

DEWEY'S *LOGIC*: REVIEWS AND CRITICISMS

LA LÓGICA DE DEWEY: RESEÑAS Y CRÍTICAS

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ABSTRACT

I draw attention to some common misunderstandings among Dewey's critics, as well as to some significant interpretive clarifications by commentators who viewed his work in a positive light. I have found it instructive to look back at two sources as an aid to understanding what his critics found so puzzling about his work. First, there are the reviews in professional journals that appeared in the wake of the publication of the *Logic*. Second, there are essays by some of his critics included in the *Library of Living Philosophers* volume published as a part of the celebration of his 80th birthday in 1939. In addition, I occasionally call on ancillary remarks and interpretations from other sources when I think they will help to clarify a point.

KEYWORDS: Dewey, logic, pragmatism, realism, idealism, philosophical fallacy, propositions, naturalism, fallibilism, truth, inquiry

RESUMEN

En este artículo señalo algunos malentendidos comunes en los críticos de Dewey al igual que algunas aclaraciones interpretativas significativas de comentadores que contemplaron su trabajo bajo una luz más favorable. He considerado que sería esclarecedor recordar dos fuentes que ayudarían a comprender lo que sus críticos veían tan desconcertante en su trabajo. Primero, están las reseñas en revistas profesionales que aparecieron tras la publicación de la *Lógica*. Segundo, hay ensayos de algunos de sus críticos incluidos en el volumen de la *Library of Living Philosophers* que fue publicado como parte de la celebración de su 80º cumpleaños en 1939. Además, en ocasiones

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recurso a argumentos e interpretaciones adicionales que provienen de otras fuentes cuando creo que ayudarán a dejar más clara una idea.

PALABRAS CLAVE: Dewey, lógica, pragmatismo, realismo, idealismo, falacia filosófica, proposiciones, naturalismo, falibilismo, verdad, investigación

Dewey's *Logic: The Theory of Inquiry* is arguably one of his most difficult works. Viewed through the lens of its reviewers, it is also arguably one of his most misunderstood. I here draw attention to some common misunderstandings among Dewey's critics, as well as to some significant interpretive clarifications by commentators who viewed his work in a positive light. I have found it instructive to look back at three sources as an aid to understanding what his critics found so puzzling about his work. First, there are the reviews in professional journals that appeared in the wake of the publication of the *Logic*. Second, there are essays by several of his critics included in the *Library of Living Philosophers* volume published as a part of the celebration of his 80th birthday in 1939. In addition, I will occasionally call on ancillary remarks and interpretations from other sources when I think they will help to clarify a point. All references to Dewey's published work will be to the critical edition edited by JoAnn Boydston and published by Southern Illinois University Press. References to his *Correspondence* will be to the four volumes edited at the Center for Dewey Studies and published online by InteLex Corp.

REALIST CRITICS

In general, as a feature of their commitment to philosophical realism, some of Dewey's critics embraced the "spectator" theory of knowledge. According to this view, knowledge is conceived as a passive relationship between a knower and what is known, and the knower is said to conceptually "mirror" the known object. These reviewers consequently had difficulty with the implications of Dewey's "philosophical fallacy," that is, his criticism of the idea that eventual functions of inquiry could legitimately be converted into antecedent existences. Avoidance of the philosophical fallacy is an essential component of Dewey's *Logic*.

There were other realist critics who were concerned with what they regarded as Dewey's neglect, or even undercutting, of formal validity. They tended to take offence at Dewey's treatment of propositions as neither true nor false, but instead valid or invalid, relevant or irrelevant, with respect to the context of inquiry.

They failed to see that Dewey had broken with the Aristotelian tradition of logic that threaded itself through medieval European scholasticism, Bolzano, Brentano, Frege, Russell and beyond as a part of his commitment to an alternative biological/cultural approach to the foundations of logic and other problems of philosophy. Departing from the Aristotelian tradition, Dewey's propositions did not bear truth values because they were means, or proposals, to be tried out with a view to the resolution of perceived difficulties.

Dewey's approach is both radical and complex, but I suggest that three aspects stand out. First, Dewey's work in the psychology of the reflex arc demonstrated the importance of selective interest—put another way, the intimate connections between meaning and action—that informs the adjustments of organisms to environing conditions, thus framing the basis for his formulation of the philosophical fallacy. Second, Dewey wanted to do for philosophy what Darwin had done for the notion of fixed species: he therefore treated logical objects, and concepts more generally, that is, contextually and functionally rather than as fixed and timeless (as they are presented in many logic texts). Third, drawing on the work of William James, he reconstructed the tradition of British empiricism by further developing James' idea of a radical, immediate empiricism which avoids the problems of sense data theories and other versions of what he called a “traditional particularistic empiricism.” Although I will not discuss them directly here, I suggest that three of Dewey's early essays are among the basic guides to understanding the radical nature of his logic, or what C. I. Lewis called his “analysis of the constructive thought-process”: *The Reflex Arc Concept in Philosophy* (1896), *“The Postulate of Immediate Empiricism”* (1905), and *“The Influence of Darwin on Philosophy”* (1909).

BERTRAND RUSSELL

In his essay on Dewey's *Logic* in the 1939 *Library of Living Philosophers* volume, Bertrand Russell appeared to be straining to grasp the details of Dewey's work in terms of his own project. Russell's logical atomism is arguably a version of what Dewey termed “traditional particularistic empiricism.” (Dewey 1988: 20; LW14:20) It is not necessary to look far to discern the source of Russell's difficulty. He was still working with a pre-Darwinian model whose central element was formal validity, whereas Dewey's project was in part a genetic account of the ways in which logical tools emerge from a biological/cultural matrix and function as significant factors in ongoing organic adjustment to enveloping conditions.

As Dewey put the matter in his discussion of forms accruing to materials by means of production in the arts, "... logic itself had to wait until various arts had instituted operations by means of which crude materials took on new forms to adapt them to the function of serving as means to consequences." (Dewey 1986: 370; LW12:370)

Although the development of Russell's thought is complex and remains a subject of considerable debate, as late as 1959 he was apparently still defending a version of logical atomism. (Pears 2010: ix-x) The development of his various accounts of propositions is also a matter of continuing discussion among historians of logic.

Although it has had an important place in mainstream philosophy, Russell's logical atomism and his treatment of propositions had very little in common with Dewey's richer and more comprehensive project. In its most basic form, Russell argued that truths are dependent on atomic facts, and that those facts are dependent on individual entities that have certain properties, either individually or in relation to other entities. The task of logical atomism would be analysis of these entities and their complexes. Propositions in logic would be true if they corresponded to those entities and complexes, and false if they did not. Russell's logic was thus analytic and relied on a form of representational realism whereas Dewey's logic was genetic, organic, and pragmatic.

