viscous than light as we know it. No southern sun brightens up this northern church; light is not cast on it. Rather, the stone itself seems to shine, completely reversing the notion of the Gothic as transparent, and also reversing the experience of the stained glass in the interior, making the whole building radiate light.

Monet’s Rouen glows – which is perfect. There is no chiaroscuro in the Gothic, no white marble, no contours, except the fractal one of the roof, which is not a roof but a landscape of spires, pinnacles and buttresses that dissolves anything defining a volume, such as a cornice. The northern Gothic is one of deep grooves, ribs and moldings, the southern Gothic one of marble paneling. Why is the northern mostly viewed from the interior and the southern from the exterior? Why, furthermore, is the northern Gothic always treated as if it scarcely has an exterior at all (Semper considered it naked and uncovered), as something turned inside out? The Gothic amalgam of stone, light and rain mixes dirt with design, as we can see in Pugin’s diagrams, with all that water dripping off the moldings and intersecting with the eyes’ gaze upward, as both enjoy the profile. It is the light that dresses the building, not the shadows; the numerous stone dressings cause it to nestle in the countless profiles; everything seems to absorb light and radiate it back. Again, wall and window are of the same order, both expelling light outward as much as they drink it in.

This light is decidedly different from that of the Mediterranean sun, which outlines things against a blue sky; this light is diffuse and opaque, mixed with clouds, with limestone, with the dirt in all the profiles. This is animism as opposed to metaphysics. All things Greek drop out of the blue, from a cloudless sky of idealism, finished, pure and polished; nothing is grown, no work or sweat required. In opposition to this, we find no metaphysics in the northern Gothic, the spirits enter from soaking wet ground, out of mud and dirt, not immaculate sky. It is sky against ground, beach against forest, and hence gods against spirits, or as we know them, ideas against things, ideas thought against things made.

At the start of the twenty-first century, having passed through the twentieth and its fatal obsession with the sublime, we can hardly imagine any longer how unthinkable it was a hundred and fifty years ago to leave the surfaces of things – vases, walls, chairs – as plain and bare as we know them today. We must be the first generation of Homo sapiens to know objects only in their naked state. To us, a wall without wallpaper, bas-relief or wood paneling, a wall that has simply been painted – white, more often than not – is normal. Our cars are as smooth and undecorated as if they had been polished, as are our razors, refrigerators, television sets, laptops and mobile phones. Today, we live in a vast universe of smooth, polished objects. And it is not only machines made by machines that are bland but our cups and plates, too; our paintings come without frames, our buildings clad in smooth concrete or steel panels, our bathrooms tiled in shiny monochrome. All our objects are treated in such a way that, were we to show them to John Ruskin, Owen Jones or Gottfried Semper (the main protagonists of the present chapter), they would recoil in horror, ashen-faced, with their hands covering their eyes and their heads bowed in total disbelief. To them, seeing an object of design bare would have meant being confronted with a thing untreated, or worse, treated without care or feeling, like a thing thrown in their faces. It would have been unspeakably rude.

Theoretically, such a gaping cultural divide is not at all a bad position to start from, since today we so completely and fundamentally lack techniques of ornamentation that we must conceptualize it in full before we can
even begin to reconsider it. We will do so, automatically, without nostalgia or the need to recreate, since our quest will have to take us from specific examples of ornament to a general theory. If we can find a way to reconstruct the reasons why ornament has always been so evident, then we can hope to retrieve it without a need to copy, comment or historicize. In a similar vein, we will have to retrieve the steps of its disappearance in order to ensure we do not follow the same path again.

I have always believed the disappearance of ornament was related to a matter of scale, and more precisely, to scaling up, because around a century ago the problems of design began to shift from the domain of surfaces to that of volumes. We needed to house more people in more and more buildings that got bigger and bigger, to produce more objects for more people, to move them more quickly from one place to another, to print them more books, more magazines, more newspapers. This certainly could have been one of the reasons behind the decline of ornament, the fact that massing - the composition of volumes - gradually became the primary focus of design, in place of the composition of surfaces. We have to keep in mind, though, that the aesthetic problem of massing is directly related to the social appearance of the masses, so we can never trace the disappearance of ornament back to a single event as primary cause. Both massing and the masses are highly industrialized products, so to speak, since they cannot exist without mass production, without cars, trains and televisions. Such a mass – for the moment I will not distinguish between the two types – must therefore be a homogeneous one, a substance without qualities, a machined mass that by its nature would have a shiny, smooth and polished surface, since it can only assume the qualities of the machine that produced it. In the end, the course of things toward abstraction, their shaking off of clothes step by step, is a process in which every influence is intricately related to every other. At some point, the concept of unformed, unarticulated mass, of pure substance, became the only option left, and the reason for the loss of ornament is found not so much in the metaphysical search for naked truth, as Adolf Loos' would have had us believe, but in the fatal disconnection of matter and form – or of substance and matter, since the former is abstractly raw and the latter necessarily formed. And at all times formed with texture, as we will see again and again in this chapter. By definition, matter, having passed through a continuous process of formation, takes on form and texture simultaneously, while mass lies passively in a reservoir, ground down to the smallest possible particles, waiting to be poured in some form or other. (It seems that I am already mixing up the masses in the streets and the semiliquid concrete that is poured into molds, both of which emerged during the same period.) In a sense, mass does not even have an outside, it is pure interior.

Ornament is profoundly related to matter, to the way it structures itself as it undergoes forces, be they natural or technological, which is a complicated way of saying that ornament and texture share the traces of being made, of the constant reconfiguration of matter. Our first task at this point becomes to resist thinking of ornament as applied, as stuck on a bland surface afterwards – to resist the thought of an underlying nakedness, and instead to see matter and ornament as mutually dependent. We will have to do so by drawing a clear line between mass and matter and following matter along its spectrum of different states of viscosity or aggregation. This path will, of course, lead us to Semper’s Stoffsiedlungstheorie, which brilliantly mixes up physiology and architectural evolution into something not unlike Ruskin’s amalgam of geology and architecture; but it will also lead us to the broader concept of pattern, which will bridge the notions of natural texture and artificial ornament. We will find that pattern is the main expression of a self-abstracting capacity of matter, as we find it in the wrinkling of a face, the ribbing of sand, or the stripping of a zebra, that is, the organization of surfaces by lines. In a sense, it comes down to a exchanging of positions: pattern in nature as self-abstraction, and ornament as abstract texture. Ornamentation, as we will see, approaches the problem of dimensionality from two opposite directions. One moves downward on the dimensional ladder, operating from surface to line; this is tessellation, or tiling, as we know it from Owen Jones’s mosaics and encrustations. The other proceeds upward through the dimensions, from line to surface; we know it as weaving, the interfacing of ribbons, such as we find in William Morris’s wallpaper designs or Celtic knotwork. Like earlier scholars, we will find that modernism was the result not of advancements in the fine arts of painting and sculpture but of discussions and developments in the decorative arts, in the world of or-
nament. And, not without shock, we will discover a terrifying monster hidden there, one that we know by the name of “abstraction” but John Ruskin disparaged as “cruelty,” a characterization I have come to find astoundingly accurate. Sometime in the middle of the nineteenth century, an alliance was forged of abstraction, machines, grids and purism, leading us straight into a century of minimalism, world war and genocide. Needless to say, crime, savagery and primitivism have persistently been part of the discussions around ornament, but perhaps not in the way they should have been. Only at the end of our quest will we see Alan Turing take up Charles Babbage’s main invention and turn it completely on its head, finding a way of abstracting not directed at a purified final destination but deployed at the start of a process of formation; a reverse abstraction that will guide us to pure variation, opening a new road to ornament and to an aesthetics of tenderness and sympathy, which we have yet to discover.

