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LA THÈSE A ÉTÉ
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PHILOSOPHICAL ANALYSIS IN EDUCATION
FROM THE PERSPECTIVE OF
MICHAEL POLANYI'S THEORY OF PERSONAL KNOWLEDGE

by

Dennis Cato

Thesis presented to the School of Graduate Studies of the
University of Ottawa in partial fulfilment of
the requirements for the degree of
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ABSTRACT

by

Dennis Cato

By means of an internal analysis of the views of three major proponents of philosophical analysis in educational thought from the perspective of Michael Polanyi's theory of "personal knowledge," an attempt is made to show that such views incorporate criteria which are inconsistent with their presuppositions. While employing D.J. O'Connor's tripartite structure of the concept of education as consisting of a set of values embodied and expressed in terms of the purposes for which education is given, a set of theories which purport to explain or to justify a further set of techniques for imparting knowledge, skills and attitudes, the study seeks to reveal those personal or "tacit" elements which Polanyi has shown to lie at the basis of all our noetic constructs. Whether conceived empirically as in the case of O'Connor or linguistically as with R.S. Peters and Paul Hirst, the nature of the activity of clarification as that by which the set of values embodied in the purposes for which education is given is itself clarified; in respect to its qualities of explanation and justification, the nature of educational theory is considered; in respect to the set of techniques for imparting knowledge, skills, and attitudes, a scrutiny of the nature of learning is undertaken. While O'Connor, Peters and Hirst maintain that the activity of clarification, the nature of educational theory, and the nature of learning may be explicated by reference to "objective" criteria, analysis of their claims shows that such explication ultimately appeals to personal or tacit grounds.

TABLE OF CONTENTS

	ACKNOWLEDGEMENTS	Page v
	INTRODUCTION	vi
<u>Chapter</u>		
I	THE NATURE OF CLARIFICATION: KEEPING OUR MINDS FREE FROM NONSENSE	1
	A. Philosophy and Education.	3
	B. The Nature of Philosophical Questions	9
	C. The Nature of Reason.	15
	D. The Appropriate Method for Philosophical Questions	29
	E. What Constitutes Evidential Relevance for Philosophical Questions	37
	F. Why Metaphysical Questions are Meaning- less Questions.	58
II	THE NATURE OF EDUCATIONAL THEORY: A "COURTESY TITLE"	67
	A. The Explanatory Function of Theory.	71
	1. The Psychological and Logical Con- ditions of Explanation	71
	2. The Various Ways in Which the Explican- dum is Related to Our Present Knowledge	76
	B. A Courtesy Title.	89
	1. The Sciences of Nature and the Sciences of Man	91
	2. The Logical Families of Statements	121
III	THE NATURE OF LEARNING: D.J. O'CONNOR AND THE DISCOVERY OF NEPTUNE	156
	A. The Proposal of a Hypothesis to Account for an Unexpected or Anomalous Fact.	160
	B. The Deduction from this Hypothesis that Certain Other Facts are Observable	171
	C. The Checking of this Deduction by Observation	190

TABLE OF CONTENTS (Cont'd)

<u>Chapter</u>		<u>Page</u>
IV	TOWARDS PERSONAL KNOWLEDGE: OBJECTIVISM IN LINGUISTIC PHILOSOPHICAL ANALYSIS	210
	A. The Nature of Clarification: R.S. Peters and Second-Order Conceptual Analysis	212
	B. The Nature of Educational Theory: Paul Hirst's Domain of Theoretical Discussion and Investigation.	245
	C. The Nature of Learning	269
V	PERSONAL KNOWLEDGE AND PHILOSOPHICAL ANALYSIS IN EDUCATION.	295
	A. Philosophical Analysis in Education.	295
	B. Polanyi's Theory of Tacit Knowing:	
	1. The Structure of Tacit Knowing.	312
	a) Perception: The Tacit Integration of Marginal and Subliminal Clues.	312
	b) The Triadic Structure of Skills and Skilful Knowing.	320
	2. The Process of Tacit Knowing.	332
	a) The Proximal Term: Indwelling.	332
	b) The Distal Term: Reality	345
	c) Isomorphism: Indwelling in Reality	355
	C. Grounds for Reconciliation?	392
	BIBLIOGRAPHY.	414

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INTRODUCTION

a. The New Dogmatism of Objectivism

For Polanyi the history of Western thought has been one of alternating belief and critical rationalism. The flowering of Greek rationalism in the fourth century B.C., which had supplanted an antecedent mythopoetic world-view had, by the fourth century A.D. become an enfeebled caricature of itself in the form of sophism and stoicism. It was St. Augustine who redressed the balance of rationalism and belief with the first "post-critical philosophy" which maintained that "all knowledge was a gift of grace, for we must strive under the guidance of antecedent belief: nisi crederitis, non intelligitis."¹ However, as Greek rationalism had declined into sophism, so the faith which provided the grounds for knowledge in the mediaeval cosmos similarly declined into dogmatism, to be overtaken in its turn by a new critical rationalism drawing inspiration not so much from the unaided powers of the mind as in Greece but rather from the empirically demonstrable findings of natural science. The floruit of the new rationalism extended up to the last century and, Polanyi points out, it has "enriched us mentally and morally to an extent unrivalled by any period of similar duration. But its incandescence has fed on the combustion of the Christian heritage in the oxygen of Greek rationalism, and when this fuel was exhausted the critical framework itself burnt away."² If

¹Michael Polanyi, Personal Knowledge: Towards a Post-Critical Philosophy (Chicago: University of Chicago Press, 1962), p. 266. Hereafter P.K.

²Ibid.

the ideal which gave life to that critical framework has burnt itself away in the structure in which it was initially housed, that is, in the realm of science, both the perversion of that ideal and its structural husk has not. A new dogmatism has emerged, not a dogmatism of faith as at the end of the mediaeval period, but rather one in which

. . . the critical mind repudiated one of its two cognitive faculties and tried completely to rely on the remainder. Belief was so thoroughly discredited that, apart from specially privileged opportunities, such as still may be granted to the holding and profession of religious beliefs, modern man has lost his capacity to accept any explicit statement as his own belief. All belief was reduced to the status of subjectivity: to that of an imperfection by which knowledge fell short of universality.³

This new dogmatism, which pronounces that all claims to knowledge which do not accord with the findings and procedures as embodied in the natural sciences and therefore do not constitute knowledge claims at all, Polanyi has termed "objectivism." As with the corrupted versions of antecedent exemplars, objectivism has spread to infect the range of contemporary intellectual endeavour and, indeed, has become in its own fashion the exemplar of such endeavour. Modern man, Polanyi points out,

. . . has set up an ideal of knowledge the conception of natural sciences as a set of statements which is 'objective' in the sense that its substance is entirely determined by observation even while its presentation may

³ Ibid. As shall presently be seen, for Polanyi critical rationalism constitutes but one of the "cognitive faculties" of man, the other being the "fiduciary framework" of belief within which the powers of critical rationalism are exercised.

be shaped by convention. This conception, stemming from a craving rooted in the very depths of our culture, would be shattered if the intuition of rationality in nature had to be acknowledged as a justifiable and indeed essential part of scientific theory. That is why scientific theory is represented as a mere economical description of facts; or embodying a conventional policy for drawing empirical inferences; or as a working hypothesis, suited to man's practical convenience—interpretations that all deliberately overlook the rational core of science.⁴

In response to this craving for impersonal certainty, objectivism has served to separate the act of knowing from assessments of the validity of the outcomes of that act. It has served to separate man's reason from his own experience. The new dogmatism seeks to place the product of thought beyond those processes in terms of which that product acquires coherence. It aspires to place man outside of, and in servitude to, the denatured results of his own intellectual activity. A new alienation is envisaged, one surpassing that of existential absurdity characterizing the confrontation of modern man and his social world to one where he stands as passive and estranged spectator to his own comprehension.

"Economical description," "conventional policy," "working hypothesis,"—all such representations of scientific theory Polanyi has labelled "pseudosubstitutions" designed

. . . to play down man's real and indispensable intellectual powers for the sake of maintaining an 'objectivist' framework which in fact cannot account for them. It works by defining scientific merit in terms of relatively trivial features, and making these function then in the same way as the true terms which they are supposed to replace.⁵

⁴Ibid., p. 16.

⁵Ibid., pp. 16-17.

In the separation of reason from experience, the new dogmatism embarks on a career of pseudosubstitution across the modes of human understanding, a pseudosubstitution designed, on the one hand, to eliminate reference to personal accreditation or belief in the formulation of such understanding, and on the other to disguise the reductionist nature of explanation to which it covertly appeals. In the sciences of inanimate nature, objectivist theory proclaims itself but a "convenient summary of the facts," that its practice serves merely "in establishing functional relationships between the data observed by our senses and that any claim that went beyond this was undemonstrable. A reality underlying mathematical relations between observed facts was a metaphysical conception, without tangible content."⁶ Objectivist explanation in the sciences of animate nature sees the functions of living organisms as reducible to the laws of chemistry and physics, without reference to "the purpose served by them and by the organs and processes which perform these functions."⁷ In the study of higher life forms, an objectivist psychology "depends on covertly alluding to the mental states which it sets out to eliminate."⁸ Such mental states, of

⁶"Science and Reality," The British Journal for the Philosophy of Science, Vol. 18 (1967):178.

⁷"Science and Man's Place in the Universe," in Science as a Cultural Force, Harry Woolf, ed. (Baltimore: The Johns Hopkins Press, 1964), p. 66.

⁸"The Structure of Consciousness," in Marjorie Grene, ed., Knowing and Being (Chicago: University of Chicago Press, 1974), p. 216. Also in Marjorie Grene, ed., The Anatomy of Knowledge (Amherst: University of Massachusetts Press, 1969), and in Brain, Vol. 88, Part IV (1965): 799-810.

course, are constituted by the consciousness of living things which, in its turn, is reduced to "an ineffectual accompaniment of neural processes, controlled by the laws of physics and chemistry."⁹ The learning theory of such psychology

. . . strives for objectivity, achieving a semblance of its aims as follows. First it curtails its subject matter to the crudest forms of learning. Second, it exploits the ambiguity of its supposedly impersonal terms, so that they will apply to the actual performance which is covertly kept in mind. I have called this pseudo-substitution. It consists in using objectivist terms which are strictly speaking nonsensical, as pseudonyms for the mentalistic terms which they are supposedly to eliminate.¹⁰

Beyond the sciences of inanimate and animate nature, the new dogma of objectivism continues the programme of pseudo-substitution and reduction, extending to embrace the broader interpretive frameworks comprehending man and society. In social theory an objectivist causal interpretation

. . . disintegrates all rational grounds on which man can hold convictions and act on those convictions. It leaves you with a picture of human affairs construed in terms of appetites checked only by fear. All you have to explain then in order to understand history, and with it politics, law, science, music, etc. is why at certain moments the appetites of one group gets the upper hand over its rivals.¹¹

⁹"Science and Religion: Separate Dimensions or Common Ground?", Philosophy Today, Vol. 7 (1963):9.

¹⁰"On Body and Mind," The New Scholasticism, Vol. XLIII (1969):204.

¹¹The Logic of Liberty: Reflections and Rejoinders (Chicago: University of Chicago Press, 1951), p. 28. In discrediting belief, the objectivist heritage had, for Polanyi, more pointed results in world affairs. His own social theory in relation to recent world history rests on his conception of "moral inversion" where the beliefs discredited

Sociological theory cloaks its moral assessments in the form of neutralist mechanisms such as "social stability" which, so disguised, "may not only protect their substance against nihilism, but even allow them to operate effectively by stealth. This is how great reformers like Bentham and Dewey have been able to use their utilitarianism for moral purposes."¹² Where philosophy has not simply adopted the programme of objectivism wholesale in the form of thorough-going empiricism, it has fled to embrace doctrines of absurdity which, for Polanyi, are founded on a "misunderstanding spawned by positivistic leftovers in our thinking and by allegiance to the false ideal of objectivity from which we have been unable to shake ourselves quite free."¹³ Alternatively, philosophy has sought to broaden the empirical basis of objectivism to comprehend non-scientific grounds of objective certainty such

by objectivism were re-channelled to fuel the rise of modern fanatical nihilism. "All the moral fervour," he writes in "On the Modern Mind" (Encounter, Vol. XIV, No. 5 [May, 1965]: 19), "which scientific scepticism had released from religious control and then rendered homeless by discrediting its ideals, returns then to imbue an a-moral authority with intense moral approval." For a fuller account of Polanyi's social theory see also: "The Foolishness of History," Encounter, Vol. VI (Nov. 1956); Chapter III, "Dedication or Servitude," in Science, Faith and Society (Chicago: University of Chicago Press, 1959); "Beyond Nihilism," Encounter, Vol. IX, No. 3 (March, 1960); "The Two Cultures," Encounter, Vol. VIII, No. 3 (September, 1959); "History and Hope," Virginia Quarterly Review, Vol. 38, No. 1 (Spring, 1962); "The Message of the Hungarian Revolution," in Marjorie Grene, ed., Knowing and Being, op. cit.; and "The Eclipse of Thought," Chapter I in Meaning (Chicago: University of Chicago Press, 1975).

¹² P.K., op. cit., p. 234.

¹³ Chapter XI, "Order," in Meaning, op. cit., p. 181.

as is found in the appeal to "linguistic rules" of ordinary language. Such, for Polanyi, constitute little more than a "pseudosubstitute for the things referred to in its terms,"¹⁴ while the activity of philosophizing in the light of such rules rests on the claim that one may "contemplate and analyse reality, while denying the act of doing so."¹⁵

Polanyi's "personal knowledge" is intended as a second redressing of the balance between faith and reason, between critical rationalism and personal belief. It is intended as a second "post-critical philosophy," one, however, which does not envisage the imposition of a new dogma in the form of some neo-mediaevalism, but rather one which recognizes "belief once more as the source of all knowledge."¹⁶

This then is our liberation from objectivism: to realize that we can voice our ultimate convictions only from within our convictions—from within the whole system of acceptances that are logically prior to any particular assertion of our own, prior to the holding of any particular piece of knowledge. If an ultimate logical level is to be attained and made explicit, this must be a declaration of my personal beliefs: I believe that the function of philosophic reflection consists in bringing to light, and affirming as my own, the beliefs implied in such of my thoughts and practices as I believe to be valid; that I must aim at discovering what I truly believe in and at formulating the convictions which I find myself holding; that I must conquer self-doubt, so as to retain a firm hold on this programme of self-identification.¹⁷

¹⁴ P.K., op. cit., p. 113.

¹⁵ Ibid., p. 114.

¹⁶ Ibid., p. 266.

¹⁷ Ibid., p. 267.

Polanyi's declaration to the effect that the act of knowing proceeds under the guidance of antecedent belief, that one's whole system of acceptances is prior to the holding of any particular piece of knowledge, does not legislate some neo-orthodoxy of conclusions but rather that the act of knowing presupposes the commitment of the knower to a fiduciary matrix which is not, in that act, an object of further reflection. This fiduciary matrix is, in fact, the ultimate logical level viewed as the object of philosophic reflection. But for Polanyi all noetic acts share this basis of antecedent belief, ranging from simple acts of perception to innovative discoveries which, paradoxically, may alter that matrix from which they arose. There can be no knowing in the absence of some prior accreditation of, and commitment to, a framework consisting of that "system of acceptances." Yet, this is what objectivism denies.

b. The Nature and Purpose of the Study

The present study is a theoretical inquiry into the epistemological presuppositions of philosophical analysis in educational thought as viewed from the perspective of Michael Polanyi's conception of "personal knowledge." It is theoretical in the sense that no attempt is made to recommend particular pedagogical practice although such practice may come to be informed as a consequence of the inquiry. Rather, the study constitutes an attempt to bring to light certain assumptions of philosophical analysis insofar as they relate to knowledge theory in general and the implications they

have for an understanding of the nature of educational theory and the process of learning. It has been prompted by certain questions which arise in connection with such assumptions, the most central of which is the nature of the process of analytical clarification.

Even a cursory review of analytical literature in educational thought reveals that the object of analysis lies in the clarification of meaning. R.S. Peters, for example, points out that to ask about the aims of education is not to ask for the production of ends extrinsic to education itself but is rather to ask about "a way of getting people to get clear and focus their attention on what is worthwhile achieving."¹⁸ Israel Scheffler sees the task of philosophy itself as "the clarification of basic notions and modes of argument."¹⁹ Paul Hirst, in similar fashion, maintains that to engage in philosophy is to be "above all concerned with the clarification of concepts and propositions through which our experience and activities are intelligible."²⁰ In spite of the fact that, for Glenn Langford, philosophy has no distinctive subject matter, the analytical philosopher still has a task which amounts to "that of clearing up the puzzlement created by supposing that problems exist where none in fact

¹⁸R.S. Peters, "Education as Initiation," in R.D. Archambault, ed., Philosophical Analysis and Education (New York: The Humanities Press, 1972), p. 93.

¹⁹Israel Scheffler, The Language of Education (Springfield: Charles C. Thomas Publishers, 1962), p. 7.

²⁰Paul Hirst, Knowledge and the Curriculum (London: Routledge & Kegan Paul, 1974), p. 1.

exists."²¹ Of first importance, for D.J. O'Connor, in philosophical investigation is the "criticism and clarification of value judgements."²² In any inquiry into philosophical analysis it would appear that scrutiny must be directed to the nature of the clarificatory activity. What do these philosophers do when they clarify a concept, proposition or value judgement? If philosophical knowledge generally and knowledge bearing upon education in particular is the outcome of clarification, how is such knowledge attained? What does Peters do when he gets people to get clear about what is worthwhile achieving? What is it to clarify our basic notions and modes of argument? Just how does Hirst render intelligible the concepts and propositions we employ so that our experiences and activities, in their turn, may be rendered intelligible? In what manner is it established that philosophical puzzlement is misconceived, that clarification will dissolve theoretical perplexity? What is involved in O'Connor's clarification of value judgements?