Faced with this disconnect, Russell settled on ridiculing what he called Dewey's "holism" (his characterization of what Dewey called a "situation") as so broad (Russell 1939: 139) that it is unable to "give rise to science or to any empirical knowledge." (*Id.* 142) He accused Dewey of holding a type of idealism. In his response, Dewey focused on one of Russell's remarks as "almost humorous." (Dewey 1988: 31; LW14:31). Russell: "We are told very little about the nature of things before they are inquired into..." (Russell 1939: 139).

Russell scoffed at Dewey's notion of ongoing organic adjustment by attention to the relation of means to ends as a basis of logic, complaining that he, Dewey, had abandoned the notion of truth. "There is therefore no end to the process of inquiry, and no dish that can be called 'absolute truth.'" (*Id.* 147) He was correct, of course, that Dewey's logic had no place for absolute truth. But he failed to see that for Dewey processes of inquiry have legitimate termination points defined as the settlement of belief. At those nodes there is no further inquiry required until novel factors intervene to unsettle the situation. Since in Dewey's view the raw material of inquiry is "unknowable," Russell wrote, "so, in Dr. Dewey's system, nothing can be fully known except the ultimate result of 'inquiry.'" (*Id.* 154) This

statement is all the more remarkable because, putting aside some of the more exotic details, the limited sense in which the “raw materials” of Dewey’s inquiry are “known” is similar to Russell’s “knowledge by acquaintance.” In neither case is there knowing in its more robust sense.

Russell’s remarks on knowledge by acquaintance recall Dewey’s postulate of immediate empiricism. Russell writes: “Acquaintance, which is what we derive from sense, does not, theoretically at least, imply even the smallest ‘knowledge about,’ i.e., it does not imply knowledge of any proposition concerning the object with which we are acquainted. It is a mistake to speak as if acquaintance had degrees: there is merely acquaintance and non-acquaintance.” (Russell 1929: 157) This similarity should hardly come as a surprise, however, since as Russell points out, languages such German and English distinguish between *wissen* and *kennen*: knowing and being acquainted with.

Finally, failing to get any real purchase on the problem, Russell appeared to just throw up his hands. He concluded that Dewey’s views and his own must ultimately be based on “values” that were neither compatible nor even debatable “without begging the question.” (Russell 1939: 156) In his review of Dewey’s 1916 *Essays in Experimental Logic*, Russell had been more specific: “What he calls ‘logic’ does not seem to me to be part of logic at all; I should call it part of psychology.” (Russell 1919: 5) Moreover, “the subject which I call ‘logic’ is one which apparently does not seem to Professor Dewey a very important one.” (*Id.* 6)

Russell’ reading of what Dewey termed a “situation” is particularly obtuse: “I do not see how, on Dr. Dewey’s principles, a ‘situation’ can embrace less than the whole universe; this is an inevitable consequence of the insistence upon continuity.” (Russell 1939:139) But a careful reading of the *Logic* would have revealed an extensive discussion of “the denotative force of the word situation” as an alternative to Russell’s logical atomism. (Dewey 1986:72-73; LW12:72-73) In the next paragraph I offer a condensed version of Dewey’s extended discussion of the way a “situation” functions in his theory of inquiry.

Briefly, a “situation is not a single object or event, or even a set of objects and events, for we never experience nor form judgments about objects and events in isolation, but only in connection with a contextual whole. This... is what is called a ‘situation.’” (*Id.* 72; LW12:72) Moreover, “There is always a field in which observation of this or that object or event occurs. Observation... is made for the sake of some active adaptive response in carrying forward the course of behavior.” As discriminately noticed, the perceived object “is an object of knowledge, but not of knowledge as ultimate and self-sufficient... It is noted or

‘known’ only so far as guidance is thereby given to direction of behavior... [I]t is rightly (validly) perceived if and when it acts as clew and guide in use enjoyment.” (*Id.* 72-73; *LW12*:72-73)

In sum, it appears that Dewey and Russell were so far apart that he, Russell, was unable to get a purchase on Dewey’s project in the *Logic*.

TWO MARXIST REVIEWS: V. J MCGILL AND HERBERT MARCUSE

According to a letter from Sidney Hook to Paul Schilpp (Dewey 2008: 1939.06.12), V. J. McGill, a professor at Hunter College in New York, used his Communist Party name Philip Carter to review Dewey’s *Logic* in the February 1939 issue of *The Communist* (the official monthly organ of the Communist Party in the United States). He first criticizes Dewey’s writing style (thus joining a long list of those who have done so) and warns the reader that Dewey is a bit guarded (unsure? tentative?) in his approach to his subject matter. But he admits that there is a “fighting edge [to] his polemic” and compliments him on his construction of a “logic of inquiry remarkably rich in suggestions.” (Carter 1929: 163) He then proceeds to attack Dewey on several fronts.

First, he faults Dewey for rejecting the correspondence theory of truth. “The deficiency of [Dewey’s] view has been clearly shown by Marxism, which recognizes that truth as a correspondence of knowledge with reality, is progressively attained through the dialectical materialist advance of science.” (*Id.* 164) He does, however, agree (on the authority of Engels—who he says made the point much more clearly) that “isolated propositions are neither true nor false apart from the series and systems to which they belong.” (*Ibid.*) But he objects to Dewey’s “description of a universal proposition as a mere stage of inquiry... or as a mere logical aid to the solution of problems... and [he argues] to deny that truth and falsity are properties of propositions, it is clear that he has pushed his theory to the brink of absurdity.” (*Ibid.*) Following that he criticizes Dewey’s treatment of propositions as “mere means to an end, that is, to another proposition,” adding that “truth, which Marxism has shown to be a reflection of reality, drops out of the picture.” (*Ibid.*) Next, he takes offence at Dewey’s philosophical fallacy. “But inquiry as such does not transform its subject matter. If it did, it could never arrive at knowledge.” (*Id.* 165) For McGill/Carter, Dewey’s alleged subjectivism seemed to be among its many flaws.

Frankfurt School Marxist Herbert Marcuse mounted a more sophisticated criticism of Dewey’s *Logic* in the 1939-40 volume of the *Zeitschrift für Sozialforschung*.

He first presents several pages of an admirably accurate summary of Dewey's book. He recognizes, for example, that Dewey's logic is both material (Marcuse 1939: 221) and temporal (*Id.* 224), and he does not seem at all bothered by Dewey's view that "truth and falsity are not qualities of propositions. Propositions are only mediating steps to reach a judgment with a context of research." (*Id.* 225)

He does, however, criticize Dewey's treatment of the continuity of common sense and science. "Such a hasty unification of theory and praxis must deliver theory in the whole over to a theory-less praxis. Theory is in truth more than methodological doctrine for scientific research. It always transcends the given praxis of what can be—can be not according to the ruling of research alone, but to Reason, Freedom, Right and similar 'metaphysical' authorities... The shriveling of theory to the methodology of scientific experimentation and of praxis to the experimentation itself encroaches onto the theory of society. (*Id.* 226) Given Dewey's profound concern with social issues, it may be that Marcuse has missed Dewey's point that theory and praxis are partners in inquiry in the broad sense of the term, both having their own roles, but both necessary. Marcuse in fact seems to be charging Dewey with a scientistic approach to social issues.

