Kant, Romanticism, and Beauty in Science and Mathematics

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Kant, Romanticism, and Beauty in Science and Mathematics

I. Kant’s Account of Beauty

1. Judgments of Taste, the Agreeable, and the Good

At the beginning of the Analytic of the Beautiful, Kant distinguishes aesthetic judgments from cognitive judgments.\(^1\) Cognitive judgments, like, “this flower is yellow” attribute properties to objects by classifying things under concepts of the understanding. Aesthetic judgments, by contrast, do not relate objects to concepts of the understanding, but are rather grounded in our feelings of pleasure and displeasure. Kant describes the difference between cognitive and aesthetic judgments by claiming that the determining ground for the former is objective while the ground for the latter is subjective; cognitive judgments are based on properties of objects, while aesthetic judgments are based on feelings in the subject.\(^2\)

Judgments of taste, which we will be focusing on, are one kind of aesthetic judgment in which we judge things to be beautiful or not beautiful.\(^3\) However, to fully understand judgments of taste, it helps to compare them to other kinds of judgments. Kant immediately distinguishes judgments of taste from another kind of aesthetic judgment, judgments of the agreeable.\(^4\) As an aesthetic judgment, judgments of the agreeable are based on feelings of pleasure and displeasure in the subject rather than properties in the object. In making a judgment of the agreeable, we say that we enjoy something, as when I say, “I like chocolate.”\(^5\) However, judgments of the agreeable are distinct from judgments of taste in two ways. First, judgments of the agreeable are interested. Kant describes this “interest” in the agreeable as a satisfaction we take in the representation of the existence of the agreeable object, as when I take satisfaction in the taste of chocolate in my mouth.\(^6\) This satisfaction is connected to my desire for the object, so we say that judgments of the agreeable gratify us rather than merely pleasing us.\(^7\) Second, in making a judgment of the agreeable I do not claim that others ought to make the same judgment. For instance, when I say, “I like chocolate,” and my friend says, “I do not like chocolate,” I do not feel that he must be wrong and I do not try to convince him that he does in fact like chocolate. Judgments of the agreeable make no claim to universality.

Kant also distinguishes judgments of taste from judgments of the good, which also judge objects that please us.\(^9\) Like judgments of the agreeable but unlike judgments of beauty, I take an interest in objects I judge to be good – I am satisfied when I represent the existence of what is good because I have a rational desire for the good, and the good object can be said to gratify me rather than merely pleasing me. However, judgments of the agreeable are distinct from judgments of the good, which is why I may judge the chocolate in my mouth agreeable but not good as when I realize that eating it will give me a stomach ache.\(^10\) Unlike both judgments of the agreeable and judgments of taste, which are aesthetic judgments, judgments of the good are cognitive judgments. While I do take pleasure in the good, this feeling of pleasure is not the

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\(^2\) Ibid.

\(^3\) Ibid.

\(^4\) Ibid., 5: 205, pg. 91.

\(^5\) Ibid., 5: 206, pg. 91–2.

\(^6\) Ibid., 5:204, pg. 90.

\(^7\) Ibid., 5: 207, pg. 92.

\(^8\) Ibid., 5: 212, pg. 97.

\(^9\) Ibid., 5: 207, pg. 92–3.

\(^10\) Ibid., 5: 208, pg. 93.
ground of my judgment. I may judge something to be good because it is a means to some end, as
when I judge something to be useful for a task, or I may judge something to be good because it is
itself an end, as when I judge my goal to be good. In both cases, my judgment is grounded in
the concept of some end, and this grounding in a concept of the understanding makes judgments
of the good cognitive rather than aesthetic.

The difference is most clear when we consider how we would defend our judgments of
the good. When I say, “It is good to read Kant,” I can give a determinate answer to the question,
“Why?” – I can say, for instance, “We can learn a lot from Kant,” giving a justification in terms
of the end, learning. By contrast, when someone asks me, “Why do you like chocolate?” I might
be tempted to respond, “I don’t know – I just do!” Because judgments of the good are cognitive
judgments, I can appeal to some concept to ground my judgment, like the concept of an end. In
the case of aesthetic judgments, however, my judgment is grounded in a feeling of pleasure, and
I cannot appeal to some deeper conceptual reason for my judgment.

Whether I judge something to be good in itself or means to something good in itself,
judgments of the good implicitly claim that others ought to agree. In this way, judgments of
the good demand universal agreement, and we feel compelled to argue with those who disagree
with our judgments of goodness. This marks a contrast with judgments of the agreeable, which
do not demand universality and are not worth arguing over. However, Kant will suggest that
judgments of taste, like judgments of goodness do lay claim to universality. We can thus
distinguish judgments of the agreeable, judgments of the beautiful, and judgments of the good as
follows:

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<th>Universal?</th>
<th>Cognitive?</th>
<th>Interested?</th>
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<td>Beautiful</td>
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This distinction between judgments of the agreeable and judgments of the good is important for
understanding Kant’s most significant innovation in theorizing judgments of taste. Kant
distinguishes his view from empiricism of taste and rationalism of taste, which were held in his
own time. As he understands these views, empiricism of taste conflates judgments of taste
with judgments of the agreeable, while rationalism of taste conflates judgments of taste with
judgments of the good. Against the empiricists of taste, Kant agrees with the rationalists that
judgments of taste are universal. However, Kant sides with the empiricists against the
rationalists of taste in claiming that judgments of taste are aesthetic rather than cognitive,
ultimately grounded in our subjective feeling of pleasure.

