tion. We certainly will not argue here that instead of subordinating ornament to the orders of abstraction we will find a way out by rediscovering representation! There is no doubt that Senape's motto is correct: we should apply the methods of nature, not imitate nature. It must be, because a painted picture of life is not identical to life at all, nor is a drawing of nature identical to nature; it would simply make us sad beyond words because such art separates us from life, and traps us in a world on the other side of the glass without hope of escape. If the answer does not lie in schematic order nor in the representation of nature, where then? Fortunately, we need not look far to find a contradictory quote by the same man in the chapter from *The Stones of Venice* uncharacteristically titled "The Material of Ornament":

For instance, the line or curve of the edge of a leaf may be accurately given to the edge of a stone, without rendering the stone in the least like a leaf, or suggestive of a leaf; and this the more fully, because the lines of nature are alike in all her works; simpler or richer in combination, but the same in character; and when they are taken out of their combinations it is impossible to say from which of her works they have been borrowed, their universal property being that of ever-varying curvature in the most subtle and subdued transitions, with peculiar expressions of motion, elasticity, or dependence.43

And, a bit further on:

... almost all these lines are expressive of action or force of some kind, while the circle is a line of limitation or support. In leaffage they mark the forces of its growth and expansion, but some among the most beautiful of them are described by bodies variously in motion, or subjected to force; as by projectiles in the air, by the particles of water in a gentle current, by planets in motion in an orbit, by their satellites, if the actual path of the satellite in space be considered instead of its relation to the planet; by boats, or birds, turning in the water or air, by clouds in various action upon the wind, by sails in the curvatures they assume under its force, and by thousands of other objects moving or bearing force.44

"Lines that are expressive of action or force" – it could easily have been the maxim of expressionism. Using the terminology introduced earlier, I would say Ruskin here proposes replacing the *outline* of a leaf, which would depict its form and therefore be representational, with the *centerline* of a force. Object versus trajectory: we have definitely started to investigate ribbon ornament, that which works in the reverse direction from Owen Jones's tessellations. And here is the answer we were looking for a page ago: a line that abstracts from the real, but not by reduction; a line capable of precisely registering the variation of the real – again, not unlike Hogarth's serpentine line, "the line of variety."45 It is all in the quality of the lines, ones that manage transitions and guide forces. Ruskin actually indexes these in a diagram entitled "Abstract Lines";46 to make these lines – abstracted from glaciers,
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ballistics, leaves, mountains — comparable, he draws them all at the same size, as single lines of a uniform thickness. I must emphasize that Ruskin’s lines, though abstract, are not schematic. Since he uses a single line to express all the subtle variations in force and matter, it can never be a simplified curve like a circle. The diagram shows lines that are known mathematically as third-degree or cubic functions (circles, ellipses and parabolas are squared or second-degree); in physics, these are typically lines of not only varying direction but also varying speed. Change of direction turns (first-degree) straight lines into curves, but change in speed adds curvature to those curves.

Now, though Ruskin started thinking about such abstract lines as the source code of variation (instead of the source code of uniformity), he only applied that notion to S- and J-figures — again, very much in line with Hogarth. If we elaborate that concept of the abstract line, it should not be too difficult to produce a wider range of variation, based on a wider range of source figures. Let us look at a simple example first, one from Gombrich’s The Sense of Order: a twelfth-century wrought iron hinge on a wooden door of the cathedral in Montréal in France’s Yonne valley. We can see how the linear element of the hinge expands over the surface of the door in a typically Gothic manner, by branching off at specific points to then form curving, spiraling tendrils. To understand the complexity of such a line, let us imagine, in an abstract design space (a computer screen — why not?), that the hinge starts out as a single straight line, moving from the left side of the door to the right. We can imagine that the forces pulling on the linear hinge would be relatively strong and the local tension at the connection points between wood and iron would soon become too much; hence, the linear element of the hinge needs to spread itself out over the door, avoiding points of high tension. Logically, it must do so in continuity with the hinge point, by branching out (forming a T-figure), even bifurcating (into a Y-figure), perhaps ending in scrolls and tendrils (J-figures) that can spiral on as far as needed. The relationship among this set of figures would be similar to the abstract code of a tree branch, but that does not mean the hinge is a tree, nor is it mimicking or trying to represent one, though it certainly acts naturally. So, on our twelfth-century computer screen, we first see the initially straight line subdivide into a specific number of segments, and then, on each of the points between these segments, we see two lines sprout off diagonally, upward and downward, and then bifurcate, multiplying lines on each side of the middle lines, which then start to bend in opposite directions, continue to spiral inward, and then stop. Such a growth algorithm consisting of a whole set of variable figures with interrelated, and therefore configurational, behavior, allows a simple line to distribute itself over a surface, to almost become a surface without losing the continuity of the line. All these hinge patterns can be different, and, given the time and stamina, one could publish an immense volume — like Bentley and Humphreys’s Snow Crystals — showing in the first part all the actual iron hinges produced for Gothic and neo-Gothic doors and in the second all the computer-generated mutations, exhausting the variations into the near-infinite.

While I lack the mathematical background to say precisely, I am sure the dimension of that resulting branching iron line is no longer a clean 1.0 but rather something moving in the direction of the two-dimensionality of a surface, perhaps 1.26: a fractalized, transdimensional number, a relational number. That is what makes it a pattern. The iron, still malleable and soft, starts to grow branches with tendrils sprawling out over the surface, and there it rigidifies to meet the door. A Stoffwechsel takes place, brought about by the behavior of abstract lines following the logic of a grammar. There is nothing lyrical or metaphorical at work here, nothing symbolic. There might well be a symbolic effect, for instance, the hinge could depict the “tree of life,” but the symbolic can never be the driving mechanism. Language and meaning can never Supply matter with the instrumentality of code. And it is pure, locally operating if/then code: if tension increases, then bifurcate outwardly; if it decreases, then spiral inwardly. Of course, the transformable
condition of the iron is active during design and forging, but it is an abstraction that is not set apart from the real; it inhabits the real, like a genetic code of branching informing the still-hot iron. I would not even say that such code preexists the hinge, because the iron finds these points of abstraction while meeting the surface of the door. In that sense, the abstraction is a shared set of points between iron line and wooden door, and we are witnessing not a transition of abstract to concrete, which is so often proclaimed as the route of actualization, but of the reverse, from concrete material to abstract design. The iron draws its own pattern on the door. Frayed, unfinished, not fitting into any fixed format, the branching hinge simply manages forces and becomes ornate. And I can imagine that if the wooden door became very large and heavy, the iron tendrils too would become enormous, like those on the door of Salisbury Cathedral, or the branches could reach further over the wood and start to touch each other, and begin to weave a net—no problem; such a code can tackle all such issues.

