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A Functional Model of the Aesthetic Response

Daniel Conrad

Abstract

In a process of somatic evolution, the brain semi-randomly generates initially-unstable neural circuits that are selectively stabilized if they succeed in making sense out of raw sensory input. The human aesthetic response serves the function of stabilizing the circuits that successfully mediate perception and interpretation, making those faculties more agile, conferring selective advantage. It is triggered by structures in art and nature that provoke the making of sense. Art is deliberate human action aimed at triggering the aesthetic response in others; thus, if successful, it serves the same function of making perception and interpretation more agile. These few principles initiate a cascade of emergent phenomena which account for many observed qualities of aesthetics, including universality and idiosyncrasy of taste, the relevance of artists' intentions, the virtues of openness and resonance, the dysfunction of formulaic art, and the fact that methods of art correspond to modes of perceptual transformation.

Key Words

aesthetics, emergence, epigenesis, evolution of the aesthetic response, intentionalism, neuronal group selection, open work, perceptual transformation, stabilization of synapses

1. Looking for Commonalities

One of the most universal human traits is the aesthetic response. All cultures have it, so it is conserved and may confer survival value by serving a biological function. What is that function? Beauty is found in painting, music, literature; but also in nature, mathematics, physics. Do these have anything in common? By triangulating, looking from many angles, we see commonalities.

In both art and nature, beauty always displays a provocative, often novel, pattern or structure (in the broad sense, including texture, colour, semantic pattern). It provokes ways of perceiving this structure, transforming it to extract something significant. That act of transformation is essential to the experience.

Start with art. Zola called art a corner of nature seen through a "temperament."^[1] This fits the Impressionist painting and Naturalist literature of his time and perhaps all representational art. But a general theory of aesthetics must explain not only representational art but also abstract painting and music, neither of which represents nature. Still, the idea of art looking through a temperament (intuitive perceptual bias) makes sense. Kant^[2] and Croce^[3] thought aesthetics depended on an intuitive sense of form and that it gave insight into our perceptual faculties.

Clive Bell called art "significant form."^[4] This is general enough; music and abstract painting have form. But what is meant by "significant?" Let us replace Bell's undefined "significant" with Zola's "temperament," and "form" with "structure." Now if we add our own observation (above) that beauty "provokes" modes of perception, we might get: "structure which provokes a

temperament or an intuitive bias or way of looking." Does this suggest a functional model?

Consider again music, poetry, painting, physics, biology. All have structures (in the broad sense) that provoke specific faculties of the mind: faculties that perceive and interpret, that find meaning and pattern, that creatively organize and make sense of raw input. And this provocation occurs through implied or explicit transformations, even if this is a simple transformation of paint into an image, metaphor into a resonant idea, or melody from a sequence of tones. In the case of art, the structure is deliberate and meant for an audience. In the case of nature, as Kant observed, it gives the illusion of being deliberate.[\[5\]](#)

2. Perception and Interpretation

All perception requires transformations: when we see, we filter out noise, fill in gaps, connect dots, rotate, stretch, juxtapose. Perception is creative: different minds interpret similar input differently. Perception is learned. Infants cannot see much until they learn to see. The eye's signals must be processed and infants learn to filter out noise, fill in gaps, integrate with other senses, etc. until the output correlates with pre-existing patterns. There is evidence for learning to see in adults also. Subjects made to wear glasses which invert the world by 180 degrees are at first confused but soon learn to make the needed perceptual transformations for seeing upside-down.[\[6\]](#)

Some cultures, for example the Inuit, the Kwoma (New Guinea), the Dogon (Mali), learn to see the natural world with great acuity. From their sculpted masks in which nature and art cohabit, animals and spirits emerge. These transformations have aesthetic power. They occur in parts of the mind that perceive and interpret. When we look at these masks, we are driven to make sense of them. And as we make that sense, we become aware of the plasticity of perception.

3. Survival Value

So we find provocative structure in all that stirs the aesthetic response, and that structure coaxes us to make some kind transformation, even if it is just paint forming an image. Is there survival value in this response?