2. Beauty and Disinterested Contemplation

Kant’s theory of beauty is original insofar as judgments of beauty are both subjective
(i.e., non-cognitive) and lay claim to universality. As an aesthetic judgment, judgments of
beauty are not grounded in concepts applied to the object judged beautiful, but in a feeling in the
subject. In this regard, they are non-cognitive, or as Kant sometimes says, subjective. But
Kant goes on to claim that they differ from judgments of the agreeable in a way other than their
universality. While the satisfaction we get from agreeable objects is interested, the pleasure we

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11 Ibid., 5: 207, pg. 92–3; 5: 209, pg. 94.
12 Ibid., 5: 207, pg. 92–3.
13 Ibid., 5: 213, pg. 98.
14 Ibid., 5: 346, pg. 221.
15 Ibid., 5: 203, pg. 89.
derive from beautiful objects is disinterested. In other words, when I make a judgment of beauty, I make no claim about the desirability of what I judge – the object need not be gratifying. As an example, Kant suggests that he may judge a palace beautiful, though he does not care for the extravagance of it which “is made merely to be gaped at,” and if he were “on an uninhabited island… and could conjure up such a magnificent structure through… mere wish, [he] would not even take the trouble of doing so if [he] already had a hut that was comfortable enough for [him.]”\textsuperscript{16}

The point is not that we should not desire the existence of a beautiful object; in many cases, we do desire the existence of beautiful objects in nature and art. Rather, the point is that whatever pleasure we get from the existence of a beautiful object is entirely independent of the pleasure we get from its beauty. This is to be contrasted with judgments of the good and judgments of the agreeable. I take pleasure in the good because I rationally desire the attainment of my end; my pleasure is bound up with my rational desire to bring into existence the state of affairs in which my end is realized. Similarly, what is agreeable is pleasurable insofar as it satisfies my immediate, sensible desires, the desires Kant claims animals have.\textsuperscript{17} I may imagine the taste of chocolate when I do not have any in the apartment. When I do, I remain ungratified and do not experience the kind of pleasure that grounds judgments of the agreeable. In fact, the more clearly I imagine the taste of chocolate, the more tormented I am by the fact that I do not have it!

The interested pleasure involved in judgments of the agreeable fosters an acquisitive attitude towards what is found agreeable. This acquisitive attitude is entirely out of place in judgments of beauty; whatever pleasure we may take in acquiring the Venus de Milo is completely independent of the pleasure we derive from contemplating its beauty. Insofar as we take a disinterested pleasure in the Venus de Milo, the kind of pleasure that grounds a judgment of beauty, it does not matter if the image we are contemplating is real or imaginary. Kant describes this by saying, “the judgment of taste is merely contemplative,” as we take pleasure in the object independently of its existence.\textsuperscript{18} When it comes to disinterested pleasure, the mere contemplation of the object in imagination should give us just as much pleasure as an equally vivid experience of the real thing; the same does not hold for the interested pleasure we take in chocolate.

3. Beauty and the Demand for Universality

Kant suggests that the disinterestedness of judgments of beauty is deeply connected to their universality. As he writes, when a person reflects on his experience of disinterested pleasure,

“he cannot discover as grounds of the satisfaction any private conditions, pertaining to his subject alone, and must therefore regard it as grounded in those that he can also presuppose in everyone else; consequently he must believe himself to have grounds for expecting a similar pleasure of everyone.”\textsuperscript{19}

In other words, because we cannot find any ground for our pleasure in the beautiful that is unique to us, our reflection on the pleasure leads us to expect that all other subjects should experience the same pleasure in our circumstance. As Kant puts it, we see this pleasure as arising from a “common sense” we all share, where “common sense” is not understood in the ordinary sense

\textsuperscript{16} Ibid., 5: 204–5, pg. 90.
\textsuperscript{17} Ibid., 5: 210, pg. 95.
\textsuperscript{18} Ibid., 5: 209, pg. 95.
\textsuperscript{19} Ibid., 5: 211, pg. 97.
but rather as a shared propensity for feelings of disinterested pleasure.\(^{20}\) This is the ground of our expectation that others ought to agree with our judgments of pleasure. While judgments of the agreeable are also grounded in pleasure, reflection on that pleasure reveals grounds for the satisfaction that we cannot expect others to share, such as a tremendous craving for chocolate. Judgments of the agreeable, unlike judgments of the beautiful, are bound up with our particular, what Kant calls “heteronomous,” desires, which is why our pleasure in the agreeable is interested rather than disinterested. Disinterested pleasure, stripped of grounding in these particular desires, is properly autonomous, and this is the ground for their universality.

We should clarify Kant’s claim that our judgments of beauty claim universality by distinguishing it from the claim that others will, as a matter of fact, agree with our judgments of beauty.\(^{21}\) When we make a judgment of beauty, we do not make some sort of empirical prediction about the aesthetic sensibilities of the majority of people. Disagreement, even strenuous disagreement from the majority of people, does not give us reason to abandon our judgments of beauty. As Kant puts the point, “a young poet does not let himself be dissuaded from his conviction that his poem is beautiful by the judgment of the public nor that of his friends” because, “Taste makes claim merely to autonomy. To make the judgments of others into the determining ground of one’s own would be heteronomy.”\(^{22}\) The universality of judgments of beauty is not a prediction, but a demand.\(^{23}\) When the young poet claims his poem is beautiful, he does not claim that most people will agree with his judgment, but rather that most people ought to. He feels that others ought to agree because he sees no heteronomous desires grounding his feeling of pleasure, and thus takes his pleasure to be grounded in universal features of his subjectivity that all others share. The poet makes the judgment of beauty as an autonomous universal subject, and this would not be the case if his judgment of beauty was grounded in a “desire for approval” from the crowd – such a desire would be heteronomous, not autonomous. Elsewhere, Kant puts this point by claiming that when “one… calls the object beautiful, one believes oneself to have a universal voice.”\(^{24}\) Thus, when a person makes a true judgment of beauty, she demands universality even if most people disagree with her. For Kant, then, there is a space between what is objective and what is relative to the particular subject; judgments of beauty occupy the domain of “subjective universality,” where we demand intersubjective agreement on something that is not objective.\(^{25}\)

This is an easy point to miss, as Kant points out. Because we take judgments of beauty to have universality like judgments of the good, Kant claims that we:

“speak of the beautiful as if beauty were a property of the object and the judgment… constitut[es] a cognition of the object through concepts of it… although it is only aesthetic… because…its validity for everyone can be presupposed.”\(^{26}\)

While judgments of beauty are aesthetic rather than cognitive, they are more like cognitive judgments than judgments of the agreeable insofar as we presuppose their universality. As a result of this similarity, we are tempted to treat judgments of beauty as cognitive judgments and treat beauty as a property of the object judged beautiful that grounds our judgment. To see this, we can note that we ordinarily think that the judgment,

\(^{20}\) Ibid., 5: 238, pg. 122.