Whereas McGill/Carter had charged Dewey with subjectivism, Marcuse's criticism is that Dewey's *Logic* is "in its decisive moment idealistic." (*Id.* 227) Dewey's inquiry, he writes, "'produces' the world which stands in question for logic. It is a world by grace of science..." What exists, says Dewey, "is in itself indifferent to the demarcations of beginning and end, origin and decline. All whence and whither is 'strictly relative to the objective intent set to inquiry by the problematic quality of a given situation.'" (*Ibid.*)

In this vein he criticizes Dewey's argument that "event" is a term of judgment and not of existence, as well as his concept of causal law as a figure of speech. Marcuse thinks that Dewey had just ignored some of the epistemological and metaphysical problems that his "idealism" had raised, but he does admit that the *Logic* was naturalistic. In a final shot, Marcuse faults Dewey for not filling in the developmental history of the "organic behavior" that he thinks provides the basis for his logic. (*Id.* 228) I suppose Dewey might have responded that such a project would be the remit not of philosophy, but of biology, sociology, psychology, and anthropology, and that from the standpoint of logic, philosophy was for the most part just a consumer in this regard (or perhaps a partner with those fields in developing new tools of inquiry). He does in fact say something like that in the tenth chapter of *Experience and Nature*. Marcuse touches lightly on the issue of praxis, but some readers of these two reviews may have found it surprising that

since Marxism and pragmatism are both understood as “praxis” philosophies there is not more discussion of that important feature of Dewey’s pragmatism.

EVANDER BRADLEY MCGILVARY

Evander Bradley McGilvary’s contribution to “A Symposium of Reviews of John Dewey’s *Logic: The Theory of Inquiry*” published in *The Journal of Philosophy*, reports that Dewey’s philosophic fallacy, left him “perplexed.” McGilvary cites Einstein’s idea of gravity deflecting light, arguing that once tested by existential means, it produced the judgment that “existentially the path of such light is so deflected.” (McGilvary 1939: 564) If this was not an instance of “conversion of eventual functions into antecedent existence,” he writes, “then I must confess I do not know what the quoted phrase means.” (*Ibid.*)

Dewey was familiar with this type of criticism. “Instead of denying that unperceived antecedent conditions are objectives of knowledge... I have very explicitly stated that no problem as to existential matters can be resolved except by inquiries which *ascertain antecedent conditions not previously observed*. I have also then pointed out that such objects do not fulfill the conditions which must be satisfied in a philosophical logical theory as to the *generalized* meaning of the category ‘object of knowledge.’” (Dewey 1988: 49; LW14:49)

For Dewey, the data of Einstein’s theory is not a pre-inquirential fact in the sense alleged by the realists. It is instead developed by tools of inquiry and capable of being utilized in the context of further relevant inquiries. Dewey makes this clear in his discussion of two types of universal propositions in the *Logic*. “A physical law, such as expressed by a relation of abstract characters, is a universal hypothetical proposition.” His example is the law of gravitation. Since the law is expressed as a hypothetical proposition, and since hypothetical propositions do not exhaust all their possible existential conditions, they may have to be modified or even abandoned at some point. Such was the case in the shift from the Newtonian to the Einsteinian theories. The implication here is that in that particular case of inquiry, which involved the ascertainment of certain antecedent conditions not previously observed, there was a re-distribution of the antecedent data, some of which may have been unobserved up to the point that they were required for further inquiry. Inquiry thus produced new data as well as a new theory of gravity, expressed by a new universal hypothetical proposition. It would have been a mistake, therefore, to have treated the eventual function, the new data and a new universal hypothetical proposition expressing a new physical law, as if they had been there all along, prior to inquiry. (Dewey 1938: 394-95; LW12:394-95)

Since this issue has been so widely misunderstood, it is probably worthwhile to highlight Dewey's extensive remarks in response to criticism by his Columbia University colleague Frederick Woodbridge of his position on the conversion of eventual functions into antecedent conditions. Woodbridge's argument appears similar to the one made by McGilvary. Here is Dewey:

Mr. Woodbridge goes on to say, "I conceive the object to exist prior to its being known." I, too, conceive that things had in direct experience exist prior to being known. But I deny the identity of things had in direct experience with the object of knowledge *qua* object of knowledge. Things that are *had* in experience exist prior to reflection and its eventuation in an *object* of knowledge; but the latter, as such, is a deliberately effected re-arrangement or re-disposition, by means of overt operations, of such antecedent existences. The difference between Mr. Woodbridge and myself, as I see it, is not that he believes in the existence of things antecedent to knowledge and I do not; we differ in our beliefs as to what the character of the antecedent existences with respect to knowledge is. While Mr. Woodbridge says "the object exists prior to *its* being known," I say that "*the* object" is the eventual product of reflection, the prior or antecedent existences being subject-matter *for* knowledge, not *the objects* of knowledge at all. (Dewey 1984: 211-12; LW5:211-12)

McGilvary appears to miss the point of Dewey's fallibilism, which holds that scientific conclusions may at one point in time or in one context be invaluable tools for ordering inquiry, but at a later time or in a different context fall into relative disuse because they have been replaced by better tools, or better versions of them have replaced earlier versions. It would a mistake, however, to charge Dewey with idealism pure and simple in this regard, as McGilvary apparently does, since at a particular time Einstein's theory is warranted and is assertable in relevantly similar situations. But it is not a free-standing thing. It is rather a tool that is context-dependent, depending on the nature of the inquiry in which it is employed as tool.

It is important to put realist criticisms of Dewey's *Logic* into historical context. When Dewey was writing about logic in the early decades of the twentieth century, many of his opponents were idealists. By the time of the publication of the 1938 *Logic*, however, idealism had lost much of its influence within American philosophy and elsewhere. The major ongoing philosophical debates then tended to be among proponents of various types of realism or between realists and pragmatists. That Dewey's realist critics continued to accuse him of idealism, however, can be read as a misunderstanding of the "paradigm shift" that pragmatism brought

to the traditional debates between realism and idealism. They failed to see that pragmatism was a philosophical *tertium quid* which incorporated elements of both idealism and realism. In his essay in the *Library of Living Philosophers* volume on Dewey Donald A. Piatt provided an insightful way of understanding this shift. Pragmatism can be read in part as a synthesis of the best features of both realism and idealism.

