The real and living logical conclusion is [the] habit; the verbal formulation merely expresses it. . . . Action cannot be a logical interpretant, because it lacks generality.

—C. S. Peirce

The concept which is a logical interpretant is only imperfectly so. . . . [It is] inferior to the habit. . . . The deliberately formed, self-analyzing habit—self-analyzing because formed by the aid of analysis of the exercises that nourished it—is the living definition, the veritable and final logical interpretant.

—C. S. Peirce

The whole function of thought is to produce habits of action.

—C. S. Peirce

Moreover—here is the point—every man exercises more or less control over himself by means of modifying his own habits.

—C. S. Peirce

Critics of the classical Pragmatists seem never to have tired of accusing them of making action an end in itself.¹ Bertrand Russell misread them in this way, accusing Dewey of subordinating knowledge to action. Russell charged Pragmatism with saying that “the only essential result of successful inquiry is successful action.”² He was later joined in this mistake by members of the Frankfurt School, including Max Horkheimer and Theodor Adorno.³

This misunderstanding has been more than a simple matter of the cultural differences between philosophers living on different sides of

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the Atlantic. Lewis Mumford, who should have known better, mocked Dewey’s version of Pragmatism as being “all dressed up, with no place to go.” This charge has also been the occasion for the turning of Pragmatist against fellow Pragmatist. In 1902 Peirce charged William James with holding the view that “the end of man is action.” Even Richard Bernstein has labeled the Pragmatists’ account of action as “vague.” He has written that there is still “a great deal of confusion about what the pragmatists understood by ‘action’ and precisely what role action does or ought to play in understanding human life.”

Perhaps it was what both Peirce and Dewey characterized as his nominalism that led James to yield on occasion to the temptation to make action an end in itself. But the situation is quite different with respect to the work of Peirce and Dewey; their work exhibits elaborate safeguards against such a move. Dewey complained in his 1925 essay “The Development of American Pragmatism” that his critics had misunderstood him in just that regard. Earlier, Peirce, in his 1905 article “What Pragmatism Is,” had already taken considerable delight in constructing a lengthy response to an imagined critic who had charged him with making “Doing the Be-all and the End-all of human life” (5.429).

The manner in which Peirce and Dewey treated action was neither vague, nor did it make action an end in itself. In their hands, practice was regarded as much more than simple action; both men characterized action as an instrument of production, and both adjudicated action in terms of its products. Their critiques of action were embedded in their critiques of production.

It is not at all difficult to demonstrate that Russell, Mumford, and Horkheimer misunderstood Peirce and Dewey, so I will leave that exercise aside. Beyond that, however, I wish to draw two conclusions from Peirce’s and Dewey’s treatments of cognition, action, and production. The first is that Peirce and Dewey were able to move beyond what are now called traditional “cognitivist” metaphysical positions, and even beyond the praxis philosophies of the Continental thinkers from Marx through Scheler to Heidegger (and beyond), thence to fashion a comprehensive philosophy of production. The second is
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that what was to become Dewey’s Instrumentalist version of Pragmatism is rooted firmly in the work of Peirce.

It is possible to see within the history of Western philosophy a kind of tug-of-war between those who have sought to make theory dominant and those who have worked for the ascendancy of practice. Cognitivists, taking their cues from Plato and Descartes, have tended to view the formation of correct concepts or ideas as the goal of philosophical activity. It is in this sense that much of contemporary linguistic analysis has been concerned with “getting clear” about various issues by means of the analysis of concepts. The approach of the praxis philosophers, following Marx and Heidegger, has been quite different. Their emphasis has been more on doing than on thinking, and their tendency has been to take into account a whole organism in an environment rather than just a ghost in a machine (or a brain in a vat). Don Ihde has captured this feature of the work of the early Heidegger, for example, in his assessment that Heidegger’s goal was the practical knowing-involvement that comes through “such phenomena as moods and emotion and, what is more, bodily movement, such that the human being as a totality is ‘being-in’ an environment or world.”