The present study is itself in the nature of a clarificatory activity, with the difference that it is directed at the clarification of that activity as conceived by the proponents of philosophical analysis in educational thought. Its purpose is not to minimize the contributions of those analytical philosophers but rather to suggest that the pre-

²¹Glenn Langford, Philosophy and Education: An Introduction (Toronto: Macmillan Co., 1968), p. 18.

²²D.J. O'Connor, An Introduction to the Philosophy of Education (London: Routledge & Kegan Paul, 1965), p. 53.

suppositions grounding the exercise of clarification as they understand it fall short of providing an adequate foundation for the results obtained. Put differently, the present purpose is to suggest that the activity of clarification so conceived incorporates in its exercise the very elements such presuppositions purported to transcend. It is to suggest that the process of clarification viewed as a neutral, impersonal, or objective activity is, in fact, a practical impossibility. More specifically, it is to suggest that the process of clarification, whether derived from presuppositions drawn from a positivistically conceived paradigm of knowing in the natural sciences or from the broader paradigm embodied in the conventions of ordinary usage, employs elements irreducible to the terms of either paradigm. These elements have been given explicit formulation, to the degree that it is possible to do so, in Polanyi's theory of "personal knowledge."

The point to be made here is that Polanyi's conception of personal knowledge or "tacit knowing" is not to be taken as a criterion of judgement in terms of which the analytical philosophers in education thought are to be measured and then accepted or rejected, but rather as an alternative point of view from which a theory of knowledge in general and the process of learning in particular might be considered. No issue is taken here with the value of the contributions philosophical analysis has made to the study of education and no suggestion is made here that such contributions should be dismissed out of hand as having been superseded by

the principles of personal knowledge. What is suggested is that Polanyi's views can be brought to bear on the analytical conception of clarification which will help us go further in our understanding of what is involved in the process of knowing and, in its educational aspect, what is involved in the process of learning.

The theory of "tacit knowing" is explained elsewhere.²³ Briefly stated, however, its main contention is that there is and that there can be no wholly explicit or impersonal knowledge, that all such "focal" awareness derives its coherence by virtue of a tacit or "subsidiary" awareness which is not, at that time, a further object of conscious or explicit reflection. The structure of knowledge so conceived is manifested in the vectorial nature of the process by which it is acquired, a process Polanyi terms "indwelling." To come to know, to comprehend, is to indwell or interiorize, to rely subsidiarily upon the particulars of a comprehensive entity while being focally aware of, of consciously directing one's attention to, that which those particulars jointly constitute. This bi-polar character of the process of knowing ranges for Polanyi throughout the spectrum of purposeful human activity, from simple acts of perception through the performance of skills to the most sophisticated feats of abstract intellection. Any attempt to expunge this tacit or subsidiary element in accounts of such processes or their outcomes in the interests of attaining explicit or impersonal criteria of

²³ See below, Chapter V, Section B.

knowledge is not to secure greater clarity or precision but is rather, in the theory of tacit knowing, to render those processes or outcomes at best incomplete and at worst meaningless. But this, and here we arrive at the focal point of the present clarificatory activity, is just what philosophical analysis in educational thought which appeals to objective criteria proposes to do. It is in the interests of furthering our understanding of what it is to come to understand by way of a clarification of analytical clarification in its philosophical and educational contexts that the present undertaking is informed as to its nature and purpose.

c. The Justification and Relevance of the Study

As it is informed in respect to its nature and purpose, so the present study seeks its justification and derives its relevance relative to the contention that there exists an inherent relationship between the process of knowing or understanding on the one hand and the educational enterprise on the other. Its claim to philosophical justification is based directly on the fundamentally epistemological nature of the inquiry. Its claim to educational justification rests on the view that the process of knowing and the process of learning are correlative concepts, that an account of the one necessarily either implies or presupposes an account of the other. While it is not maintained here that the educational enterprise is wholly reducible to serial acts of cognition, it is maintained that any coherent characterization of it demands some formulation of the noetic

processes which that enterprise embodies. If this is true, then to suggest, whether directly or obliquely, what these processes might be is to secure both philosophical warrant and educational sanction for the present pursuit.

Flowing from such a broadly conceived justification is the more pointed derivation of relevance in respect to the current state of knowledge theory in philosophy of education. If the most recent yearbook of the National Society for the Study of Education may be taken as a guide,²⁴ the issue of the nature of knowledge and of learning may be seen to lie at the heart of contemporary debate. On the one hand are those who seek, in one form or another, neutral or objective criteria for those epistemic claims which are to count, by virtue of such criteria, as knowledge properly conceived. These criteria are taken to mean those external to the knower and in terms of which correspondence between subjective belief and the facts of the case might be adjudicated, a correspondence in which the knower is only spectatorially present. In such a vein Donna Kerr reveals her "tests of objective adequacy" determinative of quality in teaching.²⁵ Jonas Soltis broadens his earlier claim to analytical neutrality resting on the value-free findings of the social scientist²⁶ to em-

²⁴"Philosophy and Education," Eightieth Yearbook of the National Society for the Study of Education, Part I, Jonas Soltis, ed. (Chicago: University of Chicago Press, 1981).

²⁵Donna H. Kerr, "The Structure of Quality in Teaching," *ibid.*, pp. 61-94.

²⁶Jonas F. Soltis, An Introduction to the Analysis of Educational Concepts (Toronto: Addison Wesley, 1968).

brace a "sociocentric" perspective on knowledge in which not propositions but "proper action and human skill" are to provide exteriorized epistemological benchmarks.²⁷ In an update of his previous concept of critical thinking, R.H. Ennis elaborates a taxonomy of "proficiencies" and "tendencies," underwritten by an unexplicated "exercise of good judgement," as constitutive of what it is to think rationally.²⁸ James E. McClellan's "first philosophy" seeks objective grounding in an ontology "continuous with physics" yielding an "epistemological realism" incorporating a cybernetic view of consciousness.²⁹

On the other hand there are those who protest that the analytical approach has failed to account for more broadly conceived dimensions of knowledge and their educational implications by reference to such impersonal criteria. Such protests, while evocative, are descriptive in nature and tend to lack convincing force. Harry Broudy, who might be taken as the champion of anti-analytical thought in education, questions the subfield-issue structure of the yearbook itself, maintaining that "there is no alternative to the study of the isms somewhere in general education."³⁰ Jane Roland Martin

²⁷ Jonas F. Soltis, "Education and the Concept of Knowledge," Philosophy and Education, op. cit., pp. 80-114.

²⁸ R.H. Ennis, "Rational Thinking and Educational Practice," *ibid.*, pp. 143-183. See his earlier "A Concept of Critical Thinking," Harvard Educational Review, Vol. XXXII, No. 1 (Winter, 1962).

²⁹ James E. McClellan, "First Philosophy and Education," Philosophy and Education, op. cit., pp. 263-288.

³⁰ Harry Broudy, "Between the Yearbooks," *ibid.*, pp. 13-35 (*italics* his).

attacks the "epistemological fallacy" of deriving a paradigm for liberal education from knowledge theory generally and from Hirst's "forms of knowledge" in particular, but is vague as to just what that paradigm ought to be and just how it is to issue out into curricular prescriptions.³¹ Maxine Greene attempts to provide justification for "aesthetic literacy" as a viable curricular component in the face of current emphasis on objectively measurable competencies on the grounds of a suggestive "enlargement of experience that can only derive from informed engagements."³² While suggestive, she is unclear as to how such informed engagements are to be identified, to say nothing of how they might be progressively incorporated into formal learning. Finally, D.C. Phillips bleakly concludes his study of conflicting Kuhnian-Popperian research paradigms in education with the Jamesian aphorism to the effect that "There are no fortunes to be told and there is no advice to be given."³³

Clearly, if topical relevance of the present study is at question, the current yearbook may be seen to lay any misgivings to rest. What is to count as knowledge itself as well as the processes by which it is acquired would appear to be the principal burdens taxing the efforts of philosophers of education at the present time, and it is upon the basis of

³¹Jane Roland Martin, "Needed: A Paradigm for Liberal Education," *ibid.*, pp. 37-59.

³²Maxine Greene, "Aesthetic Literacy in General Education," *ibid.*, pp. 115-141.

³³D.C. Phillips, "Post-Kuhnian Reflections on Educational Research," *ibid.*, pp. 237-261.

this centrality that this inquiry derives its relevance. Again, in view of the less than convincing force attending the descriptive accounts of those seeking to broaden the dimensions of knowledge as well as their implications for education, the present study may be seen to derive additional relevance to the contemporary debate by reference to its method.

d. Method and Organization of the Study

As a theoretical inquiry into the epistemological assumptions underlying philosophical analysis in educational thought from the perspective of Polanyi's personal knowledge aimed at revealing that such assumptions incorporate the very criteria analysis claims to have transcended, the present inquiry employs the procedures of analytical clarification itself. By means of an internal analysis an attempt is made to clarify or render explicit the criteria of judgments implicit in the analytical clarification of educational concepts. In asking what a particular philosopher means by a particular statement, proposition or concept, an attempt is made to elucidate the presuppositions to which he appeals. In the case of logical or conceptual analysis, the attempt is to determine whether the conclusions follow from and are supported by the premises embodied in such presuppositions. In the case of linguistic analysis, the attempt is to determine the criteria for the correct application of terms, what constitutes typical usage, what it makes sense to say. Unlike analytical clarification, however, the present study departs from the canons of philosophical analysis in that it does not

purport to be spectatorial or theory-free in the course of elucidating the criteria of judgements grounding analytical reflection. Here the methodology of clarification is embedded in the structural matrix of Polanyi's personal knowledge. Where the criteria of judgements implicit in the analytical clarification of educational concepts provide the "focal" pole of the study, the process of elucidation is grounded in the "proximal" pole of tacit knowing. It is, in other words, with a subsidiary awareness of Polanyi's concept of subsidiary awareness that the attempt to clarify and render explicit the tacit or subsidiary elements in the analytical clarification of educational concepts proceeds.

In terms of its scope, the organization of the inquiry is largely dictated by its method. An in-depth, textual analysis of the epistemological presuppositions underlying philosophical analysis in educational thought of necessity precludes treatment of all those who march under the analytical banner. It is on the basis of their exemplary standing as representatives of the empirical and linguistic wings of the movement in philosophy of education respectively that D.J. O'Connor and R.S. Peters were singled out for scrutiny. In addition, because of the fact that, of the linguistic philosophers, he has given specific attention to the nature of educational theory per se and because his "forms of knowledge" currently constitute the received paradigm justifying liberal education in analytical circles, Paul Hirst is also given consideration.

In terms of its structure, the organization of the inquiry takes its departure from O'Connor's tripartite view of the nature of "education." At its most general or theoretical level, O'Connor sees education to embody a set of values as expressed in the purposes for which it is given. It is here that philosophy has relevance for the enterprise, consisting of the clarification and criticism of those values and purposes. The first chapter of this study is devoted to a clarification of O'Connor's clarification of those values and purposes, to an elucidation of his notion of the nature of philosophical questions including the nature of the evidence relevant to and the appropriate method of answering them, and why he considers metaphysical questions meaningless questions.

O'Connor's second component of "education" consists of those theories which purport to explain or to justify his third component, the techniques employed for imparting knowledge, skills and attitudes. Neither educational theory nor its practice are, for O'Connor, the proper object of philosophical inquiry being rather that of the "positive sciences" in general and in particular that of psychology. Even so considered, however, educational theory is seen to be such only by virtue of courtesy since it fails to satisfy the criteria for theory as properly understood, that is, as it is found in the natural sciences. The second chapter, as a consequence, is divided into two parts. The first is devoted to a clarification of O'Connor's view of theory with particular emphasis on its central function of explanation. In particular,

attention is directed towards his conception of the psychological and logical conditions of explanation and the manner in which that to be explained, the explicandum, is related to present knowledge. The second undertakes an analysis of O'Connor's view of educational theory as "courtesy title," particular consideration being given to his account of the sciences of nature and the "sciences of man" and the relationship, or lack of it, between them. The section concludes with an analysis of O'Connor's view of the metaphysical, valuational, and empirical kinds of statements found in educational theory.

As O'Connor elaborates no theory of teaching by way of developing his third component of "education," that is, those techniques employed for imparting knowledge, skills and attitudes, and as he does not advance a correlative theory of learning by which they may be acquired, the third chapter constitutes an attempt to clarify his views relative to their paradigmatic embodiment in the act of scientific discovery. An endeavour is made to show that the hypothetical-deductive method, for O'Connor that by which such discovery proceeds, is supported at each of its key points by personal acts of the discoverer, acts irreducible to any formal or explicit method.

The fourth chapter is intended as both an extension of the analysis of O'Connor's three components of education: as they apply to objective criteria drawn from the realm of ordinary usage and as a transition preparatory to an explication of the main themes of Polanyi's personal knowledge. The

interests of brevity dictated limiting the treatment of ordinary language philosophy in educational thought to one chapter. The first section deals with R.S. Peters' conception of the activity of clarification itself as derived from the lessons of the "revolution in philosophy" and implemented by means of the discrimination between the central and peripheral uses of a term. It is to be taken as the linguistic counterpart of O'Connor's first component of education, the clarification of the nature of philosophical questions. Since he shares with Peters the notion of philosophical clarification and since he has provided the response of ordinary language philosophy to O'Connor's view of educational theory as deserving the title only by way of courtesy, Paul Hirst has been selected as the linguistic representative for the second component of education without loss of structural unity. His conception of educational theory as a "domain of theoretical discussion and investigation" is seen, however, to encounter difficulties in respect to the manner in which such a domain draws upon relevant knowledge from the foundational "forms of knowledge," while, in their turn, the forms themselves are maintained to encounter comparable problems in rendering explicit the criteria grounding their peculiar concepts, logical structures, and tests against experience. Finally, as the linguistic counterpart to the third component of education, both Peters' learning in its "full sense" and Hirst's "learning to come to think historically" are seen to incorporate elements which transcend the principles drawn from the clarification of usage.

The point of the first four chapters is to show, from an analysis of the views of O'Connor, Peters and Hirst, that they would have to admit something like Polanyi's concept of tacit knowing in order to render coherent their explications of the activity of clarification, the nature of educational theory, and the process of learning. In line with the stage of development reached at this point, that is, that there has been shown to exist certain lacunae in analytical accounts of those aspects under review, the fifth and final chapter is given over to an introductory and explicit statement of these lacunae, followed by an account of the concept of tacit knowing. As a consequence of its nature, the style of argumentation in the final chapter shifts from the internally analytical to the descriptively expository where both the triadic structure of tacit knowing and its process embodied in the act of "indwelling" are set forth. It is in terms of reference to such a structure and process that the present study offers an alternative or supplement to the epistemological pre-suppositions grounding philosophical analysis in educational thought. The chapter concludes with a brief examination of the possibility of reconciliation between Polanyi's concept of tacit knowing and the views of O'Connor, Peters and Hirst.

e. Tacit Knowing in the Literature

Novelty does not attach to reference to Polanyi's theory of tacit knowing in the literature of educational philosophy nor, of course, does it to the methodology of analytical clarification. Where such methodology is employed

within the framework of tacit knowing to render explicit the subsidiary elements grounding the knowledge claims of those typically associated with that methodology, however; a case for originality can be made.

Where the theory of tacit knowing has inspired considerable work in philosophy of science, religion, political science and in epistemology itself, its impact on philosophy of education has taken the form, for the most part, of incidental reference.³⁴ Where this has not been the case, some

³⁴ Kenneth Conklin has invoked Polanyi in various contexts, from maintaining the existence of an a priori truth awaiting discovery ("The Properties of Relevance between Philosophy and Education," Educational Theory, Vol. XVIII, No. 4 [Fall, 1968]), through the advancement of a theory of "plateau learning" in which attention is directed at a level slightly higher than the student's Piagetian status ("Wholes and Parts in Teaching," Educational Theory, Vol. XXII, No. 4 [December, 1973]), to the ineffability involved in the communication of knowledge derived from the integration of lower-level clues ("Knowledge, Proof and Ineffability in Teaching," Educational Theory, Vol. XXIV, No. 4 [Fall, 1974]). David Bohm calls upon Polanyi in support of the view that knowledge is concrete and active as well as abstract and passive ("Insight, Knowledge, Science and Human Values," Teachers College Record, Vol. 82, No. 3 [Spring, 1981]), and H.L. Dreyfus protests the de-contextualized picture of reality as presented by theoretical abstraction in general and the results of scientific activity in particular ("Knowledge and Human Values: A Genealogy of Nihilism," Teachers College Record, Vol. 82, No. 3 [Spring, 1981]). Maxine Greene (op. cit.) sees Polanyi's tacit knowing as the "active mode of grasping the structures of the world of appearances" (p. 134) while William E. Goding employs Polanyi to show that "knowledge becomes a verb in the seeker" (Editorial, Journal of Educational Thought, Vol. 16, No. 2 [August, 1982]). Polanyi has been employed also by those typically associated with philosophical analysis. Jonas Soltis (op. cit.) makes reference to Polanyi three times in support of his "sociocentric" view of knowledge, while Paul Hirst invokes him in support of his "discipline-refined common sense" as the theoretical base for the educational profession ("Professional Authority: Its Foundations and Its Limits," British Journal of Educational Studies, Vol. XXX, No. 2 [June, 1982]).

comment is required.

