into its metal by glazes — gold's ladder laid as transparent warmth over a working gray engine. Strong for learning and for steel; gold and copper want heavier re-saturation passes at the end. The **direct road**: the ladder mixed and the zones blocked in color from the start. Faster, fully saturated, and the usual choice once the machine is internalized. Many painters split the difference per metal — steel direct, gold sketched. Either road, the airbrush may lay the foundation: the **SE-NMM** pass (sky-earth gradients airbrushed across the masked metal regions, the horizon established in minutes) remains the great labor-saver on large armor, with every plane, edge, and specular then resolved by brush on top.

Step 6 — Block the plateaus, hard. Every zone laid at its target value with *hard edges everywhere* — blocked, not blended. Softness is added later, by the roughness dial's permission, never present by default. A blocked-in NMM looks brutal and correct; a blended-in one looks gentle and lost.

Step 7 — Sprint the transitions. The chosen edges softened to their finish: horizon gradients pulled in two-brush or feathered passes a few brush-widths wide, curvature turns compressed, the satin surfaces softened one register, the polished ones barely touched. The dial, executed.

Step 8 — Counterchange audit. Walk every edge between metal planes: do the values flip often enough? Fix by darkening or lightening whole plateaus, not by fiddling the boundaries.

Step 9 — Tint and guests. The sheen glazes (the blues across steel's sky, the chroma peak built into gold's upper-mids), the shadow guests, the contact smears from the neighbors, the re-saturation passes that rescue any sketch-road dullness — all transparent, all directional, all over a *dry* and proven value machine.

Step 10 — Condition. Wear, damage, age, heat, engraving, per Chapter 5 — the biography written onto the finished metal, last, so the history sits on top of the object instead of underneath it.

Step 11 — Speculars and spikes. The key's reflections placed at the angles of incidence, sized by hardness, counted on one hand, white-tipped only at the focal metal. Always the final marks, because they are the loudest, and loud goes last.

Step 12 — The rotation audit. The protocol in full, because metal alone requires it: photograph the figure from the primary view and judge the metal; rotate ninety degrees; re-judge — *does the map still tell a plausible story from here?* — and adjust; repeat at all four orientations. Conflicts resolve in the primary view's favor, but every angle must remain plausible, which in practice means the sky-earth logic and the horizon height hold everywhere even where the specific speculars are tuned for the front. A blade that works from one seat in the theater is a painting; one that survives the walk-around is a sword.

The practice ladder, for the painter building the skill deliberately: the **sphere set** (one sphere painted six times — steel polished, steel satin, gold, copper, iron, chrome — each an evening, each grayscale-audited); the **gem sprue** (twenty stones, the inversion drilled to boredom); the **spoon study** (paint what the actual spoon shows, once); and the **blade exercise** (one sword, four times, under four keys from the lighting volume's Appendix C). The set costs a month of evenings and repays it for a career.

Chapter 8 — Four Metals Reasoned in Full

The series cast supplies the metal. Four problems at four scales: the full harness, the warm-on-warm fittings, the two-source blade, the jewelry. Each walk-through runs the map, the value architecture, the ladder, the finish and condition, the rotation plan — and the demon question.

I. The crusader's harness (plate steel, large scale)

The problem. Forty-five percent of the figure is steel under a cold overcast key with one warm practical (the reliquary lamp) — large continuous plates, the register where NMM becomes architecture.

The map. Overcast recasts the citizens soft (Chapter 6): zone boundaries gentled, speculars broad and dim — a *satin* world by decree of the weather, which suits a campaigning harness. Horizon set high (the figure looms in his own gray morning), one height across breastplate, pauldrons, and greaves. The lamp claims its jurisdiction: a warm vertical gleam up the breastplate's left, falloff-graded, two steps below nothing — under this dim key the lamp's reflection is locally the brightest thing the steel reports, exactly as the lighting spec subordinated the world to it.

Values and ladder. The cool ladder at moderate contrast — overcast compresses — plateaus at 3 and 6 rather than 2 and 8, counterchange across every plate edge doing the legibility work the soft key declines to do. Earth zones breathe the oxblood cloak's contact smear; sky zones take the scheme's gray-blue sheen, restrained.