“Okay,” you might say, “that example is a bit too easy. Since the hinge is structural, like Gothic ribbed columns swaying over a netted vault, it self-decorates because of the physical forces involved. Can you give an example in which there are no real forces involved, like wallpaper?”

“Well,” I would answer, “why not take the hinges and place them vertically against the wall, like a grapevine shoot, and let them sprout over the wall from each vertical point?” Nothing could sound more like William Morris.

A thorough analysis of some of Morris’s better-known ornamental patterns, especially the “floriated diapers,” as he called them, is imperative at this point. Morris, like Ruskin, is generally called an advocate of a naturalist theory of ornament, but it would be much better to look at the diapers of Morris’s wallpaper designs, like Acanthus and Myrtle, as configurations of abstract lines. If we classify his diapers as ribbon ornamentation, they should operate from line to surface and, as such, invariably act to construct a surface, as a surface “in the making” (as James and Bergson would say, but we will save that for the next chapter). And, like the iron hinge, they should progress from movement to rigidity. Now, what are the constitutive elements of Morris’s design? The twig, leaf and flower, always these three. Let us, for once, not look at these as representatives of absent nature but simply consider what they actually do, and study carefully the geometrical role each plays. The twig, of course, is linear and unidirectional, and plays the part of the ribbon, branching, bending and interlacing. The flower plays the role of the tile, a small surface patch radially pointing outward in multiple directions, in contrast to the twig. Between these two, we find the leaf, which displays both directional linear and expansive surface behavior. These three elements have two options for interacting: they can nest or entangle; that is, respectively, they can either fill a surface by dovetailing together, or they can overlap, leaves over twigs, twigs over twigs, leaves over leaves, and flowers on top. When they fill each other’s leftover spaces, the surface becomes as flat as Flatland, a world without depth (such as we see in Jones’s designs). Space is created by the contours of the elements. They nest, they pack together, and in doing so, they emphasize the flatness of the surface. The other option, entanglement, creates depth: elements overlap, and therefore a third direction becomes available for movement, though it is not completely perpendicular, like a Cartesian z-axis, but more of a thickening of two-dimensionality, a depth to a surface, since the leaves can overlap the vines and hide them momentarily but never try to bend out vertically, orthogonal to the wall, for that would cause too much distortion and destroy the illusion of thickness. As in trompe l’oeil, the illusion of tactility here is textural, intensifying the sense of surface, irresistible as a dog’s furry coat; it is different from the stereoscopic effect of a pair of red-and-green glasses meant to create the illusion of space. Morris’s entanglements, like Pre-Raphaelite paintings, are not about space but entirely about texture, depth of surface.

However, such complex behavior by interrelating twigs, leaves and
flowers cannot be freely sustained over the entire surface, for obvious technological reasons. William Morris’s main problem, like any wallpaper designer’s, was the design of a tile, that is, in Morris’s case, a woodblock that could be translated vertically, horizontally, and mostly diagonally, the (exact) repetition allowing the roll its required length and width. Being one of Ruskin’s most dedicated followers, he strongly believed that for the production of wallpaper one should not resort to industrial techniques but instead revive the ancient technique of woodblock printing, using a stamp handcarved from pear wood, often applied in a diagrid or “half-drop” pattern, with each column of adjacent block prints staggering half a step. If one marked the center of each block on the wallpaper and connected these with a line, one would see such a Jonesian diagonal grid emerge. Of course, the whole point of Morris’s designs is that one does not notice such a grid, and therefore, his woodblock is not your typical tile. Its edges follow the complex roughness of all the leaves and vines; it is not a square block at all but one shaped like a torn piece of paper, quite irregularly, except that the top edge fits exactly with the bottom edge and the left with the right, or, in the half-drop pattern, the top left with the bottom right. All wallpaper design show a double behavior, embodying two types of multiplication of the elements: first, on the small scale, the bifurcating, nesting or entangling of vines, leaves and flowers, and second, on the larger scale, the horizontal and vertical translations of that mini-pattern onto a large roll of wallpaper. To create a productive relationship between the two, the geometry of the tile should only be incidentally materialized by a major element; the curving vines only hit the edges every now and then, as if bouncing off. Nor should the flower occupy the middle of the woodblock, or one would immediately see the diamond grid jumping forward from all the complex entanglements. On the other hand, the pattern is not merely obscuring the hidden grid, either, but trying to merge, following the more general rule of vitalized geometry. Obviously, since the second multiplication operates by very simple geometrical rules of tiling, and the first by intricacy of entanglement, a wallpaper design is threatened by an internal separation capable of completely destroying its coherence. The main rule of wallpaper design becomes very apparent: do not fully visualize the edge of the tile or

the edge of the roll, or else it will become a secondary system on top of another. Or, to use my earlier terminology: keep the edges dashed. Morris develops an active continuity between both types of multiplication, tiling and entanglement, which is essentially a Gothic principle, in which straight mullions and intricate tracery sprout from each other. I think there is a more profound grammar here than what we find in The Grammar of Ornament.