The enduring truth of idealism is that factuality must be qualified by meanings before we can make judgments about it. The enduring truth of realism is that factuality must have a brute quality and articulate structure of its own before judgments can have relevance and validity. The enduring truth of pragmatism is that, as active organisms, we are in the world and of it, we don't altogether have to acquiesce in facts as they come, we can alter the facts as they affect us by operationally applying our purposes and meanings to them so that they become data for knowledge by becoming data for successful action." (Piatt 1939: 126)

In short, Piatt argues that realists are correct to recognize an idealist strand in Dewey's Pragmatism. What they fail to recognize, however, is that there is also a realist strand and that together the two strands work together to motivate some of the central strategies of Dewey's pragmatism as something new, as it takes account of adjustive activities of organisms.

THE PHILOSOPHICAL FALLACY: A TECHNOLOGICAL ANALOGY

One way of addressing what bothered some of Dewey's critics about Dewey's philosophical fallacy requires a review of the introduction of the 1916 *Essays in Experimental Logic*, where his narrative is informed by technological metaphors. He begins by pointing out that his position is "frankly realistic" in the sense that "brute existences," when they are detected, both set the problem for inquiry and also serve as its test. Then he invites us to consider three things: mineral rock in place (iron ore), refined materials or intermediate stock parts (such as pig iron), and a manufactured article such as a watch spring. Put in terms of a sequence of inquiry, the iron ore would be the raw materials, the "data" that are denominated from the "situation" that occasions inquiry. There are also the refined materials, tools, and intermediate stock parts—habits, previously used tools, blue prints, previously produced objects, *etc.*—and, finally, the manufactured article, the objective of knowledge that is the (relatively) final product, the knowledge object. And "just as the manufacturer always has a lot of already extracted ore on hand for use in machine processes as it is wanted, so every person of any maturity..."

has a lot of extracted data—or... of ready-made tools of extraction—for use as they are required.” (Dewey 1980: 341-42; MW10:341-42)

It would, of course, be a mistake to argue that the conclusion (or product) of a sequence of inquiry (in this case the watch spring), existed antecedently to the sequence of inquiry. What did exist were the raw materials and the refined products, tools, and intermediate stock parts. As for the intermediate stock parts, they are “known,” but in an inferior sense. They are acknowledged, or perhaps better, we are acquainted with them in the sense that they are potentially available as tools, or means, to the end we are pursuing. “The ‘objects’ of ordinary life, stones, plants, cats, rocks, moon, *etc.*, are neither the data of science nor the objects at which science arrives.” (*Id.* 343; MW10:343)

It would be a fallacy, also, to suppose “that pigs of iron pre-existed as pigs in the mine. There is no falsifying analysis *because* the analysis is carried on within a situation which controls it. The fallacy... is on the part of the philosopher who ignores the contextual situation and who transfers the properties which things have as dependable evidential signs over to things in other modes of behavior” (*Id.* 343-44; MW10:343-44)

HANS REICHENBACH

Hans Reichenbach had many positive things to say about Dewey’s work. He even thought that his version of logical empiricism and Dewey’s pragmatism had a lot in common, suggesting that they should work together. For Reichenbach, however, only scientific concepts could be real. He was especially critical of Dewey’s portrayal of secondary and tertiary qualities in the early pages of the *Logic*. “If the pragmatist considers secondary and tertiary qualities as real, he does so because he wants to establish esthetics and ethics as aspects of reality comparable to physics.” (Reichenbach 1939: 178) He allows, however, that “secondary and tertiary qualities may be characterized as objective if we include the observer into the description... With this interpretation as objective however the secondary and tertiary qualities are no longer *qualities* of things, but *relations* between thing and observer, varying therefore with the nature of the observer.” (*Id.* 179) This is the objective basis of psychology, for example, since we can speak of certain persons under certain conditions observing the same subjective things. In one world, then, in the immediate world of experience, we have to call secondary and tertiary qualities subjective. But a second world, the world of inferred relations, is a world in which the qualities will vary with the nature of the observer. In neither

case, Reichenbach argues, can the pragmatist claim to furnish a “compulsory character of esthetic and ethical judgments.” (*Id.* 180)

It appears that Reichenbach missed the point of Dewey’s discussion of tertiary qualities in the early pages of the *Logic*. In the condensed passage below, which I include at length because it offers an excellent insight into the biological/cultural foundations of his theory of inquiry, Dewey provides a thumbnail sketch of the development of the sciences from awareness of a “tertiary” quality, that is, a felt quality that pervades an entire situation, to its expression in aesthetically pleasing products such as pots or textiles, for example, to their objectification in discourse that identifies and manages those aesthetic elements, at which point discourse moves from the aesthetic to the reflective, and thence little by little to technology and the sciences. But, as he points out, “the intended force of the illustration would be lost if esthetic experience as such were supposed to exhaust the scope and significance of a ‘situation.’ As has been said, a qualitative and qualifying situation is present as the background and the control of every experience.” (Dewey 1986: 75-76; LW12:75-76)

The phrase “tertiary qualities,” happily introduced by Santayana, does not refer to a third quality like in kind to the “primary” and “secondary” qualities of Locke and merely happening to differ in content. For a tertiary quality qualifies all the constituents to which it applies in thoroughgoing fashion. (*Id.* 75; LW12:75)

It is more or less a commonplace that it is possible to carry on observations that amass facts tirelessly and yet the observed “facts” lead nowhere. On the other hand, it is possible to have the work of observation so controlled by a conceptual framework fixed in advance that the very things which are genuinely decisive in the problem in hand and its solution, are completely overlooked. Everything is forced into the predetermined conceptual and theoretical scheme. [This would, arguably, apply to Reichenbach’s characterization of Dewey’s “tertiary qualities.] The way, and the only way, to escape these two evils, is sensitivity to the quality of a situation as a whole. In ordinary language, a problem must be felt before it can be stated. If the unique quality of the situation is had immediately, then there is something that regulates the selection and the weighing of observed facts and their conceptual ordering.

The discussion has reached the point where the basic problem of the relation of common sense material and methods to that of scientific subject-material and method, can be explicitly discussed. In the first place, science takes its departure of necessity from the qualitative objects, processes, and instruments of the common sense world of use and concrete enjoyments and sufferings... Colors [e.g.] are signs

of what can be done and of how it should be done in some inclusive situation—such as, judging the prospects of the morrow's weather; selection of appropriate clothing for various occasions; dyeing, making rugs, baskets and jars; and so on in diverse ways too obvious and tedious to enumerate... Gradually and by processes that are more or less tortuous and originally unplanned, definite technical processes and instrumentalities are formed and transmitted. Information about things, their properties and behaviors, is amassed, independently of any particular immediate application. It becomes increasingly remote from the situations of use and enjoyment in which it originated. There is then a background of materials and operations available for the development of what we term science, although there is still no sharp dividing line between common sense and science... (*Id.* 76-77; LW 12: 76-77)

It should by now be obvious that Reichenbach's understanding of tertiary qualities has little in common with what Dewey has in mind. First, Dewey writes of tertiary qualities as different in kind from secondary qualities. Reichenbach lumps the two together. Second, Reichenbach treats tertiary qualities as subjective properties of individuals, or else objective properties of relations between thing and observer, which varies with the individual. For Dewey on the other hand, tertiary qualities are the background in all situations, regulating “the selection and the weighing of observed facts and their conceptual ordering” that eventuate in technology and science. (*Id.* 75; LW12:75)