If, while walking through a northern temperate rainforest, you see a vague shape in the fog, your brain tries to connect the dots, filter the noise, crop, find patterns. If the shape is a bear, you might be in danger. Learning to perceive vague or novel patterns has survival value. If working with clay and pigment helps find ways of recognizing bears in the fog, that has survival value. If it helps you see the unforeseen, that is even better. Then recognizing bears in clay can be pleasurable even when real bears are not.

4. A Possible Mechanism

If the aesthetic response triggered by structures (in our broad usage, this term includes texture, detail, and semantic patterns) of art and nature serves to enhance our perceptual faculties, how does this work? I propose that aesthetic responses guide formation of neural circuits that mediate perception and interpretation. Some models of neural development hold that the cerebral cortex initially forms circuits partly by chance, and useful circuits are then stabilized by a selective process. Jean-Pierre Changeux calls this

model "epigenesis by selective stabilization of synapses."^[7] Gerald Edelman calls it the "theory of neuronal group selection."^[8] In these models, brain anatomy is determined not only by genetics, but epigenetically as well, by somatic natural selection, allowing the brain to respond to unforeseen events. Hence, brains of identical twins display different neural anatomy.

Initially, neurons migrate through the developing cortex forming patterns partly by chance. They form groups, grow axons and dendrites, and connect with other axons and dendrites. Junctions between axons and other neurons or their dendrites form synapses, where electrochemical signals pass. The resulting network of synaptic circuitry is constantly changing and very complex. There are roughly a quadrillion synapses in the brain.

In early neurogenesis cells migrate; some die, possibly by selection. New axons, dendrites, and synapses form. Cognition is minimal and newborns seem to move randomly. Then, speaking hypothetically, circuits start to stabilize by a selective process: when decisions lead to "favorable" outcomes, this stabilizes circuits mediating those decisions. In like manner, "unfavorable" outcomes destabilize circuits. Circuit formation and selection continue (more slowly) in adults. Useless circuits are pruned and replaced with new ones; useful circuits are stabilized.

What selective criteria determine "favorable" outcomes? These are "values," such as thirst, hunger, and sex, that originate in primitive areas of the brain, such as the hypothalamus, and are triggered by external stimuli. I posit there is an internal, "disinterested"^[9] value felt as pleasure that rewards making sense of sensation and that helps to stabilize circuits that successfully mediate perception and interpretation. Thus, when we use novel, unstable circuits to make sense (to recognize patterns that match some of the patterns stored in our memories, or which match hard-wired patterns^[10]) we feel a disinterested pleasure whose biochemical and biophysical manifestations stabilize those same perceptual circuits. That pleasure, I propose, is the aesthetic response.

This model is Darwinian: survival of the fittest acts as a selective mechanism. However, unlike phylogenetic evolution, it works somatically, as it does in the immune system and self-learning computer programs. Unlike a phylogenetic population, the brain does not expand indefinitely, however its repertoire of responses does expand indefinitely. It continually spawns trillions of random circuits that are then challenged by encounters with worldly experience, generating sensory input. And those transformational circuits which successfully make sense of that input are stabilized by the biochemical and biophysical constituents of aesthetic pleasure. Thus, perception grows progressively more versatile. And since newly stabilized circuits connect in parallel with older ones, the system builds on previous success.

5. Some Empirical Observations Supporting the Model

Consider some of the most basic methods in art making: concision, elaboration, outline, theme and variation, symmetry, balance, juxtaposition, synaesthesia, harmony, dissonance, metaphor, metonymy, symbols, etc. These methods are modes of perceptual transformation: filtering out noise, filling in gaps, connecting the dots, rotating, stretching, juxtaposing, etc. In our model, pleasure is found in these perceptual transformations, even when the thing perceived is unpleasant. As Kant argued, beauty is not appetite

and not always lyrical: some artists (Sophocles, Brecht, Grosz) show painful, corrupt, ugly parts of life. In each case, we learn new ways to make sense and become increasingly aware of the plasticity of our perceptions.

What about aesthetic pleasures stirred by nature? Einstein found the universe beautiful, calling himself an artist of physics. Some people find astro-photography beautiful, as well as the natural wilderness landscape. In the absence of urban culture, wilderness can seem to take form intentionally, only there is no artist. The sense of purpose in these things is unmistakable.