When we stand in front of a wall covered with Morris’s Pimpernel or Myrtle design, we are immediately captivated by repetition without readable, clear joints, because the edges are axes of symmetry more complex than we would expect of simple reflection. In the Myrtle pattern, the tile contains halfflowers that become complete when mirrored, but also single flowers that become two, so the pattern as a whole begins to mix individuals with twins, making it unclear to the naked eye what is going on: which lines are materialized in a continuous ribbon, and which are virtualized in a dashed axis? Morris also found another even more innovative technique for captivating the eye. Looking at his amazing Acanthus wallpaper, for instance, astonishingly we find only leaves in the pattern, no flowers or twigs – and this choice of a single element is utterly daring, since it can make a design duller than a Corbusian wall. But see how the leaves behave, each has a thick main nerve, so it can

act like a twig as long as it keeps its lobed contours close to that vein, but such large leaves often tend to curl away at the tips, so much so that they become rounded, pointing their lobed edges in all directions - in short, at that point the leaves behave like flowers. Simply by modulating the directions of the lobes of the acanthus leaf, Morris makes it act out all the complex behaviors of leaf, twig and flower. A zone of transition is created between line and patch, a zone of continuity, with lines constantly stretching out and curling up, animated by twisting lobes, in a way that is intriguing regardless of the repetitiveness of the guirlandes created by the leaves. Actually, the seriality (there are no balanced reflections in the Acanthus pattern) strengthens the rhythmicity of the whole design. The surface stays stranded and ribbed and hardly achieves two-dimensionality, but this is made up for by the plunging in and out of the densely packed leaves. The Acanthus wallpaper is one of the finest ever made.

Morris is crystal-clear in his *Some Hints on Pattern Designing* of 1881, in which he proposes a "new-born Gothic".50

As to the construction of patterns the change was simply this: continuous growth of curved lines took the place of mere contiguity, or of the interlacement of straight lines.51

And, more theoretically:

Rational growth is necessary to all patterns, or at least the hint of such growth; and in recurring patterns, at least, the noblest are those where one thing grows visibly and necessarily from another. Take heed in this growth that each member of it be strong and crisp, that the lines do not get thready or flabby or too far from their stock to sprout firmly and vigorously; even where a line ends it should look as if it had plenty of capacity for more growth if so it would.52

Is there anybody left who would label Morris a mere naturalist? I believe we have seen that such a designation does not begin to cover what takes place in his wallpaper design, and the same is as true of his book and rug designs. The quality lies in the lines, in the abstract lines of force. "Growth" is generally denigrated as "organic," but we must be careful with such disqualifications, because organicism would mean behaving like something organic, i.e., being representational, and here we are discussing the abstract life of lines. We are occupying some kind of new, middle ground here; yes, there are naturalist and organic features, but there are just as many mechanical and abstract ones. The last thing one would say, on looking at a wall covered with one of his designs, would be that it looked natural, since it looks as much like a machine has been working on it. We see organic iteration cooperating with mechanical repetition. Clearly, Morris has been able to solve the contradiction between Ruskin's abstract centerlines and his naturalist outlines by letting even the smallest leaf or flower play a role in the meshing and entangling of vectors. Morris uses mostly Y- and T-figures (specifically figures of growth) on variable curves, and offsets each figurial line sideways with the most complex lobed or toothed contour - again, not merely to delineate a leaf but to elaborate the line, to make it vary and fractalize. In short, the interplay between figures is only brought to a halt by internal coordination, never by an external, blocking force, and thus keeps that sense of potential, a "capacity for more growth," which is precisely the realm of the transdimensional, because it is a situation *in the process of crossing over but not arriving just yet*. When we compare Owen Jones's and William Morris's wallpaper designs, we can see they are not so far apart; certainly, Morris has borrowed some of Jones's innovations. His outlines often resemble Jones's abstract, thickened ones, just enough to take the realism out of the leaves. Jones's designs, though, decidedly lack the overall sense of potential of Morris's. It is not only that Jones mostly draws his flowers in orthogonal front or side views and usually reduces them to circles, but just as much because their stems are often cut off, the lines do not overlap, and there is no consistency of relationships between the flexible parts. And, though his lines are often flexible S-figures, they seem to have lost the capacity to vary. The difference is simply that with Jones we see the end of a process, it has reached that point of full repose, making the whole pattern fall back into schematism. Morris's diapers are without exception surfaces in the making, while Jones's are made and done with.

William Morris for Morris & Co. *Acanthus* wallpaper (1875).
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Just to be absolutely clear: we do need a grammar of ornament; we need rules for the abstract life of lines (though for more complex behavior than Jones imagined). Ruskin's diagram of abstract lines of force and action should be expanded, not only to encompass a larger number of figures but to include configurational interactions with each other. All figures must interact, or, as Ruskin says elsewhere, "help" each other, and that interaction must be formative. We need S-figures for serpentina and J-figures for tendrils, C-figures for bending, Y-figures for bifurcations and T-figures for branching, and even X-figures for crossing and bouncing and Z-figures for zigzagging, and all of them must be able to deploy all possible variations in direction and speed, i.e., force and action, plus all possible forms of interaction enabling the formation of configurations. There must be variation of and between figures. Some ribbons should absorb the edges of the tiling, but not all the edges, nor all the ribbons. In the realm of linear ornament, we find a broad range of ways ribbons nest and/or entangle into a surface. The simplest are the Celtic bands, which consist of pure intertwining and in which the centerline is offset on either side by two parallel lines that follow its contours. In illumination, such offsets tend to get more complex, especially in the case of tendrils, whose outlines begin to acquire thorns and leaves. It is no accident that ribbons often take on a vegetal quality (tessellation is the mineral form of ornamentation), since plants' twigs are analogous to simple bands (as found in Morris's designs and elsewhere), while their leaves are offset into either smooth, lobed or toothed contours, and their flowers can form points of radiation, with many petals growing in different directions. Vegetal ornament combines the bifurcations and branchings we know from nature with crossings and interlacings familiar from textile techniques. The last type of multiplication, interlacing, in particular, saves a pattern from simple naturalism even when its elements are very realistic. When we look at the early woodblock printing of the Toile de Jouy, for instance, we see mostly vegetal motifs, but their internal structure does not collaborate with the exact repetition at all. That is not a pattern, they are merely pictures of rural scenes being repeated. A pattern is never an image, nor a multiplication of images; it is essential that the type of multiplication abstracts the images in the pattern or that the images abstract themselves.
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enough to invent their own form of multiplication.