Harry Broudy's "On Knowing With" utilizes Polanyi's personal knowledge as a theoretical base to argue against the prevailing view, at least in some quarters, that the primary uses of schooling are "replicative" in nature, that is, that only those learnings which can be explicitly reproduced are educationally justifiable.³⁵ In what may be taken as an argument against a narrowly conceived accountability criterion in education, Broudy maintains that theoretical understandings which are themselves not the objects of such explicit recall derive their sanction not from their replicative utility but from their interpretive quality where such understandings function in the mode of "knowing with" as opposed to "knowing that," as subsidiary clues which provide a tacit conceptual framework in the act of comprehending novel entities or situations.³⁶ In a later paper Broudy employs tacit knowing as a rationale for liberal education where liberal studies come to constitute those "value exemplars" in which we dwell subsidiarily while exploring further

³⁵Harry Broudy. "On Knowing With," The Philosophy of Education Society, Proceedings of the Twenty-Sixth Annual Meeting, Illinois, 1970.

³⁶"If Polanyi is right," Broudy points out,

then the school inputs need not be found in the outputs in their original form, and not finding them is no proof that they do not function. I am convinced that in the interpretive use of schooling the inputs function tacitly, subsidiarily, even though when they were learned they were focal, but if they remained focal they could not be used for interpretation later on.

(Ibid., p. 100.)

domains of value.³⁷

R.T. Allen's "The Philosophy of Michael Polanyi and Its Significance for Education" constitutes the best brief introductory to the application of Polanyi's thought to some current educational issues.³⁸ He reviews the main points of Polanyi's thought and the principal elements of "objectivism" in contemporary knowledge theory, while his application of these points is brought to bear mainly upon the issue of indoctrination in the act of teaching. For Allen, if the injunctions against indoctrination as viewed from the objectivist perspective were to be taken seriously, they "would make us disengage ourselves from all education and the upbringing of children."³⁹

The only sustained work on the implications of tacit knowing for education takes the form of an attempt to underwrite a Deweyian experimentalism as fundamental educational theory by reference to Polanyi's view of problem-solving as the archtypical expression of the knowing process.⁴⁰ While ostensibly employing tacit knowing as a method for integrating a theory of knowledge, a theory of logic, and a sociology of

³⁷ Harry Broudy, "Tacit Knowing as a Rationale for Liberal Education," Teachers College Record, Vol. 80, No. 1 (February, 1979).

³⁸ R.T. Allen, "The Philosophy of Michael Polanyi and Its Significance for Education," Journal of Philosophy of Education, Vol. 12 (1978).

³⁹ Ibid., p. 174.

⁴⁰ J.W. Wagener, The Philosophy of Michael Polanyi as a Source for Educational Theory, unpublished Doctoral Dissertation, University of Texas at Austin, 1968. A synopsis has been published as "Towards a Heuristic Theory of Instruction: Notes on the Thought of Michael Polanyi," Educational Theory, Vol. XX, No. 1 (Winter, 1970).

knowledge to form the basis for a unified strategy of education, J.W. Wagener seeks to revive the "pragmatic experiment" in education directed at the reconstruction of society which has failed because "the experiment has never really been tried."⁴¹ The reason why it has never really been tried is because, in turn, "the school as an agent of change has not been widely welcomed, at least not by those occupying positions of power and influence in the institutional structure."⁴² It is by way of reviving the experiment that Wagener calls upon tacit knowing as a theoretical source since "The parallels between Dewey and Polanyi are striking."⁴³

In the course of explicating the nature of these parallels, however, Wagener unearths several "divergencies" between the two which both renders the parallels less than striking and throws the revival of the experiment into doubt. In the realm of values, for example, Wagener observes that while for Polanyi there is no ground for choosing a new set of values explicitly outside the action of submitting to them, for Dewey "values are chosen explicitly through the use of the scientific method."⁴⁴ The two are seen also to diverge on the nature of truth. "Knowledge for Dewey is 'true,'" Wagener points out, "when it is empirically tested. Knowledge for Polanyi is 'true' when it is intellectually

⁴¹ Ibid., p. 115.

⁴² Ibid., p. 118.

⁴³ Ibid., p. 120.

⁴⁴ Ibid., p. 203.

pleasing to the knower."⁴⁵ Further, the two diverge as to the communication of knowledge since, "For Polanyi, a great deal can be known which is not socially translatable; for Dewey, what cannot be translated into society is a futile abstraction."⁴⁶ Divergence emerges again as to the nature of society and its institutions, a rather fundamental conflict if Wagener hopes to harness Polanyi to the pragmatic experiment. Where Polanyi views social institutions "primarily as conserving agencies which balance the breaking out of bounds and moving ahead of individual discoveries," Wagener observes, "Dewey lets his revisionism extend to the reconstruction of society itself."⁴⁷ Finally, and most fundamentally for a work designed to seek its theoretical grounds on the nature of the knowing process, divergence extends to embrace the Polanyian and Deweyian conceptions of knowledge. Quoting from Polanyi's Personal Knowledge, Wagener remarks that:

Dewey contends that all problems are subject to the rules of an experimental method. Polanyi, on the other hand, contends that discovery has an irreversible character such that 'no solution can be accredited as a discovery if it is achieved by procedures following definite rules.'⁴⁸

No resolution for the first four divergencies is offered. For the fifth Wagener suggests that "discrepancy between the two men may be ameliorated by giving discovery

⁴⁵ Ibid., p. 208.

⁴⁶ Ibid., p. 209.

⁴⁷ Ibid., pp. 209-210.

⁴⁸ Ibid., p. 211.

as Polanyi sees it and problem-solving as Dewey uses it different valences."⁴⁹ What these "different valences" amount to, it appears, is assimilating Polanyi to Dewey. In spite of his own recognition of the fact that Polanyi's concept of discovery, which is identical to his view of problem-solving as taken from the perspective of the first-person, constitutes a "breakthrough which transcends already established modes of procedure," Wagener goes on to remark that "If problem-solving is limited to those issues which can be fitted into the prevailing worldview and experimental method, then the tension between the positions is lessened [sic] if not dissolved."⁵⁰ Tension, of course, may indeed be lessened if not dissolved by so fitting Polanyi to Dewey but such relief would be purchased at the price of the surrender of Polanyi's concept of problem-solving, discovery, and the Polanyian act of comprehension itself. In consequence, it is also purchased at the price of Polanyi's endorsement of the "pragmatic experiment."

In view of the foregoing review of the literature in philosophy of education incorporating Polanyi's concept of tacit knowing, whether incidentally or thematically, a theoretical inquiry into the epistemological presuppositions of philosophical analysis in educational thought employing the methodology of clarification itself yet relying subsidiarily upon the conceptual framework of personal knowledge

⁴⁹ Ibid.

⁵⁰ Ibid.

serving to ground that inquiry may legitimately claim some originality.⁵¹ So viewed, the present study assumes the form of a test. Polanyi's concept of "objectivism" poses the problem: Do we find such objectivism in the analytical activity of clarification and in the view of educational theory and of the nature of learning derived from the presuppositions incorporated in that activity? Can the present study confirm the views of Polanyi on objectivism, that is, can such objectivism be seen to be self-defeating in educational thought as he maintains it to be elsewhere? The test here is not of Polanyi's principles themselves which are in the form of a conceptual framework serving to guide its application. Indeed, an internal analysis of the epistemological presuppositions of philosophical analysis in educational thought might well be made independently of Polanyi's theory of personal knowledge. Rather, the test is of the exercise of analytical clarification and of the nature of those educational concepts issuing from that exercise as embodied in the precepts of its exemplary proponents. The place of Polanyi in the present thesis is then by way of suggesting a possible epistemology which could supply an answer to those questions unveiled by that internal analysis, not to provide a standard in terms of which those questions are to be pre-judged. It is now to the administration of that test that the reader's attention is directed.

⁵¹The phrase "conceptual framework" is to be taken here as that generalized view of the nature of things, that broad background of ultimate presupposition serving as the foundation for its more pointed and articulated expression in the form of theory. Theory, in other words, presupposes a conceptual framework, but a conceptual framework need not presuppose a theory.

CHAPTER I

THE NATURE OF CLARIFICATION: KEEPING OUR MINDS FREE FROM NONSENSE

To understand the nature of philosophy, for D.J. O'Connor, is to understand that it can offer nothing in the way of positive knowledge of man or the world. He concludes his discussion of the nature of philosophy in his An Introduction to the Philosophy of Education¹ with the view that philosophy has primarily a purgative effect on our beliefs, that its exercise serves only to "keep our minds free from nonsense."

Both the present state as well as the past history of philosophy cannot encourage us to look upon philosophy as more than a laborious piecemeal effort to criticize and clarify the foundations of our beliefs. Such successes as philosophy can claim have all been of this kind. And this means that in the present condition of human knowledge we cannot hope for more from philosophy than occasional and fragmentary glimpses of enlightenment along with a reasonable confidence that its continuous practice will keep our minds free from nonsense. But this is something very valuable that only philosophy can give us.

Two questions emerge from this view of philosophy:

- (1) What is the nature of that "laborious piecemeal effort" of criticism and clarification which, directed at the foundations of our beliefs, yields only those "occasional and fragmentary glimpses of enlightenment?" and (2) What is the

¹D.J. O'Connor, An Introduction to the Philosophy of Education (London: Routledge & Kegan Paul, 1965):

²Ibid., p. 45.

nature of that "nonsense" which, by virtue of the continuous practice of that laborious piecemeal effort, our minds are to be kept free? To answer the one, of course, will be to answer the other, for to clarify the nature of O'Connor's clarification of the foundations of our beliefs will be to understand the nature of that nonsense which such clarification is intended to expose. Such clarification as here undertaken will yield its own occasional and fragmentary glimpses of enlightenment, principal among which is the apprehension of objectivism in O'Connor's clarification, that is, the view that one can, in the absence of further beliefs, criticize and clarify the foundations of one's own beliefs. Indeed, it is here proposed that O'Connor's clarification embodies the quintessence of such objectivism for not only does he maintain that one so can clarify the foundations of one's beliefs but that those further beliefs constitute precisely that "nonsense" from which our minds must be kept free.

It will be attempted here to show, then, that O'Connor's view of philosophy as prophylactic clarification covertly appeals to that which such clarification is intended to expose as nonsense, that is, a philosophical or "metaphysical" world view in terms of which such clarification proceeds. It will be attempted here to show that O'Connor incorporates a distinct philosophical or metaphysical perspective in the very act of a clarification which purports to disclaim such a perspective as nonsense, that he does not so much clarify the foundations of his beliefs but rather utilizes them in an attack upon those who do not share them.

It is, of course, the beliefs which O'Connor does not share which constitute that "nonsense" from which our minds should be kept free. It will further be attempted to show that the foundations of O'Connor's beliefs, his metaphysical world view, is inadequate to clarify precisely those questions which he raises for clarification, that his "reasonable confidence" in such clarification under their auspices, is ill-placed. It will be attempted to show that his laborious piecemeal effort to clarify the foundations of our beliefs violates the first principle from which his clarification starts out—such is the strength of his own unspecified further beliefs—and in so doing violates that which he lays down as the criterion of rationality. Given the inadequacy of his own further beliefs to clarify just those questions he raises for clarification, it will be attempted to show that it is precisely O'Connor's further beliefs which constitute the "nonsense" he so deplures in others, that his criteria by which his clarification proceeds not only do not give out onto those occasional and fragmentary glimpses of enlightenment but rather preclude them.

To show these things it will be necessary to follow in O'Connor's footsteps as he moves forward to criticize and clarify the foundations of our beliefs. The first step is a consideration of the relation of philosophy to education.

A. Philosophy and Education

O'Connor commences by seeking to work out the way philosophy in its "technical sense" of specialized discipline—

as opposed to its "non-technical sense" of guiding values or ideals—is related to educational theory and practice. The "technical sense" of philosophy draws its inspiration, for O'Connor, from the "revolution in philosophy" which, conveniently, has determined both what philosophy is and what it is not. The "revolution" has revealed that philosophy has ceased to address itself to the "big questions." It is not, for O'Connor, "a kind of superior science that could be expected to answer difficult and important questions about human life and man's place and prospects in the universe."³ Philosophy, rather, is "an activity of criticism or clarification. As such it can be exercised on any subject matter at all, including our present concern, the problems of educational theory."⁴

³Ibid., p.4.

⁴Ibid. O'Connor tips his hand slightly at this point in respect to the "technical" - "non-technical" distinction, remarking that in construing philosophy as an activity of criticism or clarification,

I am putting forward a philosophical theory which, like all such theories, finds no general acceptance. Nevertheless, it can be made very plausible and part of my task in the following chapters will be to explain and defend this view of philosophy and show how it can throw some light on the problems of education. It is a view which is very widely accepted in one form or another at the present day. (Ibid.)

This is the last we hear of any explicit reference to his philosophical theory which, as shall be seen, reduces to a foundation of logical positivism in which meaning derives from observation and verification and which manifests itself in a positivistic naturalism, the view that things are what they are as they appear to commonsense where, by commonsense, is taken to mean that amenable to empirical check. The foundation is overlaid by appeal to "ordinary language" philosophy where meaning derives from common usage in those cases recalcitrant to such empirical check. The theory, of course, is the basis of his attempt to answer those difficult and important questions about human life and man's place and prospects in the universe.

Where philosophy in its "technical sense" turns out to be a second-order activity of clarification, education, for O'Connor, consists of a tripartite construct only one element of which is the concern of that second-order activity. At its practical level education consists of (a) "a set of techniques for imparting knowledge, skills and attitudes."⁵ This set of techniques is supported by (b) "a set of theories which purport to explain or justify the use of these techniques."⁶ At the highest level of generality there exists (c) "a set of values or ideals embodied and expressed in the purposes for which knowledge and skills and attitudes are imparted and so directing the amount and types of training that is given."⁷ Now the thing is, that (a) and (b) are not matters for the second-order activity but rather of "the positive sciences and in particular the science of psychology. . . . Philosophy has nothing whatever to do with proving such factual questions."⁸

Now of course it is an analytical truth that if philosophy is constituted by a second order activity of criticism or clarification it can have nothing to offer in terms of proving factual questions since factual questions are first-order questions and philosophy deals only in second-order questions. What the "revolution" has made quite clear is that one can, in first-order activities, describe the

⁵Ibid., p. 5.

⁶Ibid.

⁷Ibid.

⁸Ibid., pp. 5-6.

world independently of a second-order picture of that world in terms of which such description makes sense and, conversely, that one can, in second-order activities, describe the relations of concepts governing the coherence of first-order activities without relation to that upon which such concepts may bear. So in O'Connor's tripartite construct the (b) theories of the psychologists stand in second-order relation to (a) the concrete set of operations, those techniques for imparting knowledge, skills and attitudes which flourish at the first order, for that is what it is to explain or justify the use of these techniques. But what is not clear is why (c), the set of values and ideals embodied in the purposes for which knowledge, skills and attitudes are imparted and which direct the amounts and types of training that is given does not stand in second-order to (b) and by extension, to (a), that is, to explain or justify the set of psychological theories which explained or justified the set of techniques. The psychologists, one can only assume, are not burdened by any set of values or ideals embodied and expressed in the purposes for which knowledge is imparted nor, equally, are they hindered by values or ideals governing the amounts and types of training that is given. This state of noetic solitude between (c) on the one hand and (a) and (b) on the other becomes increasingly puzzling with O'Connor's report that the question of the aims of education, that outcome of that set of values or ideals embodied and expressed in the purposes for which knowledge and skills and attitudes are imparted, is "the most important question that can be asked on the

topic. For upon the detailed answer that is given will depend the whole of the organization and teaching practice of a society. Different ends usually require different means, in education as elsewhere."⁹ But if the whole of the organization and teaching practice of a society depends upon the detailed answer to the question that philosophy asks, that is, that bearing upon the set of values or ideals embodied in the purposes for which knowledge, skills and attitudes are imparted and which directs the amounts and types of training given, does not the determination of (a) and (b) demand the antecedent determination of (c) which then works to inform such determination of (a) and (b)? Are not, in other words, (a) and (b) special cases of (c) and can become the concern of the positive sciences and in particular that of psychology only after the detailed determination of (c) has been given? Such contradiction, of course, arises from O'Connor's "very plausible" philosophical theory, here manifested as positivistic naturalism. Facts, those things with which the psychologist deals, are theory-free, they simply are what they are because the world is what it is as it appears to commonsense. That is why the second order activity of clarification can have nothing to offer for that set of theories which purport to explain or justify the use of these techniques.

Having clarified the relation of philosophy to education, O'Connor now sets his sights on that detailed answer to

⁹Ibid., p. 6. Italics his.

the question that philosophy asks regarding that set of values or ideals embodied in the purposes for which knowledge, skills and attitudes are imparted. To ask about this, of course, is to ask of the aims of education.