In evolution, life develops seemingly purposeful forms like the forms of animist art. Jacques Monod called this illusion of purpose "teleonomy."^[11] To him, life arose from a balance between chaos and order. This mix of spontaneity and composition is the kernel of the unity between forms of beauty. Gerald Mast calls it "surprising inevitability."^[12] Biologists talk of "emergent properties" (I use the term in its most conservative sense, implying the unpredictability of certain synergies, not invoking additional physical laws). So Kant's tenet that nature was beautiful because it displayed a sense of purpose, though it had no purpose (Zweckmäßigkeit ohne Zweck), is, essentially, Monod's teleonomy.

Art also has emergent properties. Cézanne painted nature without contrivance, yet he followed compositional rules, as if nature were composed. Maurice Merleau-Ponty, who held that perception was a creative act, said that Cézanne "...wanted to depict matter as it takes on form, the birth of order through spontaneous organization."^[13] His forms rose from a balance between chaos and order, as Monod describes the spontaneous emergence of life.

In *The Art of the Fugue*, Bach stated themes and then transformed them using compositional techniques inversion, retrogression, and transposition. Yet his emergent forms are not completely predictable from the rules. This surprising inevitability reveals higher rules, implying a purpose. Music provokes making-sense without representing a specific world (though perhaps it "represents" imagination), yet conveys a sense of purpose. No actual purpose, of course, is revealed.

6. The Virtues of Ambiguity and Openness

Is this non-revelation important? Borges suggested that the aesthetic experience is the "...imminence of a revelation that is not yet produced,"^[14] implying that the search for sense is richer than the finding of it. Mallarmé concurred, observing that to name is to destroy; to suggest is to dream.^[15] Baudelaire said that beauty is vague, thus allowing broad interpretation.^[16] Accordingly, while there are general principles in aesthetics, there is no evidence for universal formulae for making art or judging beauty. Formulae rob art of ambiguity, emergent properties, and surprising inevitability. Real art helps the mind develop perceptual modes that adapt to handle the unforeseen. (See section 11.)

Similarly, meaning, in the sense of a moral or a message, is not a good criterion. Beauty may train the mind to construct meaning from chaos, but that does not always require a fixed meaning or "point." In our model, rather than always asking what art means, we ask what it does, what its effects are. Critic Adam Gopnik, paraphrasing John Updike, observes, "[P]urposes are not points, ...where the purpose of 'King Lear' was to purge the soul with pity

and terror, its point was that old men should not retire prematurely.”^[17]

How, then, does the artist employ meaning? Artists try to convey an intent or vision, to have an effect on the audience, but this does not always carry a fixed meaning. Meaning, in the sense of message, is not always there; and when it is, it may or may not be vital to the effect. Renaissance paintings of religious themes do not necessarily affect us through their theology. Bach’s fugues do not sound Protestant as opposed to Catholic. Delacroix’s *La liberté guidant le peuple* is arguably weakened by its overt propaganda. By contrast, the political meaning of Goya’s *May 3rd* is central to his intent. And in Orson Welles’s *Citizen Kane*, the meaning of Kane’s dying word, “rosebud,” is vital to the film.

The artist’s intent is to provoke us to perceive in certain ways. Meaning is vital only to the extent that it participates in that provocation. But even then, meaning is not the whole story. If Kane’s “rosebud” were just narrative meaning, the film would be a mere parable with a moral. The slow discovery of meaning, however, to which “rosebud” is the climax, is deeply aesthetic. The process of discovery reveals the artistic intent, and “rosebud” is as much a part of the structure of the film as is the color magenta in one of Monet’s nymphaeas.

Akira Kurosawa’s *Rashomon* also involves a search for meaning, but the meaning is left open. When using semantic openness, artists evoke multiple layers of possible interpretation without a fixed meaning. The intent is to provoke the audience to make their own interpretations, thereby collaborating in the final stage of creation: Kafka’s *The Castle* and Beckett’s *Waiting for Godot* offer multiple interpretations. Expressionist painters often omit facial details; the viewer supplies them. In film, consider Kurosawa’s *Dreams* and the ending of Kubrick’s *2001*.