There were also areas where Reichenbach thought that Dewey was on the right track. In terms of formal logic, he writes, it is proper to start with a two-valued logic –of true and false. But in the real world things are more complex. We correctly speak of more or less true, and there are even multivalued logics. “Now it is very interesting to note that this very idea of probability replacing truth is one of the fundamental ideas of Dewey... [He] knows that inquiry into existence can only arrive at conclusions having a coefficient of some order of probability... Dewey's emphasis upon the fact that empirical knowledge is written in terms of probability and not of truth is one of the great merits of this thoroughly empiricist philosopher, placing him in to one line with C. S. Peirce in the struggle for a theory of science free from the preoccupations of traditional rationalism and absolutism.” (Reichenbach 1939: 176-77)

For his part, Dewey rejected what he regarded as the positivists' reductionism, which he characterized as “traditional particularistic empiricism.” (Dewey 1988:20; LW14:20) He read Reichenbach as having made some progress beyond “traditional psychological empiricism to the point of admitting things as material of direct

experience instead of just separate qualities.” (*Ibid.*) But he thought that Reichenbach had not gone far enough: he had not admitted actions, ways of operating, ways of behavior, as also directly experienced. The problem was his starting point. Reichenbach’s stripped-down empiricism was not sufficiently radical. His starting point had not been the well-rooted “biological/cultural approach to the theory of experiencing” according to which “general ways of behavior is an unescapable datum.” (*Id.* 536-37) In short, Reichenbach was a *logical* empiricist, but Dewey was an *immediate or radical* empiricist.

A DEFENSE OF FORMAL LOGIC: MARCUS SINGER

Marcus Singer’s review in 1951 in *The Philosophical Review* properly noted that Dewey claimed to be constructing a theory of inquiry that is able to “order and account for” the proximate subject matter of logic, *viz.* “the domain of the relations of propositions to one another.” This theory of inquiry would address the “ultimate” subject-matter” of logic, which would be an account of its proximate subject-matter. “Thus Dewey’s *Logic* contains, among other things, a philosophical theory about formal logic.” (Singer 1951, 375) Singer argued that Dewey had not only not done this, but that his project, if taken seriously, would undermine formal logic. He proceeded to quote Dewey at length on the role of propositions as means, but then he suggested that if propositions are neither true nor false, as Dewey claimed, but means that are valid or invalid, relevant or irrelevant, then it “would be impossible to distinguish between a valid deduction, or argument, and an invalid one. (*Id.* 375)

Although Singer noted that Dewey had denied “that the terms ‘true’ and ‘false’ are applicable to propositions,” he nevertheless attempted to demonstrate that if the terms “relevant” and “irrelevant” were substituted into a valid argument in formal logic, then “it would seem that we have to say that an argument is valid or ‘formally correct’ if and only if it is impossible for the premises to be effective and the conclusion ineffective. But then how are we to specify what ‘impossible’ means here?” (*Id.* 378)

Singer thus took on the unenviable task of trying to fit Dewey’s logic as a theory of inquiry, which incorporates both empirical and conceptual material (for example generic and universal propositions), into a formal system, the canons of which are abstract and have no empirical content. The case of contradiction provides a convenient example. For Dewey, contradiction is essential for scientific, and even commonplace, decision making. When propositions that are

valid and relevant to a case contradict propositions that are invalid and irrelevant with respect to that case, that is an indication that the invalid propositions should be discarded and that the problem should be reformulated. We do not say that inquiry has failed, but that certain proposals that would not lead to a successful conclusion have been discarded or reformulated and that inquiry must therefore take a different course. Contradiction is thus an important stage on the way to the settlement of belief, whether in science or quotidian life. "In no case of controlled inquiry is a flat negation of a generalization taken to be final. If it were so taken, a former generalization would simply be abandoned and that would be the end of the matter. What actually happens is that the prior generalization is modified and revised by discovery of the contradictory instance." (Dewey 1986: 197; LW12:197)

For Singer, however, it makes no sense to speak of contradiction without relying on the tools of formal logic, more specifically, the properties true and false. He thinks that Dewey had to do this covertly: "the difficulty in Dewey's theory... has been obscured by certain unconscious shifts in the use of this key term ['valid']. Sometimes 'valid' is used in the sense of true, and at other times in the sense explicitly given it, namely, relevant or effective." (Singer 1951: 384) To interpret "valid" as "relevant," Singer says, undercuts the whole notion of contradiction, since both contradictory propositions in Dewey's logic might well be relevant to a particular inquiry.

But unlike formal logic, Dewey's logic does not treat contradiction as "an inherent relational property." (Dewey 1986: 344; LW12:344) It is instead a condition to be satisfied.

Contradiction is not then just an unfortunate accident which sometimes happens to come about. Complete exclusion, resulting in grounded disjunction, is not effected until propositions are determined as pairs such that if one is valid the other is invalid, and if one is invalid the other is valid. The principle of contradiction thus represents a condition to be satisfied. Direct inspection of two propositions does not determine whether or not they are related as contradictories, as would be the case if contradiction were an inherent relational property. The contrary doctrine is often affirmed, as when it is said that the two propositions A is M and A is not M directly contradict each other. But unless A has already been determined conjunctively-disjunctively, by prior inquiry, some part of A, or A in some relation, may be M, and some other part of A, or A in some other relation, may be not M. The relation of A to M and not M can be determined only by operations of exclusion which reach their logical limit in the relation of contradiction. (*Id.* 344; LW12:344)

There is no indication that Dewey set out to “undermine” formal logic, nor is there any evidence in his *Logic* that his analysis of logical forms would do so. What he was keen to do, however, was to demonstrate that his logic of experience, and ultimately, even systems of abstract formal logic, are grounded in biological/cultural considerations that are pragmatic because they are, and always have been, based on adjustment through selective interest, meaning, and action. The formulae that Singer uses as examples are elements of a strictly intensional formal language whose operations are strictly defined and that *may* be of help in a particular scientific investigation. Ralph Sleeper put it well in the introduction to volume 14 of Dewey’s *Later Works* when he wrote that “Dewey was not trying to deprive the sciences of access to the norms and criteria of formal logic. He was not an antiformalist in that sense at all. It is just that he wanted us to realize how much the norms and criteria of formal analysis owe to the biological and cultural matrix from which they arise. He wanted us to see how little they owe to ‘apart thought.’” (Sleeper 1988: xvii)

Since the truth tables and formulae of formal logic are part of a purely intensional logic, with absolutely no bearing on empirical affairs (unless interpreted), it seems odd that Singer would wish to hold the aforesaid formal logic as the standard by which to measure a much richer logic as the theory of inquiry, a logic of experience that takes account not only of conceptual but also material aspects of inquiry, which incorporates the best insights of traditional idealism and traditional realism, and which, as Piatt suggested, might provide important insights into how we actually think.

