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Peircean Steamiotics: Technological Metaphors and Pastoral Designs

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Abstract: According to Peirce, the theory of heat depends on the steam-engine, but we might also ask, does semiotics owe a similar metaphoric debt to material technologies? Throughout the nineteenth century, metaphoric motors allow novel ideas of work, energy, productivity and progress to be prescinded from intentionality, purpose or goal. Similarly, Peircean secondness, "the experience of effort, prescinded from the idea of a purpose," a concept central to contemporary materialist semiotics, is not only homologous with the new idea of energy or mechanical work, but is illustrated using the same technologies. Peirce frequently deploys the "ear-splitting, soul-bursting locomotive whistle," to illustrate the concept of "secondness," as a pure external force, within a broader triadic structure where the shriek of the steam whistle (secondness) disrupts an idyllic state of feeling of firstness (a daydreamer), provoking a more mediated state of mind (thinking) which he calls thirdness. These technological images are strikingly similar to what Leo Marx has called the American "pastoral design" illustrated by tropes of "the machine in the garden." Across nineteenth-century American literature, we encounter a ideology of technology and progress illustrated by images of a pastoral reverie which is interrupted by a counterforce, the machine-age in the form of the steam-engine and attendant steam-whistle, which draws the unwilling daydreamer out of their idyllic reverie and into the material realities of the modern age and leaves them in an agitated state of cogitation. Peirce's approach to materiality bears the imprint of these ideologies of the age of machinery.

Keywords: Peirce; semiotics; pastoral; Hawthorne; technology; metaphor; secondness

According to Charles S. Peirce, Helmholtz's theory of thermotics (the theory of heat and the conservation of forces, energy and entropy) depends on the steam-engine, but we might also ask, does semiotics owe a similar metaphoric debt to material technologies? Throughout the nineteenth century, metaphors of motors allowed novel ideas of work, energy, productivity and progress to be prescinded from intentionality, purpose or goal. Similarly, Peircean secondness, "the experience of effort, prescinded from the idea of a purpose," a concept central to contemporary materialist semiotics, is not only homologous with the new idea of energy or mechanical work, but is illustrated using the same technologies. Peirce frequently deploys the "ear-splitting, soul-bursting locomotive whistle," to illustrate his concept of "secondness" as a pure external force, within a broader triadic structure where the shriek of the steam whistle (secondness) disrupts an idyllic state of feeling of firstness (daydreaming), provoking a more mediated state of mind (thinking), which he calls thirdness. These technological images are strikingly similar to what Leo Marx has called the American "pastoral design" illustrated by tropes of "the machine in the garden." Across nineteenth century American literature, we encounter a ideology of technology and progress illustrated by images of a pastoral reverie which is interrupted by a counterforce, the machine-age in the form of the steam-engine and attendant steam-whistle, which draws the unwilling daydreamer out of their idyllic reverie and into the material realities of the modern age and leaves them in an agitated state of cogitation. Peirce's approach to materiality bears the imprint of these ideologies of the age of machinery.

According to the Charles Saunders Peirce, the sciences grow out of the "useful arts" (CP 1.226), a category including what we now call technologies.[1] One of his examples is how Helmholtz' thermotics, the science of heat, grows out of the steam-engine, or rather, Helmholtz "could have no theory of heat without the steam-engine" (CP 1.226). We might ask in turn whether Peirce's own semiotics owe a similar metaphoric debt to material technologies, and specifically, the steam-engine itself.

My points of departure are two imaginary scenes in Peirce's writings in which the steam engine, and specifically, the steam whistle, play a crucial role in explaining Peirce's semiotic concepts. Importantly, in both cases the steam engine is adduced as a material image of his category of *secondness*. What is secondness? Many readers of Peirce will naturally associate secondness with indexes and indexicality, but indexicality is a specific form of the more general concept of secondness, secondness as a *ground* or relation between sign and object, just as sinsigns or tokens are secondness of the sign-vehicle.

Peirce defines this abstract foundational concept of secondness in various ways: alterity, irrational compulsion, brute reaction. Secondness is the aspect of a proposition "that jabs you perpetually in the ribs" so that "you become awake to their truth" (CP 6.95). It is the

way that “different sense-qualities have different degrees of intensity. The sound of thunder is more intense than the sound of a dozen people clapping their hands; and the light of an electric arc is more intense than that of a star” (CP 7.496). While qualities are normally associated with firstness (qualisigns, iconicity)[2], they have secondness insofar as they have a property of “insistency” or “self-willedness” (CP 7.488). It is in the context of trying to define this quality of secondness that we come across our first technological metaphor, which I will quote at length (Figure 1):