In semantic openness, art is left undefined and contingent, to be completed by chance events or the audience. In China, this characteristic dates at least to the Zhou dynasty. In the West, it starts (arguably) in the nineteenth century (Turner, Baudelaire) with the idea that experience is irretrievable, so rather than render it directly, artists turn inward to themselves, the medium, or the mind of the audience. Umberto Eco called it “open work.”^[18] Calvino spoke of “multiplicity.”^[19] Borges reinvented it continually as a book that changes meaning as it changes authors, an endless lottery, a book of sand, an infinite library.^[20] Yasunari Kawabata, whose stories are often unfinished, spoke of “emptiness,” by which he meant not nihilism but something deeper, full of “sensuous fantasy.”^[21]

7. Structural Openness and Aesthetic Darwinism

There is also a non-semantic route to openness: the structure can be left open. Key elements can be left to chance, improvised, or constructed by audiences. Consider improvisational theatre, jazz, interactive art, and the art of Alexander Calder and Merce Cunningham. Results spawned by chance improve the odds of finding the surprise of “surprising inevitability,” but may lower the odds of finding the inevitability. This requires balance: random chaos is dull, because if everything is permitted, nothing can surprise.

Some artists use hybrid methods, first improvising, then selecting

what works. This “aesthetic Darwinism” reveals provocations they could not invent unaided, allowing them to transcend prior experience. For example, Joseph Chaikin’s Open Theater workshops used an improvisation exercise called “transformation” in which actors were urged to spontaneously change characters mid-scene. Successful segments were selected and scripted. Megan Terry’s plays *Keep Tightly Closed in a Cool Dark Place* and *Calm Down Mother* were developed this way. Though ultimately scripted, they maintained a sense of spontaneity.

Hamlet said that art holds a mirror to nature. This metaphor is not confined to realism. Mirroring nature can mean copying its images but can also mean copying its methods. When we let chance drive some elements of artistic creation and then select from the resulting pool of possibility the forms that best fit our needs, we use nature’s methods. Perhaps most artists work this way, imagining possibilities randomly, rejecting useless ones, keeping what works. Audiences can also do this, particularly with open work. Since open work gives no fixed interpretation, this experience may be more realistic than “closed” art.

Closed or open, art presupposes an artist with a purpose or intent. This implies a promise to make sense, and often a promise to make more sense over time, which is a good definition of “depth.” Closed art promises a fixed interpretation or way of making sense. Open art promises multiple ways of making sense. Nature, of course, is open, though we are continually trying to close it.

8. Unity and Intent

Another way to say that nature’s beautiful forms display the illusion of purpose is that nature seems to have unity. In science, a “beautiful” theory unifies multiple phenomena with a single concise law, model, or set of equations. In art, artists have a real purpose: an intent. When the intent is perceived by an audience, it can invest a work of art with a sense of unity.^[22] Finding this unity is a way of making sense, seeing patterns, so the art clearly fits our functional model.

In time-based art, unity may arise from sequence. We watch films and plays from beginning to end; unity suffers if we start in the middle. In novels, unity might come from plot, character development, or theme. In painting or sculpture, unity is ostensibly seen all at once in the structure, so it might be damaged by cropping. In fact, in much visual art (e.g., Picasso’s cubist painting or late work by Bonnard), deeper unity is perceived gradually, as in time-based art.

In open art, such as Calder’s mobiles, perception is labile, changing constantly. This does not always harm unity, since that continual change may be inherent in the intent. Similar logic applies to improvisation. And for art using aesthetic Darwinism, the intent drives the selective process. In all these cases, if the audience grasps the intent, that itself may endow the work with unity. Finding the artist’s intent while searching for unity is a strong way of making sense.

Thus, openness and unity are not contradictory. The artist’s intent can unify even when it does not aim at a unitary voice or interpretation. Multi-vocal, polysemic art can convey a deep central purpose or perspective. Few novels are as multi-vocal as Joyce’s *Ulysses*. Each chapter is written in a different style. Multiple

languages and myths intermingle. Yet the work holds together despite its multiplicity, and it arguably presents a unique point of view.

