Dewey on Arts, Sciences and Greek Philosophy

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1. Introduction

In this chapter, I ponder John Dewey's efforts to understand science in terms of both the practical and fine arts; and how his writings on art and science suggest that Plato and Aristotle correctly identified conditions under which things become visible to cognition, even while not satisfactorily answering how these conditions can be met. Since Dewey understood aesthetic experience as a dramatic process, I also discuss how visual experience is imbued with narrative and therefore temporal structure, and the importance of this to understanding and learning.

2. Intelligible Appearance, Modern Science and Art

Dewey wrote that "[t]he doings and sufferings that form experience are, in degree to which experience is intelligent or charged with meanings, a union of the precarious, novel, irregular with the settled, assured and uniform – a union," he added, "which also defines the artistic and esthetic" (1925: 358). "Doings" here meant actions carried out; "sufferings," the effects undergone in consequence. Thus a blind woman pushing her cane into the world meets non-haphazard resistance and thereby undergoes meaningful consequences of her actions, and perceptual experience of the world emerges. By emphasizing the union between the novel and assured, Dewey further stressed that experience is pallid and thin when there is little free play; but simultaneously that meaningful connections are lacking when actions are unvarying and mechanical, so that things lose significance and withdraw from notice.

For Dewey, the conditions under which we have meaningful experience are also conditions under which "we become capable of perceiving things instead of merely feeling and having them" (1925: 182). The distinction might be compared to the difference between seeing a candle flame as a candle flame and merely being aware of a fluttering smear. In the first instance, we do not merely register *qualia*; we discern what the thing is; and in traditional philosophical parlance discerning the "what is" means discerning "essence". It will be recalled that *eidos* – usually translated as form and occasionally as essence – is a Greek word that "basically means 'something that is seen'" (Novak 2004: 77). It is a word, moreover, that Plato poetically and brilliantly used to signify that which allows the "being" or "what is" of a thing to *appear* to the knowing mind. Brilliantly does not mean unproblematically, however; but while Plato's concept of *eidos* entails a theory of knowledge Dewey criticized, he was not unsympathetic to classical Greek outlooks. In fact, Dewey favored concepts of experience articulated by Plato and Aristotle, albeit giving experience more value than his predecessors. He retained the classical opposition to nominalism, though did so in non-classical ways – a point addressed later. He also seems to have accepted the classical view that things can only appear intelligibly if the following criteria are met: There must be structure, unity and endurance.

Dewey's discussions of experience – particularly aesthetic experience – illustrate this last point. They do so by showing experience and therewith intelligible appearance – which Plato's concept of *eidos* equates to form – emerge when doings and undergoings are linked in worldly action, integrating in much the same way incidents in a story cohere into a *single*, narrative *structure* that *endures* over time. Thus a focal point in a painting pulls other elements into a more coherent unity; and when we reach the climax of a play, earlier portions unite and gain significance in comparable ways. By virtue of this, constituents in things experienced aesthetically do not appear as isolated, fleeting bits, here now, gone an instant later. They gain stability within a temporally extended and integrated narrative-like structure.

Dewey gave the following example. Imagine a painting "in which masses point upward". A "first impression" may be "that of movement from below to above". If the painting has horizontal rhythms, our eyes are also drawn "across the picture," even while "the intensity remains in patterns that rise". Suppose further that a heavy mass dominates a lower corner, and "that instead of fitting into the vertical patterns," this mass "transfers attention to […] horizontally disposed" features in the composition. When our eyes meet it, "there is a halt, an arrest, a punctuating pause". However, this does not "operate as a disturbing interruption" or "break in experience," but rather "as a re-direction of interest and attention" and therewith an "expanding [of] the significance of the object" (Dewey 1934: 174). If the experience is truly aesthetic, moreover, it will be one that pulls the capacities of our body into unity. Here, wrote Dewey, a "tendency to turn the eyes and head is absorbed into a multitude of other impulses"; and while "the eye is primarily active, […] the color quality is affected by qualities of other senses overtly active in earlier experience" (1935: 175), so that we can "perceive, by means of the eyes as causal aids, the liquidity of water, the coldness of ice, the solidity of rocks" (1934: 123). Thus painting appears unified because of the way it coordinates our sensitivities and doings, so that they "become members of a single act" (1935: 256; for review, also see Crippen 2014; Crippen [forthcoming]).