Finally, Dewey makes it clear that formal two-valued logical systems have their place, but that it is a mistake to think that *per se* they will be of help to the empirically minded. “For the technical purposes of strictly formal logic an assumption that every proposition is of itself, or intrinsically, either true or false may not do harm. But it is the last view an empiricist can possibly take who is concerned with truth and falsity as having existential application, and as something determined by means of inquiry into material existence. For in the latter case the question of truth or falsity is the very thing to be determined.” (Dewey 1939: 574; LW14: 58)

C. I. LEWIS

Given Singer’s concern to defend the propositional calculus from Dewey, this seems the appropriate point at which to discuss the review of one of the most important logicians of the twentieth century, C. I. Lewis.

Lewis is well known for making major contributions to systems of formal logic. His criticism of the theory of material implication, for example, led him to develop a theory of strict implication. Lewis does not express the type of concern that would be raised by Singer twelve years later. That is, he does not seem bothered that Dewey's logic does not exhibit the rules of formal validity as they are found in abstract systems of formal logic. This is because at one level he knows that he and Dewey were engaged in different projects. Whereas he was primarily interested in what he called "exact" logic, Dewey was interested in a logic as theory of inquiry. In his brief quasi-autobiographical essay published in 1930, he made this clear.

I had long been attracted to certain theses of Dewey's logic—if only he would not miscall 'logic' what is rightly a much wider thing, the analysis of the constructive thought-process! The study of exact logic itself had revealed unmistakably that in every process of reasoning there must be an extra-logical element. This cannot but be so, since from any premise or set of premises whatever an infinite number of valid inferences can be drawn... What is called "*the conclusion*" must be selected from this infinity by psychological obviousness or by some purpose or interest; certainly logic does not dictate it. The direction of thought inevitably belongs, then, to such an extra-logical factor. (Lewis 1970: 12)

It is that "extra-logical factor" that takes Lewis to a deeper level where he expresses his philosophical kinship with Dewey. The title of his review, "Meaning and Action," already indicates that he intends to discuss that factor as pragmatic. He reminds his readers that Dewey rejects the "spectator" theory of knowledge. For Dewey, "[t]he cognitive or meaning situation does not admit of bifurcation into an activity of the knower and a preformed object, which is contemplated." (Lewis 1939: 572) Moreover, "knowing or meaning is integral with other activities which shape the objects to which they are addressed; that meanings themselves serve to frame the situations of action into which they enter, and exercise an operational force upon what they serve to formulate." (*Ibid.*)

Lewis admits that Dewey's rejection of the spectator theory has appeared to many as a kind of indeterminacy principle, *i.e.*, that "thought itself displaces or transforms that which it means or inquires about." (*Id.* 573) But, he adds, "there are no such [future] verifying or confirming experiences which can be predicted without reference to the activity of the subject." (*Ibid.*) Lewis thus confirms that he is on the same page with Dewey about some of the central features of pragmatism and joins Dewey in his criticism those who commit the philosophical fallacy.

Lewis reminds his readers that for pragmatists empirical knowledge is implicitly predictive, and that the meaning of our predictions “must include the significance of the knower’s activity.” (*Id.* 574) For pragmatists, the application of a substantive meaning or the truth or falsity of a proposition must be capable of being tested, and “what tests are pertinent, must be implicit in the meanings themselves.” (*Ibid.*) It would be meaningless to assert some proposition without specifying how its truth could be determined. Such a prediction must be found in future experience. “*But there are no such verifying or confirming experiences which can be predicted without reference to the activity of the subject.*” (*Id.* 575) Lewis thus makes explicit the connection between knowing and doing that is a core element in Dewey’s pragmatism.

In her excellent commentary on Lewis, Sandra Rosenthal goes further afield in his writings to expand on his pragmatism, and thus his agreements with Dewey on the biological/cultural basis even of “exact” logic. “As the canon of deductive inference, Lewis grounds logic, and logical laws such as that of excluded middle and the very necessity of consistency itself in his pragmatism, which reaches down into the very core of his thought... As he summarizes, ‘Practical consistency cannot be reduced to or defined in terms of merely logical consistency. But logical consistency can be considered as simply one species of practical consistency.’” (Rosenthal 2002: 76)

The two previous sentences seem almost tailored to respond to Singer’s concerns about the relation of Dewey’s logic to the logic of formal validity. If we ask about the relation of “exact” logic to Dewey’s “analysis of the constructive thought-process,” the answer is that Dewey’s genetic analysis is informed by the history of biological/cultural organisms who continually adjust themselves to environing conditions, both altering and accommodating themselves to those conditions. In order for such adjustments to work, they must be forward looking and they therefore require practical consistency. What is called the “logical consistency” of formal systems slowly emerged and was developed as a special case of practical consistency.

Rosenthal continues. “Meanings that mind entertains, the logic that explicates such meanings, and mind itself emerge from behavioral responses to the environment in which humans find themselves. Our ways of behaving toward the world around us, which are made explicit in our accepted logic, are those ways of behaving which have lasted because they work. The final ground of the validity of the principle of consistency, as well as the validity of ordinary inference which explicates our meanings in accordance with the principle of consistency, is rooted in a ‘pragmatic imperative.’” (Rosenthal *Ibid.*)

Lewis thus addresses both of the issues on which I have focused in this essay and that occupied Dewey's critics: the philosophical fallacy and formal validity.

ERNEST NAGEL

At least from 1936 Dewey turned to Ernest Nagel for comments on the manuscript of his 1938 *Logic*. (Dewey, 2008: 1936.10.23; Dewey, 2008: 1938.01.22; Dewey, 2008: 1938.03.16) Nagel had attended Dewey's graduate course at Columbia on Types of Logical Theory, and from 1930 he taught courses on formal logic and the philosophy of the natural sciences there. Nagel was a book editor for *Journal of Philosophy* ca. 1934-39 and editor 1939-51. He was also a contributor to the *Journal of Philosophy* review-symposium on Dewey's *Logic*. Among all the reviewers and critics presented here he is perhaps the most familiar with the details that work.

He notes that for Dewey logic does not start with abstract canons, but the reverse: "subject-matter acquires logical traits on being subjected to the differential physical transformations of inquiry." (Nagel 1939: 577) He also notes that Dewey presents his logical theory as an hypothesis, that is, as an outline of the logical principles that operate on a larger stage than their more limited place in self-contained systems of logic and mathematics. It will be up to others to test this hypothesis and to enlarge the project that Dewey has initiated.