In ribboned ornament, all the movements together, from the interaction
of smaller figures within the tile of the woodblock to the larger actions of
repetitive printing and the translation, rotation or reflection of the block
(the movements of tessellation), make up a package of abstract movements
that ensure a pattern will never become simply naturalist or abstract. At this
point, the game becomes different, the pattern is no longer solely a tessel-
lation or ribboning but a meshing and nesting of the two. First comes the
movement of the twigs, leaves and flowers within the template; then comes
the movement of the template, feeding back into the first set of movements.
In fact, it should not be too complicated, especially with digital tools, to up-
grade the complexity of the underlying grid to that of the lattice or network,
with two, three or more different tiles, and to invent for the dominant, in-
terlaced ribbon ornament as many different woodblocks. In that case, since
the tiles would now be rotating as much as translating, we would need to
leave the notion of a stem, and the growth patterns would need to develop
more radially. To conclude, the two sets of movements – within and of the
tile – which have their own domains of variation, one of a ribboned and one
of a tessellated character, always need to be calibrated and bridged; all move-
ment should be passed on and shared.

Morris’s wallpaper is not restless in comparison to Jones’s reposed type;
it is crucial to emphasize this. Ornament, especially in our times, is often
associated with exuberance, lyricism or ecstasy. Again and again we en-
counter this Baroque notion of flesh and even voluptuousness, which is
nothing but an obtrusive form of classicism in which all ornament is sub-
ordinated to abstract structure. There is no sensuality present in Morris’s
vitalized geometry, in this wallpaper whose purpose is not to create a sense
of fun, pleasure, or anything like it, but a much more abstract joy. How else
could you eat your breakfast in such a room? As with the Gothic, what needs
to be established in ornament is simply a relatedness between us and things,
a fundamental sympathy, which all design starts from. Such sympathy is only
possible because of ornament. Ornament is an absolute condition for all
things to be felt with the same immediacy as they are seen.

To elaborate a bit more, in the twentieth century we saw ornament re-
placed by texture, such as in the use of “natural” textures, often inspired by
Japanese wabi-sabi design, or the use of “honest” materials such as brick or
wood, and of less industrial craft techniques that intentionally leave traces
on the surface of the object. This was not an improvement. In fact, it has
made matters worse: the care necessary in design, or what Ruskin calls the
tenderness of art (“the first universal characteristic of all great art is tender-
ness”83), has been obscured, because now the material and not the design
takes responsibility for the sympathetic relationship, leading to a naturalism
without grammar incapable of connecting the pattern to the form of the ob-
ject. We have seen hundreds of buildings with copper cladding acquiring
patinas, and modernist boxes overgrown with ivy or cladded with rectan-
gular wooden panels with visible joints and strong visible grain – but does the
gain in any way manage the tessellated geometry of the panel (let alone the
windows)? No, not at all: it solves no problem; it merely replaces the
sympathy lacking in the design with the psychology of naturalism. There is
simply no Stoffwechsel, the sympathy is not in the architecture but all in the
building material. Natural texture should always be transformed into arti-
ficial ornament.

Texture is what I would call weak decoration: no relation between pattern
and object whatsoever. Weak decoration is simply applied independently
onto a preexisting form and structure. In contrast, in strong decoration, such
as Morris’s, the pattern “builds” or “makes” the object, including all its char-
acteristics, such as edges, corners and openings. Note that this does not
mean that ornament literally predates the form or the surface, rather, orna-
ment is abstract making, what I will call “fabricism” in the next chapter, i.e.,
it recreates the geometrical surface of, for instance, a wall abstractly, with
rules of growth such as bifurcating, tendrilizing and the like. Why? Because
a wall as a naked, Euclidean object with four static points in its four corners
presents itself as finished, stable and at rest, in short, as something we cannot
feel anything for but merely see. Sympathy can be felt only for things that
are in the making or in transition, that have a life. Paradoxically, strong dec-
oration is not an expression of strength and stability but of vulnerability and
delicacy. In Semper’s words, it is an expression not of Mauer but of Wand as
Gewand. We should never make a fundamental distinction between the
Gothic iron hinge, which may chronologically precede the existence of the door, and Morris's wallpaper, which succeeds the surface of the wall. They are both abstract patterns to real things, following almost exactly the same set of rules. Just as the hinge is not a tree and does not naturalize the door, the wallpaper does not naturalize the room; rather, it abstracts the world. The flowers and leaves in his designs may well originate in his beloved Red House garden in Kelmscott, but that does not mean they "represent" it or any other splendid field of flowers; they extend into a much larger abstract cloth, that of the patterned earth veil, a world's wallpaper, a world made of the abstract material of ornament.

After Morris and Jones, both "trends" began to evolve in very different directions. Jones found his successor in Christopher Dresser, and Morris found his partly in Art Nouveau, where the Ruskinian notion of the abstract line hit the dead end of aestheticism. (Somehow, as a mirror image, I always have to think of the young Oscar Wilde, as a student of Ruskin's at Oxford in summer 1874, working on the construction of Hinksey Road, carrying rubble and sweating heavily.) A strange thing happens in Art Nouveau: the lines, by now having turned into enormous water plant stalks, sprout from structural members — columns, doorframes, the edges of posters and menus — and move back and forth at their tops, as if under water, ending in the extraordinary tendrils of so-called whirlpales. They exist in an oniric state of horizontal movement but build nothing, no new relationships, unlike the Gothic meshworks where the curves are inextricably part of the structure, they just sprout and then tendrilize. Ornament has to work, not lie idle on a sofa. In fact, Art Nouveau signaled the end of ornament. The fatal split had by then already occurred; the naturalists dozed off in their cocooned interiors, while the Dressers were becoming full-fledged abstractionists.