The unity of the painting also emerges because the pattern of activity it brings about has dramatic pauses, culminations and more. Aesthetic experience is accordingly temporally extended and narrative-like, and interestingly, it satisfies the earlier mentioned classical criteria for intelligible appearance. However, while sharing the classical view that structure, unity and endurance are pre-conditions of things appearing to us, Dewey did not equate unity to universals binding the many into one, nor endurance to immutability. Instead, change, irregularity and instability help bring unity, structure and endurance. Hence a movie endures as a unity largely because of the way it changes and builds, whereas mechanical and unchanging intervals tend to lose significance, coherence and withdraw from notice. Paintings are similar.

By emphasizing change as a precondition of things appearing intelligibly, Dewey shifted away from the traditional Western philosophical view that the intelligible and therewith the knowable are beyond change. Some might be inclined to ask "So what?" on the grounds Modern era science has done the same. Yet this conclusion is somewhat misplaced. After all, Isaac Newton advanced laws meant to hold across time and place – laws, therefore, that are immutable and universal. Furthermore, though Newton partly derived his laws from observation, they do not exactly describe motions we could perceive through the senses.

Instead, they capture how planets would theoretically move if they were point-like objects, which is to say, under ideal conditions never observed. Newton thus described physical reality in terms of immutable and universal patterns only realizable under ideal conditions in which all materiality is subtracted away – conditions, therefore, never actualized. Other physicists have done similarly, with Galileo deriving kinematic laws by first observing rolling marbles, and then imagining their motion on non-existent frictionless surfaces, which recalls Aristotle's observation that inquiries cease to deal with material nature and consequently to be natural science to the extent they become mathematical.[27]

At the same time, the Modern emphasis on experimental science has given credence to the view that we come to know reality by actively manipulating it. Dewey argued, in particular, that this involves an adjustment to the classical tendency to think *tekhnē* a lesser form of knowledge than *theōria*, that is, theoretical or contemplative knowledge. In the texts of Plato and Aristotle, *tekhnē* encompasses everything from statecraft to the medical arts to the art of war, calculating, ship piloting, playing musical instruments, painting, making shoes and managing money. It entails knowledge about certain kinds of objects, but these objects of knowledge are not objectives at which it ultimately aims (see Aristotle *Eud*: 1216b16-18; *Phys*: 193b10-20). Awls, leather and even shoes are objects of knowledge for the shoemaker, but the objective of the shoemaker's art is not to know what these things fundamentally are, but rather to know how to work available materials into shoes.

According to Dewey, the rise of Modern science entailed "a generalized […] adoption of the point of view of the useful arts" (1925: 133) and therewith a reordering of classical Greek values. An initial point to remember is that "science" – from Latin *scientia* for "knowledge" – traditionally refers to any organized field of knowledge. Traditionally, moreover, it has designated fields of inquiry held in high esteem. Hence when Christianity became dominant, Christian theology became a science. Then, when systematic observation and experimental study of material nature became a preferred approach, it was designated as science. So if modern science adopts the point of view of the useful arts, it follows that reverence for *tekhnē* has grown – and today many do esteem technology (i.e., useful arts). Dewey suggested, however, that we express esteem more in deeds than words, for we often classify disciplines as "scientific" with the intention of distinguishing them from arts. Dewey obviously thought this distinction overdrawn, and offered a number of reasons for thinking so.

First, scientific observation is carried out with the aid of instruments or tools by means of which we work upon things; and when workings are skillful, imaginative and intelligent, directed towards an end and efficacious at producing some result, they fall within the scope of what we call "art". Dewey explained that scientists study an object by bringing "some energy to bear upon [it] to see how it reacts" (1920: 113) or by "deliberately alter[ing] the conditions under which we observe [it]" (1929: 85), as when using a telescope to redirect light. Aristotle characterized art as a kind of applied knowing that works in the "sphere of coming to be" (*An. Post.*: 100a9), and contemporary scientists, through application of art, introduce "changes which will elicit some previously unperceived qualities" (Dewey 1929: 87).

[27] For elaboration, see Book I, lesson 9 in Thomas Aquinas's *Commentary* on Aristotle's *Metaphysics*.