ruskin: wall veil and earth veil

Not surprisingly, we start our journey by consulting John Ruskin, again by reading The Stones of Venice. We turn our attention to a peculiar chapter in The Foundations, the first of the three volumes, entitled “The Wall Veil,” which, like “The Nature of Gothic,” is a bold piece of reasoning and rhetoric. As we follow Ruskin’s descriptions of all the architectural elements, all the so-called members, such as bases, cornices and shafts, we find the description of the wall starting not with stones, stucco or symmetries, as one might expect, but with an elaborate three-page description of a mountain called Mt. Cervin, one of Europe’s highest. We know it better by its German name, Matterhorn, located on the border between Switzerland and Italy and with a slope facing each country. Obviously, this is to be expected, given Ruskin’s obsession with mountains (the extensive fourth volume of Modern Painters is completely dedicated to them, to peaks lateral and central, and their ridges, their “aiguilles,” “crests” and “precipices,” and he continually compares architecture to mountains in The Seven Lamps of Architecture’s chapter “The Lamp of Power”). The narrative is breathtaking. Ernst Gombrich, who – like most twentieth-century scholars of art and architecture – is not particularly fond of John Ruskin, called him a proto-expressionist, and that is exactly what he was, not only in his premonition of Bruno Taut’s and Wassily Luckhardt’s mountainous architectures but moreover in his perception of form as a material index of forces gathering and converging into a shape.

A mountain has faces; like a building, it orients itself in an environment; but it is simultaneously something that has been directed, vectorized, a cluster of many vectors making up the mountain as an architectural object:

It has been falsely represented as a peak or a tower. It is a vast ridged promontory, connected at its western root with the Dent d’Erin, and lifting itself like a rearing horse with its face to the east … The eastern face of the promontory is hewn down, as if by a single sweep of a sword, from the crest of it to the base. 

In short, Mt. Cervin is a mass sculpted by vast forces – not an undifferentiated mass but one layered out of courses of stone set down “in their suc-
cessive order," "of a thickness and strength continuously varying," "laid by snowy winds and carved by the sunshine - stainless ornaments of the eternal temple." And, Ruskin adds with more determination, it is a mountain that "should be to us an example of the utmost possible stability of precipitousness attained with materials of imperfect and variable character." Slowly, he combines the savage, picturesque mass of the Matterhorn to a structuring and layering of that mass that is as least as wild and imperfect, and after introducing a geological aesthetics, he proceeds to put the final nails of architectural argument in the critical coffin. "I believe we may conclude with great certainty that it is better and easier to strengthen a wall necessarily of imperfect substance," he argues. And "the decorative reasons for adopting the course arrangement, which we shall notice hereafter, are so weighty, that they would alone be almost sufficient to enforce it; and the constructive ones will apply universally." All the major Victorian architects, such as the amazing William Butterfield and George Edmund Street, started changing their designs after reading this sentence; no brick wall escaped variation in the colors of its courses and even the sizes of the stones themselves. "The Wall Veil" was hugely influential.

I believe this was the first, and probably the only, architectural theory to successfully relate massing to texture through interdependence. And it works from the inside out, making it a showcase for expressionism: as the mountain is being formed, it expresses its courses at the surface in a way that communicates the same set of forces. Massing and texture are created under the same laws, as they would have put it in Ruskin's day. The form of the Matterhorn cannot be understood without understanding the geological layering of sediment that channels and guides the forces. Forces operate here in two ways, from the inside out - constitutively - and from the outside in - erosively. However, the mountain's texture - the "wall veil" - is not merely draped but also encrusted, covered with its own material, in a self-draping, a self-adornment. Such a consistency of material generally leads to what modernists call transparency, since the internal structure is exposed at the exterior, but here that internal structure transforms while being exposed to new forces such as weathering and erosion, which turn it into drapery. The wall veil is pressed out of the mountain, not draped by snow falling on its slopes but by the stones themselves, covering it in layers and courses, guided by a system of breaks and fractures. Geological articulation, by varying the hardness and orientation of the stone courses, completely structures the generation of form; the promontories, the crests, the faces all result from the stone's qualities and composition. So the process also works upward in dimensions, texture guides the shaping of form.

Here we encounter a new theory of ornamentation, which is simultaneously a theory of construction, a "third way" of treating architectural surfaces. Let us, for a moment, consider the other two, which are much better known. One way is to leave the skin undraped, to expose the naked structure to the world, waving that modernist flag of transparency, either literally or phenomenally, as Rowe and Slutzky's theory states. The other is based in a theory of drapery, of draping as an act distinct from erecting the structure, with the drape being cast over from the outside and the structure in fact kept naked underneath the cloth, untransformed, simply given a (postmodern) mask. Mask and skeleton, having persistently defined the flimsy metaphysics of architecture's history, are merely two sides of the same coin. Ruskin's third way is different, proposing a kind of generative relation between the other two, a process that originates on the inside, as in the first approach, yet is dressed, as in the second. It offers the depth of structure, but without transparency, and the opacity of the mask, but without flatness. The structure is pushed outward, but as it is exposed it transforms, like the crust of molten lava, the canopy of a tree, foam on water, or the courses of a mountain. It is no accident that these are fractal examples; the transformation of structure into texture is one of refinement, a recursive scaling, such as from rib columns to rib tracery. The word "veil" is particularly well chosen by Ruskin. Ornament is a demonstration of delicacy, that is, the surface is not merely made of ultrathin and refined elements, but the elements configure, and, as delicate as they are, they could even carry load, because they configure collaboratively. Filigree, tracery, inlay, cloisonné, lacework, guilloché, and fretwork are typical examples. Even the inventor of fractals, the late Benoît Mandelbrot, fairly early in The Fractal Geometry of Nature, expresses a preference for Beaux-Arts ornament above Miesian reticulation because of its fractalism, i.e., its unstoppable urge to add another detail. Nat-
ural texture, and abstract texture, i.e. ornament, have a depth, not of space but of surface, which offers us a very precise definition of texture.

To clarify this relationship between encrustation and drapery, it might help to look briefly at Ruskin's ambivalent relationship to the northern Gothic and its southern, Venetian counterpart -- it embodied a conflict that persisted all his life, and for good reason. We should recall his repeated travels through Europe, which invariably had the same, very symbolic structure: crossing the Channel by boat; arriving in Normandy, homeland of the Flamboyant (Amiens, Rouen, Abbeville, St. Lô, Beauvais); moving on to the Alps, where he stayed for a month or two, climbing and drawing; and then finally journeying to Pisa, Verona and Venice. In other words, the conceptual Alps are invariably divided up and balanced between the northern "linear" and the southern "surface" Gothic, the riboned and the encrusted. I do not think we need to view this opposition as mutually exclusive, as so many have done, including Ruskin himself, often. 10 We can instead safely view them as two solutions to the same problem, proceeding from opposite directions; we can see the relationship between line and surface as a dynamic one of movement and transition. Both options are concerned with dividing up a surface, either by means of interlacing lines and ribbons or the breaking up of the surface into courses and ornamental layers or tiles. The northern way drives the columns into the wall, not simply to open it up but to weave a smaller-scale web of tracery, in which columns branch sideways to form windows, absorbing color with stained glass; the southern way encrusts the wall with patterns, whether horizontal layers of alternating colors or checkerboard patterns of inlaid marble. There is structure and ornamentation to both. All the other differences -- the amount of openness, the amount of color -- are, I think, mere climatic influences enlarging the difference between the two options, but operating according to the same rules of texture to turn the whole surface expressive.