> The type of an idea of Secondness is the experience of effort, prescinded from the idea of a purpose. It may be said that there is no such experience, that a purpose is always in view as long as the effort is cognized. This may be open to doubt; for in sustained effort we soon let the purpose drop out of view. However, I abstain from psychology which has nothing to do with ideoscopy. The existence of the word ***effort*** is sufficient proof that people think they have such an idea; and that is enough. The experience of effort cannot exist without the experience of resistance. Effort only is effort by virtue of its being opposed; and no third element enters. Note that I speak of the ***experience***, not of the ***feeling***, of effort.
>
> Imagine yourself to be seated alone at night in the basket of a balloon, far above earth, calmly enjoying the absolute calm and stillness. Suddenly the piercing shriek of a steam-whistle breaks upon you, and continues for a good while. The impression of stillness was an idea of Firstness, a quality of feeling. The piercing whistle does not allow you to think or do anything but suffer. So that too is absolutely simple. Another Firstness. But the breaking of the silence by the noise was an experience. The person in his inertness identifies himself with the precedent state of feeling, and the new feeling which comes in spite of him is the non-ego. He has a two-sided consciousness of an ego and a non-ego. That consciousness of the action of a new feeling in destroying the old feeling is what I call an ***experience***. Experience generally is what the course of life has ***compelled*** me to think. (CP 8.330, original bold and italics)

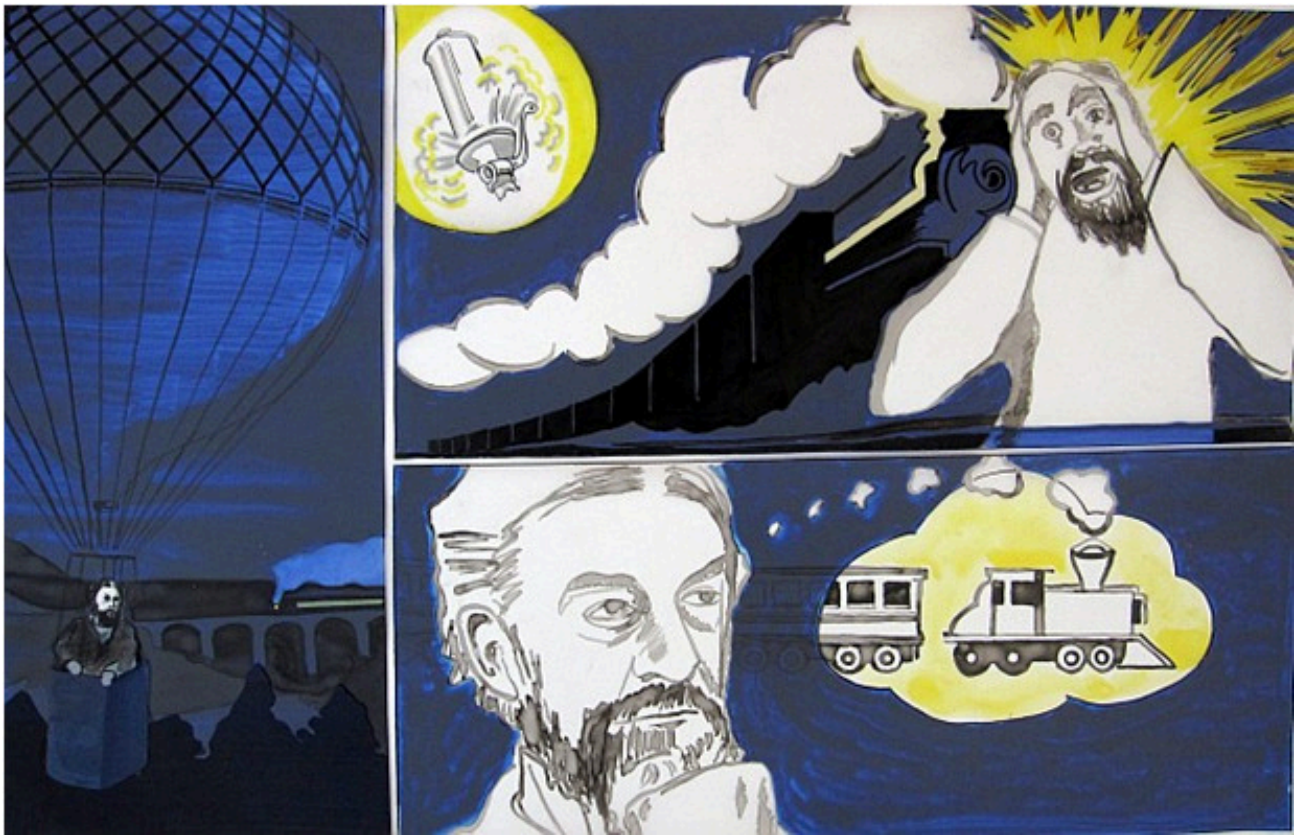

Figure 1. States of consciousness: Peirce daydreaming in the balloon (artist: Lisa Gronseth)

Peirce is concerned here to define secondness as an experience in opposition to firstness and to thirdness. He begins with thirdness: secondness is an experience of effort *prescinded* from purpose (thirdness). That is, one can imagine an experience of effort (secondness) without imagining any purpose (thirdness) to which that effort might be put. Effort is secondness because it involves two things, an experience of effort, and a correlate experience of resistance, but "no third element enters."

