

Logic, Laws, and Life

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Robert G. Colodny (ed.): Logic, Laws, and Life. Pp vii + 258. Pittsburgh: University of Pittsburgh Press, 1977. Cloth, \$13.95

The physical sciences have long been regarded by scientists and philosophers alike as paradigms of perspicuity. Their theories are publicly identifiable, they exhibit a relatively distinct logic and method, and the relation between their theoretical and observational expressions, if not razor-sharp, is at least clear enough to survive the first assault of critical inspection. In contrast, it is often argued, the social and life sciences are rife with theoretical strife, their theories often so vague as to admit inconsistent interpretations, and their logic so embryonic as to require a private understanding. And, if these were not sufficient insult, it is widely believed that the most these sciences may encourage between their observational and theoretical aspects is an impolitic statistical acquaintance. Logic, Laws, and Life is a collection of contemporary essays which hope to forgive this knavery, and, if not thereby elevating the life and social sciences to scientific knighthood, at least establishing them as respectable pages in the court of rationality.

The contents of the anthology fall into three general categories, each dealing with a natural constellation of issues motivated by the errant sciences. The first three articles concern problems in statistical theory proper. The following three deal with the status of the life sciences vis-à-vis the physical. And the last four are concerned with the nature of the social sciences.

The collection opens, appropriately, with a very readable sketch by L. J. Savage of the received task of statistical theory and its relation to the linguistic (necessarian), frequentist, and personalist (subjectivist) theories of probability. In the second article of the anthology, Ronald Giere forcefully shows that interpretations of probability do not completely determine statistical paradigms, although they may, as Savage argues, influence them. To account for the nature of work in statistical theory since the 1920's in particular, Giere finds it more fruitful to view those efforts as examples of "testing" and "information" models of statistical inference. On his view, in a "testing" model of inference the data involved are the output of a setup designed to test a particular hypothesis; the result of the process of testing is a dichotomous acceptance or rejection of the hypothesis. In contrast, the "information" model of inference produces a direct measure of the bearing of evidence on hypotheses; hypotheses are neither accepted nor rejected, but simply assigned changing weights as new evidence concerning them comes in. (I must say that in this and similar essays Giere has done much to clear the muck from the primary literature in statistics.)

In the third article of the first set, "Consilience in Inductions and the Problem of Conceptual Change in Science," Robert Butts attempts to harmonize the competing strains of statistical modeling through Whewell's highly idiosyncratic theory of consilience. The essay is perhaps the most provincial of papers in this section in the sense that it presumes acquaintance with contemporary literature in the foundations of statistics.

Michael Ruse's "Is Biology Different from Physics?" spiritedly introduces the second major topic of the collection: How are the physical and life sciences related? Ruse considers two classic issues relevant to this question: (a) whether, because of the complexity of biological phenomena, biological laws can hope to look like physical ones, and (b) whether teleological claims can be re-expressed in non-teleological form. Part of Ruse's approach to these problems is both charming and disarming. Let us take, he proposes, that part of biology most like physics, population genetics, and see whether it really behaves like a physical theory. If it does not, then the life and physical sciences must be truly distinct; but if the genetics looks like a physical theory, then at least some

sophistication will have been introduced into the old "reductionist" controversies.

In an essay of somewhat narrower scope, "Teleology and Selective Processes," Peter Machamer examines the question of whether in describing a selective process that operates on a biological entity we have provided sufficient grounds for talking about that entity in teleological terms.

In the third and final essay of the "biology" section, Kenneth Schaffner provides a quite lucid taxonomy of the varieties of reductionist experience. His "Reduction, Reductionism, Values, and Progress in the Biomedical Sciences" should be read by anyone interested in the topic of reductionism in the life sciences--it does much to identify and organize the all-too-frequently muddled issues involved.