Before we watch John Ruskin entering into a theoretical dispute (though at a polite distance) with Owen Jones, we should acknowledge that both moved the concept of ornament beyond an incidental meandering band here and foliate capital there -- the Greco-Roman variety -- toward entire textured or diapered surfaces from a drystone wall of extreme crude-

ness at one end of the spectrum to the most exquisite tiled pattern at the other, again navigating between savageness and changefulness.

We could label Ruskin's geological notion of ornamentation as "naturalist," but the reverse observation is as valid, or more so, and surely more interesting: nature shows an architectural tendency, and art occurs everywhere, not just as design but as a working collaboration between accident and structure, that is, an undivided aesthetics of pattern and texture. What does not have texture? Texture emerges at a point where surfaces start to show linearities, even actual lines, where they start to show themselves as being made up of lines -- as, in a word, woven ("texture" stems from texere, "weaving"), or in another word, woven, and in still another, wrinkled -- thus not necessarily made of fabric but occupying a zone of transition: are we seeing a system of lines or a surface? Our education is soundly unambiguous and Euclidean: lines exist as contours and edges, delineate things as objects, envelop them in universal three-dimensional space, release them from their backgrounds -- but this idea is untenable. Ruskin shows time after time in Modern Painters that only gradations and variations exist, that is, gradations not only of hue and brightness but of dimensions themselves. Texture occurs -- I will continue to describe it as an event -- when enough lines combine to produce a surface, as when fibers nest and entangle, or when surfaces start to produce lines, such as ripples on water or cracks in drying mud. It seems that only the in-between of line and surface truly exists -- all that is not Euclidean -- and the finite dimensions are just illusory stations in active zones of transition.

Just look at Pre-Raphaelite painting, and more specifically at Millais's pictures such as Ophelia, Autumn Leaves, or the astounding Mariana from 1851, which modernist scholars somehow always dismiss as "realist," or even "photorealist," as if we were looking at the chrome grille of a parked truck in California reflecting a store window and neon advertising, which is not right at all. Mariana does not question the status of the real, simply because here the real is not haunted by its reverse, as in the mediated USA, but made part of an infinitely textured universe -- "clothed," as Tennyson would say. This is a painting in which there is no fundamental difference between Mariana's velvet dress, the wallpaper, the metalwork of her intricate belt,
the stained glass, her hair (each strand individually painted), the leaves, the trees, the bushes and, at the heart of it all, the almost-finished embroidery on the table: everything is texture, all is inextricably woven into the world-cloth. There is no space separating things, no visual depth; everything is filled in, knitted together. To make is to see, and to see is to make, in fact, Millais weaves his paintings, paints them so meticulously stroke by stroke that they become tapestries.

The autumn leaves and the creases in the white tablecloth are not, because of their minute detail, realistic or in any way photographically precise, but unique and particular. Every leaf is an individual, curling, drying and catching the light in its own way; nothing is the same, and everything has the right to be acknowledged. There is no transcendence, each leaf refuses to stand in for all the other leaves; it is just that one, at that moment, though without being "captured." There is no momentariness at all, Mariana is not caught in any act; she seems to stand there forever, with her weary eyes half closed and not looking outside or at anything specific, hands locked on hips, thumbs pointing forward, arching her back but hardly letting herself go. Though she has risen from her stool and put down her needlework, the transition is not completed, but suspended. In contrast, the numerous paintings of the Lady of Shalott, another Tennyson topic dearly taken up by all Victorian painters,19 show the reverse: the subject jumps up, startled by Lancelot passing by on his horse. But Mariana seems to know what the Lady of Shalott, caught in the wires of her loom, does not know yet: there is no use extracting yourself from the texture of things. If there is no space, where can you run to? Mariana is painted as a preservation; it is a real that is not of the flesh but spiritualized, cast in colored stone, encrusted.

In Pre-Raphaelite painting things come to a stop; becoming textured is their end. When we look at the most stunning painting of them all, William Holman Hunt's The Scapegoat of 1854, in which a long-haired goat reaches the end of its life on the encrusted shores of the Dead Sea. You can almost hear the hooves puncturing the crust of salt as they take their final staggering steps. The secret communication between the undulating hairs of the goat's coat and that vast mineral world around it is of an absolute beauty. It seems unequal, but only the small animal is actively presented,
being a sacrifice, while the surrounding world is completely passive and can only receive. How on earth can the offering of that small animal be sufficient, and can its life be weighed against the uninhabitability of the landscape? The equation can only be solved aesthetically, by giving the hairs extra length and extra undulation, adding extra holes in the crust, and including skeletons of previously deceased animals at left and right in the water. The delicacy of texture is enhanced by an increased fragility of the creature that is extraordinary.

Of course, Hunt, like Millais, often accompanies his paintings with lines of text – in this case, not Tennyson but the Bible. However, we should not for a moment think that these lines provide us with the artwork’s “meaning” – that horrible word that lets us believe the mind can trade aesthetics for textual interpretation. Here the artist has already done that for us, so to attach any meaning to the work would be futile. The biblical lines may be its subject, but they are not its object; the object – the end – is beauty itself. Subjects are merely vehicles; the painting is the destination, not the scriptural text, which is just a point of departure. In other words, the picture solves what the text cannot. In twentieth-century painting, the artist’s main problem – when to stop – remained unresolved, but in Pre-Raphaelite art it was solved again and again: things, fibrous things, collaborated with the shared aim of beauty. But note that this is not the beauty of things becoming drowsy and lethargic, as we so often observe in the Victorian classicism of Albert Moore and Frederic Leighton, who populated their works with endless slabs of marble and sleeping women – pointing the way to aestheticism and l’art pour l’art – but rather the beauty of the Gothic stopping as an act we are engaged in, not as a fact that is over and done with, which is the whole reason Ruskin’s notion of active rigidity plays such a crucial role in its ontology.

In our study of ornament, we will constantly encounter this fusion of the petrified and the fibered, the mineral and the vegetal, of stillness and liveliness. "To dress it and to keep it." Ruskin begins the last volume of Modern Painters with another partial Bible quote and proceeds with an exalted narrative describing how we inhabit our planet, sharing it less and less with rivers and foliage, with a surface of the planet he designates as "The Earth- Veil":

The earth in its depths must remain dead and cold, incapable except of slow crystalline change; but at its surface, which human beings look upon and deal with, it ministers to them through a veil of strange intermediate being; which breathes, but has no voice; moves, but cannot leave its appointed place; passes through life without consciousness.

A veil of strange intermediate being! Living but not alive, dead but not passive; an enormous sheet is stretched over the whole surface of the earth, a horizontal wall veil composed of stone and foliage, encrusted and woven, ornament and alive, but also preserved and still. This is certainly the reason architecture and botany have enjoyed such a long-lasting relationship.

Now we have briefly touched on some of the main issues around ornament in order to obtain an initial overview of the field we must now explore more thoroughly, step by step, as we deploy a few of Ruskin’s most enduring themes: the wall veil as a fundamental intertwining of matter, massing and texture; the draped and the encrusted as the main protagonists of ornamentation; and his friends in the Pre-Raphaelite Brotherhood’s mixture of live foliage and stone as an illustration of his notion of an "earth-veil," of the planet as an ornate crust, more specifically as a system of sympathetic relations. We will now leave Ruskin for a moment and bring in two other theorists of ornament, his fellow Victorians Owen Jones and Gottfried Semper (though the latter was merely a temporary Victorian), and slowly stir and sort their arguments before combining them into a general, matter-oriented theory of ornament.