Secondness cannot be prescinded from firstness, a quality of feeling. It is possible to imagine a quality of feeling, firstness, without secondness, so firstness is prescindable from secondness. But since secondness is an experience consisting of two simple qualities of feeling, the reverse is not true: one cannot imagine secondness without imagining two firstnesses. So in this scene we have two logically simple qualities of feeling, on the one hand the impression of calm and stillness, enjoying the absolute calm and stillness, on the other the piercing whistle of the train. However, insofar as the piercing whistle destroys the impression of stillness, we now have an experience, the consciousness of the breaking of silence by noise. This is a secondness. This involves reaction, but also alterity ("an ego and a non-ego"), as the man identifies himself with the feeling of stillness, and identifies the new feeling which forces itself upon him as an irrational external force, a non-ego or other.[3]

But there is slightly more to be said, for the two feelings brought into contact to produce an experience are also dissimilar. There is a very unequal battle between the sense of stillness and calm and what Peirce calls elsewhere “ear-splitting, soul-bursting locomotive whistle.” The “eternally sounding and unvarying railway whistle” is on one level a quality of feeling, another firstness, no different from “a feeling of redness or of purple without beginning, end, or change” (CP 1.304). Both are qualities of feeling, but the steam whistle's negotiating position, its vividness, intensity, is such that it has some qualities that belong not to firstness but to secondness, its ability to compel attention, its irrational insistency. Again and again the shriek of a steam-whistle, along with the brightness of the arclight, the sound of a thunderclap, is recruited to stand for those qualities of feeling which also have an insistent, vivid, quality of secondness.

Secondly, the technologies of locomotion that are brought into comparison here, while both novel technologies of the nineteenth century, the hot-air balloon and the steam locomotive, are equally unequal representatives of their class. The hot air balloon is associated with a pastoral scene, a man high above the earth surveying a landscape bestilled at night. An idyllic scene, the man is in no hurry to go anywhere, for the balloon, though a new technology, is still similar to the pre-industrial technologies of the age of sail, powered by forces of wind and weather that do not set it in opposition to the passing landscape. While these pre-industrial technologies were simply an adaptation of existing forces of nature (sun and wind), “steam power appeared to be independent of outward nature and capable of prevailing against it—as artificial energy in opposition to natural forces” (Schivelbusch 1977:10). The “artificial energy” of the steam engine forces its way forward against all forces of nature on its own power on metallic rails and presents its travelers with panoramic scenes of passing landscapes separated by a space of glass. The balloon is, in a sense, as Peirce says elsewhere, “not mechanical enough” (CP 6.15), while the steam engine is the veritable incarnation, the prototypical emblem of the age of machinery. In this image, then, the mechanical forces of the late industrial age like the steam locomotive, which set the machine in opposition to the landscape, are compared to technologies like the balloon, which are like preindustrial technologies in that they depend on the vagaries of forces like wind supplied by nature, and induce no sense of separation between passenger and passing landscape. Thus, the balloon is a nineteenth century technology which seems still trapped in a pastoral reverie, able to be disrupted by the power of the oncoming age of machinery embodied by the steam engine.

If this image takes the steam engine as an external force interrupting a pastoral reverie, then the second major technological image, from his paper “What is a Sign?” (Peirce 1894:§1), places his dreamer instead on the train itself and develops the states of mind without gesturing to a passing landscape. I present a truncated version of this illustration of “three different states of mind,” primarily to show how often the steam engine intrudes

upon reveries of various sorts as an avatar of secondness in Peirce's technological imaginary (Figure 2). The first state of mind is that of a person in a dreamy state, illustrated by a passenger in the railway car, daydreaming about a red color. He is not “thinking of red” but “just contemplating it,” a play of pure fancy in his imagination, without any secondness or thirdness, that is, without any external compulsion or thought. This is feeling.