The final section of the anthology opens with an article by Hadley Cantril, who argues that psychology is intrinsically holistic, and thus, unlike physics, cannot ignore the relation of every part of experience to all others if it is to succeed as a science. This raises the old question, of course, of whether observation in psychology (or any of the other social sciences) can ever be theory-free. In the second article of this section, "Is Observation Theory-laden?," Abner Shimony tries to show that at least N. R. Hanson's arguments in the affirmative cannot succeed. Robert Efron's remarks in the following "Biology Without Consciousness--and its Implication" try in turn to chart the problems involved in denying psychology the vocabulary of "consciousness." (The latter is perhaps the most impassioned--and least tightly argued--piece in the anthology; it is encouraging, however, to find a practicing scientist concerned about the philosophic respectability of his discipline.) The concluding article of the collection, "Psychology and Societal Facts," by Maurice Mandelbaum, waves a similar anti-reductionist banner, arguing that there are features of an adequate description of societal phenomena which cannot be handled by any theory of individual psychology.

All in all, this book should be of interest to specialist and non-specialist alike, although someone wholly unfamiliar with the issues treated in the assemblage would do well to read a good sketch of their taxonomy and dynamics in an introductory text.

Notes on the Methodology of Scientific Research

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Walter Weimer: Notes on the Methodology of Scientific Research. (Hillsdale, NJ: Lawrence Erlbaum Associates, 1979.) Pp. xiii, 257. Cloth, \$19.95.

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The "modern" posture of thinking is perhaps best exemplified in the attitudes assumed by Newtonian physics, Euclidean geometry, and Baconian science. At the heart of this posturing lies coiled an unquestioned fascination with absolute methodological certainty, pure objectivity, and the logical possibility of harnessing uncompromising control over the "environment" of study. In recent years, this style of thinking has come under increasingly intensive philosophical assault. At issue, of course, is the expression one should give to the "appropriate nature" of Human Reasoning. Dewey is clearly a fore-runner in this critical movement, but we must look to the work of Quine, Popper, Kuhn and Sellars [to mention but a few] to see the full range of momentum being generated against the modern thinkers. And yet, the excitement generated by their ideas has been undercut by a serious deficiency which, until the publication of Weimer's study on scientific methodology, did not promise fulfillment. I am referring to the lack of a radical alternative to modern posturing. "Post-modern" posturing, as we shall call it, simply has not come to expression in the writings of those thinkers at the "leading edges" of the "new" philosophy of science. This all changes, however, with the development of Weimer's position in his Notes on the Methodology of Scientific Research. Not only do we encounter a full-bodied critique of modern posturing [or "justificational" thinking, as Weimer chooses most appropriately to call it], but we bear witness as well to a characterization and defense of the post-modern turn in Philosophy's attempts to give expression to the appropriate nature of scientific methodology. Not only are we led to see how justificational thinking

represents the prevailing "foundation" for our attempts to bring the methodological priorities of scientific research to expression, but we come to see as well the inherent limitations of the justificational posture. Granted, there is little if any novelty in Weimer's characterization and defense of the post-modern turn away from justificational thinking, but his effort does represent a fine synoptic synthesis of the various ways of giving expression to this movement. And of course Weimer does not stop here, for out of his discussion of the inappropriateness of justificational thinking dawns a new frame-work--admittedly limited, but helpful just the same--upon which to hang a "non-justificational" style of thinking. In the process, we are led as readers to a new posturing with respect to such foundational notions as "rationality," "certainty," "truth," "objectivity," and "commitment." Weimer's principle intent is to re-situate these notions into a more appropriate context, and this involves re-thinking the very constitution of their meaning from the standpoint of the new orientation to posturing. And of course it is Weimer's contention that this context is none other than the context which engages human response, so that the new meanings become situated in a notion of Reason which can be subjected to "fine-tuning" from the standpoint of life as we live it, not life as we think it. It is here that parallels begin to develop between the new philosophers of science and the so-called "Continental" thinkers, like Ortega, Heidegger, Sartre and others. In particular, Weimer's discussions of non-justificational thinking implicitly mirror the attitude toward Reason which has been developed in the phenomenological thinking of Maurice Merleau-Ponty.¹ Obviously Weimer and Merleau-Ponty are not saying the same things from the same perspective. Rather, they are saying similar things from different perspectives, and thus it becomes our obligation to bring their respective attitudes under the umbrella of a single philosophical posturing. Even a modicum of success should merit appreciation for Weimer's efforts--especially from philosophers of science--for it will be principally because of his outline for a non-justificational alternative to modern posturing that the road to dialogue between two apparently divergent and uncomplimentary schools of thought is allowed to open out before us. Obviously we must discuss the developments which Weimer's approach brings to expression before going on to characterize the intriguing parallels which I have uncovered between his posture and Merleau-Ponty's. But we shall refrain from going into comprehensive detail, for I feel that the book is clearly written and carefully argued.