\(^{21}\) Ibid., 5: 236–7, pg. 121.

\(^{22}\) Ibid., 5: 282, pg. 163.

\(^{23}\) Ibid., 5: 239, pg. 123.

\(^{24}\) Ibid., 5: 216, pg. 101.

\(^{25}\) Ibid., 5: 212, pg. 97.

\(^{26}\) Ibid., 5: 211, pg. 97.
(1) “This flower is beautiful,”
is the same kind as the judgment,
(2) “This flower is yellow,”
and that both are very different from the judgment,
(3) “I like the smell of this flower.”

But for Kant, judgments (1) and (3) are both aesthetic judgments (one of beauty and the other of
the agreeable), while only (2) is a cognitive judgment. However, because we demand
intersubjective agreement on our (subjective aesthetic) judgment that, “this flower is beautiful,”
just as we demand intersubjective agreement on our objective cognitive judgment that, “this
flower is yellow,” we tend to conflate judgments of beauty with cognitive judgments and treat
beauty as a property of objects like yellow.

4. Beauty and the Lack of a Principle of Taste

But what is wrong with treating beauty as a property of the flower like yellow when we
demand universal agreement on both the flower’s yellowness and its beauty? Kant considers this
worry when he writes,

“Now what should one infer from this [demand for universal assent] except that the
beauty must be held to be a property of the flower itself…? And yet this is not how it
is.”

While we may be tempted to claim that the feeling of pleasure that we take as universally valid is
grounded in an objective property of the flower, beauty, Kant suggests that, “this universality
cannot originate from concepts. For there is no transition from concepts to the feeling of
[disinterested] pleasure or displeasure.”

Kant clarifies what he means when he claims it is
“absolutely impossible” for us to find “a principle of taste,” understood as “a fundamental
proposition under the condition of which one could subsume the concept of an object and then by
means of an inference conclude that it is beautiful.” In other words, there is no list of
properties an object could have that would be sufficient to establish its beauty; two people could
agree on all the empirical properties of a flower and this would not settle the question of its
beauty one way or another. The concept of beauty is not analyzable in terms of simpler
concepts, even traditionally appealed to aesthetic concepts like symmetry, unity, and simplicity.
This is not to say that we do not use these aesthetic concepts as guidelines in certain styles of art;
surely, we do. Even then, however, the finished product is not judged beautiful because it
exhibits a certain set of those properties. Rather, we created the object with those properties
because we have taken disinterested pleasure in such objects in the past. Judgments of beauty
involve an essential reference to feeling, and thus take place on a wholly different level than that
which empirical science describes. As Kant puts it, “there is no science of the beautiful.”

Kant gives a reason for this view when he says, “I must be sensitive to the pleasure
immediately in the representation of it, and I cannot be talked into it by means of any proofs,”
because, “one wants to submit the object to his own eyes.” We can perhaps understand Kant’s
claim best with a thought experiment. Suppose I have never been to Versailles and never seen a
picture of it, and I receive a letter from my friend who is visiting it. My friend writes that

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27 Ibid., 5:281–2, pg. 162.
28 Ibid., 5: 282, pg. 162
29 Ibid., 5: 211, pg. 97.
30 Ibid., 5: 285, pg. 166.
31 Ibid., 5: 354, pg. 228.
32 Ibid., 5: 285, pg. 166.
33 Ibid., 5: 216, pg. 101.
Versailles is beautiful, and proceeds to describe everything she saw accurately in extensive detail. Kant suggests that no matter how much detail my friend includes, I will not be in a position to make a judgment of beauty concerning Versailles. I will, of course, be able to make a number of other related judgments – depending on what information she includes, I may be able to judge that my friend judges Versailles beautiful, that my friend thinks I ought to judge it beautiful if I ever see it, that most people judge Versailles beautiful, and that (given my friend’s good taste) I am likely to find Versailles beautiful. But all of these are cognitive judgments, and they do not get me all the way to a proper aesthetic judgment of taste. For me to judge Versailles beautiful, I must see Versailles myself, and take disinterested pleasure in it first-hand. This makes judgments of beauty unlike any cognitive judgments, which I can make on the basis of accurate third-person descriptions. It also makes beauty a different kind of property than ordinary empirical properties, as it is disconnected from other properties that can be included in objective descriptions of an object. On this basis, Kant can claim that the judgment, “the flower is beautiful” really is of a different kind than the judgment, “the flower is yellow.”