Again, his reverie is destroyed, and complicated by the compulsive, irrational insistence, of secondness, once more taking the form of a steam whistle, forcing him into the second state of mind, *reaction*. I quote in full:

> Second, imagine our dreamer suddenly to hear a loud and prolonged steam whistle. At the instant it begins, he is startled. He instinctively tries to get away; his hands go to his ears. It is not so much that it is unpleasing, but it forces itself so upon him. The instinctive resistance is a necessary part of it: the man would not be sensible his will was borne down, if he had no self-assertion to be borne down. It is the same when we exert ourselves against outer resistance; except for that resistance we should not have anything upon which to exercise strength. This sense of acting and of being acted upon, which is our sense of the reality of things, – both of outward things and of ourselves, – may be called the sense of Reaction. It does not reside in any one Feeling; it comes upon the breaking of one feeling by another feeling. It essentially involves two things acting upon one another. (Peirce 1894:§1)

Lastly, our dreamer awakened discovers that by opening the door of his carriage, he discovers the shrieking ceases, and now he has formulated a rule (a third thing) which generalized the relations between these two states of mind, and he is in a third state, *thinking*.

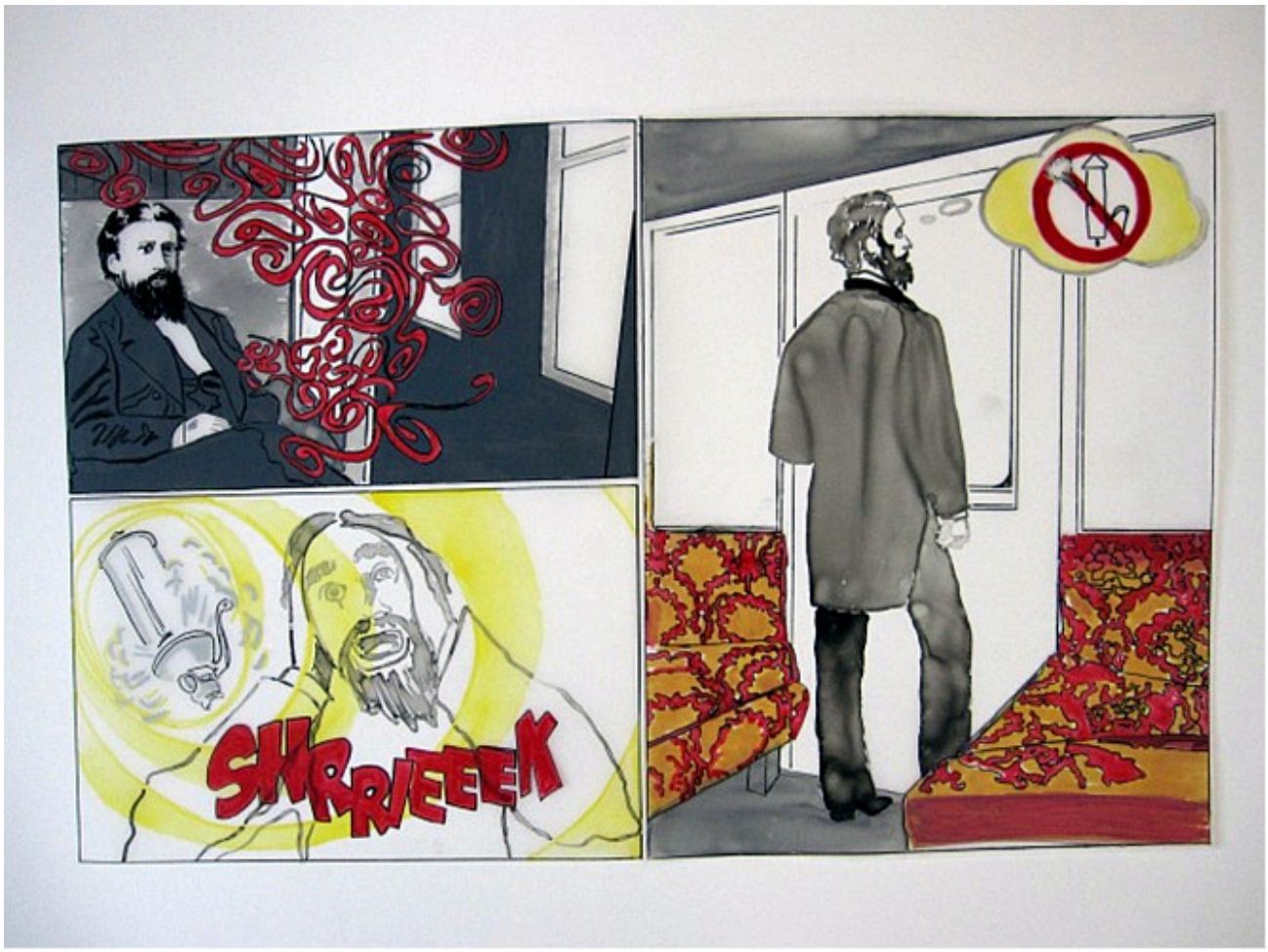

Figure 2. States of Consciousness: Peirce's Dreamer in What is a Sign? (artist: Lisa Gronseth)

I have adduced these two examples to show that there is a single metaphoric design here, snippets of which appear again and again where secondness appears in Peirce's theory, where the steam engine or the steam whistle again and again are made into technological avatars of secondness, set within a larger triadic design.