I

According to Weimer, previous efforts by the new philosophers of science have succeeded only in scratching the surface of the justificational posture. There has been no concerted effort to bring to expression the "essential unity of the metatheoretical position" which underlies justificational thinking in its essential unity as a style of posturing. This unity can be expressed in the form of a single Thought which guides the entire justificational project: "Truth exists, and can be harnessed--or at the very least, increasingly approximated--by means of justification [and only by means of justification]." ² Implicit in this Thought is a characterization of Truth as something "separate" from Man, for the justificationist needs an unbiased notion of Truth; and this means that "Truth" as a notion cannot be rooted in "human projecting." And of course it becomes imperative that we have this unbiased notion to ground the methodological tools of "prediction" and "probability inference" which most philosophers of science find absolutely essential to scientific activity. Science, after all, is looked upon as "method," as indeed it should be looked upon. But justificationists see this method as lacking the firm footing necessary for the generation of Knowledge. For scientific method to be recognized as a "legitimate source" of Knowledge, it must first be justified. How else can we be sure that the method is infallible! Now, it becomes instantly clear that we can only justify method if we have access to a supreme epistemological authority, and thus the first job of the justificationist is to uncover the essential nature of this authority. But regardless of whether you choose the "intellect" or the "deliverances of sense," you are aiming at one thing only: a justification of scientific method, so as to secure the epistemological ground for pursuing Truth.

The motivation behind the posture of justificational thinking lies in the project of ridding the world once and for all of the anarchy of relativism and the vicious spectre of irrationalism. If it can be shown that the rational way of life is justifiably best, and that Reason's "calling" is nothing short of the "march toward lasting autonomy," then it is also possible to see the efforts of science as a cumulative march toward ultimate convergence with Truth. Now, clearly we must view science as "empirical," since we want to say that it looks at real things, real situations, and explains the essential nature of the

Real. So, again, we need to give expression to the foundational authority, which will ground our access to things now, in addition to Truth. Thus our uncovering of that supreme epistemological authority would rid us not only of relativism and the spectre of irrationalism, but equally well of two questions which, it is interesting to note, have plagued Philosophy since the first advances of justificational posturing: we would need to ask neither how it is that we know things, nor how it is that knowledge claims can be justified, and the business of science would be freed once and for all from the barbs of post-modern criticism. We would set off in search of ever-more "factually relevant" input, and recognize an ever-growing plenitude of truths to be the manifestation of our increasing approximation of the Truth. But of course, as we might well suspect, there is a bit of a problem. How do we ever justify our ultimate Thought, by which the entire is given its guidance? How do we justify the fact that there is a Truth which is somehow accessible by means of justificational approximations? "Well, you have to begin somewhere, don't you?" Yes, indeed. But must we begin with a Thought? And, more specifically, with a Thought of Man as a projection toward the Absolute? Justificationists begin with this Thought because it is the only way they can proceed. Without this Idea, there is no justificational project. But does this mean also that there is no legitimate pursuit of Truth, either? Well, if we are to speak of a pursuit of "Truth," then we are going to need the justificational posture. But if we abstain from a concrete "positing" of truth as a something-in-particular-toward-which-we-project-ourselves, then we might well be able to speak of truth within a non-justificational framework. We might, in other words, be able to speak of truth without also needing to postulate the human being's projection toward the Absolute. Furthermore, it might once and for all become clear to us that the "vicious spectre" of relativism is a product of the justificational project, and that it dissolves without effort the moment we reject the "modern" posture. First, however, we must see that the justificationist has no choice but to retreat in an irrational manner to the commitment he has to his supreme Thought. It is really quite simple, and has been a recognized argument for some time: once you attempt to justify the activity of justification, you have no choice but to invoke the authority you are attempting to justify. The enforming Thought which guides the justificational project simply cannot be justified. One can only commit to its authority by an irrational leap of faith. Is this not reason enough to