5. Beauty and Conceptual Thought

Since judgments of beauty are aesthetic rather than cognitive, they are grounded in a subjective feeling of pleasure rather than a concept under which the object judged beautiful falls. Kant describes this by saying, “That is beautiful which pleases universally without a concept.” We should not read this claim in a radical way, where the feeling of pleasure requires us to bracket all conceptual thought; Kant gives examples of us judging flowers, hummingbirds, and fantasies to be beautiful, which requires us to have enough conceptual thought in conjunction with our feeling of pleasure to connect this feeling of pleasure to these determinate objects. Presumably, then, Kant is not suggesting that when I feel disinterested pleasure while looking at a painting, I bracket all my beliefs about what is depicted in the painting so I truly feel this pleasure “without a concept.” Rather, there are two ways in which concepts cannot play a role in our judgments of beauty. First, concepts cannot be the evidential grounds for our judgments of beauty – as we already saw, there are no principles of taste we can use to prove an object is beautiful, and the ground for our judgment of beauty is always a feeling of disinterested pleasure. But second, falling under a concept cannot be the cause of our feeling of pleasure, because this would conflate judgments of beauty with judgments of the good. Judgments of goodness are the judgments grounded in a pleasure caused by an object falling under a certain category; we take pleasure in the object’s falling under these categories because this helps us achieve some end or realizes that end. All of this, however, is compatible with conceptual thought accompanying our feeling of pleasure, and we may even think this is essential if we are ever to make a judgment of beauty about some object on the basis of this feeling of pleasure.

6. Beauty, Free Play, and Purposiveness

Given all of the preceding, there are still big questions needs to address. First, given Kant’s view that disinterested pleasure is not caused the fact that the object judged beautiful falls under certain concepts, what is it caused by? Second, if this feeling of pleasure is supposed to be the ground of judgments of beauty, how do we distinguish it from the pleasure we derive from an object’s agreeableness? In a difficult passage, Kant suggests that the disinterested pleasure is

34 Ibid., 5: 229, pg. 114.
caused by a universally communicable mental state. This distinguishes disinterested pleasure from the pleasure we get from the agreeable since that is based on our particular sensory modalities and thus cannot be communicated to those who lack them – the agreeableness of chocolate cannot be communicated to one who lacks taste buds. Kant calls the universally communicable mental state grounding judgments of beauty, “the harmony of the faculties of cognition” in “free play,” and suggests it is “the ground of this [disinterested] pleasure.” We will attempt to parse what he means by this.

The free play of the faculties of cognition concerns the relationship between the imagination and the understanding. As Kant writes,

“Now there belongs to a representation by which an object is given, in order for there to be cognition of it in general, imagination for the composition of the manifold of intuition and understanding for the unity of the concept that unifies the representations.”

While the imagination is the faculty that traffics in sensible intuitions and represents particulars, the understanding traffics in abstract concepts and represents universals. By conceptualizing the world we perceive, the understanding imposes a unity on it. However, Kant sees the relationship between the imagination and the understanding as problematic. In a lecture from the same time period as the third Critique (the early 1790s), Kant anthropomorphizes the faculties, claiming:

“Imagination and understanding are two friends who cannot do without one another but cannot stand one another either, for one always harms the other. The more universal the understanding is in its rules, the more perfect it is, but if it wants to consider things in concreto then [it] absolutely cannot do without the imagination.”

In their normal functioning, the imagination and the understanding work in conflict with one another, the former representing the concrete and the latter abstracting away from it. The harmony of the two faculties in free play is presumably meant to overcome the harm the faculties normally inflict on one another.

While much of what Kant says about the harmonious free play of the imagination and the understanding remains obscure, perhaps Kant’s clearest summary is:

“Now since no concept of the object is here the ground of the judgment, [the subjective condition of all judgments] can consist only in the subsumption of the imagination itself… under the condition that the understanding in general advance from intuitions to concepts… taste, as a subjective power of judgment, contains a principle of subsumption, not of intuition under concepts, but of the faculty of intuitions or presentations (i.e., of the imagination) under the faculty of concepts (i.e., the understanding), insofar as the former in its freedom is in harmony with the latter in its lawfulness.”

This image of the imagination free from any determinate concept harmonizing with the lawful understanding that conceptualizes the manifold of sensible intuition is the primary picture we get of the harmony of the faculties. While the understanding is rule-governed in its concept application, the imagination is rule-governed insofar as it is subsumed under the understanding, even though it is not subject to any particular rule in harmonious free play. Elsewhere, Kant describes this as “lawfulness without law” insofar as the understanding is lawful but does not

37 Kant, 5:217, pg. 102.
38 Ibid., 5:218, pg. 103.
39 Ibid., 5:217, pg. 102.
41 Kant, 5: 287, pg. 167.
issue a determinate cognition. Allison gives the harmonious free play at least a plausible reading when he writes,

“presumably... the imagination in its free play stimulates the understanding by occasioning it to entertain fresh conceptual possibilities, while, conversely, the imagination, under the general direction of the understanding, strives to conceive new patterns of order.”

We can perhaps understand this if we take the lack of a determinate cognition structuring the imagination to be compatible with a multitude of indeterminate cognitions that the imagination can jump between. For instance, when we read a good metaphor in a poem, we do not feel restricted to a particular way of conceptualizing it, and can play with a number of different ways of conceptualizing it. Insofar as these are all structured by the understanding, this is lawful, but insofar as we are not confined to one interpretation, the understanding does not supply a law. This, we may think, leaves room for free play, and if the metaphor is beautiful, harmonious free play.

However we read the harmonious free play of the faculties, Kant suggests that it grounds the feeling of disinterested pleasure that in turn grounds our judgment of beauty. He further characterizes this disinterested pleasure by claiming it is identical to a “consciousness of the merely formal purposiveness... through which an object is given.” Kant explains, is a quality an object has when it appears to have a purpose. Insofar as we represent something as having a determinate purpose, we need to relate it to a concept of an end, as we do in a judgment of the good. Kant calls this “objective purposiveness.” But we can represent something as purposive, i.e., as if it had a purpose, without actually representing a determinate purpose for it. This, Kant claims, is how we represent an object we ultimately judge to be beautiful; we represent the very form of purposiveness without representing its actual purpose. Kant’s account of formal purposiveness sheds a bit more light on the harmonious free play of the faculties insofar as he describes representations of formal purposiveness as, “the agreement of the manifold with a unity (leaving undetermined what it is supposed to be).” Since Kant goes on to say that our representation of formal purposiveness “is the [disinterested] pleasure itself,” this agreement of the manifold of the imagination with some indeterminate conceptual unity must be the harmonious free play of the faculties that gives rise to our representation of formal purposiveness/disinterested pleasure.