Here is Christopher Dresser himself, speaking at the Royal Society of Arts in 1871:

... Pictorial art can, in its highest development, only symbolize imagination or emotion by the representation of idealized reality ... true ornamentation is of purely mental origin and consists of symbolized imagination or emotion only. I therefore argue that decoration is not only a fine art ... it is indeed a higher art than that practiced by the pictorial artist, as it is wholly of mental origin.

As one movement was dreaming away, the other began to ignore the senses, heading straight toward conceptual art. Gombrich makes a particularly interesting observation in The Sense of Order, that "the theory of twentieth-century abstract painting owes indeed more to the debates on design that arose in the nineteenth century than is usually allowed."

No one should doubt where the origins of modernism lie. Mondrian found his predecessors not in Cézanne and Monet but in Jones and Dresser. Decorative art began to supply the fine arts with order and abstraction — though an abstraction without making, without transition — taking a fatal turn against sympathy and tenderness. The abstraction of Semper and Ruskin is one in which materiality takes on the quality of thought; the abstraction of Jones and Dresser removes that thought and locates it in the human mind, severing it from all material encumbrances. This has had devastating consequences, while the first type of abstraction, always unique and temporary, was one of a specific meeting, such as between a hinge and a door, the second separates all things from each other since its source is a mental universalism. While the first is a movement of touch and tenderness, the second is one of repulsion and cruelty. That tendency toward generalized abstraction passed from Jones to Dresser and slowly became more schematic in its use of both line and color (Jones supported the aesthetic use of George Field's primary-color theory). Then it fell entirely into the hands of Mondrian and Duesberg, and ended in the black hole of Rothko and Judd. After that, we had the humor of Pop to play with, and the irony of postmodernism, but all such movements did nothing but dance on the smoldering ruins of modernism. Deconstruction, in particular, amounted to a plundering of the collapsed edifice of abstraction. The fine arts ran away with the decorative arts, and even now when artists try to return to some kind of world of feeling, for example, by decorating museum walls with teddy bears, or try to return to sympathy, hugging people on the street in little moments of art, their actions are like those untreated wooden panels in architecture: nothing but psychotherapy after
the trauma. Its effects have proven to be so persistent that to cure them we must resort to a more radical solution: a full return to decoration. Artists have no way to structure their sympathy anymore. Why? Because they are locked in the museum, the festival, the gallery, or worse, the transitory media, leaving us with the white walls and the empty squares. Art ran off with decoration and has not yet returned the favor.

Here, again, is John Ruskin in *The Two Paths*, in the chapter entitled "The Unity of Art":

... No, it was an advised word – that 'detestable' ornament of the Alhambra. All ornamentation of that lower kind is preeminently the gift of cruel persons, of Indians, Saracens, Byzantians, and is the delight of the worst and cruellest nations, Moorish, Indian, Chinese, South Sea Islanders, and so on. I say it is their peculiar gift; not, observe, that they are only capable of doing this, while other nations are capable of doing more; but that they are capable of doing this in a way which civilized nations cannot equal. The fancy and delicacy of eye in interweaving lines and arranging colours – mere line and colour, observe, without natural form – seems to be somehow an inheritance of ignorance and cruelty, belonging to men as spots to the tiger or hoes to the snake. I do not profess to account for this; I point it out, and you will find it true if you look through the history of nations and their acquirements. I merely assert the fact.60

If there is one paragraph that has earned him continual mockery, it is this one, and though it is hard to see through the racism, I can come to only one conclusion: he was right. Right, that is, on the issue of cruelty being innate to abstraction, not on cruelty being innate to specific peoples or nations. The main issue in design is the choice between cruelty and tenderness; there is no other. And if we want to begin to conceive what I would call an ecology of design, I think there is only one option, and that is the one for tenderness, or sympathy: a fundamental reaching out of things to things.61 Let us re-

member, for instance, the concept of cruelty at the heart of Antonin Artaud's nihilism, developed in "The Theatre of Cruelty":

Without an element of cruelty at the root of every spectacle, the theatre is not possible. In our present state of degeneration it is through the skin that metaphysics must be made to re-enter our minds.62

Metaphysics through the skin! I cannot imagine a worse nightmare; a pure form of art-torture. Even more explicitly a few pages later, Artaud claims to remove "the shroud that lies over our perceptions." He means Ruskin and Semper's veil. At least he is candid about his intentions, removing the shroud constitutes an act of cruelty and is typical of a century specializing in atrocities. John Ruskin was right, especially in hindsight, with the twentieth century between us and him: abstraction is cruel and perverse, because it wants to rip the clothing off everything, to present everything naked. First the Protestant iconoclasts destroyed the Gothic, making books more powerful than architecture (as Victor Hugo taught us63); then they destroyed ornamentation, in an effort to inject truth and meaning directly into the bloodstream. Obviously, since neither truth nor meaning exists, only the obscenity and cruelty of the act remains. Adolf Loos had it the wrong way around: cruelty and criminality lie not in ornament but in its absence. It is not that Ruskin only believes things should be dressed, but that our perception itself needs them veiled, because feelings of tenderness are impossible unless we see something in the making. Things cannot exist without clothes. For more than a century now, the metaphysicians have made us believe that the truth lies beneath, and each of us has run out to rip off our share of veils. We have taken part in nothing less than the rape of things. To let only the mind see, as Dresser foresaw, means to plunge directly into hysteria, to see with an unmitigated look, an eyeless look that immediately turns the face into a grimace. Things seen can now only leave a grimace of pain, because the bare object has a neurological hotline to the bare mind, waiting to be electroshocked by metaphysics. The whole twentieth century, from 1914 until 2001, to be precise, has been occupied with only one thing: the real-
ization of the sublime, which is by default a strategy of shock and awe.