Condition. The two-finish biography: a blackened-steel field on the lower harness (the low-key compressed ladder) worn through to cold bright metal at every arris and handling point; sparse rust seated at rivet lines and bleeding a centimeter; one honest nick on the leading pauldron, dark notch and bright lip.

Rotation. Large plates are the rotation audit's home turf — the breastplate's map must hold from three-quarter views where most of it is visible at a raking angle; the grazing-angle brightness of Chapter 1 is the tool that keeps those views alive.

The demon question. Chalk. Forty-five percent of the figure in smooth cool mid-tones is the binder's torture test — one under-bound layer and the harness frosts; medium in every mix, and the satin world stays satin on purpose only.

II. The shieldmaiden's gold (boss, brooch, bridle — warm metal in a warm world)

The problem. Aged gold and bronze fittings under the golden-hour key, beside russet cloth, bay horse, and chestnut leather — the warm-on-warm separation problem the palette volume flagged, now executed.

The map. Golden hour recasts the sky citizen amber (Chapter 6): the gold's upper zones go warm-on-warm, and separation must come from *value and chroma*, not temperature. Horizon low on the shield boss (the rider above the viewer), the sun's specular furious on its upper-left quadrant.

Values and ladder. The full gold ladder with its discipline tightened: earth zones driven *deep* — chocolate into near-black maroon, a step darker than instinct, because the surrounding warm materials crowd the mids and only the gold may own the depths; the chroma peak at value 7 pushed *clean* (a saturated cad-leaning yellow the muted russets cannot match); ivory and the white-tipped spike above. The metal separates from the leather not by being yellower but by *sprinting* where the leather ramps — the plateau-and-sprint profile is the entire warm-on-warm solution.

Guests and condition. Bottle-green and violet shadow guests in the boss's earth zones (the environment the warm world cannot supply, smuggled in as reflection); aged condition throughout — the peak muted a half-step on the bridle fittings, full-voiced only on the boss, building the polish hierarchy toward the shield. Verdigris declined: this gear is maintained.

Rotation. The boss is a sphere — fisheye world, ring horizon — and spheres are rotation-proof by construction; the bridle's small cylinders need only their stripe maps checked at the quarter views.

The demon question. The mustard. One session of timid earth zones and the boss joins the leather as warm cloth; the depths and the peak placement are the medal.

III. The assassin's blade (the two-source jurisdiction)

The problem. One polished blade, two lights: the moon's cold rim-key and the window's warm practical — the lighting volume's subordination law forged in steel.

The map. The blade's central ridge is the border. The moon claims the upper bevel and the spine: silver sky-zones, dim blue plateaus at 5 to 6, the moon's own specular a hard cold spike near the tip at the angle of incidence. The window claims the lower bevel's earthward faces: a steep amber ladder, falloff-graded along the blade's length (brightest near the hilt, nearest the street), peaking two and a half steps below the moon's spike — the ratio held *inside the weapon*. The fuller runs its concave inversion against both. Earth zones beyond either jurisdiction: near-black, the night.

Values. The blade is the figure's value-range champion — 1 to 9 across two centimeters — and its counterchange is two-flavored: planes flip not only light-dark but *cold-warm* at the ridge, the temperature alternation reading as two worlds in one edge.

Condition. Mirror polish (the professional's tool), one biography note: a fine heat-temper band — straw, brown, purple, blue — a half-millimeter wide along the spine, catching the moon.

Rotation. Two-source blades are the audit's hardest case: at the rear quarter the window vanishes from the geometry and its zones must plausibly die — mapped in advance, the amber jurisdiction shrinking with the angle, the primary view tuned, the others honest.

The demon question. The treaty. One zone where the amber climbs above its station, one boundary that wanders off the ridge, and the blade becomes the committee of keys — the failure the whole map exists to forbid.

IV. The magistrate's jewelry (gold at jewelry scale, cool world)

The problem. Fine gold — rings, circlet, the staff's fittings — at two-millimeter scale under cool moonlight: the cool-scheme-warm-metal counterpoint, miniaturized.