The very first image in Owen Jones’s The Grammar of Ornament must have come as quite a shock, certainly in 1856, to a man like John Ruskin. It is of a decapitated head, its eyes closed, mouth open with the teeth bared and its skin covered in tattoos. "Female Head from New Zealand, in the Museum, Chester," Jones wrote as a caption. We now know that it is not a woman’s head but a male warrior’s, preserved after death by the Maori, as many were. These mokomokai were boiled, smoked and dried, treated with oil and finally sealed with wax to be kept by the warriors’ families, and later
often sold in desperate circumstances to European and American museums. But Jones is correct when he says that in Maori facial tattooing—*tu moko*—"every line upon the face is the best adapted to develop natural features," and in this sense it must be viewed as texture, a pattern emerging from the inside out, though it has been applied from outside. We see figural lines, motifs, or, as we called them before, figures, lines that act, and do so through variation.

The first thing we notice is that the lines—thin, continuous tattooed markings—are spaced apart, often in tiny groups of two or three, and then the spacing skips one position by leaving out one line, transforms and starts offsetting into another group. This basic operation allows the figures to fill the facial surface without a need for too much detail and to maintain a certain clarity. The second thing we notice is that the lines have acquired a multiplicity of behaviors: they can bend, and so variably; they can merge at a single point; they can bend in one direction and then switch, in an S-figure; or they can bend further and start spiraling, sometimes halting abruptly to end up as a J-figure and at other times bending more and more, logarithmically, to form a spiral that ends in its own center. Or the lines can be straight, and change direction by zigzagging and forming Z-figures, or bifurcate to form Y-figures. In short, this line work comprises a set of very precisely described figures, each with its own Maori name: kauwae, perepehi, hupe, ko-kiri, and so on. These figures then configure to not only fill but almost recreate the surface of the face, while incorporating the inborn graphics of eyebrows and lips; and this game is not a simple one, this cloth not a simple one to weave. The configuration fits, it is a three-dimensional veil without folds or seams, made of line-threads that are highly precise, not only because they are directional tools but because their directionality follows the slopes of the facial topography, like traces of skis left behind in the snow. See how they gather along the nose, sweep away downward and spiral up onto the summit of the slope of the cheek, then break backward, split off from the initial spiral, and sweep downward again toward the chin to form little spirals below the lower lip. All the lines, with all their complex behavior, act in unison to form a nested set with no loose ends. Meanwhile, the pattern stays striped; the lines never intersect; all problems are solved in a way that makes features like the chin, cheeks and nose interrelate with the eyes, ears and mouth. The pattern is fantastically Gothic, though with a different set of figural and configurational rules; nonetheless, it makes a tracered volume of the head, draping it with a "face veil" not fundamentally different from Ruskin's wall veil.

The continuity of dimensions can only be established by ornament, that is, by ornamental veils, by figural configurations, made as if drawn and drawn as if made. The question is not whether we need to "return" to ornament, because that would implicitly historicize the issue, but we do need ornament, more than ever; now that we are just naked beings between naked buildings and objects, we need to drape ourselves and our things as if they have been grown, drape them as if they are textured, as if they are encrusted; we need to weave them as if they are tessellated. With respect to weaving, we should discuss Gottfried Semper first, before arriving at Owen Jones's tessellations.

**an abstract materialism**

Semper was one of the members of the advisory committee for the Great Exhibition of 1851 (where he met Jones, who was commissioned to decorate the interior). The same year, his *The Four Elements of Architecture* was published in German, though he had written it in London, where he lived in exile in the early 1850s. It was in the Crystal Palace that Semper had seen the famous full-scale model of a Caribbean hut, an artifact of architectural anthropology that became central to his thinking and has been cited ever since in references to him. Architecture, he argued, consists of four elements,
elements that incorporate the materials as much as the techniques for processing those materials. Before getting involved further in Semper’s thought, we should take note of the fact that his theory, though it deals with materiality, is paradoxically devoid of materialism. He does not speak of brick or limestone, nor of iron and glass, which would in fact support a materialist theory and immediately turn it into a theory of building rather than architecture (if we momentarily accept the definition of architecture as being the virtual organization of a building and not its actual structure). This is why Semper is so important to our thesis, he helps us to understand design in relation to matter in a way that does not end up in a fatal determinism but allows us to perceive design as occurring at a point of transition from mass to matter, from building to architecture, as a zone of transfiguration essential to the emergence of ornament.

Semper’s four materials, the four elements as they would be used in an order of construction, are as follows: (1) earth mound, (2) timber frame, (3) textile membrane and (4) hearth fire inside. One begins building by first raising the earth to a level above the reach of water and animals; one then drives wooden piles into the mound at each corner (the hut will be rectangular) and builds a timber frame, which is subsequently closed with woven or plaited leaves and strips and then heated inside by a fire to create a comfortable environment. Semper does not, however, adhere to this sequence consistently in his writings. He often states that architecture began with fire, with the open hearth around which early humans would have gathered to warm themselves and cook their food. For the moment, the elements’ order of placement is not critical; what matters more is their theoretical status. As I have said, the four materials and their implied techniques did not directly inform the building technology of Semper’s day, nor did they take on a mythological, iconic status like Laugier’s primitive hut. Rather, Semper constructs an evolutionary path in which techniques previously used for certain purposes are transposed to others, almost as a form of heredity but also as an example of what Gould called exaptation (the taking on of a new function during evolution) in which ornamental preservation turns mere building into architecture.

Of the four elements, one clearly plays the most important role in this evolution: textile, accompanied by techniques of weaving and braiding:

Decke, Bekleidung, Schranke, Zaun (similar to Saum), and many other technical expressions are not linguistic symbols applied to the building at a later stage but clear indications of the textile origin of these building elements.20

And:

It is certain that the beginning of building coincides with the beginning of textiles.21

The making of a building, or more precisely a wall, involves not merely stacked stones resulting in a solid wall (Mauer in German) but something else that incorporates its former function and texture:

The wickerwork (Flechtwerk), the original space divider, retained the full importance of its earlier meaning, actually or ideally, when later the light mat walls were transformed into clay tile, brick, or stone walls. Wickerwork was the essence of the wall (Mauer).” And he adds in a note: “The German word Wand (wall), paries, acknowledges its origin. The term Wand and Gewand (dress or garment) derive from a single root. They indicate the woven material that formed the wall.22

Semper’s theoretical transition takes place twice, first from Mauer to Wand and then from Wand to Gewand. The first transfigures the solid wall into a fabric-like woven structure; the second considers that fabric a dress, a notion we know as Semper’s Bekleidungsprinzip. In related twentieth-century architectural theories, which are generally based on his notion of tectonics (represented by wood) and not that of textile, the first transition has actually been used to cancel out the second. What Semper saw as a design technique,
and specifically one of ornament, was turned into a building technique by modernism and its theorists. When we look, for instance, at our contemporary hollow dry walls with their steel or aluminum profiles finished with sheetrock, or at the typical Miesian reticulated curtain wall (a black, industrialized example of classicism), we can easily mistake them for Semperian Wände, because they seem woven, or at least composite and not monolithic. But this is not at all what Semper meant; he was talking about solid Mauern becoming Wände owing to the use of ornamentation, to Bekleidung, not to the restructuring of the wall into a composite set of hollow elements. Again and again, the Semperian elements have been taken literally, but modernist composite dividers and panelized cladding are conceptually as far removed as can be from adorned, monolithic Mauern. What has been used as a theoretical basis for shaking off ornament was actually intended as a theoretical explanation of its emergence, precisely because, at a certain point in prehistoric times, primitive open-wickerwork dividers no longer sufficed and had to be replaced by closed, solid stone walls, but these were considered acceptable only if the woven and braided patterns were retained, petrified in stonework. Why? Human cultural evolution became intertwined with architecture as an art not of space but of atmosphere, and one less of materials than of patterns and textures:

Hanging carpets remained the true walls (Wände), the visible boundaries of space (Raumbegrenzung). The often solid walls (Mauern) behind them were necessary for reasons that had nothing to do with the creation of space; they were needed for security, for supporting a load, for their permanence and so on. Wherever the need for these secondary functions did not arise, the carpets remained the original means for separating space. Even where building solid walls became necessary, the latter were only the invisible structure hidden behind the true and legitimate representatives of the wall, the colourful woven carpets.23

In short, the transfiguration of weaving into stonework explains the two most important traits of ornamental surfaces: polychromatism and inherent structure, i.e., the fact that many ornamental patterns still feature the typical under-over interlacing of weaving or the meandering ribbons of knotwork. Of course, since Gewand means dress, we are talking about ornamentation as drapery, as a cloth cast over the body. Yet we are also talking about it as encrustation, since we are observing the hardening of wickerwork into stone – sometimes directly, as when early baskets were used as molds for ceramic clay (which automatically took on an impression of the weave) and wickerwork was covered with mud reinforced by plant fiber (while the underlying plaited structure remained discernible), and sometimes indirectly, by design, as in a painted or embossed pattern on a vase.24 Drapery is conceived as a soft cloth hardening at the moment it touches the stone, while encrustation is to be conceived from the inside out, with the hard stone softening at the exterior to be chiseled. At this point in our argument, it is not so important to know exactly what Semper’s position was, what is crucial is that he understood this transfiguration as a material one, which he famously called Steffinschel.25

He derived the terminology from his friend Jacob Moleschott, a Dutch physiologist who published writings in German on metabolism in plants and animals. The German term Steffinschel can specifically refer to metabolism as it occurs in living organisms, and Semper’s usage is vaguely related to this, since in bodily processes chemical reactions constantly transfer matter into energy, but Semper’s theory is not so much one of chemical transformations as of technocultural ones. What is so powerful about Semper’s notion of the metabolic is that materials do not passively wait to be cast or chiseled but are a symbiotic part of activities, techniques and technologies. His theory does not make the stereotypical connections between the half-product clay, the product brick and the object of the wall, going from raw to finished in linear fashion; that would not explain anything. Rather, he understands the transition from architecture to building as proceeding from soft to hard. In this sense, his four elements resemble the four ancient Greek ones, fire, air, water and earth, which embody the four states of aggregation. The four categories of raw materials, as he lists them in Style,26 corresponding to his four elements of a decade earlier, are: (1) pliable, tough, resistant
to tearing, (2) soft, malleable, capable of being hardened, (3) stick-shaped, elastic, principally of relative strength, and (4) densely aggregated, resistant to crushing and compression. These still correspond to the four elements of the Caribbean hut but are now material attributes, states of aggregation from softest to hardest, which become activities through their respective technological classes: textiles, ceramics, tectonics and stereotomy. The first two categories are techniques of embellishment, as he calls them—textile drapery and mosaic encrustation—while the last two are categories of structure, embodied by wood and stone. Thus, in the transitory Stoffwechsel, two events occur; the object becomes adorned, and it becomes rigid. Or, more precisely, the object becomes adorned whilst it hardens. The fact that it bears traces of the soft and malleable connects it to life, while the fact that it is petrified makes it endure. It is an embellishment that has become structurally stable, not a petrified image (the patterns of weaving are never literal). During the change of material—literally, the Wechsel of the Stoff—a texture is left on its skin by a technology of weaving transformed into a technology of carving and painting.

The question now is what became of our Behleidungsprinzip after the mystery of transfiguration was complete: as the essentially material, structural, and technical notion presented by the dwelling assumed monumental form, from which true architecture arose.37

Normally abstraction leads to idealism, i.e., pure formalist principles independent of material notions. On the other hand, materialism generally leads to a theory of building or construction, in which everything is driven by the connections between materials, their structural properties and their expression as such, rather than a theory of architecture. Semper steered clear of both "speculative aesthetics" and "coarse materialism"38 and took an in-between position which remains extraordinary today; architecture is abstract because it is the result of a transformation and material because it is informed both by textile weaving and stone carving. Since we cannot proceed directly from the materiality of weaving to that of carving, we need an ab-

straction in between, an abstraction that by its nature is technical. Architecture still suffers daily from the devastating chasm between the technical, as it was taught at the Polytechnic, and the artistic, as taught at the Beaux-Arts schools. Only a few convincing solutions transcend this inherent opposition, and Semper’s is one of them; Ruskin’s is another. Semper’s theory is, in short, one of abstract materialism, something quite unheard of and not yet well understood. Scholars try to retrospectively correct Semper either at the symbolic level—like Alois Riegl in Stilfragen—by replacing his material evolution with artistic will (pushing him into the formalist corner), or at the material level—like Kenneth Frampton in Studies in Tectonic Culture—by stating that his theory is one not of the knot but of the joint, i.e., the joint between panels or building elements (pushing him into the structuralist corner).39 But Semper’s intermediary veil is like Ruskin’s, both alive and still, a crust of ornamentation that becomes a membrane between forces, materials, techniques and forms.

What can one say about such abstract materialism? Clearly, it does not view substance as something to be cast in the mold of forms but sees matter as occupying fields of activity, as clustered and grouped with technical and aesthetic forces; it views matter as being in transit, as neither being raw substance any longer nor having yet entered the field of finalized forms. This notion brings Semper’s abstract materialism close to expressionism, which is generally classified under the individualist Kunstwollen and not under the category of material skills and techniques. Techniques bring materials to life because they can dissociate themselves from a specific material but not from matter in general. In this way, they become living, abstract stations for moving materials into other domains. One can weave anything—a dress, a house, a car, a vase—as long as one only applies the abstract logic of weaving. This means that, just as Ruskin’s stone courses are related to the form of the mountain, the woven pattern is necessarily related to formal aspects, i.e., in the case of a vase, its bulging and edges, and in the case of a house, its openings, corners if any, and massing.40 So, as long as one applies that logic, the weaving never becomes metaphorical or "applied." Since ornamentation occurs in the transition, it manages the original textile pattern as well as its abstraction and transfer onto another object. It is a technique that nestles
between two technologies, that of weaving and that of building. All the
ideas and intelligence are located in it, not in the mind. Matter can think
perfectly well for itself. Semper offers us an active alternative to mere sub-
jective artistic will or the objective archive of forms. Forms are merely dead,
things archived as thoughts, because they have retreated from matter com-
pletely. The game of design, whether in nature or in aesthetics, is played be-
tween matter and technique, with the latter located somewhere between
Ruskin's craft and Semper's technology.