Of course, ornament is in itself a sign of caring and an act of sympathy; cruelty only surfaces when we are confronted with an absence of ornament. We must now correct him slightly: the presence of ornament is never a sign of cruelty, in whatever form, be it Arabic, Maori, English, Greek, whatever. Ornament represents care and tenderness, by its nature, because it is a form of sacrifice (as Ruskin titled his first Lamp), in the sense that it is uncompensated work, and without the return of user value. In a way, it is pure work, because it is perfectly useless; we only have "to dress it and to keep it." As I have said, ornament is often mistaken for a sign of exuberance, a kind of special treatment, dressing-up for a special occasion, but in fact it is simply dressing as keeping – an everyday act of caretaking, calm and dutiful, like gardening. This is why Ruskin opposed tenderness to cruelty and why, in a similar vein, we should oppose sympathy to pity, with which it is often confused. While sympathy could be described as a form of resonance, a co-movement, pity by definition designates the feelings of the other as suffering. I would not be the first to define pity as an especially cruel form of contempt (Nietzsche gets credit for that), a degrading of the other through being overcome by feelings but not allowing them to cross over. It is a feeling that masquerades as a gift but in fact steals from the other. One person’s feeling of pity leaves the other feeling humiliated. We need only think of Schopenhauer, the chief philosopher of Mitleid, who kicked a woman down the stairs, turning her into a lifelong invalid, and imagine him lovingly stroking the poodles he walked every day.

some hints on pattern designing

We have looked at the world of the tile and the world of what happens in the tile, in the respective domains of cracking tessellations and interlacing ribbons, and we have tried to unravel the conditions of exchange between them, one taking on traits of the other, one virtualizing the other, one being continuous while the other is dashed, one foregrounding itself and trying to obscure the other. We have also observed that we have come to live in the world of the pure tile, geometrized and abstracted. The abstractedness of pattern is obviously the home of mathematics, though it was not mathematicians that built our cities or started our wars (though they did join in the fighting) – architects and politicians did that. Abstraction made a pact with machines, with iron – imagine the last vitalist expressionists, such as Franz Marc and T. E. Hulme, dying, as they did, amid an orgy of iron in the trenches of World War I.

As the cloning devices of Henry Ford and the Bauhaus were taking over culture, fundamental changes were taking place at the heart of mathematics, not further toward the generic and the reductive, but in the opposite direction, towards the genetic and the generative. These changes reversed the notion of abstraction altogether, from one that reduced all variation to a uniform schema in order to produce sameness at the prolific rate of modernity to one of our abstract lines: living entities of minimal difference generating complex patterns, what we know as the world of code. The pivot figure in this turn was a Charles Babbage who thought like a John Ruskin: Alan Turing. Not only was he the cracker of the Enigma code and one of the theorists of digital computing, he also wrote the seminal 1952 article "The Chemical Basis of Morphogenesis," which based a whole notion of natural patterns, such as zebras' stripes, on the relationship between two competing tendencies: one that activates the growth of an effect and one that inhibits it. Such a notion is inherently of a digital nature, since at each point a yes or a no defines the "difference that makes a difference," as Gregory Bateson characterized the smallest building block of information. The mechanism, called a reaction-diffusion system, begins by diffusing chemicals in a medium, in this case, an animal's skin, but this diffusion, i.e., the population of a surface, operates via a double chemical reaction – one that activates more of the same and one that inhibits it – which occurs in waves over the surface of the skin, thereby expressing a pattern of black and white stripes, i.e., lines. The skin is, of course, not a flat surface like a rug but is wrapped around the three-dimensional shape of the animal, its neck, legs and torso, in short, its massing. When we look carefully at zebras, we notice that, though they are all different, their patterns share some specific characteristics. The stripes are perpendicular to a centerline running through
each of the more tube-like parts of the body: the neck, legs and middle part of the torso. The morphogenetic process runs quite uniformly over these more Euclidean areas, with black and white stripes alternating almost as if on wallpaper covering a cylinder. Obviously, a zebra is not made of pipes, and all its parts merge smoothly into one another, so the pattern on the zebra’s back must transform from vertical stripes to horizontal ones that wrap the hind legs. It does so by bending the stripes into C-figures, by deforming the pattern over the haunches. The front legs are more complex, since the horizontal stripes must be managed between the two vertical sets on the neck and torso; this can be done only by splitting the vertical lines, transforming them into Y-figures, which straighten out again on the legs. Basically, these play the role of the joints in the tessellated model, like the seams of a suit, being absorbed in a ribboned pattern that can only be stretched to a certain limit. The same also occurs in other areas, on the neck near the ears and on the legs at the protrusions of the joints: whenever the system cannot manage the changes in geometry by stretching and deforming the stripes, the pattern does it by inserting an extra stripe, i.e., transforming. (In truth, there are no “lines” — the pattern is made up of tiny dots of white and black, but their relatedness in the diffusion expresses them as lines.)

Incidentally, at the end of the paper, when Turing encounters problems solving nonlinear equations, he suggests that a “digital computer” might be helpful.

I would summarize by saying that in animal skin patterning we find an extremely close relationship between what we called texture and massing at the beginning of this chapter. The pattern is not like wallpaper stuck on a form (as most texture mapping in 3D modeling still is nowadays); rather, it must be constantly modified and adapted, deformed and transformed. The deformations are, in Ruskinian terms, “changeful” (they vary), while the transformations are “savage” (they jump) — always a mixture of gradualism and incrementalism. To clarify, I am not arguing against wallpaper — a wall is flat and without massing and allowed us to closely investigate the relationship between the tessellated and the ribboned — but at this point in the chapter we are returning to the wall veil, that is, to decorated mass. Funnily enough, Ruskin himself got this wrong when he used the example in *The Seven Lamps* of animal skin patterns to encourage the use of color and ornament:

The stripes of a zebra do not follow the lines of its body or limbs, still less the spots of a leopard. In the plumage of birds, each feather bears a part of the pattern which is arbitrarily carried over the body, having indeed certain graceful harmonies with the form, diminishing or enlarging in directions which sometimes follow, but also not unfrequently oppose, the directions of its muscular lines. Whatever harmonies there may be, are distinctly like those of two separate musical parts, coinciding here and there only — never discordant, but essentially different. I hold this, then, for the first great principle of architectural colour. Let it be visibly independent of form.