After Peirce’s sharp critique of Descartes in his 1877 and 1878 articles in Popular Science Monthly, even the most obtuse of critics would have been reluctant to place him in the camp of the cognitivists. Consequently, exhibiting the unfortunate excluded-middle fixation found so frequently in much of the history of philosophy, critics of the Pragmatists have tended to locate them inside the praxis camp. Bertrand Russell, for example, was fond of lumping them together with Marx.

Pragmatism does in fact share many concerns and conclusions with praxis philosophy. But both Peirce and Dewey in fact located their own positions well outside of this cognitivist-praxicalist struggle, arguing that the positions of both camps are defective because they are incomplete. Peirce and Dewey did this by subordinating both theory and practice (cognition and action, thinking and doing), to production or making; to what the Greeks had called poietike. It is not that they ignored either cognition or praxis, for they did not: it is
just that neither Peirce nor Dewey thought cognition or praxis to be the end of inquiry.

But if Pragmatism is concerned with production, what are its products? A general, though somewhat misleading, answer is that the products of Pragmatism are habits. The reason why this statement is a bit misleading is because the term “habit” is equivocal in the work of both Peirce and Dewey, and because of the presence in Peirce’s work of what may be called “quasi-habits.”

For Peirce, habits are associated with control, and control is linked to products and production. In the context of his remarks on critical common-sensism, Peirce outlined a continuum of levels of control which are correlated with the habits he calls “inhibitions and coordinations” (5.533). Moving from less to more control, there are habits that are unconscious, habits that are instinctive, and habits that are the result of training. Peirce was not reluctant to describe a stream cutting its bed as the unconscious formation of a habit (5.492). Ants and other insects which we do not normally count as trainable nevertheless operate according to instincts, which are another type of habit. And nonhuman animals, especially the higher primates, are capable of certain forms of training which habitualizes them to certain forms of responses. In none of these cases is control self-conscious, but in each of them the level of complexity of control is linked to and consistent with the level of complexity of the entity or organism.

Among human beings, however, it is possible for an individual to be his or her own “training-master,” and it is at this stage that control becomes self-control. Up to this point, habits have operated in Peirce’s sketch as a means of control: as a terminus a quo of action (even though that action is not self-controlled). The habit that is the bed of the river controls its flow. Instincts genetically transmitted to insects control their activities. And the training instilled in a loquacious parrot controls its vocabulary.

Beyond this watershed, however, habit, in addition to being means of control, operates as a goal of control: in addition to being a terminus a quo of action, it also functions as a terminus ad quem of action.
In addition to self-training that involves gross motor functions, self-training may also be conducted in the imagination. Further, self-training may involve just a single insight or association rather than a repetition. Peirce is not reluctant to speak of habits as being “produced” even in such circumstances (5.477).

In imaginative self-training, ideas and ideals often enter into the training process and serve as its norms. Among such ideals are the “leading principles” of Peirce’s famous thought experiments. Moreover, at a certain stage of self-control, ideas and ideals are themselves the subject of improvement by means of control. This is a very high level of production which Peirce calls control over control of control (5.533).

Peirce thought that language itself is a “phenomenon of self-control” (5.534), but one in which two distinct levels are possible, corresponding to the grades of complexity with respect to which self-control is capable of being exercised. He was willing to admit that nonhuman animals use signs, but he thought that the difference between their form of sign use and the forms invented and developed by human beings is exhibited in the extent to which human beings are able to control signs in their role as signs.

Another way of putting this is that human beings are able to conduct themselves more productively than nonhuman animals. Habits are what allow nonhuman animals to produce certain things, and this is also true of human beings. But human beings are in addition capable of producing habits, and their greater organizational complexity—their greater powers of self-control—allow them to craft these habits so that they are increasingly sharper and more pertinent to their existential situations. Like nonhuman animals, human beings are just “endowed” with a store of habits. Unlike nonhuman animals, they are able to manipulate and improve old ones, and they are able to produce new ones.