The textile inhabits the stone, not as a material but as a technique and
a logic. Reciprocally, the stone also abstracts the textile, and the weaving
can inhabit the stone only as ornament—how else? Since we cannot literally
knit a building or a vase, the stone, and the carving, must transform the fab-
ric too; therefore, the abstraction of materials works in both directions: stone
abstracts textile and weaving abstracts carving. It is not as if one material is
literally in another, as if two materialities were existing simultaneously;
rather, one state of aggregation is transforming into another, going from
soft to hard, from pliable to rigid. This can happen to a single material, too,
as when water freezes, lava turns to stone, or a face grows old. A material
that solidifies as it cools, a group of threads weaving together into a fabric,
without exception takes on a pattern during the transition from pliable to
rigid. Nothing passes through undecorated. All such configurations, in which
materials are arranged through a history of forces, we have come to call pat-
terns. Of course, it is no surprise that the term "pattern" comes up in a dis-
cussion of ornament—dozens of books on ornament use it in their titles să
— but there is a much more profound connection at work than its mere
graphical meaning, something truly material, and abstract.

Here is a well-known quote from Gregory Bateson:

It all starts, I suppose, with the Pythagoreans versus their pred-
ecessors, and the argument took the shape of "Do you ask what
it is made of?" or do you ask "What is its pattern?" Pythagoras
stood for inquiry into pattern rather than inquiry into sub-
stance. să

The first question apparently fits with the notion of passive mass awaiting
a negative form to be molded in, as if the "made of" can be separated from
the "it," while the second question implies an appreciation of form in the
manner of Ruskin's Matterhorn or Semper's Stoffwechsel: when matter trans-
forms, undergoes a transition, it organizes itself by abstracting into a pat-
terned state. Matter is both material and structure, which is not the structure
of a final form but the structuring of a zone of potential forms. Seen from this
angle, pattern is an abstraction that can never be idealized, never fully sub-
tracted from matter; on the contrary, it gives direction to matter's potential
to become many forms, depending on the actual forces at work during the
transition. The moment things have taken on a form, they will also have
taken on a pattern; there is no other way through. All things are made, and
all things made are structured by the making. Every thing is a nexus of ex-
ternal forces and internal structuring.

So far, there is no difference at all between natural and technical pat-
terns, which is fully logical, since natural patterns, too, occur in massive fac-
tories—of climate and temperature change, for instance—with a continuous
supply of matter to be transformed and a tendency to spill our products in
great numbers, be they mountains, snowflakes or waves on water.

Let us look at a few such patterns—call them what you like: natural
patterns, matter-patterns, pattern-forms—and see what their properties are
and how these properties might begin to drive our own technically produced
patterns of ornamentation. For reasons that will become clear later, I would
like to start with two that have some similar properties but occur in opposite
circumstances of cold and heat: snowflakes and mud cracks.

In the previous chapter, we referred to Bentley and Humphreys's mag-
nificent 1931 book, Snow Crystals, which depicts no fewer than 2,453
snowflakes, no two of course, the same. We could call each one an individ-
ual, in spite of them all being hexagonal—in fact, because they are all hex-agon.
If we look carefully, we see that the hexagons are actually hardly ever
"filled"—only under very special conditions. We are not dealing with a
hexagonal mold into which water is poured in some sky-high freezer. Only
a few water molecules are needed to start the growth process that creates a
snowflake, not as a liquid that freezes solid but as a tree of spicules or den-
drites, linear elements that progress in a solid state by branching, exploring the abstract space of possibilities in a consistent sixfold symmetry. What is important to us is that: (a) the flakes consist of similar branching motifs, (b) the figures add up into a set of similar, i.e., patterned, configurations, (c) there are many flakes, i.e., the patterns are repeated; and (d) the configurations come out different. It is undoubtedly a clear case of "uniformity amidst variation," the paradigm of aesthetics for hundreds of years. Or, in Owen Jones's words: "See how various the forms, and how unvarying the principles." Evidently, principles do not operate at the same level of existence as forms, or else it would not be possible for the two to coexist. We see an "ordering" principle at work, but it does not result in order, or any type of finalized entity. Like a Gothic cathedral, a snowflake is never "finished"; it is purely the management of a supersaturation of cold air through the extraction of water vapor in the form of solid crystals. If the air cannot contain all the vapor at a freezing temperature, the vapor simply transfigures into snow and gravity does the rest.

Uniformity does not occur at the same level as variation. The variation is real; the uniformity is abstract. The actual forms are all different, while their organizations are all the same; that is, the production of each flake is driven by the same principles, which, however, operate locally, making each dendrite decide when to split off and when to proceed forward, rather than globally as a constraint to form. So, to define the difference more precisely, the variation is explained by a consistency of behavior (Jones's principle of unvaryingness), not a sameness of form. What we think happens in space ("form") actually occurs in time ("formation"). The consistency is periodic, recursive and rhythmic. Patterns are true expressions of formation as time-dependent; the spatial forms are only the final products of such periodicity, the remnants carrying all the information as a graph of the process. Many authors, and especially Ernst Gombrich (an art historian of the Vienna School, founded by Riegl) in The Sense of Order, have attributed our need for patterned ornament to a need for order, not only an order of matter but one inherent in perception — a Gestalt, more a cognitive projection of an order onto objects than something we actually see and feel. We notice the same danger in all such observations: applying a schematism to a material transformation as if using a template for producing wallpaper, repeating exactly the same motif. In wallpaper design, this problem appears in the realm of the technical, and more specifically in the use of the woodblock (in the nineteenth century, that is; we'll return to Jones's and Morris's designs later), which necessarily results in "unvarying principles of unvarying forms," to paraphrase Jones, since technically it has been impossible to produce multiplication without unvarying, exact repetition. As we all know, individual things in nature do not repeat exactly, though it would be ridiculous to say there is only variation, in the sense that all things are simply different from each other. Waves on water are similar enough that we can speak of a kind of inexact repetition, better known as iteration. The changes in the waveforms that appear during their repetition work iteratively to create more variation. Variation and repetition are interdependent, and, as such, they are more a form of multiplication than addition.

Now, it would be oversimplifying matters to state that since today we have digital techniques of production we can act like nature and concentrate solely on variation, because this is not the case: variation cannot exist without repetition. How else would it vary? To organize variation, we still need repetition, exact or inexact. Obviously, inexact repetition implies variation, but that does not mean exact repetition necessarily works without variation; on the contrary, there it only needs to happen in the tile, instead of to the tile. Ergo, it comes down not to a final choice of one or the other but to acknowledging that there are two effects occurring simultaneously, the tiling and the tile, respectively, how it repeats and what it repeats; that is much more important than the actual form of repetition. In this sense, the problems of designers today are by no means lesser than those of Owen Jones or William Morris. If, for a moment, we imagine a room decorated with digitally produced wallpaper, varied like Bentley and Humphrey's photographs, with all the snowflakes carefully packed together like coins (each surrounded by six others) but each different from the next, would that make all the difference in the world from a single motif repeated exactly? It would surely raise some interesting issues, but I do not honestly think it would make a crucial difference, for the same reason that I called the twelfth-century Gothic digital: the issue of how to design variation lies not so much in
the choice between the exact repetition of latticed order and the inexact repetition of recurrent variation but in the understanding of the transition between variation and uniformity, between concretization and abstraction, or mobility and stillness. I think pattern is not an index of order but the expression of transfiguration. It is all in the passage. Pattern is something that occurs, not something that is. We will discuss what this means for design a few paragraphs down.