Here, Ruskin seems further removed than ever from his Matterhorn as a system of horizontal courses and vertical fractures, though in his mind the wall veil is as often a form of drapery as it is one of encrustation. In textile drapery, a pattern generally manages through a certain looseness and a capacity to deform, adapting locally to forces acting on its flexible system. Only when the forces exceed a certain value do we observe a sudden change, a switch in direction, a seam or cut, a first crack. If we moved the concept of dressing from simply draping oneself with a flat cloth (hence containing only folds, like a poncho) to wearing a cut suit (containing both folds and seams), which is more than simply two-dimensional, to wearing, say, a stretch sweater, with a printed or woven pattern that both could deform and contained seams (but not folds), we would begin to close the gap between the two seemingly contradictory meanings of Ruskin’s wall veil.

Between Turing’s digital zebra and Ruskin’s architectural Matterhorn, we find the same periodicity of pattern, a course system articulating the form, in a rhythm that can stretch, bend or deform and then, at a specific point, shift into another rhythm by passing through a transformation. The ribboned excels at the former, at gradual variation, deformation, stretching
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the matter of ornament

— in short, the realm of changefulness. Tessellation is the realm of fractures per se, of cracking, or savageness. I think if we take our findings on zero-massing patterns — that is, wallpaper, including both Jones’s and Morris’s domains — and apply them to Turing’s much more sophisticated concept of digital pattern emerging on complex massing, we should be able to map out a path toward contemporary ornament, combining the age of decoration with the one of massing, as it were.

Again, as in the case of the Gothic, we find ourselves entering the realm of digital machines, while we had started out on what seemed merely a historical journey. Before we proceed any further, let us retrace our steps for a moment. After acknowledging some landmarks in the field of ornament and texture (Ruskin’s Matterhorn, Jones’s Maori head, Millais’s Mariana), we found Semper playing a pivotal role with his apparently paradoxical invention, abstract materialism, which stated that ornament was a form of making but necessarily an abstract form of making. This shift was similar to the one we noted in our discussion of the nature of Gothic, where the crafts of weaving, braiding and bundling nestled themselves in the design of windows, columns and walls. As is well known, Semper was creating an ethological basis for the historical notion of design, and therefore he made no real use of abstraction; to him, it merely established a historical fact. To continue following Semper would have led us straight in the arms of historicism, however, since anything from the past can volunteer to become a sign to be imprinted on any contemporary material.

We moved further, searching for abstract activity, and found it in the behavior of matter itself, which demonstrates a tendency to self-abstract into pattern, to self-assemble and express texture and form simultaneously, either through the principles of tessellation or those of ribboning. This subsequently led us toward Ruskin’s abstract lines and his expressionist concept of active lines, which, similarly to Gothic ribs, constitute centerlines of force and action. Making — and more specifically the making of ornament — does not occur in a zone between the drawn and the executed but between the concrete and the abstract. Seen from this point of view, it no longer matters if a blacksmith in the Yonne valley followed a design drawn up by someone

or merely his own intuition, or if we imagine the iron crawling by itself over the wooden plane, fundamentally acting no differently from, say, ice crystals flowering over a windowpane. An abstract pattern is a form of agreement between concrete states, in which one conditions the other. A material can never meet another directly; there will always be the thinnest possible sheet of design between them. Design is a veil between things, whether they are organic or inorganic, artificial or natural.

While matter finds form, we will never come across any consciousness operating on the outside of matter. Human agency is just a way to speed up the process, a third material at best, acting as a catalyst. Again, we find technology acting on the inside of matter, and though we cut it, hammer it, forge it from the outside, our consciousness lives in the interior. We only have to sympathize with the technological tendencies present in matter itself. The branching and spiraling of the tendrils act abstractly, yes, but only — I emphasize — because the iron requires it. Though the rules are formal, the abstraction is not formalistic, not generalized but specific. Semper’s braiding of rope acts within the carving of stone, and the flamboyant “cobwebs” of the tracery in Rouen Cathedral were, as Ruskin explains, made possible by the soft limestone of northern France. They never would have been conceivable in marble or granite. It is of the utmost importance to grasp this as fully as possible, because we are arriving at a point in our own times when Turing’s “digital computers” can not only generate and draw such patterns but now also numerically steer the machines to carve and cut our ornaments. It seems as if we can generate any pattern and carve or cast it in any material, but that is not the case. Yes, we have found an abstract core in craft, be it the self-crafting of matter, the crafting of iron hinges or the drawing of intricate wallpaper patterns, but note that it is still craft and still deals directly with matter. Abstract, digital craft only abstracts to find a way into matter, to manage specific material problems, not a way out of it.