Now the perplexing thing about doing laborious, piecemeal, value-free, second-order work on the aims of education, those values or ideals embodied in the purposes for which knowledge, skills and attitudes are imparted, is, unsurprisingly, that they are value-laden. The first thing one must do, O'Connor reveals, is to notice this. Then one must be careful. "Any list of educational aims," he discloses, "must embody, however carefully they may be disguised, the valuations of its proposer. Like superstitions, valuations are dangerous unless they are recognized for what they are."¹⁰ Now if all valuations are dangerous if they are not recognized for what they are, and what they are are superstitions, is not the valuation that valuations are dangerous and like superstitions itself dangerous and superstitious? Certainly O'Connor does not wish to bring himself under his own interdict. Are there, perhaps, valuations which are not like superstitions and are not, as a consequence, dangerous? How will they be recognized for what they are and how will they be distinguished from those that are superstitious and dangerous? To get clearer about the aims of education and at the same time not to fall into the snare of imputing one's own values to the aims of education, to be, in O'Connor's

¹⁰ Ibid., p. 9.

words, "safeguarded against one of the commonest and most dangerous of intellectual errors—that of talking philosophy unawares,"¹¹ one must approach the question obliquely. One must not commit the methodological howler of approaching the aims of education directly by listing one's own but one must rather clarify the nature of the questions in terms of which such aims are demanded. One must clarify the nature of philosophical questions.

B. The Nature of Philosophical Questions

What does, and what does not constitute a philosophical question is determined for O'Connor by what he conceives to be the watershed of rational endeavour, the discovery of the scientific method. With the advent and development of inductive science over the past three hundred years there grew the realization that the branches of knowledge were to be distinguished "not on the kind of material that we study but on the sort of evidence by which we advance our knowledge."¹² To distinguish philosophical questions from those that are not, then, is to take cognizance of the "very important logical point that different kinds of statements demand different kinds of evidence."¹³ There are the questions of science and these can be settled, according to O'Connor, "by empirical methods, by hypothesis arising out of observation and observa-

¹¹Ibid., p. 15.

¹²Ibid., p. 18. *Italics his.*

¹³Ibid., p. 19.

tion confirming hypothesis."¹⁴ Questions of a mathematical or logical sort, on the other hand, can be settled "by calculation in accordance with the settled rules of deduction."¹⁵

The thing is, however, that empirical and deductive methods and the sorts of evidence they embody do not exhaust all the branches of knowledge. On this point O'Connor is clear, as he points out that

. . . there are a very large number of questions that do not seem to fall into either of these categories and among these are the traditional problems of philosophy, of ethics and natural religion. But if such questions cannot be decided either by empirical or by purely deductive methods, how are they to be answered?¹⁶

In order to clarify the nature of philosophical questions O'Connor's operational principle seems beyond doubt, that is, that different sorts of questions demand different sorts of evidence, that such a demand is not simply stipulative but is, indeed, a logical point inscribed in asking different sorts of questions. He has further maintained that the questions of traditional philosophy, ethics and "natural religion" do not fall into the categories of empirical or deductive questions and that evidence from either of these categories is inoperative by way of answering such questions. How then, are such questions to be answered?

In a word, they are not to be answered, for let it be understood at the outset that for O'Connor such questions

¹⁴Ibid., p. 22.

¹⁵Ibid.

¹⁶Ibid.

cannot be answered for the reason that empirical and deductive evidence jointly constitute and collectively exhaust the sorts of evidence by which we can advance our knowledge. Indeed, there is, au fond, only one kind of evidence by which we advance our knowledge for O'Connor, and that sort of evidence is empirical evidence. The "settled rules of deduction" yield only tautology and necessarily so.¹⁷

That said, let us proceed buoyed up by the bright prospects offered by the reassurances of the past three hundred years of inductive science, that is, that different kinds of questions demand different sorts of evidence. Disillusion is not, however, long in coming for O'Connor next directs his attention to that which he conceives as his main task, the discrediting of metaphysics which may here be taken as synonymous with the "traditional problems of philosophy, ethics and natural religion." This, after all, is the nonsense from which our minds are to be kept free.

Employing his own claim to interpret the universe on a grand scale, O'Connor divulges that metaphysical statements consist of those "claims to interpret the universe on a grand scale," and that such claims, being superstitious, "must be rejected for just the same reasons that the claims of alchemists, astrologers or magicians are now rejected."¹⁸

¹⁷ See his Introduction to Symbolic Logic (A.H. Bosson and D.J. O'Connor, eds. [London: University Tutorial Press, 1962]) where, it is pointed out, an expression in logic "is shown to be true for all possible truth-combinations of the variables. And this means that the expression is valid or logically true or a tautology (the terms italicized may be taken as synonymous)." (p. 42.)

¹⁸ O'Connor, op. cit., p. 17.

What are these reasons? They are the reasons drawn from the past three hundred years of inductive science, reasons which have determined that a metaphysical statement is one which

. . . assumes the existence of entities or facts which lie outside the range of human observation and experience. An argument is metaphysical if it purports to prove the existence of such entities or facts. Not that the statements are not metaphysical because they cannot in fact be checked by observation, but because they cannot in principle be checked this way.¹⁹

If the "range of human experience" is reduced to that which can be checked by observation, then, of course, the "traditional problems of philosophy, ethics and natural religion" are metaphysical since such problems are definitive of what it means to be metaphysical. The exclusion of these traditional problems rests on tautology, but O'Connor must establish the major premise of the syllogism, that is, that the "range of human experience" is so reduced, and not simply tell us that it is. Further, it might be pointed out that O'Connor's own statement that metaphysical statements are such by virtue of the fact that they cannot in principle be checked by observation is itself metaphysical, under the definition, since it cannot, in principle, be so checked. To contrast that which can be checked by observation with that which cannot be so checked is to transcend in its very utterance the bounds of observational check. To invoke an "in principle" condition is to slip loose, in principle, the chains of sensory verification. Further still, while O'Connor,

¹⁹ Ibid. Italics his.

of course, violates his "very important logical point," the operational efficiency of the test of empirical check itself requires scrutiny, for presumably the purpose of the test is to distinguish those traditional problems of philosophy, ethics and natural religion, from legitimate philosophical questions. Now O'Connor's point is that such problems are metaphysical and not legitimate philosophical questions. Such metaphysical statements are rejected because they failed the test of empirical check, but scientific statements, which are not legitimate philosophical questions either, under the definition, are barred although they pass the test. One can only conclude that the test of empirical check is then irrelevant as a determinant of what constitutes a legitimate philosophical question.

Beyond showing that philosophical questions are not scientific questions or those of deductive logic on the grounds that different sorts of questions require different sorts of evidence and that, paradoxically, proper philosophical questions are not the sort of questions asked by traditional philosophers since they are metaphysical in that they are not amenable to the tests appropriate to scientific questions, O'Connor does not reveal what the nature of a legitimate philosophical question is or what it might look like. What he does reveal, however, is that the past three hundred years of inductive science had shown the philosophers of the time that what was needed was the determination of a method peculiar to its questions.

This is the problem that has been set to philosophy by the success of natural science. Of course, we see it more clearly at the present day than did the philosophers of the seventeenth and eighteenth centuries since we have the advantage of profiting by their work.... But it was well understood by most of them that the first problem for the philosopher had become the problem of finding a method.²⁰

Most of those philosophers of the seventeenth and eighteenth centuries for whom it was well understood that the successes of natural science had impelled the discovery of a method suitable to philosophical questions proceeded to muddle things however. What they did was to simply replace the speculation on the nature of the universe and man's place in it characteristic of the classical and mediaeval philosophers with speculation about the nature and the powers of mind. They did not realize that they were being equally metaphysical and their efforts resulted, O'Connor reports, only in "the incidental success of opening up a new field of inquiry," an incidental success which, paradoxically, gave rise to that "group of important problems concerning the origin, nature and validity of human knowledge."²¹ The reason why the success was "incidental" and the problems were "important" is explained by the fact that "as long as the problem of method was unsolved, this addition to the field of philosophy was rather like discovering new diseases without finding cures for the old ones."²²

²⁰Ibid., p. 22.

²¹Ibid., p. 23.

²²Ibid.

Will O'Connor find a cure for the old diseases? Will he uncover the nature of the virus which incubated in the speculation on the nature of the universe and man's place in it so characteristic of the classical and mediaeval philosophers? He will do so, oddly in view of the fact that we see things more clearly than the philosophers of the seventeenth and eighteenth centuries, by speculating on the powers of the human mind for, as it turns out, such constitutes "a very good starting point for the search for such a method."²³ What, then, is the nature of the human mind? What is the nature of reason?

C. The Nature of Reason

For O'Connor reason consists in "the capacity to solve problems, of whatever kind they may be; or, to put the same point in another way, reason is the ability to answer questions appropriately."²⁴ Now the issue, of course, is what is involved in solving problems, in what way the capacity to do so might be characterized, of how, precisely, the determination is made that a problem is solved; or, to put the same point in another way, what constitutes appropriateness in the ability to answer questions? Unfortunately, O'Connor does not reveal his own conception of that capacity or ability but his presuppositions as to both are revealed in his passing on those who have revealed their conceptions of that capacity and ability and, what is more, in showing the

²³ Ibid.

²⁴ Ibid.

inadequacy of those conceptions thus revealed. For it appears that those who have so revealed their conceptions of that capacity and ability fall, according to O'Connor, into two groups, those who expected "too much" of reason, and those who expected "too little."

It was the mediaeval philosopher who incubated the virus to which the philosophers of the seventeenth and eighteenth centuries fell heir, for it was he who was overly sanguine about the nature of reason. The reason he was overly sanguine was owing to the fact, for O'Connor, that he lacked "a correct conception of what the human mind was capable of knowing and how it should set about acquiring the knowledge that lay within its power."²⁵ The reason why he lacked the correct conception of what the human mind was capable of knowing and, consequently, why he botched the job of determining how it should set about acquiring the knowledge that lay within its power was, by further consequence, that he had not settled the prior question, "What kind of evidence would be appropriate to the sort of questions that we are asking?"²⁶ He did not realize that for different questions different sorts of evidence are required. This is clear, for example, where the mediaeval philosopher mistakenly thought that he could prove the existence of God from common sense and self-evidence principles. He did not realize, O'Connor points out, that

²⁵ Ibid., p. 24.

²⁶ Ibid., p. 25.

. . . in either mathematics or in natural science, their 'proofs' on these subjects have not commanded any general assent among equally competent and well-informed philosophers. That is to say, the metaphysical findings of the mediaevals do not meet the criteria that we would ordinarily apply to the theories offered to the world by scientists, mathematicians, scholars, economists and so on, namely the criteria of independent checking by experts in the same field and coherence with the established body of knowledge in that field. There is indeed no such established body of philosophical knowledge; and philosophy being the sort of enterprise that it is, there never could be.²⁷

Having laid it down that different sorts of evidence are demanded for different sorts of questions and that the answers to those questions are, or are not, appropriate in terms of those different sorts of evidence and, further, having equally laid it down that philosophical questions constitute a part of that very large number of questions which cannot be decided by either empirical or deductive evidence, O'Connor then proceeds to invoke precisely those sorts of evidence appropriate to empirical or deductive questions to disqualify the "mediaevals" and their proofs. Although, in other words, the questions of the mediaevals were not the sort of questions for which empirical or deductive sorts of evidence were appropriate, it is precisely because their questions were not amenable to the methods of mathematics or natural science that their proofs failed, that they went wrong. The mediaevals did not realize that their proofs would not meet the criteria that we would ordinarily apply

²⁷ Ibid., p. 24.

to the theories offered to the world by scientists, mathematicians, scholars, economists and so on. That is why the mediaevals expected "too much" from reason. They had missed out on the past three hundred years of inductive science which has shown that different sorts of questions require different sorts of evidence. It was just a bit of bad luck.

Elsewhere O'Connor shows where the mediaevals went wrong in expecting too much from reason.²⁸ Here he directs his attack on the Thomistic conception of essences and the view that such essences can be apprehended by virtue of intuitive reason. Aquinas also, so it seems, suffered from bad luck.

A man, for Aquinas, is a rational animal; and he himself is the most rational animal of us all. Unfortunately, the will to rationality, even allied to great philosophical acumen, is not enough to guide a man to the truth. He must know also (a) what rational argument can do and what are its limits; and (b) what evidence we can appropriately use as material for the processes of reason. The rise of natural science, mathematics, and formal logic in the past three hundred years has made both (a) and (b) clear to us. But St. Thomas has a very imperfect idea of both. We are lucky enough to have the right models for rationality; he had the bad luck to be born too early.²⁹

While peripheral to this thesis, it is of interest to observe O'Connor's attack on Thomistic essences, that by which an entity is marked off as being of a particular sort. The method involves first drawing on ontological realism

²⁸D.J. O'Connor, Aquinas and Natural Law (Toronto: Macmillan and Co., 1967).

²⁹Ibid., p. 6.

while concurrently restricting the meaning of essences to their empirical sense; that done, he proceeds to invoke epistemological nominalism to undermine such ontological realism. So, St. Thomas was muddled in believing water was an "element" for we now know that it is not an element "but rather the combination of two elements in the proportion of two to one."³⁰ Now, St. Thomas was mistaken in believing that essences are presented to us in experience "pre-packaged for us by nature in pigeon holes that divide one kind of thing from another. In fact, such classifications are largely the outcome of our practical interests and our linguistic equipment and conventions."³¹ But O'Connor does not show whether water, consisting of the combination of two elements in the proportion of two to one, is the outcome of our practical interests, linguistic equipment and conventions. He does not show how our classifications, that to which the theory of essences is addressed, correspond to that which is classified, how we apprehend the object having the properties it does before we can assign to that object specific empirical components such as those pertaining to water, consisting of a combination of elements in the proportion of two to one.

Of more central concern here is O'Connor's attack on Aquinas' view of rational intuition, that is, that the ultimate premises upon which reasoning rests are known by direct insight and are, consequently, self-evidently true. For O'Connor as

³⁰ Ibid., p. 16.

³¹ Ibid.

for Aquinas, all reasoning proceeds from propositions accepted as true, that is, we must know such premises to be true if we are to be safe in believing the conclusions of reasoning which rest upon such premises. There are those premises, however, which are not themselves the conclusions of previous acts of inference, that is, those ultimate premises upon which subsequent inference rests. For Aquinas these ultimate premises are known by rational intuition. For O'Connor, on the other hand, such rational intuition confounds psychology and philosophy. "The psychological process of grasping a principle common to particular cases is real and important," he observes, "but the philosophical problem of justifying 'self-evidence' as a criterion of truth is evaded. The criterion of felt certainty is demonstrably unreliable."³²

The issue then becomes one of O'Connor's attempting such philosophical justification. Does he succeed in the attempt? He does not. Rather, he points out that:

Like all empirical concepts, the concept of rational activity is clear-cut only in its application to central standard cases like mathematical and logical demonstrations and scientific reasoning. Contemporary philosophy would generally dispute the classification of intuitions of first principles or of essences as a way of working of the human intelligence.³³

If the concept of rationality is an empirical concept and is clear-cut only in relation to its "central standard cases" will O'Connor show how contemporary philosophy

³²Ibid., p. 12.

³³Ibid., p. 37..

arrives at the apprehension of the first principles of such standard cases? In the case of the standard case of scientific reasoning, O'Connor simply assumes that which he must establish. The working of the human intelligence in the standard case of scientific reasoning, O'Connor reveals, is associated with the "so-called hypothetical deductive method," that is, "making conjectures about facts that we do not know on the basis of facts that we do know."³⁴ But it is, of course, the nature of the derivation of these "facts that we do know" which is at issue and which O'Connor nowhere reveals.

O'Connor, unfortunately, does not pursue a consideration of those other "central standard cases" in his treatment of St. Thomas, but he did manage to diagnose an identical "disease" in Aquinas' mentor.³⁵ Here he clearly maintains that in order for the conclusions of a logical demonstration to be true, the premises from which they are deduced must also be true and necessarily so.

If a statement S_1 is both necessarily true and demonstrably so, we must be able to prove it from prior premises, S_2 and S_3 , say, which are themselves necessarily true. For no statement can be necessarily true if it is proved from premises that are not themselves so. Now what of S_2 and S_3 themselves? If they are to be demonstrated too, there must be further necessary statements, $S_4 \dots S_k$ from which they are deducible. It is clear, as Aristotle points out, that

³⁴ Ibid.

³⁵ D.J. O'Connor, "Aristotle," in A Critical History of Western Philosophy, D.J. O'Connor, ed. (London: Macmillan Ltd., 1964).

such a process of proof cannot go on ad infinitum. Sooner or later we must come to a starting point in a set of statements $S_m \dots S_n$ which, though true and necessarily so, are not themselves demonstrable and do not contain any of the statements $S_1 \dots S_{m-1}$ which they are used to prove.³⁶

The issue could not be clearer. There can be no infinite regress of statements serving as the premises of logical demonstration as sooner or later we must come to a starting point in a set of statements $S_m \dots S_n$ which are necessarily true and not themselves demonstrable. Aristotle and Aquinas claim that such a set of statements is known by rational intuition. What does O'Connor say?

Intuition of supposedly self-evident propositions cannot guarantee their truth. What appears self-evident to us will depend upon our intelligence, our interests, and our training. Thus A may accept as self-evidently true what B will reject as false or doubtful. The history of mathematics has in fact shown that the axioms at the basis of a mathematical system do not have to be 'true,' still less, 'self-evident.' They merely have to be consistent. 'True' is not an appropriate predicate for such propositions.³⁷

It was "clear" when Aristotle pointed it out that a process of proof cannot go on ad infinitum but that sooner or later we must come to a set of statements which are necessarily true and not themselves the outcome of a further process of proof. Now we find that such a set of statements does not have to be true after all, it is not an "appropriate predicate for such propositions." In addition to self-contradiction, O'Connor passes by the point at issue, for it is not a matter

³⁶Ibid., p. 48.