question the integrity of justificational presumptions? Weimer could easily stop here, but he chooses instead to pursue the matter from within the justificational posture, to show how internally generated fallout from the position brings justificational thinking to the utter brink of skepticism.

He begins this "internal" criticism of the "received" view with a discussion of "factual relativity." His intent is to show, in effect, how Kantian Idealism offers justificational thinking the supreme epistemological authority it so desperately needs at the expense of the supreme end toward which it fancies itself projected. The point is quite simple, though hardly as easy to defend: "facts" are always situated within the confines of that perspective one assumes with respect to the study of facts. If it is indeed true that facts do not partake in neutrality, then clearly our horizon of expectations will come to have a direct impact on how we go about giving expression to the fact's presence. Without giving us any convincing reasons for accepting this "fact" about facts, Weimer proceeds to draw the ultimate Idealistic conclusion. Facts, by which he means the "references" of the "empirical terms" of science, simply "cannot be given in our acquaintance" since they are, rather, "idealized, i.e., constructed, by our conceptual schemes." Facts, then, are, by the inherent nature of their constitution, necessarily relative to conceptual points of view. But does this not take away the "empirical ties" necessary for science to investigate and explain the play of forces we call Reality? "Conventionalism," the last retreat of justificational thinking before the evidence of factual relativity, accepts this revelation without looking upon it as problematic. "The given in experience, as a 'neutral' or independent foundation for knowledge, as a 'basis' of firm and invariant facts, is a myth." So clearly, we have to recognize that a

theory is not informative knowledge but
[merely] our way of looking at particular
facts, our way of classifying particular
observed facts.

Theoretical science thus becomes nothing more than "an empty structure to store information in, a way of saying things, a language." Furthermore, "nothing in reality strictly corresponds to [the] abstract or imagined theoretical concepts." But this really does not prove to be a problem. After all, we may not have a science that engages "reality," but at least our

science has a Thought of the real. And by means of this Thought, it is able to postulate the Ideal toward which human reason should endeavor to project itself. The Ideal environment, the Ideal genetic make-up, the Ideal artificial equilibrium within which the Ideal Human would be situated. All of this we feel justified in striving after, simply because of our retreat to a commitment in an ability to justificationaly approximate an unbiased Truth. You see, it may be true that empirical science cannot be grounded in an absolute fashion, but this is not really the type of science we need. We need a scientific methodology that operates on the basis of our Thought of reality. And this Thought of reality is really, we come finally to see, no more than a logical extension of the initial enforming Idea by which justificational thinking is given its orientational bearings.

We must remember that the issue is not scientific methodology, but the expression we come to give of the appropriate nature of scientific methodology. And thus it clearly makes sense to ask whether science is really so detached from experience as the justificationist must ultimately argue, or whether it is not rather directly engaged with--and indeed, even inserted within--the stream of experiential unfolding itself. Clearly Weimer is of the strong opinion that the unflinching justificational drive to provide science with an absolute foundation has "removed" us from genuine contact with the scientific enterprise. But he has failed, in my opinion, to provide his reader with convincing reasons for sharing in this opinion. We may feel extreme sympathy for his position, but we cannot, on the basis of his presentation, give reasons why Conventionalism, say, has not really captured the essentiality of appropriate scientific methodology. As I will argue later, one must turn to the writings of someone like Merleau-Ponty, before anything like an "ontological" argument surfaces against the justificational style of thinking. Nonetheless, Weimer is quite helpful, for he has given us a rather clear picture of what justificational posturing amounts to. We are essentially brought to the point where we would, if we could but harness the necessary ontological vision, see clearly why justificational thinking is, at best, self-stultifying. And of course Weimer continues his study as though we had as readers actually been given over to such a vision. The result is the uncovering of some essential dimensions of non-justificational posturing, and, most appropriately, a notion of Reason which the human being can actually live up to.