Besides habits, Peirce thought that human beings produce what may be called “quasi-habits.” Among these quasi-habits are what Peirce calls “hypostatic abstractions.” In his 1905 remarks on common-sensism, Peirce lists several examples of hypostatic abstractions:
a collection (or a class qua extended, i.e., predicatable of its members),
a multitude (or an abstraction from the predicate of a collection, i.e.,
“intended,” or taken as a subject for further predication), a cardinal
number (or a predicate of a multitude), an ordinal number (or an
abstraction by means of which cardinal numbers are placed in space
with respect to one another), and so on. Each of these things is a
product of strictly controlled sign-usage, or what Peirce calls a “logi-
cal interpretant,” and the meaning of each is a habit, or general way
of treating situations that may occur in the future.

Each of these things I have just listed, a collection, a multitude, a
cardinal number, and an ordinal number, is also characterized by
Peirce as an _ens rationis_ or “being of reason.” He follows the Thom-
mists and Scotists of the thirteenth through the sixteenth centuries in
this matter, adopting their technical term for an entity which is the
result of the operation of the intellect in its interaction with its
“data,” literally whatever is given to it.

The scholastics had differed among themselves rather sharply re-
garding whether these _entia rationis_ were invented or simply discov-
ered as something pre-existing, and in this they anticipated the
debates regarding the foundations of mathematics which were such
an important feature of the intellectual life of the last decades of the
nineteenth century and the first decades of the twentieth.¹¹

Peirce thought that these _entia rationis_ are produced, and that de-
spite their name, they may sometimes be real. By calling some _entia
rationis_ “real,” his terminology departed radically from that of the
scholastics, although in terms of practical effects, his view reflects the
position of one of the many factions that made up that movement.
What Peirce means when he speaks of _entia rationis_ being real is that
once abstracted, once produced, they have effects that do not depend
on what any one person thinks them to be.

Peirce has sometimes been misread on this point as being an epis-
temological realist of the sort who says that things are such as they
are regardless of whether _anyone_ ever knows them to be as they are.
And there is a certain sense in which Peirce contributed to this mis-
understanding by his use of the terminology employed by some of
the “scientific realists” who contributed to the scientific revolution of the seventeenth century.

The early paragraphs of the seventh volume of the Collected Papers indicate the extent to which he took over that terminology (although he intermingles it with the terminology of evolutionary theory). There he tells us that science is not a body of knowledge, but “the concrete life of the men who are working to find out the truth” (7.50). He argues that this scientific passion is not separate from the process of organic evolution, but just a part of its emerging organizational complexity. “Given the oxygen, hydrogen, carbon, nitrogen, sulphur, phosphorus, etc., in sufficient quantities and under proper radiations, and living protoplasm will be produced, will develop, will gain power of self-control, and the scientific passion is sure to be generated. Such is my guess. Science was preordained, perhaps, on the Sunday of the Fiat lux” (7.50).

Peirce characterizes science as “storming the stronghold of truth” (7.51), and as “a mode of life whose single animating purpose is to find out the real truth” (7.54). Further, “Science is foredestined to reach the truth of every problem with as unerring an infallibility as the instincts of animals do their work” (7.77). The “infallibility” of science is due to its rationality, or what may seem somewhat paradoxical, to its procedures for detecting whatever is fallible. The rationality of science lies precisely in the fact that it is “self-criticizing, self-controlling and self-controlled, and therefore open to incessant question” (7.77).

Peirce’s description of science might appear somewhat old-fashioned to many of us now. Some of us might have a tendency to wince at words like “real truth,” “unerring infallibility,” and “preordained.” Taken by themselves, these terms might lead us to place Peirce among the cognitivists. But beneath these grand phrases, we can see Peirce at work constructing a kind of realism far different from the one that says things are such as they are regardless of their being known by anybody. His language is that of seventeenth-century science, but his message is Lamarckian and Darwinian: it includes as elements not only his doctrine of chance, his tychism, but also his
view that the experimental method is the only one that is self-correcting.