Peircean Steamiotics: Peircean Secondness and Helmholtzian Energeticism

First, if Peirce explains Helmholtz's thermotics (and by extension, ideas of mechanical work) as a concept afforded by the steam engine, then Peircean secondness seems to bear an equal debt to the same technology. Peircean semiotics is to some extent a "Steamiotics". The parallelism goes deeper than affording an awful pun. Peircean secondness, involving experiences of effort and resistance, and Helmholtz's concept of mechanical work bear a striking resemblance to one another. Peirce himself is quite explicit in treating Helmholtz as a theorist of secondness par excellence: Just as Condillac and the Associationists, who "explain everything by means of qualities of feeling," are the theorists of firstness, and Hegel whose privileging of a mediating thirdness (*aufhebung*)

over the dualism it mediates make him a theorist of thirdness (CP 4.318, 5.79), so Helmholtz, who explains everything by reference to mechanical force, is, in effect, the theorist of secondness (CP 5.79).

If Peircean secondness is the experience of effort prescinded from purpose, then categories of mechanical work or labor power in Helmholtzian theory --and ultimately all the varied forms of "energy" that proliferated in the late 19th century-- are similarly the product of prescinding mechanical effort from any specific working body (human, animal, machine) and from any specific purpose:

> The idea of work is evidently transferred to machines by comparing their arrangements with those of men and animals to replace which they were applied. We still reckon the work of steam engines according to horse-power.... Thus the idea of the quantity of work in the case of machines has been limited to the consideration of the expenditure of force; this was the more important, as indeed most machines are constructed for the express purpose of exceeding, by the magnitude of their effects, the powers of men and animals. Hence, in a mechanical sense, the idea of work is become identical with that of the expenditure of force, and in this way I will apply it. (Helmholtz 1868:214-15)

Importantly, both of these forms of analytic abstraction find their material examplar in the steam engine or motor, which really does produce mechanical work independently of any specific task. For Helmholtz, this makes the steam engine quite unlike two related impractical and utopian mechanical creations of the 18th century: the automaton, which simply imitated playfully the varied activities of humans or animals, perhaps in the utopian attempt to produce a servant who lacked immoral and moral qualities alike, and would thus provide “services which should combine the regularity of a machine with the durability of brass and steel” (Helmholtz 1868:212); and the related search for a *perpetuum mobile*, a self-winding device which would “produce work inexhaustibly without corresponding consumption, that is to say, out of nothing” (Helmholtz 1868:213). According to Helmholtz, both of these arise from attempts to imitate living creatures, life, in mechanical form: the fantasy of transferring *all* the myriad qualitatively different activities of an organic life form (human or non-human) to a machine produces the automaton, while the related fantasy of a perpetual motion device was based on a fundamental vitalist misunderstanding of organic life forms as being in effect self-winding clocks: “The development of force out of itself seemed to be the essential peculiarity, the real quintessence of organic life” (Helmholtz 1868:213).

Just as the steam-locomotive stands as a technological metaphor for secondness when contrasted with the hot-air balloon associated with firstness above, so here the steam engine again provides a different technological metaphor from earlier mechanistic models of the human, especially the automaton, a model based not on firstness (imitation, resemblence, iconicity), "created for no other reason than the pleasure of seeing a machine simulate the appearance and movements of a living being" (Black 2006), but secondness: delegation, substitution, or replacement of the work of one by another (on delegation see Latour 1992). Sadi Carnot had already written in 1824 of the steam engine as a "'universal motor' which could be substituted for animal power, waterfalls, and air currents" (cited in Rabinbach 1992:45). Where the 18th century embodied their idea of life as motion in the perpetual motion machine and automaton, which copies animate motions but lacks motive power, the 19th century universal motor is founded on the animating principles of energeticism and thermodynamics, the motor requires fuel, it produces work and heat. The decisive sea historical change between the 18th century and the industrial 19th century conceptions of animation is, for Helmholtz, emblematized by the transition from the automaton and the motor as opposed kinds of animated machine in which "mechanical play" is replaced by "mechanical work", so to speak:[4]

> We no longer seek to build machines which shall fulfil the thousand services required of *one* man [*an automaton*], but desire, on the contrary, that a machine shall perform *one* service, but shall occupy in doing it the place of a thousand men. (Helmholtz 1868:212)