The map. At jewelry scale the environment model compresses to its essentials: each piece is a bright-cap sphere or a stripe-mapped cylinder, sky and earth reduced to two or three marks, the horizon implied rather than drawn. Moonlight recasts gold cold-adjacent (Chapter 6): the ladder's mids dimmed and grayed, the warmth surviving as identity rather than glow — *this is gold* whispered, not declared — with the single carmine staff-gem (the palette volume's accent) and its bezel running the gem-in-metal interaction at the piece's one full-voiced address.

Values. The maximum-local-contrast principle is everything at this scale: each piece is a dark base note, one mid, one spike — three marks, placed perfectly, because there is no room for four. The spike budget across all the jewelry: two whites, both near the face.

Condition and finish. Mirror polish by station (a magistrate's gold is kept), no biography — restraint as characterization.

Rotation. Trivial by size; the audit's minute here is spent instead on *placement* — confirming each spike still serves the circulation route from every angle.

The demon question. Over-rendering. Jewelry is where NMM painters spend forty minutes per ring proving the system and lose the face to a glittering crowd — the count discipline, the polish hierarchy, and the palette volume's carrier census are the medal at this scale, and the bravest stroke is the ring left quiet.

Four scales, one machine. The map drawn, the world set once, the plateaus blocked hard, the counterchange flipped, the guests invited, the spikes counted — and the demon question asked while its answer is still a plan.

Chapter 9 — Failure Patterns and Their Repairs

The NMM failure catalogue — the named diseases of the discipline, each with signature, cause, and repair. More than in any other volume, the repairs here route back to one document: the map. Metal fails on paper before it fails in paint.

Gray cloth. *Signature:* steel that reads as gray fabric — even gradients, polite mid-values, no flash. *Cause:* the diffuse profile imported — long ramps where plateaus and sprints belong, counterchange declined. *Repair:* Chapter 3 re-run on the existing work — plateaus pushed apart (earth zones glazed down to 2, sky zones rebuilt at 7 to 8), transitions *narrowed* by overpainting their

outer reaches back to plateau value, the value flips installed at the plate edges. The instinct will be to blend more; the cure is to blend less.

Mustard cloth. *Signature:* gold as yellow fabric — three steps of yellow-brown, chroma peaking at the highlight. *Cause:* the ladder truncated and the peak misplaced. *Repair:* extend both ends — deep chocolate-maroon glazed into the earth zones, ivory-to-white rebuilt above — and relocate the saturation: a clean warm-yellow glaze at the upper-mids (value 7) with the zones above it *desaturated* toward ivory. The peak moves down; the gold appears.

The pewter problem. *Signature:* technically lovely metal that reads as dull cast pewter regardless of recipe. *Cause:* every transition softened equally — an accidental claim of rough finish made by good blending habits. *Repair:* re-cut. The chosen boundaries (horizon, plate edges, specular rims) re-hardened with blocked edges; softness retained only where the dial licensed it. The painful truth: this repair deletes hours of careful blending, which is why the dial is set *before* Step 6, not discovered after.

The wireframe. *Signature:* every edge of every plate traced in bright line; the planes between left flat; armor as a glowing diagram. *Cause:* edge highlighting substituted for plane painting. *Repair:* the planes claimed first — full zone maps blocked across the flats — then the edge lines audited down: weighted by orientation to the key, broken at overlaps, deleted on shadow-side edges. Edges garnish the machine; they are not the machine.

The one-angle wonder. *Signature:* spectacular from the front, nonsense from the side — speculars facing nothing, sky zones underfoot at the quarter view. *Cause:* the rotation audit skipped. *Repair:* run it now — four photographs, the off-angle implausibilities listed, the map's logic (horizon height, sky-earth orientation) restored everywhere while the front's tuning survives. Prevention costs four photographs per session; the late repair costs the off-side's repaint.

Specular drought and specular spam. *Signatures:* metal with no source in it (dead, lightless — common on the sketch road, where the machine was built and the key forgotten); or every surface spiked white (the frost). *Causes:* Step 11 skipped, or unbudgeted. *Repair:* the lighting volume's law executed late — one specular per surface at the angle of incidence, sized by hardness, the figure's white tips counted on one hand, the focal metal keeping the brightest.