³⁷Ibid., p. 49. Italics his.

of intelligence, interests, or training but rather of the manner in which a set of ultimate statements is known, how A will accept as self-evidently true what B will reject as false or doubtful. Further, there must be some reason for accepting certain axioms as opposed to others, else O'Connor merely replaces infinite regress of basic statements with infinite conventionalist relativity of psychological background condition. Where the criterion of "felt certainty" is "demonstrably unreliable," if intuition of supposedly self-evident propositions cannot guarantee their truth, what is one to say about intelligence, interests, and training? O'Connor, of course, is guilty of that with which he charged Aquinas, that is, he has evaded the philosophical problem of justifying "self-evidence" as a criterion of truth.

O'Connor's appeal to "consistency" fares no better, since such consistency is operative only after the first premises have been grasped. With logical demonstration, O'Connor points out,

First, the evidence or premisses from which we make our deductions must be true. And, secondly, the deductions themselves must be correct or valid. Of these two conditions, logic can guarantee only the second. The truth of those propositions which are not formally deducible from other propositions has to be established by means which lie outside the scope of logic.³⁸

It is clear, then, that either O'Connor is dodging the question of the derivation of first principles by appeal to the consistency criterion, since that criterion properly belongs to

³⁸Introduction to Symbolic Logic, op. cit., p. 11. Italics his.

the second condition of logical demonstration, that is, to its validity;³⁹ or, O'Connor is seriously suggesting that the truth of those propositions which are not formally deducible from other propositions and which have to be established by means which lie outside the scope of logic is to be found in the intelligence, interests and training of one who selects those propositions. Such intelligence, interests and training constitute those "means which lie outside the scope of logic." The question then becomes a reductio ad absurdum as to whose intelligence, interests and training is to take precedence in the determination of the truth of those propositions which are not formally deducible from other propositions. Unfortunately, O'Connor does not pursue this point in his treatment of symbolic logic, Aristotle, or Aquinas. By failing to do so, however, he has equally failed to give some form of non-intuitive account of the derivation of such first principles and, by extension, failed to show how the mediaevals, and St. Thomas in particular, expected "too much" from reason. He has himself not shown the "correct conception of what the human mind was capable of knowing and how it should set about acquiring the knowledge that lay within its power."

³⁹"Validity" in logical demonstration is secured by the derivation of tautology which, in turn, is secured by an axiom set being both complete and consistent. Such a set is complete if the formulas as laid out in the logical "truth table" cannot be extended without running into inconsistency, and a set is consistent if every derivable formula is a tautology.

Where the mediaevals went wrong in expecting "too much" from reason, O'Connor next reveals, the sceptic fares little better since he expected "too little." He expected too little because he maintained the view of "the fallibility of the human mind and the untrustworthiness of all the sources of our knowledge from our senses and memory to our powers of deduction and so-called intuitions."⁴⁰ More specifically, the sceptic slipped up in his failure to recognize the "reliable standards for distinguishing true statements from false ones and for assessing probabilities with success."⁴¹ Now O'Connor could not determine the manner in which the premises of science or the ultimate axioms of mathematics or formal logic were derived; will he be able to specify those "reliable standards" by which we distinguish true statements from false ones and for assessing probabilities with success? Will he, further, be able to do this in the context here under consideration, that is, for philosophical questions which, under the principle, "cannot be decided either by empirical or purely deductive methods?"

According to O'Connor what one does when one uses reason, when one employs that capacity to solve problems or answer questions appropriately, is to proportion "the degree of conviction with which we hold our various beliefs to the strength of the evidence that we have to support them. The abuse of reason consists in holding beliefs on insufficient

⁴⁰ An Introduction to the Philosophy of Education, op. cit., p. 26.

⁴¹ Ibid.

evidence or holding them with a degree of certainty that the evidence does not justify."⁴² The "reliable standards" for distinguishing true statements from false ones and for assessing probabilities with success, for solving problems or for answering questions appropriately, are now revealed to consist of standards for the determination of evidential sufficiency. However, it is obvious that to maintain that rationality rests on the correct proportioning of degree of conviction to such evidential sufficiency and its abuse in incorrectly so proportioning it is platitudinous unless some further "reliable standards" regulative of such proportioning are forthcoming. How, in other words, do we know when the degree of our conviction is correctly proportioned to the strength of the evidence?

The point is not lost on O'Connor, who muses that people "do not disagree on the principle of using appropriate evidence but on the standards by which we decide what is evidence for what."⁴³ In addition to controversy over what is evidence for what, one might add, in view of the above, that they also disagree over what constitutes evidential sufficiency, and, correlatively, its correct proportioning to degree of conviction. There can be no question: Unless some specification of these "reliable standards" is forthcoming by which we distinguish true statements from false ones and for assessing probabilities with success, in addition

⁴²Ibid., p. 27.

⁴³Ibid., p. 28. Italics his.

to some determination of those further "reliable standards" adjudicating the correct proportioning of degree of conviction to strength of evidence, O'Connor will himself stand guilty of failing to so proportion the degree of his conviction in respect to these "reliable standards" with the strength of evidence he has to support them. What, then, are these "reliable standards?"

O'Connor, unfortunately, does not know what these "reliable standards" might be, that, in fact, he has merely employed platitude to counter the sceptic. It appears, after all, that

. . . it cannot be said that there is yet any final agreement on the point. I do not want to suggest that nothing useful can be said on the matter. It is certain however that anything that can usefully be said will not be so platitudinous as what I have said so far. It is well to remember that in philosophy any statement that is not a truism is controversial. Nevertheless, even a truism may be true. Truisms are often worth re-affirming just because what is obvious to one man is not so to another. What we find 'obvious' depends to a large extent on our training, knowledge and pre-conceptions.⁴⁴

One must, of course, agree with O'Connor that anything that can usefully be said on the topic will not be so platitudinous as what he has said so far. This, then, is his delayed response to Aquinas in regard to the apprehension of the ultimate premises of logical demonstration. Where for St. Thomas they were "self-evident" for O'Connor, after much deliberation, they are "obvious." Further, in rebuttal to

⁴⁴Ibid., p. 28. Italics his.

the sceptic who expected "too little" from reason, O'Connor invoked his "reliable standards" yet, admittedly and explicitly, he has failed to show what they are. He is, then, under his own criteria, in abuse of reason.

In attempting to keep our minds free from nonsense O'Connor sought to clarify the relation of philosophy, that set of values and ideals embodied in the purposes for which knowledge, skills and attitudes are imparted and which direct the amount and types of training given, to the enterprise of education. Such clarification required a further consideration of the aims of education, which, in turn, required a clarification of those values embodied in those aims if we were to be safeguarded against that most dangerous of intellectual errors, that of talking philosophy unawares. Now the clarification of those values demanded a still further clarification of the nature of the questions in terms of which the aims of education and their embodied values are put, and this required a still further clarification of the method by which one might answer these questions. But any clarification of the method of answering these questions required, still further, a clarification of the nature of reason, of what the human mind was capable. This is the point we have now attained, but the fruit of such resolute, piecemeal, second-order and value-free exercises of clarification has been paltry. We do not know what a philosophical question might look like, although it does not look like an empirical or deductive question. We lack a method for its appropriate answering, although we are assured that empirical and deduc-

tive methods are not applicable. We are not clearer as to the nature of reason, we do not know where the premises of science or the basic statements of logical demonstration come from, nor do we know what the "reliable standards" might be by which we may answer questions appropriately and assess probabilities with success.

It is now time, however, to circle back, to regain some purchase on the question lost during the descent into the nature of reason. The fact that, on the basis of O'Connor's clarification, we do not know what it is constitutes no barrier for a return to the question which the clarification of the nature of reason was intended to presuppose. That question, it might be recalled, is the question of the method appropriate for philosophical questions and the nature of the evidence by which such questions might be answered. What, then, is the appropriate method for philosophical questions?

D. The Appropriate Method for Philosophical Questions

Oddly, in view of his attack on the mediaevals who expected "too much" from reason as they were not aware that their proofs did not meet the criteria "that we would ordinarily apply to the theories offered to the world by scientists, mathematicians, scholars, economists and so on," O'Connor now points out that "it will not help us here to use the same methods to deal with the intractable questions of philosophy that have worked so well in enabling us to

understand the natural world."⁴⁵ If such methods are of no use in respect to those intractable questions, one may, with some justice, wonder why they were brought forward to serve as criteria for judging the mediaevals who directed their attention to just those intractable questions. What we can learn from such methods, however, is that "no set of problems is likely to yield its solution until we find the right method for approaching it. The key to problem-solving of all sorts is first to find the general method for the kind of problem in question."⁴⁶ This has a rather familiar ring—it was, it might be recalled, why the philosophers of the seventeenth and eighteenth centuries slipped up. They were speculating on the nature of the human mind, just discovering a new disease, little realizing that the quest was quixotic "as long as the problem of method was unsolved." With the failure of O'Connor's own quixotic quest, the question is now directly faced. What, then, is the right method for approaching those intractable questions of philosophy in order that they are likely to yield their solutions?

O'Connor makes short work of determining the appropriate method for philosophical questions. The fact is that there is no such method for experimental science and logical demonstration exhaust between them the only methods by which solutions may be secured. "There can be no philosophical proofs," O'Connor emphasizes, "because philosophy cannot pro-

⁴⁵Ibid., p. 29.

⁴⁶Ibid., p. 30.

ceed either by the axiomatic method of mathematics or by the experimental way of the scientists. And there are no other kinds of proof but formal deduction on the one hand and the establishment or refutation of hypothesis on the other."⁴⁷

To possess an appropriate method, in other words, is to know what sort of evidence is relevant to the question as well as the proper method of collecting it, and "this is just what we do not know in many questions relating to philosophy, morals, politics, religion and so on—all those questions that seem perennially controversial because there is no established, agreed and tested method of approaching them."⁴⁸

O'Connor's principle of different sorts of evidence for different sorts of questions, initially to have been interpreted as the precipitate of the past three hundred years of experimental science and a beacon of rational liberalism, turns out to be more exclusive than inclusive. Initially raised to demarcate the modes of knowledge and the questions appropriate to those modes, the principle so viewed was promptly violated with respect to metaphysics and those who expected "too much" of reason. Yet O'Connor could not account for the genesis nor for the application of his two exemplary modes. Conversely, he could not account for their operation by way of articulating their "reliable standards" against the charge of the sceptic. The principle is carried over to the determination of uncovering the right method for philo-

⁴⁷ Ibid.

⁴⁸ Ibid., p. 31.

sophical questions with the consequent discovery that there are no other methods than those of science and mathematics. The rub is that philosophical questions are controversial questions and they are controversial questions because there is no appropriate method for their solution. If there were a method for their solution, then they would not be controversial.

But O'Connor himself has admitted that the question of what is evidence for what in science is controversial. People do not disagree on the principle of appropriate evidence itself but on the standards by which we decide what is evidence for what. Equally controversial were those standards constituting evidential adequacy as well as the proportioning of degree of conviction to strength of evidence. In addition, since the establishment of the truth of the premises upon which deductive demonstration rests lies outside the realm of such demonstration, it being a matter of intelligence, interests and training, it also is controversial. But if controversiality extends to the axiomatic method and the experimental way, is not the barring of philosophy, morals, politics, religion and so on, on the grounds of their controversiality, itself controversial?

Now, if philosophical questions are controversial questions because there is no appropriate method for their solution, and there is no appropriate method for their solution because one does not know what sort of evidence would count towards such a solution nor the proper method of collecting it, the

issue reverts to the question of the standards by which we decide what is evidence for what, one, by the way, which was controversial, since there is not yet any final agreement on the point. If O'Connor wishes to ground his controversial barring of an appropriate method for philosophy, morals, politics, religion and so on, on the basis of their controversiality, he must bestir himself from platitude couched in the observation that appropriateness resides in the proportioning the "degree of our conviction with which we hold our various beliefs to the strength of the evidence we have to support them." He must, in other words, give some account of evidential relevance.

It is in terms of evidential relevance that a question has meaning. A meaningless question lacks such evidential relevance. O'Connor points out that were we confronted by a question where we do not know what the relevant evidence would be, "then we should in all honesty admit that for us the question is not a meaningful one."⁴⁹

Now asking the right question means, among other things, putting questions that specify implicitly the type of evidence appropriate to their solution. . . . If the questioner cannot tell you what sort of evidence would be relevant to his answer, his query is a mere pseudo-question having the grammatical form of a question but not its interrogative function. For if the questioner does not know what sort of evidence would be relevant to his problem, he is in no position to distinguish a relevant from an irrelevant answer, still less a true answer from a false one.⁵⁰

⁴⁹ Ibid., p. 31. Italics his.

⁵⁰ Ibid., p. 32. Italics his.

There are, for O'Connor, two sorts of meaningless questions. Meaninglessness may be relevant to the questioner, where he cannot tell you what sort of evidence would be relevant to his answer, or relevant to the respondent, where he "personally did not know what kind of evidence would answer the question."⁵¹ In addition, there may be meaninglessness in principle, relating to those questions where "there was not and never could be any such evidence."⁵² Meaninglessness in principle extends beyond present practice to embrace "a possible range of evidence that, were it obtainable, would verify the statement or answer the question."⁵³ The thing is that to possess an appropriate method for answering questions is to know what evidence is relevant as well as the method for collecting it, and this, for O'Connor, is just what we do not know in many questions relating to philosophy, morals, politics, religion and so on. Are, then, these questions meaningless?

The answer to that question, following O'Connor's sequence of argument, shall be postponed momentarily by way of comment on his distinction between relative and absolute meaninglessness. The simple point here is that the standards by which we decide what is evidence for what has been passed by, or, in other words, is presupposed in the account of relative meaninglessness or meaninglessness in principle. The

⁵¹Ibid., p. 33.

⁵²Ibid.

⁵³Ibid., p. 34. Italics his.

latter merely drives the question back to the issue of what, in fact, does constitute obtainable evidence which, of course, presupposes those standards by which we decide what is evidence for what. In the absence of such standards the possible range of obtainable evidence would extend to cover all cases of questions since it is by such standards that the meaningful are discriminated from the meaningless. Similarly, if asking the right questions means, among other things, specifying the type of evidence appropriate to their solution, such appropriateness will naturally feature as a function of the standards of the questioner or respondent. The questioner may specify, in his question, the type of evidence appropriate to its solution but such appropriateness may or may not satisfy the standards of the respondent, and conversely. But so what? Of course a person is in no position to distinguish a relevant from an irrelevant answer, still less a true from a false one, if he does not know what sort of evidence would be relevant to his problem, but that is not the issue. The issue remains what it has been, and that is the determination of those standards by which we decide what is evidence for what. If O'Connor wishes to maintain that those questions relating to philosophy, morals, politics, religion and so on are meaningless questions, it is this he must establish. Having invoked the principle of meaninglessness on the grounds of evidential relevance, yet having suppressed the criteria by which such relevance is to be determined, O'Connor proceeds to archly observe that:

Indeed, some philosophers have suggested, perhaps unkindly, that all metaphysical statements are of just this kind. Unfortunately, it is not possible to give any useful general rules that will enable us to proscribe such statements and questions in advance. We have to test each one and pass or fail it on its merits.⁵⁴

But, of course, O'Connor has himself given just such a general rule for proscribing meaningless or metaphysical questions in advance, that general rule being that in order for a question to be meaningful it must specify implicitly the type of evidence appropriate to its solution. If, on the other hand, one is to take this pronouncement at face value, that is, that there is no general rule that will enable us to proscribe such statements and questions in advance, then it is, under the criteria, itself meaningless and metaphysical since it has failed to specify implicitly the type of evidence appropriate to its answer. On the other hand, a third way beckons. If there is indeed no general rule that will enable us to proscribe such statements and questions in advance and that each has to be tested on its merits, and the statement is to avoid the opprobrium of being itself metaphysical and meaningless under the criteria, O'Connor must reveal what these merits might be, that is, on what basis do we test each one and pass or fail it on its merits. Will O'Connor show of what such tests might consist, where such merits might reside, and the criteria by which such statements and questions pass or fail, and will he do this in the light of his own principle that there is no final agreement on the stand-

⁵⁴Ibid., p. 35.

ards by which we decide what is evidence for what?

To this point we have learned that there is no appropriate method for philosophical questions because we do not know what sort of evidence would be relevant to such questions. They are controversial questions just because they lack such an appropriate method because, in turn, that is what it means to be controversial. But are such questions meaningless questions? Meaningless questions are such by virtue of the fact that we do not know what sort of evidence would be relevant to their answer or even if such evidence were in principle obtainable. The determination of whether we know what sort of evidence would be relevant to their answer or if such evidence were, in principle, obtainable, is, in turn, a feature of the determination of the standards by which we decide what is evidence for what. It is by such a determination that we will be enabled to test each question and pass or fail it on its merits. Whether philosophical questions, together with those of morals, politics, religion and so on, are in fact meaningful questions will turn on the determination of the standards by which we decide what is evidence for what, on the determination, in other words, of what constitutes evidential relevance.