Dewey writes about the conditions under which logical forms developed, he suggests, as a biologist might write about the development of various organs of life. Dewey is interested in "the conditions under which the logical forms occur and are developed, their specific functions, their dependence upon and their transformation of their environment, and their own interrelations on the basis of their contributions to the achievement of their objectives." (*Ibid.*)

For Dewey's naturalism, subject matter acquires its logical traits within inquiry and not *a priori*, or what Dewey called "apart thought." Nagel thinks it important to clarify Dewey's terms "logical form" and "logical principles." "[L]ogical form' stands for the *way* in which selected features of a situation in which inquiry occurs *function* in it, while the phrase 'logical principles' denotes a *mode of operation*—and not, as is sometimes the case among students of formal validity, for quasi-grammatical forms or rules." (*Ibid.*) This is an important distinction, since, contrary to the way the principles of logic are usually presented, in Dewey's logic they receive their "adequate theoretical interpretation only by being exhibited in the roles they play within the process of inquiry." (*Ibid.*) Once again we get a statement of the philosophical fallacy: objects of knowledge as outcomes of

sequences of inquiry cannot be identified as existing (as known) antecedently. It might have been good, however, if Nagel had provided some examples.

Nagel notes that some of Dewey's critics have accused him of committing a genetic fallacy, that is, confusing origin and development with validity and logical order. But he dismisses this criticism: it is just that Dewey refuses to treat logical principles as residing in textbooks. He insists, rather, that logical principles receive their sole meaning from their function in inquiry.

He thinks that most other writers on logic have confounded generic and universal propositions. For Dewey, the relation between generic propositions as expressing existential relations and universal propositions as expressing necessary connections parallels his functional correlation between perceptual and conceptual material. He rehearses Dewey's point that the linguistic forms of these propositions do not indicate that distinction, *i.e.*, between generic and universal propositions. They are instead distinguished by their function in inquiry.

Dewey is chided for apparently violating his own rule by using as examples propositions that have been taken out of their functional context. He also complains that Dewey has not been clear about "the force of 'necessary' in the account of universals as involving *necessary* relations between characters." (*Id.* 579) In addition, he warns his readers against identifying generic propositions as "synthetic" and universal propositions as "analytic" as, he says, some of Dewey's readers have already done. He suggests that Dewey has further confused the issue by differentiating between two types of universal propositions: "one kind being exemplified by propositions of mathematical physics (e.g. Newton's law of gravitation), and the other by propositions of mathematics (e.g., two plus two equals four); and he recognizes that the former kind do not exhaust the possibilities, so that they may have to be abandoned under the stress of actual demands, while the latter are apparently free from such limitation." (*Id.* 580) He then suggests that Dewey should clean up this confusion, and he makes some suggestions about how this can be achieved.

First, some propositions "suggested but not derived from empirical material, may be asserted with confidence because the conditions for warranted assertion have been approximated for them. These propositions do not enter integrally into the theoretical framework of science, and their correction or even total abandonment does not involve a radical recasting of that framework; such propositions, [he suggests], may be Professor Dewey's generic ones." (*Id.* 580)

On the other hand there are propositions that gradually acquire a "commanding position in the set of warranted assertions" such that they "reach the status of

leading principles” and “control the general direction of research.” To challenge them would “involve a fundamental overhaul of the theoretical systems of science.” They thus function as “procedural principles, no longer at the mercy of random experiments because suitable devices are provided for obviating apparent contradictions.” (*Ibid.*) He suggests that these propositions are Dewey’s first kind of universals.

Nagel ends his review by challenging Dewey readers to “contribute their share toward completing the fundamental task with Professor Dewey has envisaged.” (*Id.* 581)

ADDENDUM: MATERIAL LOGIC IN 17TH CENTURY SPAIN

As we have seen, Bertrand Russell thought that Dewey was doing nothing he could recognize as logic. “What he calls ‘logic’ does not seem to me to be part of logic at all; I should call it part of psychology.” (Russell 1919: 5) Moreover, “the subject which I call ‘logic’ is one which apparently does not seem to Professor Dewey a very important one.” (*Id.* 6) Even C. I. Lewis hesitated to refer to Dewey’s project “logic,” preferring to call it “a much wider thing, the analysis of the constructive thought-process.” (Lewis 1970: 12)

But Lewis also acknowledges that systems of formal logic are completely intensional, empty of existential import until interpreted, and in an important sense circular. He also acknowledges that he shares Dewey’s insight that human inquiry—problem solving or organic adjustment—is hypothetical, forward-looking, and therefore pragmatic in nature.

The very fact that we qualify abstract systems of logic as “formal,” is a tacit recognition that the term is redundant if there is no “material” logic. One of the reasons that Dewey’s *Logic* was a source of puzzlement, and even offence among his critics was their failure to recognize this point. They did not understand what Lewis called Dewey’s “analysis of the constructive thought-process” as logic because they did not recognize a part of logic as being material.

Dewey was not the first to develop a material logic. An earlier version, inspired by the work of Thomas Aquinas, was developed in seventeenth century Spain by John of St. Thomas (1589-1644, born John Poinset), at the famous University of Alcalá de Henares. A portion of his massive work on logic was translated by Yves R. Simon, John J. Glanville and G. Donald Hollenhorst and published as *The Material Logic of John of St. Thomas* in 1955.

In his Foreword to that volume, Simon reminds his readers that formal logic is generally held to deal with consistency alone. Formal logics usually have

transitivity rules, but if one is asked about the truth of the sentence “Chicago is north of St. Louis and St. Louis is north of New Orleans, therefore Chicago is north of New Orleans,” for example, transitivity rules will not help. The truth of the statement is not a matter of formal logic (alone).

For John of St. Thomas, as for other scholastic logicians influenced by the work of Aquinas, there are things that are understood as they exist in nature. These are “first intentions.” But there are also “second intentions,” which are “properties which accrue to things by reason of the new existences that they enjoy as objects of the human mind.” (Simon 1955: xi) It is among these second intentions that we find material logic. “Intentions belonging to terms of propositions are considered formal or material according as they are preparatory to the consistency of reasoning or to its demonstrative power.” (*Id.* xv)

Simon argues that Aristotle has been widely misread as having constructed only a purely formal logic that deals with the rules of syllogistic inference. The “perfection” of his syllogistic logic, however, as Simon put it, is found in his much-neglected *Posterior Analytics*, which offers a demonstrative, or material logic.

Simon’s remarks suggest some affinities with Dewey’s project. He writes that “Because the second intentions are founded upon the first, the intelligibility of logical entities, directly or indirectly, flows from the intelligibility of things... The foundations of the logical world are aspects of the real world, both physical and mental... [T]here is no a priori restriction on the volume of real inquiry which will be needed in order to achieve satisfactory explanation of even the most familiar of logical objects.” (*Id.* xviii) Further, Simon writes of “properties placed beyond the achievement of consistency, i.e., properties whose laws concern the truth of our argumentations, their certainty, and their explanatory power... Material logic is a possibility if and only if some second intentions are so constituted that their laws be the rules of scientific demonstration.” (*Id.* xi)

The cultural contexts that informed their work were for John of St. Thomas and Dewey, of course, very different. John worked within the tradition dominated by the work of Thomas Aquinas, and Dewey was a post-Darwinian naturalist. Nevertheless, their projects have some interesting things in common. Both see the rules of formal logic as ultimately based on our understanding of natural objects. Both view formal logic as a part of a wider project that is concerned with what Simon calls material logic and what Dewey calls “inquiry into inquiry.” And both argue that the canons of formal logic must be supplemented by material considerations if logic is to be capable of scientific demonstration (although they understood the term “science” differently).