The energeticist monism of the concept of mechanical work, which symmetrically describes the actions of animals, humans, and machines, depends on prescinding away an equivalency of effort or mechanical work from the specific nature of the task or goal or even the kind of actor: "The animal body therefore does not differ from the steam-engine, as regards the manner in which it obtains heat and force, but does differ from it in the manner in which the force gained is to be made use of" (Helmholtz 1868:238). This is very similar to secondness, and both these forms of prescision are exemplified best by the steam engine in both theories. Peircean secondness, "the experience of effort, prescinded from the idea of a purpose," is not only homologous with the Helmholtzian idea of energy or mechanical work, or rather, a whole constellation of ideas including labor, production, all of which abstract work, labor, or production from its purpose or ends. From Helmholtz onwards into the 20th century, the monist energeticist model of labor comes to be illustrated using a master image of the steam engine or motor, as Rabinbach (1992) shows. This master image is central to the modern ideology that Rabinbach calls productivism, "the belief that human society and nature are linked by the primacy and

identity of all productive activity, whether of laborers, of machines, or of natural forces" (Rabinbach 1992:3).

At the same time, if delegations of labor from human to nonhuman via the motor produce an abstraction of mechanical or biophysical "work" which can be prescinded, like secondness, from any purposeful activity or goal, the late Marx' conception of abstract labor (in which labor becomes a means prescindable from any ends, a turn from the paradigm of work to a paradigm of production) famously alternates between this naturalizing energeticist conceptualization of abstract labor and a social one (Rabinbach 1992:76-83): The former abstraction of biophysical labor power or mechanical work is produced by the delegations between humans and non-humans mediated and measured by machines and the resultant quanta of identity expressed themselves in quanta of energy; the latter abstraction of socially necessary labor time (abstract labor) is instead an abstraction mediated by exchanges between humans mediated by capitalist exchange whose measure is time (mediated and measured by, among other things, the technology of the clock). Indeed, as Postone argues, the comparability of the multifarious incommensurable different *human* activities that are classified as "concrete labor" in a capitalist society, and the equally various "use-values" of their products, possibly result from the prior abstract generality of abstract labor.

> Because any particular sort of labor can function as abstract labor and any labor product can serve as a commodity, activities that, in other societies, might not be classified as similar are classified in capitalism as similar, as varieties of (concrete) labor or as particular use values. In other words, the abstract generality historically constituted by abstract labor also establishes 'concrete labor' and 'use value' as general categories. (Postone 1993:152-53)

Such abstract labor, labor prescinded from any purpose and also any other specific qualitative determinations that differentiate varieties of concrete labor, can be viewed alternately monistically and naturalistically as something shared by humans and non-humans, measured rendered comparable by the motor metaphor, or dualistically and humanistically as an exclusively social property of humans, measured and rendered comparable by capitalistic exchange (time).

> Labor power is therefore both social and physiological, historically specific and at the same time a form of universal energy.... Labor power represents the quantitative aspect of labor under capitalism. First, as an abstract, universal

> measure of labor and a ‘magnitude of value,’ it is clearly a social phenomenon as ‘the labor-time socially necessary for its production.’ But it is equally a physiological concept, ‘devoid of all social and historical elements.’ Both a social and physiological magnitude, it is a measure of value and a measure of energy. (Rabinbach 1992:74-75)

As Rabinbach shows (1992:76-83), this is an antinomy inherited by Marxian conceptions of labor, which move back and forth between an energeticist monism produced by the steam engine (which compares human and nonhuman labor in quanta of energy), and a humanistic dualism induced by capitalist exchange (which compares labor -- measured in quanta of time-- as an exclusive property of humans who engage in capitalist exchange)[5].

The Machine in the Garden

In the first example, Peirce also locates the steam engine within a broader context that sets it in contrast with a pastoral landscape, in a triadic structure of kinds of consciousness that bear a striking resemblance to what Leo Marx, in his classic *The Machine in the Garden* (1964), calls a specifically American “pastoral design”. Peirce frequently deploys the “ear-splitting, soul-bursting locomotive whistle”, to illustrate the concept of “secondness,” as a pure external force, a firstness which has the added quality of secondness in its compulsive insistence. The steam whistle is found within a broader triadic structure where the shriek of the steam whistle (secondness) disrupts an idyllic state of feeling of firstness (daydreaming), sometimes provoking a more mediated state of mind (thinking) which he calls thirdness. These technological images are strikingly similar to what Leo Marx has called the American “pastoral design” illustrated by tropes of “the machine in the garden.” Marx illustrates this peculiarly American pastoral design with a lengthy discussion of Nathaniel Hawthorne's reflections from his notebooks in Sleepy Hollow, 1844.