9. Resonance and Bricolage

Multiplicity is closely linked to a sister-idea: resonance. In art, symbols (including symbolically charged characters) and metaphors may lack fixed referents. This freedom can make them more adaptable, enabling them to serve multiple uses within a work of art and travel to other works. The light in Goya's *Third of May* recurs in Picasso's *Guernica*. Kafka's castle, Virginia Woolf's lighthouse, and Jeanne d'Arc display similar adaptive depth. By analogy to vibrating strings, we can call this sympathetic excitation "resonance." Since it leads to qualities like symmetry, metaphor, parallelism, etc., resonance is central to the perceptual process.

In biology, also, themes repeat, serving different purposes in different contexts. François Jacob termed this "bricolage" (tinkering), and found it ubiquitous in evolution; e.g., microtubules shape cytoskeletons, move organelles, mediate mitosis, form cilia and flagellae, etc. By bricolage, transformational circuits used in one kind of perception might be useful in other kinds as well.

There is evidence for this cross-modal wiring. Patients blind from childhood, whose eyes are surgically repaired, take months to learn to "see." Yet Oliver Sacks tells of one such patient who, prior to training, could tell time on a clock; he previously used a watch with no glass, which he read by touch.^[23] Similarly, he could see the letters of the alphabet whose shapes he had learned by touch. Thus, relevant circuits from one modality can aid perception in another.

When circuits developed for one purpose are used for another, this "bricolage" may be mediated by parallel links with distant circuits. While the primary function of this cross-wiring may have more to do with basic perception than manipulation of symbols, it may explain the "resonant" transferability of symbols and metaphors, and the high incidence of synaesthesia in artists.

These parallel networks are essential for perception. The eye is not a video camera nor the ear a recorder; nothing is captured whole. Instead, different sense organs make multiple, disjunctive samplings of the environment. These samplings are routed to various "maps" (groups of related neurons that sample similar qualities), and those maps are interconnected. Instead of rendering simulacra, the different maps specialize in measuring individual properties, such as bumpiness, orientation, contrast, tone, contour, outline, key detail, colour, rhythm, volume, timbre, etc. The brain then integrates the samplings of these individual maps to "perceive" the environment. The interconnections (between maps) that mediate this integration, are dense, complex, and parallel.

10. Music

If symbols achieve resonance by adaptable, multiple references, then music, whose reference to the environment is abstract, should be highly resonant. It is. Music connects convincingly to the pool of human experience despite its lack of depiction. Music seems mostly to affect attitudes and emotions, which are not representations of the world but responses to prior perceptions of that world. In film, for example, music usually does not describe

events but, through resonance, tells the audience how to feel about them. How might this work?

Music is sound organized for aesthetic effect, usually in tones, each with a dominant frequency (plus timbre). This in itself is aesthetic. Tones can be sequenced into melody, rhythm, and various kinds of repetition. Other tones join to make harmony and counterpoint. In complex music, composers transform the melodies by compositional techniques such as inversion (turning upside-down), retrogression (turning backwards), transposition to other keys, canon, stretto (rapidly-layered canon), augmentation (lengthening each note proportionally), etc.

Thus, when we make sense of music, we learn which pattern may apply to other non-representational patterns (e.g., emotions). These patterns may be useful for re-interpreting or reinforcing emotional links to other neural areas. This kind of recursive, cross-modal facility may explain not only how music connects with emotions but how it might enhance other mental functions. [24] It may even explain how Beethoven could write his late quartets when he was deaf, conduct performances guided only by watching the movements of the bows, and inspire one critic to prefer the written score of *Die Grosse Fuge* to its live performance. [25]

In sum, I propose that music provokes abstract ways of ordering, of extracting sense (particularly emotional sense) from chaos. It rewards this sense-making with pleasure, stabilizing circuits, and some of that transformational circuitry will then be useful in making sense of non-musical experience.