7. Genius, Aesthetic Ideas, and the Creation of Beauty

In addition to explaining how judgments of beauty are possible, Kant tries to explain how beauty is brought into the world. He does this by developing an account of genius, which he defines as “the talent (natural gift) that gives the rule to art.” Kant tells us that, “beautiful arts

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42 Ibid., 5: 241, pg. 125.
44 Ibid., 5: 222, pg. 107.
46 Ibid., 5: 221, pg. 106.
48 Ibid., 5: 227, pg. 112.
49 Ibid.
50 Ibid., 5: 222, pg. 107.
51 Ibid., 5: 307, pg. 186.
must necessarily be considered as arts of geniuses."52 The basic idea is that the various arts presuppose rules that determine the trajectory of the field. However, given Kant’s arguments that there are no rules grounded in concepts that determine whether or not an object is beautiful, the rules that govern the field of the beautiful arts cannot be formulated conceptually. As a result, those creating beautiful arts cannot consciously think of the rules they are following, because they lack the concepts to express these rules. Thus, Kant suggests the rules governing the beautiful arts must be inborn predispositions of the artist that he can never be consciously aware of, and that artists in possession of these predispositions are geniuses.53

Kant tries to derive a number of consequences from this account. Since the genius does not follow determinate rules that can be formulated conceptually, the rules he follows cannot be taught or learned. Because the rules the genius follows could not have been learned from someone else, his work will be characterized by originality.54 Thus, all knowledge that could have been learned by imitation cannot be indicative of genius – it is essential that genius cannot be learned. However, the works of the genius are themselves esteemed as exemplars to be imitated, and in this way genius gives the rule to beautiful art.55 These rules remain unformulated, because they are not conceptual. Rather, there are certain patterns of imitation, where what is imitated is always a concrete, particular work of art, not just some set of concepts that work of art falls under. Further, because genius can emerge on the scene at any time and flood the world of beautiful art with new original contributions, the rules of beautiful art can go in unpredictable directions.

As Kant tries to develop the qualities of genius further, he introduces a notion of aesthetic ideas. Kant points to examples of aesthetic judgments where something is not beautiful but we cannot find anything specific to criticize, for instance, when a poem is “pretty and elegant,” or a “story accurate and well organized,” but not beautiful. In such cases, Kant points to our tendency to say the work of art is “without spirit,” and asks what we mean by this.56 He suggests that spirit is a principle of the mind that animates the harmonious free play of the faculties, so when this is lacking in an encounter with a work of art, we do not judge it beautiful.57 Further, he identifies spirit with a faculty in the mind that exhibits aesthetic ideas, which he defines as “that representation of the imagination that occasions much thinking though without it being possible for any determinate thought, i.e., concept, to be adequate to it, which, consequently, no language fully attains or can make intelligible."58

Kant compares these aesthetic ideas to the ideas of reason from the first Critique, like God, the soul, and the world as a totality, which he now calls “concept[s] to which no intuition… can be adequate.” In this way, there is a symmetry between ideas of reason, where the understanding has a concept that is “too big” for any intuition, and aesthetic ideas, where the imagination has an intuition that is “too big” for any concept. To further the parallel, like the ideas of reason, aesthetic ideas exhibit what lies beyond the bounds of experience, such as creation, eternity, and

52 Ibid.
53 Ibid.
54 Ibid., 5: 307–8, pg. 186.
55 Ibid., 5: 308, pg. 186; 5: 309, pg. 188.
56 Ibid., 5: 313, pg. 191–2.
57 Ibid., 5: 313, pg. 192.
58 Ibid., 5: 314, pg. 192.
These aesthetic ideas fill the imagination with images that stimulate the understanding into frantic thought, though the understanding can never pin the idea down. With this doctrine, Kant claims that the genius brings beauty into the world through the expression of aesthetic ideas, and thus requires an imagination that “is free to provide… unsought extensive undeveloped material for the understanding… which it applies… subjectively, for the animation of the cognitive powers.” Kant goes on to say that the genius is gifted with the ability “to express what is unnamable in the mental state in the case of a certain representation and to make it universally communicable.” Genius, then, spurs on the activity of the understanding and drives it towards the creation of new concepts through an imaginative act. When genius is clearly displayed in a work of art, Kant tells us, the imagination of the artist shines through it and we call the art inspired.

8. Kant on Beauty in Mathematics and Science

With Kant’s account of beauty now articulated, we can look at the way he handles beauty in mathematics and science. Surprisingly, he denies that there is beauty in either field. In the case of mathematics, Kant writes, “It is customary to call the properties of geometrical shapes as well as of numbers… beauty, on account of a certain a priori purposiveness, not expected from the simplicity of their construction, for all sorts of cognitive use, and to speak of this or that beautiful property of, e.g., a circle… But it is not an aesthetic judging by means of which we find it purposive, not a judging without a concept, which makes noticeable a merely subjective purposiveness in the free play of our cognitive faculties, but an intellectual judging in accordance with concepts, which gives us distinct cognition of an objective purposiveness, i.e., serviceability for all sorts of (infinitely manifold) purposes. One would have to call it a relative perfection rather than a beauty of the mathematical figure.”

Kant feels compelled to deny beauty in mathematics because on his account, beauty is supposed to please universally “without a concept.” Mathematics, by contrast, is entirely conceptual, and we take pleasure in certain conceptual relations that obtain between mathematical entities. Because of this, Kant claims, we can judge mathematics to be good but not beautiful; we make cognitive, not aesthetic, judgments about mathematics.