First, Hawthorne gives a description of a pastoral landscape, “a set of unadorned sense impressions, and especially sounds-- sounds made by birds, squirrels, insects, and moving leaves” (Marx 1964:13). As Marx notes “what counts here...is not the matter so much as the feeling behind it.... a state of being in which there is no tension either within the self or between the self and the environment. Much of the harmonious effect is evoked by the delicate interlacing of sounds that seem to unify society, landscape, and mind” (Marx 1964:13). The image is almost precisely the same *quality of feeling* in which there is no tension or alterity between ego and non-ego that characterizes Peirce's dreamer in a balloon, or daydreaming passenger in a train. In short, Peircean firstness and the serenity of Hawthorne's pastoral reverie are approximates of one another. Secondness enters this

pastoral reverie with the harsh shriek of steam whistle, producing a sharp “contrast between two conditions of consciousness” (Marx 1964:28) in which the machine brings “a world which is more ‘real’ into juxtaposition with an idyllic vision” (Marx 1964:25) (Figure 3). I quote Hawthorne's notes on this ‘little event’ directly:

> But hark! There is the whistle of the locomotive-- the long shriek, harsh, above all other harshness, for the space of a mile cannot mollify it into harmony. It tells a story of busy men, citizens, from the hot street, who have come to spend a day in a country village, men of business; in short of all unquietness; and no wonder that it gives such a startling shriek, since it brings their noisy world into the midst of our slumbrous peace. (cited in Marx 1964:13)

Precisely as in Peirce, the insistent harshness of the whistle of the locomotive destroys the unified feeling of the pastoral soundscape, there is “the breaking of one feeling by another feeling,” and insofar as Hawthorne identifies himself with the preceding feeling and the steam whistle with an unquiet “noisy world” beyond it, these two feelings are turned into “a two-sided consciousness of an ego and a non-ego”: in short, secondness.

Figure 3. States of Consciousness: Hawthorne, Sleepy Hollow 1844 (artist: Lisa Gronseth)

When the steam engine finally goes, Hawthorne is unable to return to his first state of pure feeling (firstness), nor is he in a state of pure reaction (secondness), but is instead troubled by his inability to express a tide of feelings and associations as “distinct and expressed thought” (thirdness). Like Peirce’s daydreamers, he is no longer caught up in unreflexively recording the stream of impressions, associations and feelings (firstness), nor yet reacting

instinctively to the noisy steam engine (secondness), but reflexively *thinking* about (writing about) these feelings and associations (thirdness): “What begins as a conventional tribute to the pleasures of withdrawal from the world....is transformed by the interruption of the machine into a far more complex state of mind” (Marx 1964:5).

The Peircean semiotic design of firstness (feeling), secondness (reaction), thirdness (thought) is thus part of a broader pastoral design that Marx argues forms a recurrent metaphoric pattern in American literature of the period. The machine (the steam locomotive) plays a structuring role within this pastoral design:

> The locomotive, associated with fire, smoke, speed, iron and noise, is the leading symbol of the new industrial power. It appears in the woods, suddenly shattering the harmony of the green hollow, like a presentiment of history bearing down on the American asylum. The noise of the train, as Hawthorne describes it, makes inaudible the pleasing sounds to which he had been attending.... (Marx 1964:27)

The Peircean pastoral design is thus a specific version of the broader motif of “the machine in the garden” identified by Marx as a recurrent motif in 19th century American literature. In the Peircean version, Peircean semiotic primitives (firstness, secondness and thirdness) are implicitly structured by the terms of this pastoral design: the triadic structure of kinds of sign relation (firstness, secondness, and thirdness) are illustrated by reference to the relationships (states of consciousness) of a person to a landscape (the garden) mediated by a counterforce (the machine, the steam engine embodying secondness).

As Leo Marx argues, the recurrent motif of “the machine in the garden” in 19th century American literature defines a specifically American pastoral design in which the landscape (“the garden”) also takes on an ambivalent role in contrast to industrial progress figured by the locomotive (“the machine”). Heather Paxson usefully summarizes this ambivalence as follows:

> While pastoral imagery has tended to be overly romanticized or sentimentalized in popular discourse, Leo Marx has shown that in American literature the pastoral ideal is continually interrupted: into the contemplative wilderness chugs the locomotive, that noisy engine of industrial progress. Naming this device "the machine in the garden," Marx then draws attention to a paradox at the heart of American industrialism, that nature is simultaneously reduced to raw materials

> for human cultural and technological transformation and, in its purportedly pristine form, upheld as an object of reverence and means of contemplative self-realization. While *land* is seen by agricultural and mining industries as a resource for value extraction, *landscapes* are framed as objects of contemplation and sites of relaxation. (Paxson 2013:16)