Let us first proceed with the inverse of the snowflake. When we look at the way a mud puddle dries up in the blazing sun, we see a similar tendency toward pattern, toward a certain configurational schema that nonetheless never results in exactly the same patch of dried mud twice. A dried mud puddle is made up of mostly polygonal tiles, that much is obvious, but the tiles’ edges are not very straight; they tend to zigzag, and some edges do not make it all the way but instead remain cracks in single tiles that end in a sharp tip surrounded by dried mud. But even if the mud were homogeneous and the cracks totally straight, the polygons would still all be different; that is, they would consist of different numbers of edges and angles between those edges. The consistency of such a pattern does not lie in the polygons but in the nodes, since they are all three-legged junctions, which I call Y-figures. Since the angles between the legs do not have to be the same all over to fill the surface, they are the place where variation is expressed. It is rather amazing (from a design-theory point of view) to see a clay surface “self-tile,” forming a floor pattern as it dries. This configuration, which we perceive as tiles laid one after the other, as in a dry stone wall or pavement, starts with the whole and breaks into the parts. We find many similarities between the snowflakes and the clay tiles, but there is an important difference: while in the snowflake the hexagonal contour is never filled, in the mud it is precisely the contour that is constantly materialized, though variably, as the outline of the tile. What is a continuous outline in the dried mud tile is only a dashed line in the snow crystal limiting the growth of the continuous lines of the dendrites.

These two natural phenomena seem to present us with two different models of patterned ornament, each occurring in the transition from one material state to the other: water vapor into ice crystals and homogeneous mud into cracked, baked tiles. Suddenly, under critical conditions, a homogeneous materiality acquires a “graphic” (i.e., operating by means of lines), even diagrammatic, self-abstracted form in order to pass into another state. All pattern emerges in a space between dimensions. We generally see dimensions as stations of the extensive, but in pattern formation we continually encounter dimensions as expressions of intensive material properties, of transitional states within matter. Why? Because all the external forces operating on matter can only be processed internally, through a restructuring. The ice crystal starts with lines that multiply into a surface; the mud tile begins with a clay surface breaking into a network of lines – in each case, there is a passage from one dimension to the other, but they occur in opposite directions: the snow crystal moves from a lower dimension to a higher one, the clay tile from higher to lower. The latter, an encrusted pattern we call tessellation, consists of a system of outlines: the cracks, analogous to what we know in mosaic patterns as joints. The former proceeds by materializing not the surface patches but the lines, which we will call centerlines, which branch, weave, nest, or otherwise multiply into a surface, a system of networked ribbons. So as ornamental systems, the two modes of multiplication, of moving between figures and configurations, are antipodal: the tessellated breaks, self-tiles, into polygons, because only polygons can fill a closed surface, while the ribboned operates by variable curving and branching ribbons that multiply into some variable interfaced group. In ornamental design, of course, both will have to repeat in some form, either as a single element or as a group of varied ones. This obviously applies to tessellated ornament but is also true of ribboned ornament, which can multiply only with the help of polygons, tiles with dashed, invisible outlines, as in the best wallpaper designs, where we want to see the field of interlacing vines and leaves but not the hidden tiles organizing the “repeat” of the pattern, as it is called in wallpaper design.
At this moment in our argument, however, after passing through Semper’s domain of Stoffwocbel and entering the world of pattern, we must confirm that both the ribboned and the tessellated exist in this specific zone of transition or transfiguration, of movement not just from one material state to the other but specifically between dimensions: the ribboned operates from line to surface, the tessellated from surface to line. One is a world of weaving, the other of cracking. This is exclusively the transdimensional realm of pattern, because nothing else can emerge there but pattern. We must look carefully into these separate approaches, each of which became a separate school of design, with very different protagonists, evolving along a very different path. However, we will find that there was no deciding moment of either/or; one does not face a choice for either the mosaic, the tessellated system of outlines filled with patches of color, or the fabric, a woven, ribboned system of centerlines filled with gradations of color. We will see that both, when at their best, work towards each other, the tessellated toward the ribboned (or, as we called it before, the encrusted toward the draped) and the ribboned toward the tessellated – neither resulting in pure weaving nor pure tiles but again, as in the Gothic, working towards a vitalized geometry, where the movement of flexible figures merges with the hardness of the edges of the tiles, again in a merging of abstract structure with vital ornament.

**tessellation ornament and ribbon ornament**

We will first visit the world of tessellations and encrustations before immersing ourselves in the jungle of interlacing ribbons. We find all the richness and beauty of tessellated encrustation we can possibly imagine in Owen Jones’s *The Grammar of Ornament* of 1856.

Its title is already extraordinary and telling – the grammar of ornament – since until Jones the only books on ornament had been handbooks, manuals, and books full of canonical examples. Though his book contains a comparative analysis of ornament, grouping styles by nation or people and appreciating all the differences between them, its goal is a new one: finding a universal logic of ornamentation. Such handbooks normally depict all the various objects – keystones, lions flanking doors, fences, ironwork, heraldry, guildelands, capitals, and so on; members all – but Jones’s does not. He concentrates on ornamental fields, on so-called diapers, mosaics, rugs and fabrics – in short, on surfaces, and how they are constructed according to the logic of ornamental figuration. These fields are structural; they are constructions, or, as we call them, configurations; and for each category, he finds new sets of rules, new types of figures that have various properties enabling them to make bands, corners, or, most commonly, complete fields.

Jones’s focus on surfaces must certainly have been affected by his comprehensive studies during the early 1830s of the Alhambra in Granada with Jules Goury, since Moorish ornament concentrates solely on the production of intricate diapers: complex, mathematical, even kaleidoscopic patterns of a tessellated geometry, a geometry of subdivided surfaces comprising polygonal patches fitted together in mesmerizing configurations. Looking at Grammar, we immediately notice the minimal presence of the Greek and Roman – a mere eight plates, and in the context of the whole book, they hardly seem to fit, decorated as they are only with a few scrolls and meandering bands and some grotesques, but grammatically, they are more like formal solutions, difficult to vary and certainly difficult to nest into a patterned diaper. They differ greatly from the Persian, the “Hindoo” (represented by all the fabrics Jones bought for the Great Exhibition), the Chinese, “Moresque,” Arabian and Indian. Jones’s is very much an Orientalist notion of ornament: stylized, networked and always polychromatic. Each chapter contains a number of full-page color plates in folio format and is introduced with an explanation of the figures, their rules of construction, and their historical background. These introductory texts are generally more interesting than the famous thirty-seven propositions at the beginning of the book, which lack precision in their attempt to abstract rules, which become so general that they lack the power of grammatical logic and are ultimately useless. In the chapter introductions, however, Jones uses text, annotations, numbering, diagrams (some large, some small enough to fit into a sentence), and illustrations, some very abstract, some very realistic, and all without color. The “Moresque Ornament” chapter is one of the best, along with the previously mentioned “Savage Tribes,” which starts with the decapitated Maori head.

Here are a few of the rules of the Moresque as listed by Jones, in the form of instructions for Victorian designers: (a) we must decorate construction, not construct decoration (obviously, the whole book argues against this rule), (b) lines should grow out of each other by gradual variation, (c) forms must be understood as subdivided, (d) one must properly balance the use of orthogonal, diagonal and curved lines; and—more interestingly and less geometrically—(e) every ornament must be traceable back to a root, (f) one should use radiation from a parent stem as much as possible, (g) junctions of curved and straight should be tangential, and (h) one must try to avoid schematizing curves into circle segments.

I have rephrased these rules somewhat, but they are clearly still quite formalist, though often something seems to emerge in Jones’s analysis that takes his grammar beyond Semper’s notion of weaving. (By the way, how Semper arrived at his Bekleidungsprinzip has never been clarified, but it is certain that very early on he talked to Goury and Jones, who compared the decorations of the Alhambra to weaving.) Let us not forget that weaving, because it is a material technique, is inherently structural; therefore, rules of ornament derived from textile techniques, whether knotting, plaiting or interlacing, are structural (i.e., connective) too, even when applied to chiseling or painting. As previously stated, the transfiguration of weaving gives textile-derived ornamentation a logic, a set of configurational rules, but of course it is the abstract rules of connecting, overlapping and merging that make such ornamentation work, not actual weaving. In short, weaving and knotting are only a class of a much broader range of configurational patterns.