Here is a specific example. Beethoven's late quartets, written when he was deaf, are often extremely dissonant. Elaine Pagels, author of *The Gnostic Gospels*, relates that she "...spent about two years listening to them obsessively after the death of my husband. I couldn't listen to anything else, because Bach was too harmonious. What they did is what George Fox, who founded the Quaker movement, says that the holy spirit does. They spoke to my condition." [26]

This "speaking" uses music's capacity to provoke the making of emotional sense in individuals. Such responses are not necessarily universal. Ornette Coleman has said that his highly idiosyncratic and dissonant music must make sense because he can hear when he makes mistakes, yet not all listeners like his music. As an Arabic saying goes, on the taste of coriander, no two agree.

11. Universality and Idiosyncrasy

Our model predicts this idiosyncrasy: different life experiences will generate polymorphic neural circuitry. Yet Kant held that aesthetics, while subjective and intuitive, had universality, and this is often observed. (To Kant, intuition is innate, while in our model it is learned. But in both cases it refers to a kind of judgment whose opposite is deliberation. [27]) Taste varies yet beauty can be shared. If not, making art would be pointless. Can universality and idiosyncrasy be reconciled?

One hypothesis is that it takes experience to appreciate some works of art or nature. Stendhal wrote *The Red and the Black* for "the happy few," knowing it would take decades to be accepted. Van Gogh was unsuccessful in his lifetime. Beckett's *Waiting for Godot* was initially panned. When Ornette Coleman started his

career, nightclub clients used to physically eject him, along with his brass saxophone, breaking it. He finally bought an unbreakable fiberglass instrument.

In corroboration of this hypothesis, in art, ontogeny can recapitulate phylogeny. One does not start a child's musical education with Beethoven's *Die Grosse Fuge*. A wiser plan might go: Gregorian chant, Renaissance polyphony, Bach, Mozart, Beethoven's early, middle, and late quartets, and finally *Die Grosse Fuge*. Thus broader, deeper exposure to art might increase the incidence of universality.

By contrast, many children and naive viewers appreciate Kwoma, Inuit, and Dogon masks, and sculpture by Rodin and Henry Moore. Many naive listeners like complex East Indian ragas. We can argue over whether children understand Moore's worldly references or whether naive listeners can distinguish morning from evening ragas, but is that cultural knowledge essential for appreciating some universal qualities of art?

We have already explained idiosyncrasy: differences in life experience generate polymorphic neural circuits. Then how do we account for universality? It likely arises from convergent evolution, the process which generated the striking similarities of human eyes to octopus eyes, despite five hundred million years of divergence. Our model posits somatic (rather than phylogenetic) evolution, but convergence still applies. Since the selective pressures on individual perceptual abilities have strong commonalities, we expect that different circuits can yield similar outcomes.

Since judging and creating share circuits (artists judge work as they make it), this universality suggests that art might be made by formula. As noted in Section 6, I reject this. Contrived formulae, like those for Harlequin romances, yield shallow art. Can our model generate better formulae to simulate aesthetic intuition and make art? Could such art help us recognize the unforeseen?

Aesthetic intuition is a product of the integrated brain, distributed across many parallel circuits. It is not analyzable in the way one analyzes an automobile, whose few components yield easily predictable outcomes. The brain employs trillions of small, polymorphic components, and its complexity is enhanced by recursive circuitry, capable of self-organization. Thus, we can treat aesthetic intuition as an emergent property of a complex system that can learn to interpret the unforeseen but cannot be reduced to a simple formula. We can surmise its origins and describe its general features, but we cannot predict its specific outcomes from first principles.

12. Aircraft Simulators, Catharsis, and Cargo Cults

If intuition is the central faculty for judging beauty and making art, its opposite, contrivance, is responsible for much shallow art and for some art that is not even meant to affect audiences. We do not, of course, preclude using standard forms like the sonnet, the fugue, or the Greek tragedy. These are not prescriptive or mechanical; they require intuition for proper use.

Consider drama. For Aristotle the function of tragedy was catharsis: purging viewers' minds with terror and pity.^[28] This "aircraft-simulator" model offers risk-free, imagined disaster but does not actually simulate reality. It condenses, abstracts, and

transforms it. It seeks primarily not to teach modes of behavior (though it may do that) but to teach more general ways of abstracting and transforming sorrow. So rather than simply judging how a play contrives to follow the rules (e.g. unity, melody, meter, tragic flaws, etc.), we should first judge how it fulfills its function.