In the case of science, Kant again denies that there is any beauty. He writes that there is no “beautiful science, only beautiful art,” and oddly attributes the “rise [of] the customary expression ‘beautiful sciences’” to a “verbal confusion” resulting from the realization that advances in science spur on the creation of beautiful art. Kant says more about this when he writes about the lack of geniuses in the sciences, where he is explicit that, “By means of genius nature does not prescribe the rule to science but to… beautiful art.” Explaining this, Kant asks us to consider the case of Isaac Newton, writing: “Everything that Newton expounded in his immortal work on the principles of natural philosophy, no matter how great a mind it took to discover it, can still be learned; but one

59 Ibid.
60 Ibid., 5: 315, pg. 193.
62 Ibid. 5: 317, pg. 195.
64 Ibid., 5: 366, pg. 238.
65 Ibid., 5: 304, pg. 184.
66 Ibid., 5: 308, pg. 187.
cannot learn to write inspired poetry… The reason is that Newton could make all the steps that he had to take, from the first elements of geometry to his great and profound discoveries, entirely intuitive not only to himself but also to everyone else, and thus set them out for posterity quite determinatively… In the scientific sphere, therefore, the greatest discoverer differs only in degree from the most hard working imitator and apprentice, whereas he differs in kind from someone who is gifted by nature for beautiful art.”

In other words, Kant thinks that everything Newton did can be learned, while poetic genius cannot be learned. While genius does not act in accordance with conceptualizable rules, Kant suggests that Newton’s science proceeds exactly along those lines, which is why it can be taught.

Kant’s objections to beauty in science and mathematics have one thing in common: in both cases, what is to be judged beautiful is formulated in terms of abstract concepts, and Kant does not have an account of purely conceptual beauty. Indeed, if all instances of beauty are expressions of aesthetic ideas, beauty is essentially bound up with intuitions that exceed anything we can possibly conceptualize, thus spurring on the harmonious free play of the imagination and the understanding. However, it is not clear that Kant sees any role for the imagination in mathematics or science. Rather, it seems that Kant sees both disciplines as ultimately rule-based and formulating theories on a wholly conceptual level with the understanding.

II. The Romantic Response

In the following passage from 1807, just seventeen years after the publication of the third Critique, chemist and sometime-poet Sir Humphry Davy, eventual president of the Royal Society, writes what reads like a point-for-point challenge to Kant’s views on beauty in science without ever mentioning Kant by name.

“In the truths of the natural sciences there is, perhaps, a nearer analogy to the productions of the refined arts. The contemplation of the laws of the universe is connected with an immediate tranquil exaltation of mind, and pure mental enjoyment. The perception of truth is almost as simple a feeling as the perception of beauty; and the genius of Newton, of Shakespeare, of Michael Angelo, and of Handel, are not very remote in character from each other. Imagination, as well as the reason, is necessary to perfection in the philosophic mind. A rapidity of combination, a power of perceiving analogies, and of comparing them by facts, is the creative source of discovery. Discrimination and delicacy of sensation, so important in physical research, are other words for taste; and love of nature is the same passion, as the love of the magnificent, the sublime, and the beautiful.”

Against Kant, Davy suggests that the scientist perceives beauty in his grasp of the laws of nature. While Kant would suggest that science is a matter of following rules that does not require the creative power of the imagination, Davy claims the imagination is essential in science. And though Kant claims Newton was not a genius as geniuses are only in art, Davy insists that Newton was a genius in the same league as Shakespeare.

Davy is said to have had “some acquaintance with the doctrines of Kant,” and it would not be terribly wild to speculate that this could have been through the influence of his good

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67 Ibid., 5: 308–9, pg. 187–8.
friend, the famed romantic poet Samuel Taylor Coleridge. In his *Biographia Literaria* of 1817, Coleridge had written that, “The writings of the illustrious sage of Konigsberg… more than any other work, at once invigorated and disciplined my understanding… the clearness and evidence” of, among other works, *The Critique of Judgment*, “took possession of me as with a giant’s hand.” We can see the extent of the third Critique’s influence on Coleridge in a passage from “On the Principles of Sound Criticism”, where Coleridge lays out his theory of beauty:

“The sense of beauty subsists in simultaneous intuitive of the relation of parts, each to each, and of all to a whole: exciting an immediate and absolute complacency, without intervenence, therefore, of any interest, sensual or intellectual. The Beautiful is thus at once distinguished both from the agreeable, which is beneath it, and from the GOOD, which is above it.”

This appeal to the relation of the parts to the whole is a nod to Kant’s notion of purposiveness as it gets developed in the second half of the third Critique on teleological judgment. The reference to the disinterested nature of beauty as distinct from the merely sensual agreeable and the intellectual good is straight out of Kant’s triadic distinction at the beginning of the “Analytic of the Beautiful.” And yet, while Coleridge seems to adopt a Kantian view of beauty, he prefaces it in a very un-Kantian way. Immediately before the passage quoted above, Coleridge writes, “The safest definition, then, of Beauty, as well as the oldest, is that of Pythagoras: THE REDUCTION OF MANY TO ONE…” For Coleridge, the Kantian concept of beauty that Kant claimed was not found in mathematics was prefigured by one of the most famous mathematicians who ever lived.

Like Davy, Coleridge believes that there are geniuses in science, saying of the young Michael Faraday in 1833, “he seemed to have the true temperament of genius, and carrying-on of the spring and freshness of youthful, nay, boyish feelings, into the matured strength of manhood!” This should not be dismissed as a mere careless use of the word genius, since Coleridge’s point about carrying on the freshness of youth into the strength of manhood clearly echoes his own account of genius in his 1817 *Biographia Literaria*:

“To contemplate the Ancient of days and all his works with feelings as fresh, as if all had then sprang forth at the first creative fiat; characterizes the mind that feels the riddle of the world, and may help to unravel it. To carry on the feelings of childhood into the powers of manhood; to combine the child’s sense of wonder and novelty with the appearances, which every day for perhaps forty years had rendered familiar… this is the character and privilege of genius, and one of the marks which distinguish genius from talents. And therefore is it the prime merit of genius and its most unequivocal mode of manifestation, so to represent familiar objects as to awaken in the minds of others a kindred feeling concerning them and that freshness of sensation which is the constant accompaniment of mental, no less than of bodily, convalescence.”