As long as there are figures, and a certain variation of these figures, accompanied by rules of interconnection, they will always result in configurations. Abstract materialism thus gained a level of abstraction in Jones’s Grammar, and this form of abstraction became highly influential, to say the least; we will return to this topic later.

If we consider Jones’s turn to abstraction within the definition of pattern, we discussed earlier, however, as part of a passage from individual (“figural”) variation to collective configuration, from a world of movement to one of stillness, his grammar is a syntax that looks at global states of final order more than local rules of connectivity. Jones was so affected by the Alhambra that his view of order became strongly influenced by the notion of tessellation as an overall harmonics of subdivision. We must keep in mind that in 1856 we were still half a century away from fully grasping the complexities of the various symmetries of tessellation, as worked out by Fedorov and Polya. There are seventeen different types of symmetry in the Alhambra, operating through the translation, rotation and reflection of polygonal tiles, including combinations of different types of polygon.

Though tessellation does not in itself necessarily prefer the simple over the complex, Jones favored the more simply ordered types, such as grids and diagrids. It is important to note in advance that the reason I list tessellation as one of the two categories of ornamentation (the fact that it works from surface to line in its expression of interdimensionality) is not the same reason Owen Jones was interested in it. There is a “natural” schematicism to tessellation, since it visualizes the lines of organization, though this does not mean that its way of configuring surfaces is inherently simplistic or without dynamics. Nowadays, we know of very complex, irregular, fractal and even aperiodic forms of tessellation. But merely because of its sense of schematicism, in aesthetics tessellation tends to be associated with uniformity and the study of repetitive patterns, while the ribboned tends to be associated with an emphasis on variety.

If I were classifying different types of tessellation, I would put what we call (1) the grid at one end of the spectrum, as the simplest; then perhaps (2) the lattice, then (3) the Arabic lacework, then (4) the more modern network, which can occur in many forms, from something as simple as a triangulated mesh to what today are called small worlds, and finally, at the other end of the spectrum, (5) the contemporary notion of pattern, which can contain cuts and breaks, in contrast to the network. Jones, as a strong believer in “repose” (Proposition 3: “As architecture, so all the works of the decorative arts should possess fitness, proportion, harmony, the result of all which is repose.”) in both his own wallpaper design work and his analysis of existing diapers, floats somewhere between grids and lattices. His designs are very symmetrical and, depending on the degree of symmetry, more or less homogeneous. As we saw in the dried mud example, the consistency of a tessellated system arises, often confusingly, not from its polygons but from its
chapter two

Owen Jones. Savage Tribes No. 3. Plate III from The Grammar of Ornament (1856).

Owen Jones. Moresque No. 5. Plate XLIII from The Grammar of Ornament (1856).
types of nodes. For instance, the variety seen in the combination of hexagons and pentagons on the surface of a soccer ball disappears when we look at the nodes: they are all three-legged. In our analysis, we will therefore shift from studying the types of patch in a pattern to the types of node. Of all possible tessellations, the repetition of an X-figure (intersection), as in a checkerboard pattern, is the simplest, but it is also the most dangerous, since the X crossing does not allow for sliding, nor for a hinging of the four legs at the point of intersection. The X-figure can give us only grids and diagonals, i.e., grids made up of diamonds (as the legs do not necessarily cross orthogonally). Then there are grids of triangles, which are constructed by six-legged nodes, and hexagons, created by three-legged nodes, which we have previously called Y- or T-figures; I would prefer to call them lattices, because their structure seems more refined, more delicate and more comparable to that of a typical Arabic screen, such as the Mashradiya, carved from wood.

As stated, every mathematically possible type of tessellation can be found in the Alhambra, from simple checkered patterns operating on simple translations of tiles to much more complex patterns. For instance, beyond the simple X-, T- and Y-figures, we find overlapping geometries that, where they intersect, create two or sometimes three or four different polygons in a group to be repeated (rather than just one, as in grids and diagonals). Even when materialized by straight lines, such patterns create an effect that is less than reposed, especially when the joint of the tile transforms itself from a non-element into a band element with a width, changing the intersections into crossings, enabling the bands to slide over one another. The crossings can be aligned into a continuous band, and such bands can locally start to vary, to buckle or zigzag, creating tiles that have only one axis of symmetry left and are all of very different sizes. This type of pattern, which is a step beyond grids, diagonals and lattices, is much more like lacework, and moves closer and closer to the category of ribboned ornament. Yet these patterns are still very much of a crystalline, if not static, nature and made Owen Jones decide in favor of the harmonic, solid-state order, and – as Gombrich later did – Jones began to view ornament as a “sense of order.” It is at this point – as Christopher Dresser, a follower of Jones, correctly saw – that decoration started to ignore feelings and became “an art of wholly mental origin.” I, for
For tessellations, this means cracks form an infrastructural system that distributes forces over a surface; therefore, in design we can bring in all the complexities of different directions and edges as needed. The more we move away from grids and lattices towards our contemporary notion of pattern, the more variable they get. It is the consistency of the node, not as a fixed object but as something that can be varied — first in the angles between the edges, then in the length of the edges — that leads to great variation in polygons, such as that found in two-dimensional packing systems, like Voronoi diagrams. Nonperiodic tessellations, such as Roger Penrose's, are as interesting; though his only use two tiles, a kite and a dart, the patterns they create never repeat. Maybe more variation will also be possible when we become free to use irregular polygons, somewhat as Haeckel suggested in his studies of radiolaria. But, as in the Arabian lattices, the tiles would have to be kept relatively small, unlike typical large structural elements. But whatever we do, we should reverse the roles of patch and edge, the life should be in the line, not the patch, or move from the edge across the tile, because it is the line that transports force.

Ruskin was horrified at Jones's inclination toward perfection, order, structure, harmony and repose — and rightly so. Today Ruskin is often shelved away as a one-dimensional naturalist, a position considered to be acceptable for an artist, since he or she "sees and therefore can only feel" and necessarily must register the unique and the varied. But things are different with pattern design, which inherently has to deal with repetition, since, as we have explained, pure variation does not exist. Putting Ruskin at one end of the spectrum, however, on the side of empiricism as opposed to ordered idealism, would certainly oversimplify matters, and would not do him justice. He himself is partly to blame, however, as he so often took the liberty of changing his mind — "I am never satisfied that I have handled a subject properly until I have contradicted myself at least three times." Therefore, if we want to get to the heart of the matter of ornament, we should quote him more than once, to be safe. First, here are a few lines from The Two Paths, specifically the chapter carrying the ominous title "The Deteriorative Power of Conventional Art over Nations":

It is quite true that the art of India is delicate and refined. But it has one curious character distinguishing it from all other art of equal merit in design — it never represents a natural fact. It either forms its compositions out of meaningless fragments of colour and flowings of line; or, if it represents any living creature, it represents that creature under some distorted and monstrous form. To all the facts and forms of nature it willynilly and resolutely opposes itself: it will not draw a man, but an eight-armed monster; it will not draw a flower, but only a spiral or a zigzag.

Without a doubt, this quote of Ruskin's only strengthens the accusation that he was a straightforward naturalist — if it is an accusation — and, perhaps worse, it supports the fatal opposition between abstraction and representa-