For Peirce, scientific thinking, like thinking in general, is iconic. The difference between scientific reasoning and what he calls “sham” reasoning (1.57) is that the experimentalist must exercise the kind of self-control that proceeds from a commitment to follow the dictates of reasoned inference, regardless of where such inference may lead.

But the goal of technoscience—the goal of logic, the goal of self-control, the goal of production—is the finding out of what is before us, and this is only possible insofar as the investigator produces ever more finely wrought and powerful habits. We always produce more than we can consume, and it is the job of experimental technoscience to keep finding new patterns of consumption, and, thereby, new patterns of production. Habits are thus for Peirce both produced and productive. They are more or less the tools and instruments that Dewey was later to spotlight in the 1903 Studies in Logical Theory and in the 1916 Essays in Experimental Logic.

Now Peirce not only avoided the language of Dewey’s Instrumentalism, but in fact criticized Dewey’s instrumentalized theory of inquiry.12 His response to Dewey’s 1903 Studies in Logical Theory was to accuse Dewey of lack of self-control, adding that perhaps it was because Dewey had become corrupted by having lived too long in Chicago. But when Peirce speaks of the things he calls “real,” he, like Dewey, does not take them to be independent of all thinking, but only independent of any particular way of thinking about them. In “How to Make Our Ideas Clear” he writes that “reality is independent, not necessarily of thought in general, but only of what you or I or any finite number of men may think about it . . . and . . . on the other hand, though the object of the final opinion depends on what that opinion is, yet what that opinion is does not depend on what you or I or any man thinks” (5.408). Understood in the context of his characterization of technoscientific methods, this just means that the result of an experiment, qua general, does not depend on it being replicated in any particular experimental situation, though it must be replicable in some experimental situations.
I passed rather too quickly over Peirce’s contention that self-controlled inquiry is iconic, so let me return to that matter, for it is an essential part of Peirce’s account of production. He argues that perception is generally beyond our control; that we do not choose what we perceive. After the production of the *entia rationis* which Peirce calls “hypostatic abstractions,” a new iconic situation is present. This, in fact, is the point of the work that leads to the hypostatic abstraction. “All necessary reasoning without exception is diagrammatic. That is, we construct an icon of our hypothetical state of things and proceed to observe it. . . . We not only have to select the features of the diagram which it will be pertinent to pay attention to, but it is also of great importance to return again and again to certain features” (5.162).

After the construction of the diagram or icon, in other words, the experimenter is then able to perceive certain things about the new situation that were not theretofore present or (if it is later determined that they were present) were not obvious. But since perception is not generally a matter of self-control, since it is a matter of habits already autonomized, doesn’t this mean that the task of the logician or scientist is just to be a keen observer rather than a “producer”? This is to a certain extent the case. But the qualifier “generally” is essential to understanding Peirce’s position on this matter, since in certain circumstances perception is in Peirce’s view linked to a kind of controlled conduct, a controlled product.

His example (5.183) is of what we today know as the favorite figures of the gestalt psychologists. Looking at a “duck-rabbit” or “face-vase,” it is as if the perceiver gets “tired” or “bored” with seeing it one way, then switches ground and figure or sees the figure as rotated. Once this is done, such switching may be a matter of control, as it is for those of us who are familiar with the work of the gestalt psychologists (or the artists, such as M. C. Escher, who have been influenced by the gestalists). In such cases, we can generally choose one percept over another, and this is where judgment and production enter into the situation.
Another way in which perception is linked to control lies in the transformation of the icons or diagrams. Peirce writes of “such a transformation of our diagrams that characters of one diagram may appear in another as things” (5.162).