While Coleridge’s account of genius is much more poetic than Kant’s, there are a number of notable similarities. The genius’s “contemplation of the Ancient of days” fits well with the

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71 26.
Kantian notion that the genius contemplates aesthetic ideas of what goes beyond the bounds of experience – presumably God can be a proper aesthetic idea for Kant. And since thought about what lies beyond the bounds of experience engenders antinomies for Kant, it would be fair to say that one who contemplates such thoughts “feels the riddle of the world.” In addition, this feeling for the freshness and novelty of the world coupled with the capacity to represent this to others is a proper characterization of the Kantian genius, whose artistic expression is radically original and cannot be anticipated by previous works. This ability of awakening a kindred feeling in the minds of others is like the Kantian doctrine of spirit, the faculty of the mind aroused by the genius that animates the harmonious free play of the faculties and gives us a feeling of a disinterested pleasure. Even the idea that we must distinguish genius from talent follows Kant, who claimed in 1785, “When I extract other rules from rules that are known, it is talent, but not genius.” But when Kant goes on to say, in the same passage, “Thus Newton was, it is true, a human being of great talent, but not of genius, as he himself said,” it is less clear Coleridge would agree – Coleridge does not claim that only artists can be geniuses in this passage, and if he did, it would pose a problem for his claim that Michael Faraday is a genius. While Coleridge agrees extensively with Kant’s account of genius, it seems he believes scientists exhibit the characteristics of genius and not just artists.

We can strengthen this interpretation by appealing to Coleridge’s 1818–1819 lectures on philosophy, where he writes: “there is through all nature and we must assume it as a ground of all reasoning a perpetual tendency at once to individualize and yet to universalize.” There are strong echoes in this passage of Kant’s claim that the imagination and understanding are like two friends that constantly harm one another, as the understanding universalizes what the imagination renders concrete. This tension between our representations of the universals and representations of particulars is, for Kant, relieved in the harmonious free play of the faculties of the understanding and imagination which grounds the disinterested pleasure on which we base our judgments of beauty. Coleridge, too, suggests a way of overcoming the conflict between individualization and universalization in his 1814 journal The Friend:

“It is Shakespeare’s peculiar excellence, that throughout the whole of his splendid picture gallery… we find individuality everywhere, mere portrait nowhere. In all his various characters, we still feel ourselves communing with the same human nature, which is everywhere present… We may define the excellence of [Shakespeare’s] method as consisting in that just proportion, that union and interpenetration of the universal and the particular, which must ever pervade all works of decided genius and true science.” What makes Shakespeare’s works of “decided genius” is their ability to communicate a feeling of universality as we “feel ourselves communing with the same human nature” despite the individuality of each of the characters. And this mere feeling of universality is perhaps best understood as the feeling of subjective purposiveness in Kant’s account of beauty, where we have a mere feeling of an indeterminate concept uniting the sensible manifold we encounter though there is no determinate concept at work. As Coleridge tells us, such a feeling of universality in particularity must pervade all “true science.” If the ability to cultivate this feeling

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75 Ibid., 25:1311, pg. 421.
is a sign of genius, then it seems Coleridge is committed to true scientists being geniuses, which
is perhaps why he called Michael Faraday one.

III. An Analysis

In the dispute between the romantics and Kant, there is a large amount of meta-level
agreement concerning the nature of beauty and genius. Both link genius to the imagination, and
the imaginative genius to the creation of beauty. Both connect genius to originality. Both see
experiences of beauty as involving a kind of disinterested pleasure. Both claim beauty somehow
makes us transcend the domain of experience. Both take beauty to somehow harmonize our
capacity for abstraction and our capacity for representing concrete particulars in representations
of unity. But despite all of this agreement, Kant and the romantics disagree on whether or not we
find these features in science and mathematics, with Kant denying beauty and genius in both
domains and the romantics affirming beauty and genius in both domains.

There are a few criticisms of Kant I think we can raise at this point. First, Kant suggests
that we cannot make judgments of beauty in mathematics because our judgments about
mathematical truths are not “without concept.” However, while there is some trivial sense in
which this is true, (i.e., mathematical truths are conceptual), Kant needs something stronger than
this trivial sense. Kant wants claim that we take pleasure in mathematics because we judge
mathematics to be good, which means he needs to show that the only pleasure we take in
mathematics is connected with the realization of some end. He suggests such an end when he
talks about its “serviceability for all sorts of (infinitely manifold) purposes.” Arguably,
however, this fails to capture why mathematicians take pleasure in their field of study. In his
1940 book on the aesthetics of mathematics A Mathematician’s Apology, famed English
mathematician G.H. Hardy emphasizes that mathematics is not directly useful in the same way
that, say, chemistry and physiology are. While mathematics may be useful in the long-run,
Hardy reminds us of “the fallacy of supposing that the men whose work most benefits humanity
are thinking much of that while they do it.” Even if mathematics is ultimately useful, that is
not why the mathematician takes pleasure in it. If Kant wants to show that we take only pleasure
in mathematics insofar as we relate it to an end, he will need to give another account that does
not rely on mathematics’ practical utility.

Hardy suggests that:
“The mathematician’s patterns, like the painter’s or the poet’s, must be beautiful; the
ideas, like the colours or the words, must fit together in a harmonious way. Beauty is the
first test: there is no place in the world for ugly mathematics.”