E. What Constitutes Evidential Relevance for Philosophical Questions?

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tioner's evidential framework. However, meaningless questions may also be such in principle, where there was and never could be any such evidence in terms of which the question might be answered. Meaninglessness here is such because there exists no evidential framework in terms of which the question makes sense, because there exists no range of evidence which might be brought to bear upon it. Relative meaninglessness then presupposes meaninglessness in principle for there could be no meaningless question for one who did not know what sort of evidence would answer the question if the questioner were in prior possession of the standards of meaninglessness in principle or, alternatively, every question would be meaningless to that questioner if such questions did not conform to his standards of meaninglessness in principle. To possess the standards of meaninglessness in principle, in other words, is to possess knowledge of an absolute evidential framework in terms of which not just relative meaninglessness may be judged but, which is saying the same thing, that by which the validity of differing evidential frameworks themselves may be tested and passed or failed on their merits. Now it so happens that O'Connor is in prior possession of just such standards.

It seems that there are questions in respect to which both questioner and respondent know what sort of evidence would be relevant to the question, yet that question may still be meaningless. This is just the case, O'Connor reveals, with metaphysical questions.

The metaphysicians who debated about God, mortality, human destiny and so on were assuming that these problems were similar to scientific questions about definite matters of fact to which answers were in principle possible. Yet it is obvious from the history of philosophy that equally honest, intelligent and well-informed men may have all the relevant facts at their disposal and still disagree about such matters. This indicates that the facts which they supposed to be relevant were not really relevant at all. If they had been, it is incredible that generally accepted answers on these matters should not by now have been reached.⁵⁵

Meaninglessness in principle is now seen to be analytical with appropriate method, as both turn on the issue of consensus. There was no appropriate method for philosophical questions since such questions were controversial and such controversiality picked out what it was not to have such an appropriate method. Similarly, meaninglessness in principle is such by virtue of the fact that equally honest, intelligent and well-informed men may be in possession of all the relevant facts at their disposal yet still disagree about those matters to which such facts refer, that is, to God, mortality, human destiny and so on. Such disagreement shows that the facts which they supposed to be relevant were not really relevant at all and that questions employing such facts were meaningless in principle. Such is not the case with scientific facts where equally honest, intelligent and well-informed men who are in possession of all the relevant facts at their disposal do not disagree. Their agreement

⁵⁵Ibid., p. 35.

establishes such scientific facts as facts, for that is what it is to be a fact.

The fact is, however,—it is obvious from the history of science—that equally honest, intelligent and well-informed men have been in possession of all the relevant facts at their disposal and yet have disagreed profoundly about their relevance.⁵⁶ Again, O'Connor's conventionalist-naturalist reading of the history of science has served simply to render what it is to be "relevant" as analytical with what it is to be "agreed upon." In such a reading, things are what they are, facts are facts, and the world is as it appears to commonsense. In such a case, of course, there can be no disagreement between equally honest, intelligent and well-informed men who have all the relevant facts at their disposal since such relevance is tautological with consensus in respect to those facts. That is what "relevance" means. Further, under the aegis of empirical naturalism, to be a "fact" is analytical with things as they are, for that is what is meant by "definite matters of fact," and things as they are, under the concurrent aegis of conventionalism, is what it is to be "relevant" and "agreed upon." It is ~~upon~~ such empirical, naturalistic and conventionalist standards, constitutive of what it is to be meaningful in principle, that O'Connor rules against metaphysical questions as meaningless, for to violate such standards is what it means to be metaphysical.

⁵⁶ See below, Chapter III: "The Nature of Learning: D.J. O'Connor and the Discovery of Neptune."

It is by the light of such standards that O'Connor has espied the difference between scientific facts and philosophical facts, for where scientific facts are analytical with their truth, with things as they are, as well as with their relevance, for they are agreed upon, philosophical facts fail the consensus test and are, consequently, analytical with neither. By circular implicature, it is an all or nothing affair. But what is not clear is, precisely, what these philosophical facts are. If equally honest, intelligent and well-informed men may have all these relevant facts at their disposal and still disagree about such matters, where by "matters" is to be understood God, mortality, human destiny and so on, what, exactly, are these facts which they have at their disposal? Are they the gospel texts? The structure of the snowflake? The writings of O'Connor? In any event, two terms appear in O'Connor's construct, the fact and that to which the fact is relevant. Unlike scientific facts, with philosophical facts one may be in full possession of all the relevant ones yet still disagree with another equally endowed about that to which such facts are relevant, that is, about God, mortality, human destiny and so on. Such disagreement, O'Connor reveals, shows that the facts themselves were not really relevant at all, that is, that to which the facts were relevant remained untouched but, as it happened, one just had the wrong collection of facts. One's collection of facts may well have been relevant to something else, but they were just not relevant to God, mortality, human destiny and

so on. The conundrum then arises as to how one is to determine if one's collection of facts is relevant to that to which the facts refer.

This pseudo-problem throws O'Connor's empiricist standards into relief, that is, the view that facts have somehow a life of their own and can subsist in a realm apart from and in independence of the conceptual framework which establishes the fact as a fact and bestows relevance upon it.⁵⁷ It is, of course, O'Connor's own empiricist conceptual framework which has so reified the fact in isolation from its theoretical foundation in his attempt to secure the primacy of the scientific fact at the expense of the philosophical fact, a reification which then appeals to conventionalist consensus as the mark of its relevance. Where O'Connor has merely rendered consensus and relevance as analytical terms in respect to scientific facts, it might be pointed out that such consensus as to the relevance between the scientific fact and that to which it refers is not itself the foundation of such relevance. The absence of consensus within the

⁵⁷D.J. O'Connor, "The Status of Sense Data," in Impressions of Empiricism, G. Vesey, editor (London: Macmillan, 1976). O'Connor, oddly, supports the contrary view of the concept-dependency of "facts," a dependence which extends to the level of perception.

Our visual fields as now given to us are so concept saturated, so moulded by the structure of the visual world that it is almost impossible for us to prescind from the conceptual load that gives meaning to what is presented to us. Certainly any expression in language of a visual experience, however primitive and ill-defined, is already conceptually tainted. (pp. 83-84.)

scientific community is not itself sufficient to disconfirm relevance, for the fact is that the content of such consensus rests ultimately on the belief or commitment to relevance, and it is by such commitment that scientific evidential frameworks work to establish scientific facts, not the reverse. As such, then, scientific facts do not differ from their philosophical counterparts.

On the basis of consensus as the criterion constitutive of evidential relevance, O'Connor next moves to extend that criterion in two directions. First, he proposes to raise such consensus from its status of criterion of relevance specific to the evidential framework of the questioner, from that of the criterion of relative meaninglessness, to that of absolute standard, to that of the criterion of meaninglessness in principle. It will thereby come to distinguish those questions for which there was and never could be any such evidence in terms of which an answer may be given. Concurrently, he proposes to widen the scope of consensus so raised to embrace other disciplines where there are "definite matters of fact," and in so doing to further distinguish meaningful questions from those perennially controversial questions of philosophy, morals, politics, religion and so on. O'Connor sees history as such a discipline, one in which, as with science, disagreements do occur but which, also like science, they may in principle be settled.

Historians and scientists may, and often do, disagree on the way in which the available facts are to be interpreted. But their disagreements can, in principle,

always be resolved by the discovery of further relevant facts; and no historical or scientific disagreement could outlive the knowledge of all the facts, if they were even attainable. Yet this can and does happen in metaphysical disputes. It is indeed one more way by which we may recognize that the dispute is metaphysical.⁵⁸

While one may look in vain for those "other ways" than the consensus criterion by which we may recognize that the dispute is metaphysical, it is not clear how evidential relevance may be secured by raising consensus to the status of operational principle, by eventual agreement attendant upon discovery of all the facts. Why, in other words, should it be supposed that disagreement over the interpretation of the "available facts" will be resolved by the discovery of "further facts" or even knowledge of "all the facts?" Will not that disagreement in interpretation over which conflict arose in relation to the available facts extend to the discovery of those further facts and to knowledge of all the facts since it is by virtue of those interpretations that those further facts are established as relevant? Why should such disagreement of interpretation be erased by simple enumeration? Disagreement over interpretation of such further relevant facts could outlive knowledge of all the facts since the relevance of these facts is determined by that interpretation upon which such selective enumeration is based. The Marxist and capitalist historian, for example, may indeed have knowledge of "all the facts," yet their disagreement would outlive such knowledge. Similarly with the Newtonian

⁵⁸ An Introduction to the Philosophy of Education, op. cit., p. 35. Italics his.

and Einsteinian physicist. O'Connor's argument for consensus in principle as the criterion of evidential relevance fails for the same reason that his own evidential framework of empiricism-naturalism failed to account for its own reliable standards for the selection and discrimination of "facts," for such consensus equally presupposes the criteria by which it is achieved. In O'Connor's scheme, evidential relevance is tautological with what is agreed upon and what is agreed upon is tautological with definite matters of fact, but the problem of determining if one's collection of facts is relevant to that to which the facts refer remains. In other words, O'Connor's conventionalist consensus criterion of evidential relevance is parasitic on his empiricist-naturalistic conception of what it is to be a fact, and what it is to be a fact is, in its turn, parasitic on what it is to be agreed upon, on what it is to be relevant. The circularity picks out O'Connor's essentially objectivist position, a view which seeks to divorce facts from the interpretive matrix by which they are established, to divorce the product of thought from thought itself. "Facts" are seen to subsist in independence of their being known yet, paradoxically, the justification of the relevance of those facts rests on consensus in respect to the knowledge of those facts. However, where the empirical element in the scheme renders such knowledge incomprehensible, the conventionalist justification trails off into infinite regress for such consensus, to be itself justified, must appeal to further consensus, and so on.

O'Connor takes his consensus criterion of evidential relevance by which he maintains he has established the objectivity of the scientific and historical fact to attempt, in the case of philosophical questions, to "re-interpret such empty propositions in such a way that we can see what they are really asserting and come to some agreed decision about their value."⁵⁹ Such re-interpretation shall be done in the light of an "important discovery about language." That discovery is the realization that "The meaning of a word is created and controlled by the way in which it is used."⁶⁰ To say what the meaning of a word is, then, is to say merely

. . . that the relations between a word and its meaning is not a part of nature independently of human wishes but rests upon social conventions. Words and phrases have the powers of communication that their habituated modes of use have endowed them with, and no more.⁶¹

Here the consensus criterion of evidential relevance has passed from the "fact-stating language" of the factual disciplines to the non-fact-stating language of philosophy. The propositions of philosophy are "empty" because they are not "fact-stating," yet a residuum of meaning may be retrieved in terms of their habituated modes of use with which the terms and phrases of such propositions may be conventionally employed. Now metaphysical and philosophical propositions—the two are identical—have certainly been sanctioned by use,

⁵⁹Ibid., p. 36.

⁶⁰Ibid., p. 37.

⁶¹Ibid.

and if such use is the criterion of meaning of such non-fact-stating language, then such propositions must have meaning which such habituated modes of use have endowed them with, and no more. Will O'Connor grant them, then, such meaning?

On scrutiny, unfortunately, it is revealed that when philosophical terms are compared with those in everyday usage it can be seen that "most of the key terms of philosophy must be both vague and irremediably so."⁶² Terms employed in everyday use, O'Connor maintains, are "common," while those of philosophy are "uncommon," and they are uncommon because they are "used much less often and in much less concrete contexts than the words describing the common features of our everyday experience."⁶³ However, the uncommonness of philosophical terms does not mark them off from ordinary usage completely, since such ordinary usage is often vague and ambiguous as well. The modern philosopher, it seems, resolves ambiguity and vagueness in the one much as in the other.

The modern philosopher who is sensitive to this natural feature of language often looks to the ways in which we remedy vagueness when it troubles us in everyday speech. We commonly do so by pointing to examples. In the case of 'violet,' for example, we can point to examples, some of which we are prepared to call 'violet' and also of those that are just too red or blue to qualify for the term.⁶⁴

O'Connor does not pursue here what is involved in the modern philosopher who is sensitive to the natural features

⁶² Ibid. Italics his.

⁶³ Ibid.

⁶⁴ Ibid., pp. 37-38.



of language being prepared to call certain examples "violet" and others as being just too red or blue to qualify for the term. He elsewhere points out that simple sensing is to be distinguished from observing for, in the latter case, similar to that of pointing to examples of "violet," "we clothe a portion of our visual field with concepts. And perceiving and misperceiving depends on choosing the right set of concepts to clothe the raw data."⁶⁵ What, then, is involved in the modern philosopher's pointing to examples of "violet," of choosing the right set of concepts to clothe the raw data, the undifferentiated colour patch? In what sense, further, can ordinary usage determine the selection of the right set of concepts? The difficulties confronting the modern philosopher sensitive to the natural feature of vagueness and ambiguity in language, however common such vagueness and ambiguity may be, do not appear to be resolvable simply in terms of such usage but point themselves rather to the concept dependency of such pointing and to the denotative intentionality involved in the discrimination and selection of such concepts. For O'Connor himself emphasizes discrepancy between the qualities of the physical object, in this case "violet," and the visual field, the conceptualized visual world.

Let us consider, from a large number of possible examples, the following: We have several instances of a shade of colour which vary gradually from C₁ to C_n. It often happens that C₁ is not distinguish-

⁶⁵"The Status of Sense Data," op. cit., p. 84

able to the normal eye from C2; nor is C2 from C3; nor is C3 from C4. However, C1 is distinguishable from C4. Thus there must be variations in the qualities of the physical object that are not matched by variations in the visual field (and this conclusion can, of course, be reinforced by evidence from physics). Thus sense data, in such instances cannot be identical with parts of the physical world; for the physical world in question differs qualitatively from one part to another and the 'corresponding' sense data do not.⁶⁶

Now either the modern philosopher who points to the colour "violet" does so under the impression that the example "corresponds" to the physical object, or he does so because the term "violet" is commonly employed in association with such an example. In the first case he is clearly mistaken since the qualities of the physical object are not matched by variations in the visual field. In the second the question of objective "correspondence" is evaded but the question of referral still remains, embedded here is what is involved in choosing the right set of concepts to clothe the raw data and by means of which one is prepared to call something "violet," together with the nature of that further consensus on the consensus that the term "violet" is commonly and correctly employed in association with that particular example. The modern philosopher in pointing to examples to remedy vagueness when it troubles him in everyday speech, in other words, overtly appeals to denotation, which can be disproved by physics, while tacitly invoking consensus or common usage

⁶⁶Ibid., p. 86. Italics his.

as its justification, but he nowhere shows how such commonness legitimizes such usage.

Unlike "violet," however, the examples to which the modern philosopher can point, to things like examples of "thinking," show for O'Connor, "how fuzzy this and similar concepts are round the edges and how there are no standard examples of them with a unitary set of properties that all genuine instances of the concept possess."⁶⁷ "Thinking," for example, might mean "when I am daydreaming, when I am doing mathematics, when I am writing a letter, when I am playing chess, when I am talking with friends and so on."⁶⁸ There is no end to the examples to which the modern philosopher can point to illustrate "thinking." If, then, the unitary set of properties of philosophical concepts are recalcitrant to simple pointing, if they are too fuzzy round the edges to be so elucidated as was the case with "violet," does this mean that ordinary language is inadequate as a criterion of evidential relevance for such concepts? On the contrary. The fact is that such "consideration of the workings of language has thrown new light on the nature of a concept and has gone a long way towards disposing of a philosophical problem that has been outstanding since Plato."⁶⁹

The "new light" that has been thrown on the concept of "thinking" by consideration of the workings of language

⁶⁷ Introduction, op. cit., p. 38.

⁶⁸ Ibid.

⁶⁹ Ibid.

is, of course, that no one use exhausts the concept, that its uses are legion. "Thinking" is then to be seen as "not an all-or-none affair but a matter of degree."⁷⁰ To ask what it is a degree of which the "new light" has illuminated is to miss the point, that point being that all uses of the term in ordinary usage are to be embraced, all discourse is valid. The difficulty is, however, how the determination can be made that daydreaming, doing mathematics, writing a letter, playing chess, and talking with friends are all legitimate uses of the concept "thinking" without some prior possession of just that concept by which such instances are identified. But this is just the other chimaera which the "new light" has dispelled for, in addition to that contained in the illumination that no one use exhausts the concept, the consideration of the working of language has also shown that there is, after all, no such concept. There is only usage. This was that problem which had been outstanding since Plato.

Now if there is only usage, if the meaning of a term is created and controlled by the way it is used, surely such usage for those perennially controversial questions of philosophy, morals, politics, religion and so on constitutes their evidential relevance. In spite of the fact that the terms employed may be fuzzy around the edges and may lack those "standard examples" with a unitary set of properties that all genuine instances of the concept possess, does not

⁷⁰ Ibid.

such usage of itself render them legitimate? Oddly, in spite of the revelation that there indeed exist no such "standard examples," O'Connor proceeds to disclose that there exists "another important application" of the principle that the meaning of a word is created and controlled by the way in which it is used. This important application of the principle is the appeal to the "standard case."

If the word has no application to the standard cases of its use, it loses its meaning and has, in consequence, no application at all. . . . This kind of appeal to the standard uses of words has had very wide application in contemporary philosophy and has proved a very effective logical weapon. It is particularly powerful in exposing the emptiness of those metaphysical theories whose point depends upon using ordinary words in extraordinary senses.⁷¹

It appears, after all, that there is not only usage itself but usage which must conform to the "standard case" if such usage is to aspire to meaning. Now in order to expose the emptiness of those metaphysical theories whose point depends upon using ordinary words in extraordinary senses, O'Connor must reveal what these standard cases are to which meaningful terms must have application. O'Connor, unfortunately, has very little to say on this crucial point, one, indeed, upon which his argument for meaning from use depends. He does mention one "extraordinary use," that of the term "cause" employed in connection with the "first cause" argument for the existence of God. Such an argument, for O'Connor, "uses the word 'cause' in a sense entirely different-

⁷¹Ibid., p. 39.

from that conferred on it by ordinary usage."⁷² But what he nowhere explains is why the term "cause" as here used is extraordinary, why it is entirely different from that conferred on it by ordinary usage. Of course, why it is entirely different from the sense conferred upon it by ordinary usage is because it is entirely different from the standard cases of O'Connor's usage which restricts ordinary usage to conform to his empirical-naturalistic assumptions. But is such restriction, under the criterion, legitimate? Are not the uses of a term, under the principle, legion? If, in other words, the relation between a word and its meaning is not a part of nature, independent of human wishes but rests upon social conventions, are only O'Connor's wishes, only O'Connor's conventions admissible?