The meanings of the hypostatic abstractions just discussed are thus habits. They mean that the person who interprets them will be inclined to do certain things under certain conditions. But they are also *produced* or manufactured. Peirce argues that the certainty of pure mathematics is “due to the circumstance that it relates to objects which are the creations of our own minds” (5.166). But what of the fact that mathematicians speak of “discoveries” rather than “products”? In one sense, self-control has led to the construction of the mathematical objects; but the mathematician may exhibit the surprise of discovery because weak or loose reasoning had led her or him to think such objects impossible or unlikely, or not even to think of them at all.

Now habits are for Peirce, as they were for Dewey, “Janus-faced” entities. This is what Peirce has in mind when he refers to them as inhibitions *and* coordinations. One face is their autonomy. William James characterized habit as the “flywheel” of society and of the inquiry undertaken by individuals. It is in this sense that a habit is a *terminus a quo*. It is the dead but lingering force of momentum—a flywheel. In this sense a habit may function unconsciously, and this is the popular sense of some activity being called “habitual.” This is the sense in which habits are “transparent” in use: they involve a certain autonomy. We do not have to think about tying our shoelaces or remember how to use the number two.

The other face of a habit involves the way in which it is formed. This is the function of habit as *terminus ad quem*. A habit has “to be formed” as a part of a successful piece of inquiry. A habit is in this sense a goal or ideal which is solidified as a part of the puzzle which Peirce thinks science continues to piece together. If action (of which inquiry is a species) is properly controlled, then its products are the habits he calls “final logical interpretants.” Thus the “real and living logical conclusion” of a piece of reasoning is a habit (5.491). Logical
habits as artifacts in peirce and dewey

interpretants are products in a way in which actions can never be, because unlike actions, they are general: they are general in the sense that they are enduring instrumentalities for future action, and they are general in the sense that they are able to operate not only with respect to this or that thing, but with respect to a whole class of things.

In 1952, George Gentry published an essay that shed a great deal of light on these logical interpretants. It was included in the first series of *Studies in the Philosophy of Charles Sanders Peirce*. He pointed out that Peirce’s writings have two very different kinds of logical interpretants. Early in his career, Peirce held the view that there is an infinite continuum of signs such that there is neither a “first” nor “last” object which is not a sign of something further. More specifically, in his early work Peirce rejected the view that there is a terminal logical interpretant, or a logical interpretant that requires no further interpretant of the same category, that is, a sign. In his early work, Peirce argued that the interpretant of every sign is itself a sign of something further, that it has a logical interpretant—and so on to infinity.

These logical interpretants of intellectual concepts are what are best termed “quasi-habits.” Like habits, they are conditional. Peirce tells us that they are associated with a “conditional future,” and that in mathematics “they are as plenty as blackberries” (5.483). Their conditionality also lies in the fact that they may or may not lead to action. But they are also like habits in that they are general. He tells us that they are “either general or intimately connected with generals” (5.482). They are not actions, which are particular, but ways of acting, which are general: they are rules of action.

But Peirce eventually abandoned this view for another one. Or, put perhaps more accurately, he added something to his earlier view which made it function better. In addition to there being logical interpretants which themselves have further logical interpretants, Peirce began to write of logical interpretants that are “ultimate” or “final” or “veritable.” He realized that what he had developed up to that point were just “quasi-habits” that lacked something that habits must
possess: they must possess what Gentry called “ultimacy” or “terminality” with respect to an interpretative transaction. A terminal, i.e., an ultimate or final interpretant of the logical species, is, as Peirce conceived it, an interpretant characterized by both conditionality and generality, which itself does not presuppose or require an interpretant in the proper sense.”