II

Karl Popper has written that "the empirical basis of objective science has . . . nothing 'absolute' about it." There is, he says, "nothing rock-bottom" upon which to rest scientific methodology. Speaking in language quite reminiscent of the later Wittgenstein, Popper adds that

when we cease our attempts to drive our piles into a deeper layer, it is not because we have reached firm ground. We simply stop when we are satisfied that they are firm enough to carry ₅ the structure, at least for the time being.

Thus empirical knowledge must be seen to be rational, "not because it has a foundation, but because it is a self-correcting enterprise which can put any claim in jeopardy, though not all at once."⁶ Only a non-justificational style of thinking can give expression to this facet of scientific methodology. From the standpoint of non-justificational posturing, "nothing is conclusively 'established' or 'refuted'," simply because the "aim of justifying a scientific proposition has been abandoned." Knowledge is no longer equated with proof. Rather, we come to speak of "warranted assertions," the activity of proof giving way to the activity of "marshaling enough good reasons" in the assertions behalf to allow for commitment to the claims of the assertion. And this means that rationality ceases to be located in justification, becoming situated instead within the realm of criticism. And here the point seems to be the claim that Questioning should take "precedence" over Presumption. Not that we become constantly critical, for then we would have no room for commitment. But we are critical enough that there is no room for absolute commitment [which, of course, can only be "reached" by an irrational leap of faith]. There is, then, no "retreat" to commitment, for the "principle" of infallibility becomes a supreme ontological principle. Nothing is immune to criticism. What we have in place of absolute commitment is "commitment simpliciter," where one retains "both the courage of his convictions and the courage to go on attacking his convictions."⁸ This attitudinal posture is only possible by means of a dialogue between criticism and commitment, a dialogue which shows forth as a kind of monitoring. But no longer do we speak of assessment in terms of an invariant goal/truth, and thus our "picture" of where we want to go (in terms of which we take our current bearings) cannot be a picture

so much as a feeling. For the goal/truth we assess in terms of is an operative goal/truth. The dialogue between criticism and commitment thus amounts to a testing out and playing around inside some particular guiding thought which is expressed initially not as an Ideal toward which I project my conscious desires and aspirations, but simply as a feeling. From the moment an enforming operative goal/truth cries out from within for expression I am the project of bringing a feeling to conceptual articulation through the successive refinements of active expression. Thus the "search" for Truth never really leaves the horizon mapped out by the operative goal. And the operative goal is what I am the activity of bringing to articulation. But I am not "progressing toward" the truth, so much as participating in the truth. In this way, then, it can be said that truth indeed has its roots in the essence of human projecting, and that we must therefore come to see the appropriate way to look upon notions like "truth," "objectivity," and "certainty." They are no longer appropriately viewed as "absolute" notions--notions that would somehow be what they are apart from the human taking of perspective--but rather, they must be viewed as "operative" notions, and, furthermore, as notions which have been given expression by humans to articulate a certain underpinning of stability which we experience in our lives. Modern posturing presumed that this stability was somehow a product of Absolute Foundation which, if given proper expression, would justify our endeavor to partake in Reason's march toward lasting autonomy. But the non-justificationist cannot resort to such an absolute commitment. He must look for our underpinning of stability within the operative dimensions of our projective being. Weimer comes close to this recognition when he writes that "scientific life (its inferences)" are guided by "the way scientists form concepts."⁹ And scientists form their concepts no differently than the so-called creatures of ordinary reason. "A correct characterization of the nature of scientific knowledge is also a correct characterization of knowledge, simpliciter" (Weimer, p. 69). Thus the key to unlocking the door to appropriate expression of scientific methodology lies in our coming to "understand how human beings generate their concepts." "Put another way," Weimer writes, "the nature of knowledge acquisition does not change with the change from common sense to science; it is only the end products that change." Unfortunately, Weimer stops short of an active attempt to work for the harnessing of such an understanding, choosing instead to refer briefly to Polanyi's notion of "tacit" knowledge. His