Second, scientists do not typically build or learn theories with the final objective of securing them as objects of knowledge. Rather, their objective is securing means through which observable phenomena can be rendered intelligible. Thus whereas knowledge of Platonic forms – assuming, for a moment, that forms have being – is knowledge of reality, knowledge of scientific theories is possession of instruments that work to make reality knowable or at least intelligible (Dewey 1929: 205–206). So while it is perhaps going too far to equate scientific theories, say, to the shoemaker's knowledge of leather, the two share an important commonality: both are used for working and making. The shoemaker's knowledge is applied to the making of shoes; scientific theories as sense-making instruments; and neither are complete until they work upon and re-form materials, thereby making them appear in new ways.

Scientific theories, moreover, structure how scientists directly and indirectly work upon objects of investigation and thereby "shake loose" heretofore "unperceived qualities" (Dewey 1929: 87). In addition to and by virtue of structuring hands-on work, theories also structure how scientists make objects – both conceptual and physical – relate. Therewith they structure how given fields of inquiry knit together into coherent worldviews or narratives. The Copernican theory that the Sun is at rest literally changes how we must picture relationships between celestial objects if we are to picture them coherently at all. The point is that scientific theories – however they may arise – perform work; they perform what Dewey called "the *work* of art" (1934: 214). In the case of fine arts, this "work takes place when a human being cooperates with [an artistic object …] so that the outcome is an experience that is enjoyed because of its liberating and ordered properties" (1934: 214). And with scientific theories, the work takes place when actions, incidents and objects coordinate into instrumental, which is to say, integral and hence meaningful relationships, so that orderly arrangements cohere intelligibly into appearance.

Dewey believed his understanding of knowledge as art was anti-skeptical in the sense that it "does not commit us to the notion that classes are […] purely mental" or "merely nominal" (1920: 154). It does not because "knowing" means making "a *certain* difference in reality" (Dewey 1908: 47) and conceptual classes are realized in "objective action" (Dewey 1920: 154). The general distinction, for example, between hard and softwood is realized in how carpenters *generally work* and *build* with lumber. Very literally, therefore, the distinction is based in human *constructions*. Yet we do not designate houses and other constructed entities as figments of imagination, so Dewey warned against rejecting conceptual distinctions as such simply because they reflect worldly arrangements we help build (1925: 181–191). Like artists, we confer "upon things traits […] which did not *previously* belong to them." Complaints that this makes knowledge a "perversion" reflects "a confusion of tenses. Knowledge is not a distortion […] which confers upon *its* subject-matter traits which *do* not belong to it, but is an act which confers upon non-cognitive material traits which *did* not belong to it" (Dewey 1925: 381).

3. Implications on Teaching

So how might all this translate into classroom practices? To begin with, the forgoing account reaffirms that things are not visible to the knowing mind if there is no unity, endurance and structure. In contrast to older views, however, it also suggests things only take such form if there is change, yet artful and not just random variation. In line with more recent approaches, therefore, it affirms that knowledge involves mucking around. By means of this, we change the world and produce outcomes that change us. Thereby we learn. The imaginative experimentations of impressionist painters, for example, open us to seeing light in new ways, and something analogous occurs in experimental science.

Interpreting this mucking about into what counts as knowledge means, in effect, arranging it into dramatic form. This point is illustrated in the earlier example of the painting. But likewise, when students engage in learning by doing, whether they are putting car engines together or doing scientific experiments, comparable effects are achieved. Making sense of an experiment means telling a story, and putting an engine together or even learning how it is put together can be experienced as a story. This view, which is typified in Dewey's claim that science and knowledge are art, resonates with the prevailing view that we learn more from doing than mere listening or reading (Sousa 2006: 95).

Regarding images and visual learning, Dewey's account offers a viewpoint that has received relatively little attention: namely, that pictures, when they engage us in a relatively full manner, do not merely operate on a purely cognitive or mental level, but engage a variety perceptual faculties, along with the motor capacities. I therefore conclude with a plea: that when pondering visual aspects of learning, we consider how images can motivate a total body process. That is, we ought to consider how the visual is never merely visual, how it not only mobilizes other perceptual faculties but movements too; and how, by developing visual tools along such lines, we might become better teachers.

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