In addition to the first "important discovery" about language, that meaning is created and controlled by use, there is another to which the modern philosopher sensitive to the natural feature of vagueness and ambiguity of language has become privy. The discovery could not have been long in coming since it is tautological with the first important discovery. This second discovery consists, for O'Connor, in the disclosure that "language is not a picture or map of the world and, in consequence, no conclusions can be drawn from the nature of language to the nature of reality."⁷³ This, of course, is where the mediaevals went wrong, for they thought

⁷²Ibid., p. 39 (Footnote).

⁷³Ibid., pp. 39-40.

that they were talking about reality when all along they were simply exchanging linguistic counters in a meaningless language game. What they did was to mistakenly assume "that our thinking about the world mirrored what we found there, at least when our thinking was not mistaken and that our language mirrored our thinking."

The harm lay in the supposed split between thinking and its expression as if thinking is some sort of mysterious inner process apart from language or from any other kind of symbolism whatever. Both the source of this error and its consequences are too complicated to dwell on here. One of its most damaging results is to make us suppose that the actual grammatical and syntactical structures of natural languages are a key to the nature of reality. For language on this view, is a picture of the world, or rather a picture of a picture. And what we find in the structure of language may fairly be supposed to correspond to the structure of the world.⁷⁴

It is unfortunate that the sources and consequences of the error involved in the view that, on the one hand, our thinking about the world mirrored what we found there, and on the other, that thinking is some sort of mysterious inner process that can proceed apart from language, are too complicated to dwell on here for the second important discovery, to say nothing about the first, demands precisely such dwelling. It seems that more is required than the simple assertion that our thinking does not mirror what we find there and that thought cannot proceed independently of its expression in language for presupposed in such a contention is an unsup-

⁷⁴Ibid., p. 40.

ported view of the relation of thought, reality and language which does mirror the reality, that is, that thought, reality and language are not mirror images but that rather language is constitutive of both thought and reality. It is, of course, in the realm of fact-stating language, that dealing with definite matters of fact, that O'Connor's assumed empirical naturalism does establish such a mirror image between our language and what we find there, that the structure of such language may fairly be supposed to correspond with the structure of the world. It is only when language is couched in "non-fact-stating" language that such correspondence collapses, where usage becomes the north star and where the standard case discriminates appropriate from inappropriate use. But the odd thing is that O'Connor is now himself engaged in the non-fact-stating mode, not that mode where the world is as it is and language makes no difference but that mode where language is constitutive of thought and reality, where it comprises that all-enveloping context and where it is simply being metaphysical to suppose that one can transcend it. But has O'Connor not himself transcended those forbidden barriers and stands, as a consequence, guilty of exactly the charge he levelled at the mediaevals? Put baldly, to maintain that no conclusions may be drawn from the nature of language to the nature of reality is to draw just such a conclusion from the nature of language to the nature of reality; in attempting to quash the theory of correspondence O'Connor has merely invoked his own theory of

non-correspondence and in so doing has not only presupposed on unargued grounds the validity of that theory but has traduced in the process the principles upon which that theory rests. As with ordinary and extraordinary usage, so it seems, it is O'Connor's view of correspondence which provides the standard case.

Connected with the error that thinking about the world mirrored what we found there is the other, the view that thinking is some sort of mysterious inner process that can proceed apart from language or any other kind of symbolism whatever. The view is that thought is identical with its expression, whether that expression consists in daydreaming, doing mathematics, writing a letter, playing chess or in talking with friends, since the term "thinking" can be used in connection with all these activities. Since thought so conceived is assimilated with its overt expression it is, in effect, a move within one of an infinite number of language games, and any thought or move outside such games collectively considered, that is, outside language or any other kind of symbolism whatever, is impossible. But the fact is that O'Connor's correction of the error constitutes just such a move, as it did, of course, in drawing the conclusion that no conclusions may be drawn from the nature of language to the nature of reality. To maintain, in other words, that thinking is not some sort of mysterious inner process that can proceed apart from language or any other kind of symbolism whatever is to draw a conclusion between

language and thought, between language and that which, under the principle, lies outside the bounds of language. It is to make a move outside language and is, consequently, to be metaphysical.

O'Connor's search for that which constitutes evidential relevance for philosophical questions has not been fruitful. His invoking of the meaningless in principle criterion for such evidential relevance has been seen to be circular with that which was agreed upon which, in turn, was circular with what it was to be a "fact," which, in turn, was circular with what it was to be relevant. As philosophical questions were seen by their nature to be perennially controversial, they failed the consensus criterion and in so doing such "facts" as fell under its provenance were irrelevant. Both circularity and irrelevance, however, rested upon the prior possession of O'Connor's empiricist-naturalistic-conventionalist interpretive framework, one, oddly, which rules against such frameworks and the facts established in their light. His appeal to meaning as use forced the invoking of the "standard case" to rule out philosophical usage from legitimacy as constituting evidential relevance, but he did not explicate why such usage violated the standard case beyond showing that it did not conform to his legislated standard cases. Finally, O'Connor violated his own principle which laid it down that one could draw no conclusions from the nature of language to the nature of reality and thought by proceeding to draw precisely such conclusions, albeit the conclusion that there was no relation.

O'Connor's whole point, of course, is that nothing constitutes evidential relevance for philosophical questions, whether such evidence be considered from an empirical, deductive, or linguistic perspective. It is with such purpose in mind that he turns to the final phase of his clarification of the nature of philosophical questions, the discrediting of metaphysical questions as legitimate philosophical questions since it is by this very discrediting that we shall be able to keep our minds free from nonsense.

F. Why Metaphysical Questions are Meaningless Questions

O'Connor had earlier proposed that the evidential relevance of philosophical questions could not be established on the basis of empirical consensus because such questions were perennially controversial. It was for that reason that a brief foray into linguistic philosophy was made in order that we might "re-interpret such empty propositions in such a way that we can see what they are really asserting and come to some agreed decision about their value." Unfortunately, no such agreed decision about their value was forthcoming, save perhaps that while philosophical questions were couched in terms habituated by use, such use was extraordinary and could make no claim to meaning. He now abandons his re-interpretation of such empty propositions to resume the attack from the perspective of empiricism, and does so by initially resurrecting his distinction between metaphysics and natural science.

In violation once again of his principle of different evidence for different questions O'Connor discloses that since metaphysical questions are not natural science questions they are meaningless questions. For instance, the questions of the classical philosophers in reference to "mental events," the "nature of mind," the "nature of objects revealed to us by the senses" may all look to us "superficially like the problems of the psychologist because they deal with the subject matter of psychology."⁷⁵ As it turns out, however, they are not really the problems of psychology because "they are not questions that can ever be answered by the psychologist as a scientist because no amount of factual evidence collected by the most careful observation and experiment could ever finally settle them."⁷⁶ The line of reasoning here is that such questions appeared to deal with the subject matter of psychology and not of philosophy, but since psychology cannot settle them they are not after all questions of psychology. Are they then questions relating to the subject matter of philosophy? No, what the exclusion of such questions from the subject matter of psychology does is to reveal that they are not legitimate philosophical questions either, under the principle that philosophical questions are not legitimate as philosophical questions because they are not psychological questions.

Having shown that the questions of the classical philosophers are not psychological questions because no amount

⁷⁵Ibid., p. 41.

⁷⁶Ibid.

of careful observation and experiment could ever settle them, O'Connor goes on to reveal, puzzlingly, that they are also not questions of natural science. There are, it seems, two distinctions between such questions and those of natural science, the one based upon method and results, and the other discernible on linguistic grounds. For example, take the questions of the physicist.

The methods of the physicist are "based upon controlled and accurate observation and can be checked by further observation."⁷⁷ Furthermore, if the answers to his questions are found to be correct, "they can be embodied in useful gadgets like dynamos and refrigerators which will be found to work efficiently."⁷⁸ Now how does a metaphysical theory like "the human mind is immaterial" crack up against the theories of the physicist, since no observations are relevant to such theories nor can they "be put to any practical use." No, there can be no doubt about it, the questions of the classical philosophers are not like those of the physicist, they certainly seem to have different methods and different results. But can one then draw the conclusion that since philosophical questions are not physics questions they are not legitimate philosophical questions either?

The second difference between metaphysical questions—it must be remembered that philosophical questions before the advent of the "revolution" are by definition "metaphysical

⁷⁷Ibid., p. 42.

⁷⁸Ibid.

questions"—and those of natural science is that the metaphysician, unlike the physicist who accurately observes, "derives his theories by tracing the logical connexions between statements expressed in ordinary language enriched by the technical terms of his philosophical vocabulary."⁷⁹ What the metaphysician does in doing this is to reveal his "blind confidence in the symbolic powers of language."⁸⁰ It will, of course, come as news to the classical philosophers that they derived their theories by tracing the logical connections between statements expressed in ordinary language enriched by the technical terms of their philosophical vocabulary since they thought, mistakenly of course, that they were talking about the world. It is rather the ordinary language philosophers themselves, among whom one may count O'Connor himself on the basis of his "important discoveries" about language, who so derive their theories and who, under the charge, reveal their blind confidence in the symbolic powers of language. Indeed, such blind confidence is revealed in O'Connor's counter to the anticipated protests of the metaphysicians who maintain that they are not tracing the logical relations between one linguistic expression and another but are rather "tracing these connections between one thought or judgement and another," and that furthermore, "because these judgements are judgements about reality, their logical consequences will give us new and often unexpected information about the universe we live in and our relation to

⁷⁹Ibid., p. 43.

⁸⁰Ibid.

it."⁸¹ For O'Connor this reveals their "linguistic innocence." Do they not realize that such a view presupposes that "thinking is a process prior to and independent of language?" Do they not realize that such a view presupposes that "words can have meaning that are to some degree independent of the way in which they are used?"⁸² Do they not realize that O'Connor has assimilated thought and reality to statements expressed in ordinary language and that it is his standard case which discriminated the legitimacy of such statements? Do they not realize that one must have blind confidence in the symbolic powers of language since this is all we have?

Finally, in what may be taken as an explicit expression of that philosophical theory, which, like all such theories, finds no general acceptance, O'Connor concludes his analysis as to why metaphysical questions are meaningless questions. The reason, at base, why such questions are meaningless is because they are not "factual" questions like those of natural science and history, they are not "publicly testable in the same field and coherent with the rest of established knowledge."

If it is objected that this is an unfair criterion to use because it has been developed by application to factual disciplines like science and history, we have to ask: How else is the truth of anything, historical, scientific, mathematical or philosophical, to be estab-

⁸¹Ibid., p. 44.

⁸²Ibid.

lished? We learn to recognize truth in the future by seeing how it has come to be recognized in the past.⁸³

The argument has come full circle from the establishment of the principle of different sorts of evidence for different sorts of questions, through the continuous and systematic violation of that principle, back to an expression of faith in the empiricist-conventionalist conceptual framework from which it departed. On the ground of that violation alone it may well be objected that the criteria of public testability and coherence with established knowledge is unfair since it is precisely the truth or meaning of philosophical questions which the criteria were intended to discredit. On the other hand the issue of its unfairness is irrelevant since the criteria of public testability and coherence with established knowledge developed by application to "factual" disciplines presuppose further criteria by virtue of which testability and coherence themselves acquire coherence. Public testability and coherence with established knowledge are, of course, analytical terms in the conventionalist theory of meaning, for it is by such coherence that questions are testable and by such that their truth is established. But it is those further criteria formulated in terms of the premises of science and the axioms of logical demonstration which testability and coherence do not touch but which are rather presupposed in their exercise, to which questions of truth ultimately appeal. These further criteria are of a

⁸³Ibid., p. 45.

philosophical nature and it is, indeed, O'Connor's own further criteria of empiricism and conventionalism which have been presupposed in the attempt to rule out just these questions. Yet it has been shown that the "facts" of the "factual disciplines" become such by reference to the evidential framework by which they are established and that disagreement could outlive knowledge of "all the facts." Where testability and coherence may be taken as mechanisms of consensus, it has also been shown that such consensus is no more an attribute of truth and meaning than controversy is an attribute of meaninglessness or falsity, a fact particularly evident in discovery science or revisionist history. Further, the criteria of public testability and coherence with established knowledge equally passes by the question of just how we do come to learn to recognize truth, they being rather in the nature of confirmatory exercises of truth once so recognized, and, in the absence of some account of such recognition, preclude rather than guide such recognition in the future.

In the course of his laborious, piecemeal effort to clarify the foundations of our beliefs, O'Connor has directed his scrutiny at the nature of philosophical questions. In so doing he has invoked the objectivist criterion of impersonal consensus as determinative of evidential relevance coupled with the equally objectivist criterion embodied in the empirical view of what it is to be a "fact" towards which such consensus is directed. Such criteria, however, have failed to reveal either the nature of philosophical

questions, the nature of the evidence relevant to them, or the method by which they might be answered. Yet rather than such questions, together with those relating to morals, natural religion, politics and so on being meaningless questions as O'Connor contends, it is his criteria which preclude the establishment of such meaning.

O'Connor emphasized that, as a direct result of the discovery of the scientific method, it was determined that different questions require different sorts of evidence and that philosophical questions were not amenable to the evidence or methods of empirical or deductive questions. Nonetheless, he invoked the objectivist criterion of empirical observation to mark off those questions which purport to prove the existence of facts lying outside the range of observation. In addition to violating his own principle of different evidence for different questions, the appeal to observation itself transcended the bounds of what can, in fact, be checked by observation. Similarly, he invoked the objectivist criteria of independent checking and coherence with established knowledge to counter the claims of the "mediaevals" who expected "too much" of reason, but such criteria failed to reveal how we arrive at knowledge of the premises of science or the first axioms of logical demonstration. In the case of those "reliable standards" by which we distinguish true statements from false and assess probabilities with success, O'Connor's empiricist criteria availed him little. Indeed, as reason was held to consist in the proportioning of one's degree of conviction with the strength of the evidence one

had to support them, O'Connor's criteria forced him into the odd position of violating his own criterion of rationality. His rejection of an appropriate method for philosophical questions on the ground that such questions are perennially controversial and lack consensus merely generalizes but does not solve the problem of those "reliable standards" by which we determine what is evidence for what and how we proportion the degree of conviction to the strength of evidence so determined, to support them. The inadequacy of O'Connor's empirical and conventional criteria to clarify the nature of philosophical questions was matched by the extension of the latter into the linguistic realm. No reliable standards were forthcoming, save those legislated by O'Connor himself, to discriminate ordinary from extraordinary usage, while his equally legislated non-correspondence between language and reality and thought transcended the legitimate bounds of usage so drawn. In his clarification of the nature of philosophical questions by way of keeping our minds free from nonsense, O'Connor appears to be indulging in just that which such clarification is designed to prevent, that is, of committing one of the commonest and most dangerous of intellectual errors—that of talking philosophy unawares. For in his attack on the nature, evidence, and method of philosophical questions as put before the advent of inductive science, O'Connor has simply employed his own philosophical beliefs appealing to logical positivism and ordinary language philosophy, beliefs which are themselves pre-inductive and therefore metaphysical, in the course of an attempt to rule out metaphysics. It is armed with such metaphysical beliefs that O'Connor next scrutinizes the second element of that tripartite construct constituting education.

CHAPTER II

THE NATURE OF EDUCATIONAL THEORY: A "COURTESY TITLE"

O'Connor's clarification of the nature of philosophical questions was undertaken to get clearer about the role such questions played in relation to the study of education. "Education" was seen to consist of a set of techniques for imparting knowledge, skills and attitudes, a set of theories which purport to explain or justify the use of these techniques, and finally a set of values or ideals embodied and expressed in the purposes for which knowledge and skills and attitudes are imparted and so directing the amount and types of training that is given. While philosophical questions, at least of the traditional sort, concerning the nature of that set of values and ideals were seen to be meaningless in that there existed no empirical evidence relevant to their answer nor method by which we might come to some agreed solution in respect to that answer, the issue was seen to be peripheral in any case since such questions had nothing to do with the practice of education nor its theoretical explanation or justification, that being rather the province of psychology. Of course, while it was O'Connor's empiricist, naturalistic and conventionalist view of such questions which precluded possession of the appropriate evidence and consensus on method, the issue now comes to that of his conception of the nature of theory and its relation to that set of techniques which it serves to explain or justify.

There is, for O'Connor, "No final and objectively demonstrable answer to the question 'what is a theory?'"¹ On the other hand, the fact that there is no final and objectively demonstrable answer does not "justify us in using the term just as we like."² Appeal to the Concise Oxford Dictionary, however, is here of little help since "theory" defined as "a supposition explaining something" is broad enough "to enable us to say that explaining the squeaking behind the wainscot by the presence of mice is to propound a theory."³ As a consequence, O'Connor finds it necessary to give his own "stipulative definition," one which holds a theory to be "a logically interconnected set of hypotheses confirmed by observation and which has the further properties of being both refutable and explanatory."⁴

¹"The Nature and Scope of Educational Theory," in G. Langford and D.J. O'Connor, New Essays in the Philosophy of Education (London: Routledge & Kegan Paul, 1973), p. 49. O'Connor's account of the nature of educational theory is less detailed in "The Nature and Scope of Educational Theory" than in the Introduction. Both works will be employed here, the latter in particular where there is divergence in explanation in respect to educational theory.