point is to suggest that "unspoken" knowledge takes over the role of "guidance" from the justificational unattainables posited by modern thinking. But he also endeavors to show that the mere fact that tacit knowledge guides our activities shows how our explicit knowledge must represent a biased transformation of meaning. Quoting from the physicist David Bohm, Weimer brings his reader to the brink of the understanding we seek regarding the generation of human concepts:

Theories are changing all the time [writes Bohm]; . . . each new step may introduce something novel and incommensurable with what came before. Indeed, even to read an article and to understand it is, in general, to change it significantly. For understanding something is assimilation . . . a kind of perception.¹⁰

As Merleau-Ponty says, conceptual articulation is grounded in perceptual figuring. It is because we are first and foremost perspective [and not the taking of a perspective] that our thinking cannot be given appropriate guidance by the simple positing of absolutes. Our expression of appropriate scientific methodology must take its principal bearings from the brute given of perceptual ambiguity. We are perspective; thus, we are a way of seeing, and, quite simultaneously, countless other ways of not seeing. And we are this way of seeing as an operative goal/truth which focuses us in tune with a certain directionality, but only at the expense of other ways of being attuned. Thus we are always situated with respect to the prevailing "projection" we exist, and can, therefore, see no more than our perspective allows. We are an opening-onto-the-world which engages profiles. And these profiles, these shadings, are the things of the world insofar as they have been articulated. We thus never have a thing in its unadulterated entirety, and thus a scientist does not either. But then scientists have, by and large, known this for some time, thanks in large part to Heisenberg's discovery of the uncertainty principle. We can measure the speed of a particle or its location, but not both simultaneously. Thus we decide, in the words of Heisenberg, "by our selection of the type of observation employed, which aspects of nature are to be determined and which are to be blurred."¹¹ Weimer refers to the economic theorizing of F. A. Hayek to bring the force of Heisenberg's discovery into the realm of everyday life. According to Hayek, perception is a seeing-as, and one can only see something "as," say, an event if the seeing is enformed by "an

organism's preexisting natural kind classifications."¹² One simply cannot "see" an "event" at all, unless the event "is assimilated to a classification that already exists in the functioning" of the body-perspective. And this places a distinct limitation on our ability to "know" things. We can only know things as they show themselves to our bodily projection, and our projection is always perspectival, always focused in a distinct way that allows for no more than the generation and engagement of profiles. This is a major ontological position within the philosophy of Merleau-Ponty, and more than Hayek or Weimer or anyone else in the domain of post-modern philosophical attitudes toward appropriate scientific methodology, Merleau-Ponty¹³ shows why we are perspectives opening onto the world. And to show this is to show as well that human meaning is a product of perceptual figuring, that it necessarily harbors at the core of its genesis an essential dimension of ambiguity. This becomes an extremely important point to bear in mind in relation to the study of complex systems. If one is true to perception, if one recognizes the fundamental limitations of human thinking, then it becomes quite clear that "we should not be able fully to shape human affairs according to our wishes."¹⁴ Justificational thinkers have long believed

that by the full use of his reason man could make himself fully master of his fate. It seems, however, that this desire to make everything subject to rational control, far from achieving the maximal use of reason, is rather an abuse of reason¹⁵ based upon a misconception of its powers.