Horizon chaos. *Signature:* each plate wearing its horizon at a different height; the harness issued five worlds. *Cause:* surfaces mapped in separate sessions without the Step 2 decision. *Repair:* elect one height, audit every vertical and near-vertical surface against it, and re-zone the dissenters — usually a one-evening glaze campaign, since the values mostly survive relocation.

Environment amnesia. *Signature:* steel that ignores the crimson cloak touching it; gold whose shadows contain no world; metal hue-mixed from strangers to the scheme. *Cause:* the fifth citizen never invited; the palette volume's law unenforced. *Repair:* the guest passes — contact smears glazed in from the actual neighbors, the sheen blues swapped for the scheme's own blue, the shadow guests (violet, green, deep red) admitted to the gold. Cheap, transparent, transformative.

Chalk on the ladder. *Signature:* a frosted, dusty bloom across the smooth mid and sky zones — corrosion nobody painted. *Cause:* the binder failure of the parent volume, published by metal's flawless-surface requirement: over-thinned paint, chalk-prone matte ranges pushed past their threshold, layers scrubbed during the tack window. *Repair:* seal and re-saturate — a glaze-medium or satin pass over the afflicted zones, then the local tint glazed back — and the mixing corrected with medium for every layer after. On NMM this is not a finish preference; an under-bound sky zone cannot hold the hard edges the map demands.

The sticker blade. *Signature:* a reflection map painted *across* the blade's actual geometry — gradients sailing over the fuller, the bevels ignored, the design floating on the surface like a decal.

Cause: the map drawn on an imaginary flat blade rather than the sculpted one. *Repair:* re-map to the geometry — every bevel a plane with its own reflection answer, the fuller's concave inversion installed, the ridge honored as a counterchange border. The sculpt is the map's terrain; NMM painted with the geometry is a sword, painted on it is a label.

The unratified treaty. *Signature:* TMM and NMM sharing a figure with no agreement — a metallic-flake sword beside painted-reflection plate, each correct, jointly two different figures. *Cause:* the parent volume's coherence rule unapplied. *Repair:* ratify or convert — either the deliberate hybrid (the metallic base carrying an NMM value structure, zones and horizon glazed over working flake, one system wearing both technologies) or one philosophy repainted to match the other. The hybrid is usually the cheaper treaty and often the stronger metal.

Banding on the sprints. *Signature:* the compressed transitions showing their steps — staircase stripes across the horizon gradients. *Cause:* execution, at last, rather than design: the narrow gradients are the hardest blending real estate on the figure. *Repair:* the parent volume's universal solvent — the unifying mid-value glaze pulled along the transition — with the consolation that metal forgives more banding than cloth: a slightly stepped sprint reads as polish before it reads as error. Fix the visible offenders; spare the rest.

The meta-pattern, completing the series' set of five: NMM fails by **unasked questions** — *what does this plane reflect* never put to the surface, the map never drawn, the world never set. Every repair above is an answer given late. Paint what the metal sees; to see it, you have only to ask.

Appendices

Appendix A — The Reflection Map Sheet

Per metal surface, filled at Step 3. **Metal and anchor** — steel / gold / copper / bronze / iron / chrome: *through what tint does it see?* **Finish** — the roughness dial position, and so the edge specification: *how sharp are my transitions and speculars?* **Rank** — position in the polish hierarchy: *is this the focal metal or the supporting cast?* **World** — the one horizon height; the key's address and color from the lighting spec; the citizens named (which blue is the sky, which umber the earth): *what does the mirror contain?* **Zones** — the sketch: sky, earth, horizon, curvature compressions, concave inversions: *the map itself.* **Counterchange** — the planned value flips at this surface's edges: *where do the plates argue?* **Speculars** — count, placement at angle of incidence, which (if any) takes the white tip: *where does the source appear?* **Guests** — sheen glazes, shadow guests, contact smears from named neighbors: *who visits?* **Condition** — wear points, damage, age, heat, inlay: *what is its biography?* **Jurisdictions** — for multi-source designs: which zones answer to which light, the border's geometry, the subordination in steps: *who rules where?* **Rotation notes** — what must stay plausible at the quarter and rear views: *does the story survive the walk-around?* **The demon question** — *what here would cost the medal if fumbled?*