Whereas concepts can still function as “ordinary” logical interpretants, such concepts are now subordinated in terms of their importance to “final” logical interpretants, which are habits in the full sense. As Peirce puts it in his “Survey of Pragmaticism,”

The concept which is a logical interpretant is only imperfectly so. It somewhat partakes of the nature of a verbal definition, and is as inferior to the habit, and much in the same way, as a verbal definition is inferior to the real definition. The deliberately formed, self-analyzing habit—self-analyzing because formed by the aid of analysis of the exercises that nourished it—is the living definition, the veritable and final logical interpretant. Consequently, the most perfect account of a concept that words can convey will consist in a description of the habit which that concept is calculated to produce. But how otherwise can a habit be described than by a description of the kind of action to which it gives rise, with the specification of the conditions and the motive? (5.491)

The production of the final logical interpretant is a matter of self-control—the control that is exercised by means of judgments of perception insofar as that is possible, and the checking of consequences against certain habits of action which he calls “leading principles.” The production of the final logical interpretant involves recourse to concepts and activities—to thinking and to doing. But the ultimate products of Peirce’s Pragmatism are neither concepts nor activities: they are habits which are not themselves necessarily signs of something further.

Peirce thought that technoscience is a habit of changing habits, and he called this a “plastic” habit. He argued that the Darwinian view, namely that “the whole gulf [between the simplest protozoa and
human beings] has been bridged by imperceptible variations at birth,” was inferior to the view of Lamarck, namely that “it is exercise and the consequent growth which by imperceptible steps has transformed the Moner into Man.” In short, some tychistic event occurs which is transformed by specialized and focused energy into new habits.

Peirce thought that evidence for the Lamarckian version of evolution was everywhere in the scientific-technological world.

Some invention like that of writing, or printing, or gunpowder, or the mariner’s compass or the steam engine, in a comparatively short time changes men very profoundly. It seems strange that we who have seen such tremendous revolutions in all the habits of men during this century should put our faith in the influence of imperceptible variations to an extent that no other age ever did. Is it because we have so little of Asiatic immovability before our eyes that we do not realize now what the conservatism of old habit really is?

Technoscience thus presents for Peirce the clearest exhibition of the ways in which a habit is produced: “It is formed by the interaction of the two elements, a . . . mind of common origin with the universe, and facts which are selected by that mind as its suitable pabulum.”

Peirce’s attention to the instruments of scientific technology offers a bridge to the second conclusion I wish to draw from his treatment of cognition, practice, and production. Very briefly put, it is that Dewey’s Instrumentalism is happily rooted in the soil of Peirce’s account of the production of habits. Like Peirce’s habits, Dewey’s instruments are conditional, general, and final. They are conditional in the sense that they are available for use if the proper situation presents itself. Like tools in a toolbox, it is not that they must be used, but that they are available for use. They are general because they are applicable to whole classes of situations, and those classes are defined by and further refine their associated tools. There is a class of objects to which a hammer can be applied; but if an object is included in that class to which the hammer is not fully applicable, then, given the
proper motivation, the hammer can be redesigned. They are final because even though they may operate as signs of something further, there is no requirement that they do so: they terminate in action that is satisfactory, and that is all that can be asked. For Dewey, tools perform certain types of work, and if they perform satisfactorily there is no need to develop them further, to inquire into their extended meanings.

In sum, both Peirce and Dewey reached escape velocity with respect to the traditional and still-raging debate between the cognitivists and the praxicalists. They accomplished this by measuring human development and accomplishment in terms of neither ideas, nor activities, but in terms of habits produced. Their root metaphors went beyond theory and practice all the way to production.

Viewed from a slightly different angle, the insights of Peirce and Dewey into the nature and function of habits provides support for classical Pragmatic post-postmodern solutions to the two difficulties of “official” postmodernism that I identified in chapter 1. First, because of the ways in which Peirce and Dewey link the experimentalism of the technosciences to the quotidian production of habits, they can account for objectivity. Second, because of their arguments on behalf of what Peirce termed the final, veritable, logical interpretant of a sign, they have the means to terminate processes of infinite self-referentiality, redescription, and reinterpretation in ways that can produce reliable habits which can serve as platforms for action, should the need arise.