Thus the non-justificationist is really condemning the justificationist for his greatest achievement, namely, the ability to "abstract" from ambiguity to the clarity of pure calculative thinking. The justificationist is able to ignore the ambiguity, or perhaps able even to cover it up behind a wealth of statistics and mathematical formulae, because he is operating not with the thing given in experience, but with the thing given in Thought. But to operate on the basis of a Thought-of-thing constitutes an abuse of reason. It is not as if Reason could somehow work "hard enough" to overcome the ambiguity. Rather, it is impossible to completely remove ambiguity, for ambiguity is an integral part of our very experiential unfolding. It is harbored in the very upsurge of meaning. And thus we have no choice but to confront the ambiguous, for the situations enworlding us and the contexts within which we operate

will harbor essential dimensions of ambiguity simply because we must orient ourselves in perspectival fashion. Would it not seem appropriate, then, to style our Thinking from the standpoint of a special sensitivity to the brute fact of ambiguity? The non-justificationist would be, on Weimer's account, operating with just such a sensitivity, as the dialogue between criticism and commitment makes clear. But what Weimer fails to make clear is the nature of the "ontological 'why?'" which Merleau-Ponty's philosophy strives to bring to expression. Both Weimer and Merleau-Ponty are critical of the justificational posture for attempting to "found the existing world upon thought of the world."¹⁶ The justificationist sets out, on the basis of this thought, to look upon the Real as a "correlate" of thought, the actual becoming quite literally "exactly what we think we see--cogitatum or noema." This, of course, is the idealism of Conventionalism, and the activity of its thought-process amounts to nothing less than the endeavor to uncover some kind of "cognitive adequation" between ourselves and the world.¹⁷ Given the primacy of the justificationist's Thought-of-Reality, it is no surprise that our thinking has traditionally projected itself toward a "correcting" of the characterization we give to the world, until the world itself comes into literal conformance with the Rational Idea we hold supreme. Clearly this is Hegelian thinking. But it is thinking at work in the world today, as well, for the world engaged by justificationists is nothing short of a Husserlian "Noema" which serves as the presumptive Ground against which we "figure" our cultural and technological innovations. The justificationist, then, operates upon the basis of a Thought, but his responses to problems which have been defined within the context of his guiding Thought are injected into the very flesh of the world within which we live. Obviously this could become an extremely hazardous practice if the justificational posture represents an abuse of reason.

Instead of postulating an absolute spectator who strives incessantly after cognitive adequation between self and world, we must speak of the situated perspective which we are first and foremost, and which is in perpetual dialogue with its environment. The need, then, would seem to be for a non-justificational style of thinking. Such a style of thinking would be responsive to the demands of human involvement, responsive as well to feedback, but no longer for the justificational purpose of "keeping on target" toward some pre-fixed, pre-arranged rendezvous point. Instead, the responsiveness to feedback would be guided

by a desire to evaluate the status of an operative goal/truth which is still in the process of being refined. It would be a style of thinking which poses questions that are essentially aimed at assessment and interrogation of prevailing procedures, environmental signals and goal-refinement, rather than questions which are essentially goal-reinforcing. There would be no presumptions of completeness, though nevertheless one would, after a time of planning, have to "go on" and take that first step. But one's method of proceeding would strive to enforce options rather than some presumptive linear progression toward the absolute approximation of a pre-fixed goal. And always the underlying question--the critical dimension of the dialogue between criticism and commitment--would be an interrogation which aims to remain faithful to the fact that while we are, as perspectives, "openness-onto-the-world," there is an equally present "occlusion," or unrevealedness, of the world which must not be excluded from the domain figured by the operative style of thinking. Non-justificational thinking, therefore, does not operate on the presumption of absolute clarity and the corresponding illusion of potentially harnessable absolute control. Instead, it posits as ontologically primary the "compossibility" of presence and ambiguity. And this demands, quite literally, a new style of thinking. Notions like "objectivity," "truth," "commitment," and "clarity" would take on entirely new dimensions. No longer would these notions be situated within a framework defined by the human ability to conceptually abstract on the basis of a guiding Thought-of-Reality. Instead, these terms would take on an operative dimension, becoming situated as notions within the framework for thinking which is silently constructed out of the perceptual dialogue we exist with the-world-onto-which-we-open-as-perspective. It is my feeling that Weimer has opened up new horizons which future post-modern philosophers of science will be able to situate themselves within as they work to bring to expression a non-justificational characterization of appropriate scientific methodology. But it is also my opinion that Weimer's framework is not, in itself, enough. Thus these post-modern thinkers will need to turn elsewhere for inspiration, and it has been the purpose of this study to give reason for turning to the work of Merleau-Ponty. Clearly such a suggestion could not have been made prior to the publication of Weimer's book, and thus we owe a debt of gratitude to his efforts, as well as a careful reading of his text. The book is really quite excellent, and students of the various specific philosophical attitudes toward scientific methodology