For Kant, judgments of beauty are characterized by being grounded in a feeling of disinterested
pleasure. But why can’t the mathematician take a disinterested pleasure in mathematical truths?
Must all pleasure in mathematics be interested? This point is perhaps debatable, but a
mathematician can arguably take pleasure in Goldbach’s conjecture that is independent of his
desire for its ultimate confirmation. Even if Goldbach’s conjecture turned out to be false, one
might take pleasure in the mere contemplation of the proposition, “Every even integer greater
than 2 can be expressed as the sum of two primes.” What reason could Kant have for denying
the possibility of such pleasure? I do not see any. And as long as a mathematician can take that

78 Kant, 5: 366, pg. 238.
79 Ibid., 5: 366, 238.
81 Ibid., 78.
82 Ibid., 85.
kind of pleasure in a mathematical truth, he can pass on a judgment of beauty on it, even if (as will usually be the case) he will also judge it to be good.

We will come back to some ways Kant can respond later; until then, we will look at Kant’s account of science. First, in response to Kant’s claim that there is no beautiful science, an argument parallel to the one above can be given. Even if scientific theories are conceptual, this does not mean that our pleasure in them is based on their relationship to a determinate end. The relevant question is whether or not one can take disinterested pleasure in a scientific theory. Again, it seems very plausible to suggest that one can. Suppose Scientist A has proposed a theory and has a vested interest in having it confirmed. Further, suppose Scientist B proposed a competing theory that if true would undermine A’s life work. Can A take pleasure in the contemplation of B’s theory after bracketing his desire that his own theory be confirmed? I suspect he can, and if so, this disinterested pleasure can be the ground for a judgment that B’s theory of beautiful.

Kant’s argument that Newton is not a genius, by contrast, hinges on his claim that science is merely a matter of following determinate rules that can be rigorously conceptualized and taught to others. But this claim seems almost certainly false. First, it is not at all clear that when scientists ask good questions, it is merely a matter of following rules. A similar argument could be given if Kant claimed (as he likely would) that mathematics is merely a matter of following rules. As Wigner writes,

“The great mathematician fully, almost ruthlessly, exploits the domain of permissible reasoning and skirts the impermissible. That his recklessness does not lead him into a morass of contradictions is a miracle in itself.”

Much of the most important work of the scientist and the mathematician involves asking the right questions, and this is not something that fits Kant’s model of these fields as entirely rule-governed. Second, Kant’s account seems to eliminate the possibility of anything resembling a paradigm shift, which seems to involve more than just following rules – a paradigm shift has the potential to change the rules themselves.

At this point, the romantics seem to have an upper hand in the debate. Against Kant, there is room for creativity in imagination in both mathematics and science, and it may even be necessary for making big breakthroughs in either field. There is room for genius in mathematics and science, and the people we are most likely to identify as geniuses are precisely the ones who alter the trajectory of the discipline in a profound way, the ones who do not simply follow the rules. In a way, then, it seems that one need not even challenge Kant’s account of beauty or genius to account for the beauty of mathematics and of science.

But this is perhaps speaking too fast. If the previous arguments are successful, we have reason to think that it is possible to take disinterested pleasure in mathematical and scientific theories and that this pleasure can be the ground for judgments of beauty concerning such theories. As judgments of beauty, we will demand universal agreement with such judgments. All of this is compatible with the claim that there are no principles of taste by which one can deduce that a mathematical theorem or scientific theory is beautiful, a claim that is by no means implausible. However, despite all of these similarities with judgments of beauty as Kant lay them out, it is not clear how to understand the pleasure we derive from the contemplation of abstract conceptual theories in terms of the harmonious free play of the imagination and the understanding. This is perhaps most clear if we connect the imagination and the understanding.

to Kant’s doctrine of aesthetic ideas, which engender representations of the imagination so powerful that no concepts are adequate for it. If beautiful objects involve this excess of the imagination over the understanding, we may fear that scientific and mathematical theories cannot be beautiful on Kant’s account insofar as they are wholly conceptual.

However, there is another way of reading this result in which judgments of beauty in science and mathematics are legitimate on Kant’s account even though they do not involve an excess of the imagination over the understanding. We may be inclined to think that judgments of beauty in science and mathematics reveal in problem with the way Kant formulated his account of beauty. Kant seems to think that disinterested pleasure in an object is necessarily linked to the harmonious free play of the imagination and the understanding in which the imagination is not confined by any determinate cognition. If scientific and mathematical theories are wholly conceptual, and if we can take disinterested pleasure in them, we may think that Kant was wrong to run together these two ideas. Disinterested pleasure may be distinct from the harmonious free play of the imagination and the understanding.

Let me end with a final speculative suggestion. Perhaps we are too quick in claiming that beautiful scientific and mathematical theories are wholly conceptual. Wigner claims that:

“The principal emphasis [in mathematics] is on the invention of concepts. Mathematics would soon run out of interesting theorems if these had to be formulated in terms of the concepts which already appear in the axioms.”

We could compare this claim with Allison’s understanding of the harmonious free play of the imagination and the understanding, in which he claims,

“the imagination in its free play stimulates the understanding by occasioning it to entertain fresh conceptual possibilities…”

On Allison’s reading, the imagination seems to spur the understanding into developing new concepts, which Wigner took to be the principle emphasis of mathematics. Davy also characterized the imagination as a creative source for, what sounds like, conceptual discovery when he wrote:

“Imagination, as well as the reason, is necessary to perfection in the philosophic mind. A rapidity of combination, a power of perceiving analogies, and of comparing them by facts, is the creative source of discovery.”

Perhaps we can save Kant’s doctrine of the harmonious free play of the faculties in judgments of mathematical and scientific beauty if we consider the possibility that the imagination plays a role in making the understanding develop new concepts, leading to new insights, and new discoveries. This topic needs to be explored further.

Bibliography