Shakespeare uses different methods. He is interested less in pity and terror and more in complexity of character and how truth hides below the surface. He employs few fixed rules. His tragedies tend to follow Aristotle, and his character revelations often emerge in wilderness, e.g. in *The Tempest*, *Midsummer Night's Dream*, *King Lear*, *Macbeth*. But *Hamlet* is not very Aristotelian in structure and it does not employ wilderness. Its truth is buried but compelling, so we try to understand the Prince's deep struggle with truth, illusion, and his own existence. In the process, we find ways of digging at truth, illusion, and identity.

Now consider contrivance. In World War II, the Allies built air bases in the South Pacific to fly in cargo for the war, and employed many islanders. Some thought they were gods from the sky. After the war, the Allies went home. Some islanders formed "cargo cults" to lure the cargo back. They constructed mock landing strips to attract aircraft. Some were convincing reproductions, and a few pilots, low on fuel, attempted emergency landings. The mock runways were not suitable for real aircraft, and some pilots crashed, spilling their cargo.

Some art is made with art history or ideology in mind. From theory, artists predict the next stage of art and then contrive ways to satisfy those theoretical needs. If aesthetic intuition then prevails, all may be well. But if the contrivance takes precedence, as so often happens, and the artist tries only to satisfy theory, then the art becomes a kind of cargo cult, and the audience is cheated.

In a related vein, Landolfi tells of a poet who diligently learns Persian from an old, multilingual sea captain.^[29] Then he writes his life's work: three brilliant poems in his beloved, new language. He soon discovers this language is not Persian, but the captain's own twisted, idiomatic, private language, invented in long, feverish sea voyages. And during the years of writing, even the captain has forgotten it. Landolfi's gedanken-experiment parodies hermetic, "audience-less" art.

13. Some Useful Methods

As noted, our caution against formulae does not preclude flexible standard forms (the sonnet, the fugue) or basic methods (rhythm, meter, canon). These help create unity and pattern. But beyond that, some basic methods are more than just formal devices; they aid the creative process. Regarding the sonnet, writer John Gray recalls Freud's idea (borrowed from Schiller) that creativity requires relaxing inhibitions.^[30] All visions must pass a guard at the gate to the mind before you can see them. The guard blocks what is foolish. Artists learn to distract the guard, sift through their visions, and select what is useful. The form of the sonnet, Gray suggests, slips contraband words past the guard. They pass (temporarily) because they rhyme and fit the meter.

Similar ways of opening the creative imagination include Joseph Chaikin's "transformation" exercise, Braque's and Picasso's

methods of collage, and the dreams of the Surrealists. Dreams are of particular interest, as they may be enriched for precisely those “inappropriate” associations normally blocked by the guard at the gate.^[31] All these methods introduce unedited randomness, so they tend to work best when followed by selection that is guided by aesthetic intuition. Neglect or failure of the selection process may lead to useless noise.

14. Interaction with the Physical Medium

The artists’ intent does not pass to audiences directly but through physical media. These media can play a key creative role. Rembrandt and Hals, for example, show the paint’s texture, forming a second expressive level to the image. Crosstalk between levels is part of the sense they make. Working closely with the physical media is also a way to play with random variation. Jackson Pollock certainly had rich conversations with the partly-random physical paint.

Some of the most intense play between artists and physical media occurs in East Asian pottery and ceramics, epitomized by Tang dynasty glazed figures, Song dynasty Jun and Ru ware, and Koetsu’s seventeenth century Raku. The underlying chemical and physical processes are very complex. There is much random chance in the production process and the work seems accidental, yet at the same time it renders a striking illusion of purpose, as if the glaze had a will. This illusion recalls Kant’s account of nature’s beauty, only here there are two illusions: the illusion of purpose regarding nature, and the illusion of pure accident regarding the artist, who actually has a lot of control over this partly random process through intuitive mastery.