Saying that, I think we can now distill from our journey a set of requirements that we can perhaps use to create ornament for our own age. Decoration is not about play or fun, as I hope to have made clear; it is the most serious and rigorous part of design. It demands incredible precision and dis-
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The first thing one needs is relatively small, flexible agents; call them figures or abstract lines, it does not much matter, but one precisely selects a number of them, and each of these has a certain amount of freedom to act, in what we call variation and changefulness, or, in digital speak, parametric behavior. All this behavior is rule-based (“if/then”). However, the pattern as a whole must be a system that can absorb every tiny eventuality, the edges of a menu, the concavity of a vase, a sudden change in width, or the windows and columns on a façade. In theories of texture, randomness or stochastics is often considered one of the most important properties, but in ornamental design this must be reevaluated as an inherent redundancy, or what Ruskin calls “richness.” Though ornamentation is often considered rich, its richness is mostly misunderstood:

Commonly it is said of all Gothic, that it rose in simplicity, that it declined by becoming too florid and too rich. Put that error at once out of your minds. All beautiful and perfect art, literature or nature, is rich. Titian is rich, Beethoven is rich, Shakespeare is rich, and the forests, and the fields, and the clouds are richest of all.⁵⁶

Our second rule, therefore, is: when using ornament, use many figures. Decoration is an art of the many, and an art of elaboration. Etymologically, the term “elaboration” implies craft. The number of figures needs to greatly exceed the number of required elements, just as in the Gothic the number of ribs exceeds the number of columns and windows. The richness needs to be able to manage various problems from any angle.

Now, thirdly, these many figures need to be able to configure, to gather via the same or extra sets of figures, and to deal with design problems as they do so. For example, how does one break a text block? Use a large initial, let its tendrils spiral into the margins of the page, so the next block is automatically spaced and, if needed, shifted by the ornament. Again, ornament has to work. Ornament is structure, though often abstract structure or configuration. We need to understand how, in design, texture can never reach such a level of organization. When we look, for instance, at Mies’s famous onyx-cladded wall in the Barcelona Pavilion, which has so often been hailed as an example of the perseverance of ornament in modernism, we notice that the curves in the material do not participate in constructing the surface of the wall. The lines of the marble have merely accessed the surface afterwards, not helped to create it, as does Gothic ribbon ornament, for instance, or Morris’s wallpaper. Mies’s onyx never reaches the abstract level of architecture, nor would any other cladding material. Again, we should call this weak decoration. Ornament is strong decoration, because it is able to exactly organize edges, openings, thickenings, corners, the whole volume, anything: it is articulation and elaboration. This is very different from a textured field with the windows and doors punched out afterwards, as we see on so many contemporary decorated boxes today.⁵⁷

Let us proceed with our list. Fourth: the pattern must reenter the material domain. Along with managing design problems, our ornamental patterns should deal just as effectively with material issues. There is an inherent danger in splitting craft into design and robotics, because craft needs to deal with materiality, and since we are not holding the hot iron in our hands, the iron lacks the ability to talk back. The braiding informs the iron, but the iron also informs the braiding. How can we accomplish this with our contemporary materials, since we often lack direct contact with them? We need to organize our processes of fabrication in a manner that allows the materials to talk back. To make patterns integrate material issues (often represented by various specialisms), we must test and prototype and find solutions presented by both our ornate pattern and the qualities of the material.

Something I have done my utmost not to mention until now, because it is so overly obvious, of course, is that the age of intelligent machines allows us to return to ornament. As ornamentation was inherently part of an economy of manual labor and handicraft, it was completely excommunicated on technological and economic grounds (as well as Loos’s moral grounds) in the last century. Today, it can return to center stage, since Charles Babbage’s machines have converted into Alan Turing’s machines, drawing and generating patterns and now, fifty years later, fabricating and producing them with the same ease. Nothing ever has to be smooth or bare again, since robot
arms steered by digital information can cut, mill, press or paint anything. Most commentators argue that the fact that we can use digitally controlled machinery does not necessarily mean we should, but I disagree. Digital technology indisputably means a move away from uniformity toward variation; the only question remaining was how to design with variation. Contrary to the notion of an avant-garde, digital technology is taking us back in time, to the Ruskins and the Darwins, or, more generally, to the unique and the contingent, and, in a way, back to craft. We should reject both the default futurism associated with technology and the default historicism associated with ornamentation: we want to go back, yes, but not via history.

Once we have reestablished the unbreakable connection between massing and ornamentation, plus the fact that ornament is configurational, a form of work, not of leisure, and laid out the characteristics of both tesselated and ribboned ornament and how the two classes of objects relate to variability, the answer to the question of how to design with variation cannot be more obvious. We should challenge the appearance of metro cars, refrigerators, airplanes, DVD players, computers, cars, laptops, cameras, as well as houses, teapots, jugs, chairs, vases, suitcases, desks, if not also governments, companies, advertisements, television programs, and so on: Why are you so smooth and polished? Why do you not show wear and tear? Why are you not as excessively decorated as our beloved wrought iron hinge or Morris wallpaper? Why are cars not decorated like the bronze helmets made by Celtic craftsmen? Why are websites not overgrown by neighboring sites? Do we still believe every object should be tested in a wind tunnel, and be reflective like a pair of sunglasses and smooth as stones in a river?

To me, there is no question but that things should be jungles, overgrown by relations, woven, frayed, nested and entangled. I think a new form of ornament could lead us back into a certain wilderness—not that of pristine, authentic nature, heaven forbid, but another, maybe technological wilderness. We should not use our intelligent machines to return to nature (we would not be able to retrieve it anyway, since it was never there), on the contrary, we should make our machines go wild. Let us seek a way to send our postmodern tools back to premodern times. To some, such technoromanticism might seem preposterous, but for me, it is nothing less than an absolute necessity. My only question is: Can we, and will we, ever be Romantic enough? Will we ever be able to restore the feelings and care we had for things? We definitely need a Naturphilosophie for intelligent machines, since they have gradually become our natural environment. If the machines of modernism were meant to cleanse and purify, our machines will bastardize and hybridize.

I will begin to investigate this technological wilderness in the last two chapters, initially going back to the picturesque and then radicalizing it through several versions of the wild, and finally envisioning an ecology of design, in which things take on pattern and shape by conditioning each other. Things design one another through entanglement—this is the paradigm of Gothic ontology—continuously weaving Ruskin’s “veil of strange intermediate being” between them.

But first we must descend deeper into the core of things and arrive at an understanding of how and why they entangle. In fact, they do so because of nothing but sympathy.