There are also significant differences. For John of St. Thomas's project, "logic, unlike practical command, is not formally concerned with the elicitation of acts, but rather with the setting in order of known objects." (John of St. Thomas 1955: 31) For Dewey's pragmatic project, however, "Propositional formulation is required for control of a way of acting that effects discrimination and ordering of existential material in its function as evidential data." (Dewey 1986: 263; LW12:263) Simon does note, however, with apparent affection, that John had difficulty confining himself to logic in its formal and material senses. Since he was very much interested in reality and a generous teacher, he occasionally yielded to the temptation to digress about interesting issues "in a logical context." (Simon 1955: xviii)

Again, I want to thank Professor Faerna for his invitation to contribute to this volume, and I hope that the foregoing presentation and analysis of some of the reviews of Dewey's *Logic*, both positive and negative, will serve as a worthy prelude to the important essays that follow.

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REFERENCES

- CANDLISH, S. (1996): "The Unity of the Proposition and Russell's Theories of Judgment", in R. Monk and A. Palmer (eds.), *Bertrand Russell and the Origins of Analytical Philosophy*, Bristol: Thoemmes Press, 1996, pp. 103-133.
- CARTER, P. (1939): "Pitfalls of Pragmatic Logic", *The Communist*, no. 18, pp. 163-169. (See McGill, V. J.)
- DEWEY, J. (1980): "Introduction to Essays in Experimental Logic", in *John Dewey: Middle Works, 1889-1924*, vol. 10, Carbondale and Edwardsville, Southern Illinois University Press, pp. 320-365.
- DEWEY, J. (1984): "In Reply to Some Criticisms", in *John Dewey: The Later Works, 1925-1953*, vol. 10, Carbondale and Edwardsville, Southern Illinois University Press, pp. 210-217.
- DEWEY, J. (1986): *Logic: The Theory of Inquiry*, in *John Dewey: The Later Works, 1925-1953*, vol. 12, Carbondale and Edwardsville, Southern Illinois University Press.
- DEWEY, J. (1988): "Experience, Knowledge and Value: A Rejoinder", in *John Dewey: The Later Works, 1925-1953*, vol. 14, Carbondale and Edwardsville, Southern Illinois University Press, pp.3-90.
- DEWEY, J. (2008): *The Correspondence of John Dewey*, 1871-2007, vols. I-IV, InteLex Corp.
- JOHN OF ST. THOMAS (1955): Y. R. Simon, John Glanville, and G. Donald Hollenhorst (trans.), *The Material Logic of John of St. Thomas*, Chicago: University of Chicago Press.

- LEWIS, C. I. (1939): "Meaning and Action", in "A Symposium of Reviews of John Dewey's Logic: The Theory of Inquiry", *The Journal of Philosophy*, vol. 36, no. 21, pp. 572-576.
- LEWIS, C. I. (1957): *Our Social Inheritance*, Bloomington: Indiana University Press.
- LEWIS, C. I. (1969): J. Lang (ed.), *Values and Imperatives: Studies in Ethics*, Stanford: Stanford University Press.
- LEWIS, C. I. (1970): "Logic and Pragmatism", in J. D. Goheen and J. L. Mothershead, Jr., (eds.), *Collected Papers of Clarence Irving Lewis*, Stanford: Stanford University Press, pp. 3-19.
- MARCUSE, H. (1939-40): "Review of John Dewey's Logic: The Theory of Inquiry", *Zeitschrift für Sozialforschung*, vol. 8, 221-28. (trans. Phillip Deen).
- MCGILL, V.J. (writing as P. Carter) (1939): "Pitfalls of Pragmatic Logic", *The Communist*, no. 18, pp. 163-169. (See Carter, P.)
- MCGILVARY, E. B. (1939): "Professor Dewey: Logician—Ontologist", in "A Symposium of Reviews of John Dewey's Logic: The Theory of Inquiry", *The Journal of Philosophy*, vol. 36, no. 21, pp. 561-565.
- NAGEL, E. (1939): "Some Leading Principles of Professor Dewey's Logical Theory", in "A Symposium of Reviews of John Dewey's Logic: The Theory of Inquiry", *The Journal of Philosophy*, vol. 36, no. 21, pp. 576-581.
- PEARS, D. (2010) "Introduction to the 1985 Edition", in Russell, B., *The Philosophy of Logical Atomism*, New York: Routledge, pp. vii-xli.
- PIATT, D. (1939): "Dewey's Logical Theory", in P. Schilpp (ed.), *The Philosophy of John Dewey (Library of Living Philosophers)*, La Salle, Illinois: Open Court, pp. 105-134.
- REICHENBACH, H. (1939): "Dewey's Theory of Science", in P. Schilpp (ed.), *The Philosophy of John Dewey (Library of Living Philosophers)*, La Salle, Illinois: Open Court, pp. 159-192.
- ROSENTHAL, S. (2002): "The Logical Reconstruction of Experience: Dewey and Lewis", in F. T. Burke, D. M. Hester, and R. B. Talisse (eds.), *Dewey's Logical Theory*, Nashville: Vanderbilt University Press, pp. 72-92.
- RUSSELL, B. (1919): "Professor Dewey's 'Essays in Experimental Logic'", *The Journal of Philosophy, Psychology and Scientific Methods*, vol. 16, no.1, pp. 5-26.
- RUSSELL, B. (1939): "Dewey's New Logic", in P. Schilpp (ed.), *The Philosophy of John Dewey (Library of Living Philosophers)*, La Salle, Illinois: Open Court, pp. 137-156.
- RUSSELL, B. (1961): *Our Knowledge of the External World*, New York: W. W. Norton.
- SCHILPP, P. (1939): *The Philosophy of John Dewey (Library of Living Philosophers)*, La Salle, Illinois: Open Court.
- SIMON, Y. R. (1955): "Foreword", in Y. R. Simon, John Glanville, and G. Donal Hollenhorst (trans.), *The Material Logic of John of St. Thomas*, Chicago: University of Chicago Press.
- SINGER, M. (1951): "Formal Logic and Dewey's Logic", *The Philosophical Review*, vol. 60, no.3, pp 375-385.
- SLEEPER, R. (1988): "Introduction", in *John Dewey: The Later Works, 1925-1953*, vol. 14, pp. ix-xxiv, Carbondale and Edwardsville, Southern Illinois University Press.