Appendix B — Metal Ladders Quick Reference

Metal	Anchor tint	Ladder (earth to spike)	Chroma peak	Shadow guests	Sheen glazes	Signature failure
Steel / silver	Neutral	Cool near-black, blue-grays, cold near-white, white spike	None (guests supply)	Warm umber, rust breath	Turquoise / scheme blue on sky zones	Gray cloth
Gold	Warm filter	Chocolate-maroon, burnt sienna, ochre, warm yellow, ivory, warm-white spike	Value 7, upper-mids	Violet, bottle green, deep red	Warm yellow at the peak	Mustard cloth
Copper	Hot red-orange	Red-brown black, burnt sienna, orange-red, salmon, warm spike	Value 6	Verdigris blue-green	Orange at the mids	Terracotta
Bronze	Olive-brown	Umber-green dark, muted ochre-brown, pale straw	Low, mids	Verdigris	Olive breath	Plain brown
Brass	Green-gold	As gold, leaned yellow-olive, brighter mids	Value 6-7	Verdigris	Yellow-olive	Impersonating gold
Iron / gunmetal	Cold, compressed	Chromatic near-blacks, dark steel grays, top near 6, hard spikes	None	Oil violet-blue, rust	Blue-violet on flats	The black hole
Chrome / aluminum	Neutral, total	Pure environment, 1 to 9.5, hardest edges	None	Everything nearby	None needed	Any mapping error, published

Appendix C — The Roughness Dial

Finish	Transition edges	Specular	Environment legibility	Technique
Mirror polish	Hard, blocked	Tight, brilliant, white-tipped	Sharp — contact reflections legible	Blocked planes; minimal blending
Satin	Softened one register, short gradients	Broader, half-step dimmer	Blurred but zoned	Two-brush / feathered sprints
Brushed	Smeared along grain	A drawn streak, not a point	Streaked anisotropic bands	Directional liner work in the mids
Rough / cast	Dissolved	Broad, mild	Mottled value variation only	Stipple, sponge, dome drybrush
Worn two-finish	Field at one stop, wear at a higher	Per zone	Mixed — the biography	Field first; wear points climb the dial

Appendix D — Glossary

Anchor: the hue family a metal's tint multiplies the environment into; steel's is none, gold's is the warm filter. **Anisotropic:** directionally scattered — brushed metal's streak-along-the-grain reflections. **Chroma peak:** the value at which a colored metal's saturation maximizes — upper-mids for gold, never the top. **Citizens:** the simplified environment's members — sky, earth, horizon, key, neighbors. **Contact reflection:** the soft smear of a nearby object inside a metal surface. **Counterchange:** the value flip across edges between metal planes; the metallic signature at distance. **Concave inversion:** the gradient reversal inside fullers and flutes — a mirror folded inward flips its world. **Environment model:** the designed, simplified world a painted mirror reflects. **Horizon:** the sky-earth boundary worn by vertical surfaces; one height per figure. **Jurisdiction:** the zones of a metal surface assigned to each source in a multi-light design. **Ladder:** a metal's mix sequence from deepest earth zone to spike. **Plateau and sprint:** metal's value profile — broad steady zones joined by compressed transitions; the staircase, not the hill. **Roughness dial:** the finish continuum from mirror to rough; equivalently, the transition-sharpness control. **SE-NMM:** sky-earth NMM — the airbrushed gradient foundation resolved by brush. **Sheen glaze:** the transparent tint pass (blues on steel, the peak yellow on gold) laid over a proven value machine. **Shadow guests:** the borrowed environment colors living legally in a metal's dark zones. **Spike:** the pure-white tip of a specular; budgeted figure-wide on one hand. **The spoon:** the standing reference — a real polished object consulted whenever a painted one stops making sense.

End. Paint what the metal sees, not what it is.