This ambivalence also finds its semiotic homology in Peirce. Elsewhere (CP 1.43) Peirce explores a parallel triadic typology of the relationship of persons to landscape, a typology of kinds of persons and their corresponding ideas of "nature," which echoes the oppositions of this pastoral design, as well as broader themes in the American ideology of nature (on which see Marx 1964, 2008). According to this typology, as is usual with Peirce there are three classes of men, the first, artists "for whom the chief thing is the qualities of feelings," are those like Hawthorne, at the moment he is beginning to scribble his pastoral notes about Sleepy Hollow. For people of this class, firstness incarnate, who "create art," "nature is a picture." Indeed, it is a specifically pastoral image, the very kind Hawthorne is writing. "The second consists of the practical men, who carry on the business of the world": These are the men on the train itself whose entry into Hawthorne's pastoral is announced by the steam whistle, which "tells a story of busy men, citizens, from the hot street" who are carried on their unquiet business by the steam engine. They are *other* (non-ego) to the first man (Hawthorne, ego), observing the passing train, of course. Like the steam engine that carries them, these people are secondness incarnate, they are all about actual power overcoming actual resistance: "They respect nothing but power, and respect power only so far as it [is] exercized." For people of this class, nature "is an opportunity," an exploitable resource, the moving westmarch march of the "frontier" is itself a measure of progress, the "conquest of nature" (Marx 2008:14-16). For such people, in a period whose apogee was the time of Peirce's writing, "industrialism is a railway journey in the direction of nature," as Marx (1964:238), paraphrasing Emerson, puts it.[6] Lastly, when Hawthorne returns his attention to the landscape, but his quondam oneness of relation becomes contemplative, alienated, like the man on the train, he is not daydreaming (firstness, feeling) but *thinking* (thirdness). In this sense, he is like Peirce's third class, thirdness incarnate, which "consists of men to whom nothing seems great but reason." For men of this class, nature is not an image or a resource, but a resource for thought: "a cosmos, so admirable, that to penetrate to its ways seems to them the only thing that makes life worth living."

Marx's classic *Machine in the Garden* argues that across nineteenth century American literature, we encounter a ideology of technology and progress illustrated by images of a pastoral reverie which is interrupted by a counterforce, the machine-age in the form of the

steam-engine and attendant steam-whistle, which draws the unwilling daydreamer out of their idyllic reverie and into the material realities of the modern age and leaves them in an agitated and complex state of cogitation. Peirce's approach to secondness and materiality similarly bears the miniaturized imprint of the dawn of the age of machinery, the beginning of the anthropocene, what one might call the latent pastoral design underlying Peircean semiotics.

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Endnotes

1. I use the standard citation system for Peirce's manuscripts from his *Collected Papers* throughout. On the concept of technology, and specifically the railroad in the development of this concept, see Marx (2010 [1997]). ↩

2. On the distinction between qualities, qualia and qualisigns see Chumley and Harkness 2013, Harkness 2015.↩

3. Peirce's insistence on secondness as an experience involving two feelings deserves comparison with the concept of "affect," if we mean affect in Spinoza's sense as the capacity to affect and be affected by another, something arising from "an encounter between the affected body and a second, affecting, body" (Deleuze and Guattari 1987: xvi). In current usages, affect is thus dyadic (a secondness) rather than monadic (a firstness), but it is inchoate, not yet interpreted or mediated as an articulable emotion (a thirdness) (Pile 2010:8). Affect, the capacity to affect and be affected, in this sense belongs to the semiotic order of secondness central to Peircean semiotics. Secondness involves the interactions of self and other: it produces a sense of real presence, what Peirce calls hereness and nowness (CP 1.405). ↩

4. For "animation" in the sense I am using it see Silvio 2010. On Carnot and the steam engine see also Serres 1982.↩

5. For an extremely interesting attempt to use the ambivalent category of "work" to create a relatively symmetric account of human and nonhuman actants (the river, the salmon, machines) in the "Organic

Machine" of the Columbia River, see White (1995).↩

6. In his *Evolutionary Love* (1893), Peirce does not mince any words about his blistering contempt for people such as these, who embrace "secondness" as the basis for civilizational progress ("*anancastic* evolution", or "evolution by mechanical necessity" as he calls it, naturally the second in a tripartite series) -- the dominant philosophy of the 19th century espoused by political economists-- in which "greed" is treated as a species of "love": He predicts "Soon a flash and quick peal will shake economists quite out of their complacency, too late. The twentieth century, in its latter half, shall surely see the deluge-tempest burst upon the social order -- to clear upon a world as deep in ruin as that greed-philosophy has long plunged it into guilt. No post-thermidorian high jinks then!"↩

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