will find Weimer's comprehensive appendix especially rewarding. I have chosen to isolate the focus of my discussion of Notes on the Methodology of Scientific Research on the theoretical foundations being set out in the first half of his presentation. But the appendix-half of the book offers the reader a clear examination of how specific "problems" in the philosophy of science are influenced or completely rethought from the standpoint of the theoretical framework Weimer offers for a non-justificational style of thinking, and is, thus, not to be ignored.

NOTES

¹ See in particular Merleau-Ponty's essay, "The Primacy of Perception and Its Philosophical Consequences," in The Primacy of Perception (Evanston: Northwestern University Press, 1964), pp. 12-42, and his monumental Phenomenology of Perception (London: Routledge & Kegan Paul, 1975). Finally, the reader is referred to Merleau-Ponty's unfinished work, The Visible and the Invisible (Evanston: Northwestern University Press, 1968), which not only extends earlier ideas, but also offers some radical new departures. PP was originally published in 1945, the Visible and the Invisible appearing posthumously in 1964.

² This is my own statement of the justificationist's fundamental guiding thought, but is, I am certain, entirely consistent with Weimer's presentation.

³ This is Husserlian terminology, suggested by Appendix IV of Husserl's Crisis of the European Sciences and Transcendental Phenomenology (Evanston: Northwestern University Press, 1970). The exact phrasing is Natanson's. See Husserl: Philosopher of Infinite Tasks (Evanston: Northwestern University Press, 1973) p. 184.

⁴ Agassi, "Sensationalism," Mind, 1966, pp. 4-5. Quoted by Weimer, p. 31.

⁵ Popper, The Logic of Scientific Discovery (New York: Harper, 1959) p. 111. Quoted by Weimer, p. 31.

⁶ Sellars, Science, Perception, and Reality (New York: Humanities Press, 1963) p. 170. Quoted by Weimer, p. 31.

⁷ Weimer, p. 40.

⁸ Bartley, Retreat to Commitment (New York: A. A. Knopf, 1962), p. 151. Quoted by Weimer, p. 48.

⁹ Weimer, p. 69.

¹⁰ Bohm, "Science as Perception-Communication," in Suppe (Ed.), The Structure of Scientific Theories (Urbana: University of Illinois Press, 1974), p. 388. Quoted by Weimer, p. 74.

¹¹ Heisenberg, Philosophic Problems of Nuclear Science (New York, 1952), p. 73. See Hannah Arendt's excellent essay on "The Conquest of Space and the Stature of Man," in Between Past and Future (New York: Penguin Books, 1977), pp. 265-280.

¹² Weimer, p. 24.

¹³ Again, I refer the reader to "The Primacy of Perception and Its Philosophical Consequences," where Merleau-Ponty outlines the ontological dimension of his argument for why we are perspectives opening onto the world.

¹⁴ Hayek, Studies in Philosophy, Politics and Economics (New York: Simon and Schuster, 1967), p. 93. Quoted by Weimer, p. 91.

¹⁵ Ibid. For a comprehensive fleshing out of the justificational posture Hayek is criticizing, see Gerald Feinberg's Consequences of Growth: Prospects for A Limitless Future (New York: Seabury Press, 1977), especially pp. 7-18 and 94-143.

¹⁶ Merleau-Ponty, The Visible and the Invisible, p. 34.

¹⁷ Merleau-Ponty, The Visible and the Invisible, p. 23.