This tension between accident and design sits at the heart of aesthetics, uniting the responses to art and nature, even in art which is completely controlled by the artist (since the audience still has to make a bridge between chaos and order). We see this at its purest, perhaps, in the simple act of bringing bits of nature indoors for aesthetic ends. Chinese scholars practiced this alternative to mimesis, collecting natural Lingbi and Taihu rocks for their elegant, accidental forms. When contemplated by the collector, such a rock is nature; when deliberately shown to a guest, it is art. Some photography likewise “collects” accidental natural forms. Below are two photographs of littoral sand formations showing biomorphic resonance in the traces left by the outgoing tide.

Resonant forms in nature: traces of the outgoing tide in the sand, photographed by Daniel Conrad



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15. Evolutionary Advantages of the Aesthetic Response

Our model's few precepts may explain the original function of the aesthetic response to art and nature, but other uses of art have

emerged. Ellen Dissanayake makes a well-supported argument that art serves the key social role of “making special,” of investing certain phenomena with special significance.[\[32\]](#) Daniel Levitin’s insightful analysis of music[\[33\]](#) reviews its possible evolutionary origins, including its important role (along with dance) in mate selection, one of Darwin’s suggestions.[\[34\]](#) These key functions of art are consistent with our model, which predicts that such uses would arise by bricolage.

Other models propose that some patterns are hard-wired for recognition. This seems an inefficient use of genes, but there is precedent. Some birds show innate fear of the shadows of specific predators.[\[35\]](#) While such models possess less plasticity, they do not contradict our model. In fact, if some patterns were hard-wired, it would help the early perceptual system judge when useful patterns were being recognized, speeding the system’s maturation. Denis Dutton argues cogently for a version of this model in which landscape features of desirable habitats were hard-wired into our perceptual faculties in the Pleistocene epoch.[\[36\]](#)

All these models (including ours) imply we may find hints of the aesthetic in other animals. Such hints include chimpanzees who admire sunsets[\[37\]](#) and elephants who paint.[\[38\]](#) Willem de Kooning admired some of the elephant drawings. When told where they came from, he remarked, “That’s a damn talented elephant!”

One virtue of evolutionary models is that they let us evaluate art by its function. In our model, we ask if the art evokes disinterested aesthetic pleasure (excluding work based on desire, such as wish-fulfillment fantasies, pornography, or fast food ads), and if it enhances the way we perceive and interpret. Ratings, box office numbers, and focus groups are useless here. Also, personal judgment is different from judging for exhibition to a large audience over time. Education, experience, and broad exposure to art are vital; so again, ratings do not help. Artist-run juries are useful, but juries should judge whether the work can enhance the way we perceive, rather than using formulaic or hedonistic criteria.

We also must be careful how we interpret the above word “enhance.” D.W. Griffith’s racist film, *The Birth of a Nation*, while innovative, had so hateful and shallow a world-view that it led to a resurgence of the Ku Klux Klan and a multitude of lynchings and murders. Instead of giving audiences deeper, more agile modes of perception, this film made them stupider and nastier. Restrictive prejudices (sexism, racism, homophobia, anti-semitism) are not enhancements. In like manner, TV commercials, though they may engage aesthetic sensibilities, usually work poorly as art. Instead of enhancing our modes of perception, they seek to impoverish perceptual faculties, focusing them on body odor or limp hair.

Good art enriches our perceptive repertoire. Beyond seeing bears through the fog, it can reveal a culture alienated from nature. John Berger relates an experience of metaphysical exhaustion he had in Amsterdam.[\[39\]](#) He had lost the power to name, form associations, or see meaning. In despair, he entered the van Gogh museum and encountered the paintings. In a surge of psychological transformation, the paintings restored his mind. By strange coincidence, Hugo von Hofmannsthal wrote of an almost identical experience in 1907 with some of the same paintings.[\[40\]](#)

Given the effects of art on individuals, how does art affect the broader culture? We would expect cultures that suppress art (North

Korea, the Khmer Rouge, the Taliban) to grow narrow-minded and atrophy, whereas cultures that actively support the arts may develop more adaptable minds and thus have better chances of surviving unforeseen technological, ecological, and social changes. In this context, the art of our time could serve a survival function. How well our do our dominant systems of producing art, which give rise to so much formulaic commercial entertainment, serve that function?[41]

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