²Ibid.

³Ibid., p. 50.

⁴Ibid. O'Connor dropped the "descriptive" and "predictive" functions of theory in the Introduction in favour of the function of refutability. This may have been prompted by the realization that neither is epistemologically distinct from the other nor collectively distinct from the explanatory function. Michael Scriven in "Explanation, Predictions, and Laws," Minnesota Studies in the Philosophy of Science, H. Feigl and G. Maxwell, editors, Vol. VII, Scientific Explanation, Space and Time (Minneapolis: University of Minnesota Press, 1967) has pointed out that since prediction "is produced in advance of the event it predicts, it is intrinsically nothing more than a bare description of that event." (p. 177) As description comprehends prediction, explanation comprehends description. For Scriven, explanation is not

... something 'more than' or even something intrinsically different from informing

The stipulative definition constitutes the "standard case" of theory and one to which any other claimant to the title must measure up if it hopes to be counted as a genuine instance. It is, however, just in the case of education where O'Connor sees that the term fails to meet the conditions of the "standard case" and where, consequently, it must only "be considered a courtesy title. It is justified only where we are applying the well-established experimental findings in psychology or sociology to the practice of education."⁵ As he shall show in the course of his consideration, it is just these findings which are at the present time not well established with the outcome that educational theory is termed such only by virtue of etiquette.

In the absence of that set of values or ideal embodied and expressed in the purposes for which knowledge and skills and attitudes are imparted and so directing the amount and types of training that is given, several questions emerge in respect to O'Connor's theoretical component of education, that set of theories which purport to explain or justify the set of techniques for imparting knowledge, skills and attitudes. These questions concern O'Connor's view of the nature of theory itself as well as its role in explaining

or describing, but (in) its being the appropriate piece of informing or describing, the appropriateness being a matter of its relation to a particular context. Thus, what in one context would be a 'mere description' can in another be a 'full explanation.' Ibid., p. 176.

⁵ An Introduction to the Philosophy of Education, op. cit., p. 110.

or justifying that set of techniques. More specifically, the questions concern the genesis or derivation of theory regarded independently of that set of values or ideals. How, in other words, are theories adopted? How, further, might one account for theory change in the absence of that set of values or ideals? What is the nature, for O'Connor, of theoretical explanation? What is his view of the guidance function of theory in relation to practice where, independently of that set of values or ideals, theory selects and comprehends its relevant instances or, conversely, such instances are recognized as falling under a theory which serves to explain or justify them?

In the course of an analysis of O'Connor's "stipulative definition" of theory it will be attempted here to show that his "standard case" encounters difficulties in terms of its own criteria, that it fails to explain or to justify just those features of theory and the theory-practice relation upon which the stipulative definition grounds its appeal as the standard case. It will be attempted to show that (1) in terms of the nature of theory itself that the stipulative definition is not explanatory and that (2) in terms of the theory-practice relation that the stipulative definition cannot account for its own guidance function.

The analysis will proceed in accordance with O'Connor's own procedure, that is, by way of an examination of that which he sees as the "central criterion of a genuine theory, its explanatory function."⁶ This will be followed by a considera-

⁶"The Nature and Scope of Educational Theory," op. cit., p. 51. Italics his. The nature of hypotheses and their confirmation or refutation by observation will be considered below. See Chapter III, "The Nature of Learning: D.J. O'Connor and the Discovery of Neptune."

tion of O'Connor's view of the theory-practice relation and those reasons why educational theory cannot be considered a candidate for the title of "practical theory." Principal among these reasons is, on the one hand, O'Connor's distinction between the "sciences of nature" and the "sciences of man," while on the other is the place of judgements of value in educational theory, judgements which for him play no role in the standard case.

A. The Explanatory Function of Theory

1. The Psychological and Logical Conditions of Explanation

For O'Connor, explanation "is a concept with two components, the psychological and the logical."⁷ The psychological component of explanation is that attaching to the one who undertakes to explain something, commencing in initial perplexity, proceeding through relating that to be explained to his background knowledge, and issuing out in relief from puzzlement. To explain something, in this sense, is for O'Connor "to link it in some intelligible way with what we already believe. It follows that an explanation of some puzzling or anomalous item of experience may be a 'good' explanation, in the sense that it is subjectively satisfying to one person without being so to another."⁸ However, such an explanation issuing in relief of puzzlement by linking what has to be explained to background belief does not satisfy

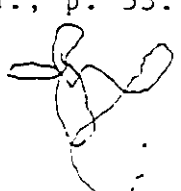
⁷"The Nature and Scope of Educational Theory," op. cit., p. 52.

⁸Ibid.

the complete conditions for explanation since, in order for an explanation to be true, the background belief also has to be true. Were such not the case, explanation would be relative to the individual. To complete the conditions for explanation then, what is also required is the knowledge or the logical condition. Any explanation, O'Connor points out, "is a conclusion arrived at by inference and so must conform to the requirements of valid inference. That is to say, for the conclusion to be true, we must know (a) that the premises are true and (b) that the inference is a valid one, made in accordance with the rules of logic."⁹

Under the knowledge condition of the explanatory function of theory the premises of the conclusion or explanation must be known to be true if the theory is to yield a true and not merely psychologically satisfying explanation. Knowledge, not mere belief is required, and it is in terms of such knowledge that the logical condition rests, where the logical condition is taken in its strict sense of valid inference. To be a true conclusion or explanation, in other words, valid inference alone is insufficient for no true conclusion can follow from false premises. O'Connor's brief account in "The Nature and Scope of Educational Theory" becomes itself puzzling, fulfilling the first step of the psychological condition, for he goes on to report that "We cannot reasonably demand of any theory that it should be true. We do, of course, hope and intend that our theories

⁹Ibid., p. 53.



will be true; but we cannot know that they are."¹⁰ But if explanation is not to be merely satisfying in nature, if it is not aimed simply at the relief of puzzlement for one who undertakes to explain something, it is not enough to hope and intend that our theories will be true. For the rules of logic lay it down that a valid inference can yield only conclusions tautological with the premises of such inference, and if those premises are not true and known to be so, no true explanation can ensue. That is why O'Connor introduced the knowledge condition to begin with. To relieve our puzzlement by way of satisfying the psychological condition of the explanatory function of theory, recourse to the fuller account of the Introduction is demanded.

"The assumption is," O'Connor points out,

. . . that since one of the purposes of explanation is to remove puzzlement, the explanation must relate the proposition that is found puzzling to the rest of what we know. There are, as we shall see, various ways in which what has to be explained, the explicandum, as it is often called, may be related to our present knowledge. However, if the explanation is to be a true one, it is essential that the explicandum should be thus related to what we know and not to what we mistakenly believe. It follows from this that to a person whose relevant beliefs are faulty, no explanation can be given. We could not explain the causes of a plague epidemic to people who believed that all diseases were caused by witchcraft and who had never heard of bacterial virus infection. In such cases, the process of explanation has to start with re-education.¹¹

¹⁰ Ibid., pp. 51-52. Italics his.

¹¹ An Introduction to the Philosophy of Education, op. cit., p. 84. Italics his.

Clearly, explanation to be a true explanation and not merely a "good" explanation, must rest upon what we know and not upon what we merely believe. One may, for example, give a "good" explanation to those who believed in witchcraft by explaining that the plague epidemic was, in fact, caused by witchcraft, but such an explanation, while "good" would be false, since the relevant knowledge of those to whom the explanation was given was faulty. To give a true explanation one would have to start with a process of re-education so that their background knowledge was true, that plague epidemics were caused not by witchcraft but by bacterial virus infection.

But the difficulty is that O'Connor's psychological and logical conditions of the explanatory function of theory are themselves contradictory. If the explicandum, here the plague epidemic, is related to what we already know, that is, that plague epidemics are caused by bacterial virus infection, it is just by such knowledge that the explicandum ceases to be puzzling, that it ceases to satisfy the psychological condition aimed at the relief of such puzzlement. If one to whom the explanation of the plague epidemic were given in terms of bacterial virus infection knew that plague epidemics were the result of bacterial virus infections, and yet was still puzzled as to the cause of plague epidemics, this would be puzzling and would, although for different reasons, fulfil the psychological condition. For something to be puzzling, for something to fulfil the psychological condition of the explanatory function of theory, it must not be related, or



at least not seen to be related, to that which one already knows. The puzzling conclusion, then, is that if the explanatory function of theory satisfies the psychological condition in that it issues forth in relief of what was initially puzzling, the explanation fails the logical condition since that which was to be explained was not related to that which was already known. Conversely, if the explanation satisfies the logical condition, that is, where the explicandum is related to that which is known to be true, it simultaneously fails the psychological condition for there exists no puzzlement from which relief is sought. Where O'Connor's two conditions of the explanatory function of theory become themselves the explicandum, neither the psychological nor the logical condition is met. While his psychological condition yields no relief from puzzlement since the formula is little more than an objectivist mechanism for the accommodation of the unpuzzling, his logical condition fails to establish just that upon which its efficacy rests, that is, the demonstration of the truth of the premises upon which valid inference constitutive of the logical condition is grounded and in terms of which a true explanation is forthcoming. That the "central criterion" of explanation given by O'Connor is not itself explanatory is further revealed by a consideration of the manner in which the explicandum is related to our present knowledge.

2. The Various Ways in which the Explicandum is Related to Our Present Knowledge

What is the nature of that "some intelligible way" in which what is to be explained is linked to that which we already know? For O'Connor these various ways reduce ultimately to subsumption under covering law, although, oddly, he introduces his explanation of such a relation by way of an illustration recalcitrant to subsumption, that is, in terms of a person whose behaviour we find puzzling.

If we were to see a man in conventional city dress dive into the river from Westminster Bridge, we would naturally ask for an explanation of his behaviour. And we should take as a satisfactory explanation that he was trying to rescue a would-be suicide or to win a bet or to escape from the police or some such story. Explanations of this kind are acceptable because they reduce what is apparently exceptional to an instance of a familiar type.¹²

There are two points which might be raised in connection with O'Connor's view of explanation where the explicandum involves an understanding of puzzling human behaviour and where such puzzlement is relieved by the reduction of what is apparently exceptional to an instance of a more familiar type. The first deals with the different orders of what is being reduced. To explain the action of a man diving off Westminster Bridge by such a reduction, that is, by reduction to trying to rescue a would-be suicide, winning a bet, or escaping from the police, is to confound overt behaviour on the one hand with the reasons for such behaviour on the

¹²Ibid., p. 85.

other. But the latter is irreducible to the former. There is, in other words, no "more familiar type" of behaviour under which diving off a bridge may be reduced since diving off a bridge is simply diving off a bridge. Comprehension and explanation of purposive behaviour is not reductive but consists rather in comprehending the intentions of the agent, comprehending higher-order reasons, not in assimilating an instance of overt behaviour to more familiar types of overt behaviour. By way of explaining purposive action by reduction, O'Connor has smuggled in a bit of teleology, just that sort of explanation resistant to the model.

Secondly, if O'Connor wishes to maintain that explanations of purposive human behaviour are reductively subsumptive in nature, he must show (a) what the general laws of human nature are which serve as the basis of the reduction, and (b) the mechanism of reduction by which such explanation proceeds. In other words, if trying to rescue a would-be suicide or to win a bet or to escape from the police are instances of a more familiar type, of just what are they instances? O'Connor does not go into this at this point, but might it be that human behaviour is usually motivated by, or that people generally act on, the basis of reasons? If such were to be brought forward as a general law under which human behaviour might be subsumed, one might ask as to the explanatory force of this "law." How might an explanation that a man diving off Westminster Bridge, explanation to the effect that he was trying to save a

would-be suicide or to win a bet or to escape from the police, be deduced from the generality that human action generally involves acting on the basis of reasons? Any such "law" to be minimally explanatory must discriminate among those instances upon which it has bearing from those upon which it has none and it is just this which a "law" of the generality that all human action is motivated does not do. Further, explanation of an instance of a particular type by reference to a general law involves necessity in terms of the behaviour of that instance in conformity with that general law. That hot air rises at a particular time may be explained by the law that hot air is lighter than cold and that in conjunction with cold air it will necessarily rise. But where is the necessity involved in a man who was trying to save a would-be suicide or to win a bet or to escape from the police which requires him to dive into the river from Westminster Bridge? He may be trying to do all these things yet, on reflection, choose not to dive from Westminster Bridge. While O'Connor's example of explanation by reduction to a more familiar type is inapplicable to human behaviour, it has been introduced with an eye to showing what he conceives to be the standard case by which the explicandum is related to what we already know.

(a) Subsumption of Anomalous Facts Under General Laws

While O'Connor points to four ways in which the explicandum may be related to what we already know, only

two are of first importance.¹³ There is, first, the explaining "a single anomalous fact (or a small group of facts) by showing that it is after all not exceptional but is an instance of a general law. Sometimes this general law may be a well-known one and sometimes it may be quite new."¹⁴ To illustrate subsumption of a single anomalous fact or small group of facts under a general law, O'Connor gives the case of a balloon rising in air.

¹³O'Connor views explanation by the construction of models as well as "gap-filling" explanation as secondary since neither fall under his reductive model. Models are constructed, for O'Connor, to elucidate the manner in which puzzling events occur and are seen to be of use primarily in terms of their suggestive power. They enlighten us, O'Connor points out, by "suggesting arguments from analogy from known resemblances so far unnoticed," but such models "tell us nothing about the laws governing human and animal nature." (p. 90) It is, then, just the integrative and projective qualities of that suggestive power emanating from explanation based upon the construction of models, a quality beyond the scope of reduction, which appears to compel O'Connor to assign it to a secondary status. In the same way, "gap-filling" explanation does not itself fall under the standard case, for, while it may be of some use in science according to O'Connor, it is so only as a "first step towards elucidating the facts and is not required or even appropriate there." (p. 91) Gap-filling explanation, as with explanation based on models or analogical argument, is not reductive but integrative and for some, Scriven for example, is of the essence of scientific explanation. The "right explanation" for Scriven is one

. . . which fills a particular gap in the understanding of the person to whom the explanation is directed. That there is a gap in understanding, or a misunderstanding, seems plausible since whatever an explanation actually does, in order to be called an explanation at all, it must be capable of making something clear not previously clear, i.e., of increasing or producing understanding of something. "Explanation, Prediction, and Laws," op. cit., p. 175. •

¹⁴An Introduction to the Philosophy of Education, op. cit., p. 85.

To an intelligent child to whom this phenomenon was a novelty, one might say: 'it is just like a piece of wood floating on water. Any body immersed in any fluid is subjected to an upthrust equal to the weight of the fluid it displaces. This means that materials lighter than water float in water and materials lighter than air float in air and so on.'¹⁵

O'Connor's view of how the explicandum is related to what we already know by means of the subsumption of an anomalous fact or small group of facts under a general law points up the inconsistency of the two conditions of the explanatory function of theory. The inconsistency requires the introduction of two parties to the explanation, the one satisfying the psychological, the other the logical condition. So, the "intelligent child" satisfied the psychological condition, it was he who found the balloon rising in the air a novelty and was suitably puzzled by the occurrence. His interlocutor fulfils the knowledge condition for he had previously related the anomalous fact to what he already knew and what he already knew just happened to be Archimedes' principle. The balloon rising in the air for him was neither anomalous nor puzzling, it did not rise to the status of explicandum, just because of such prior knowledge. O'Connor's model of explanation, by subsumption of an anomalous fact under a general law is, then, itself either incomprehensible viewed from the perspective of the puzzled intelligent child or contradictory when viewed from the perspective of the knowledgeable interlocutor. In either case the explana-

¹⁵ Ibid. Italics his.

tory function of theory as rendered by O'Connor is not itself explanatory. O'Connor generalizes the model to explanation lying outside the realm of science. Here it is the "serious misbehaviour" of the school child which presents itself as the anomalous fact. Such misbehaviour may be explained, he points out,

. . . by pointing out that the child lived in a slum and that bad housing conditions were known to be associated in a high proportion of cases with delinquency in children. We find this sort of procedure enlightening, though to a more limited degree than the first, just because we know, by and large, that events in nature occur in regular patterns. If therefore an apparently exceptional event can be shown to be an instance of an established regularity we find it reassuring, even if the regularity was one previously unknown to us.¹⁶

It is, in the example, puzzling as to who satisfies the psychological condition and who the logical. It is, presumably, O'Connor himself who is doing the "pointing out" that misbehaviour in the school child is known to be associated with bad housing conditions and that this, in its turn, is known to be an instance of the regularity of the patterns of events as they occur in nature. Yet, oddly, we find that it is O'Connor himself who is relieved of puzzlement in respect to the school boy's misbehaviour—he found the procedure of relating the anomalous fact with bad housing conditions and that it constituted a regular pattern of events as they occur in nature both enlightening and

¹⁶Ibid., p. 86.

reassuring—although the explanation was the outcome of regularities previously unknown to him. O'Connor has appeared to assimilate both the psychological and logical conditions to himself, to cast himself simultaneously both in the role of puzzled novice and knowledgeable adept.

Where O'Connor₁ may be taken as O'Connor puzzled and O'Connor₂ as O'Connor knowledgeable, there can be no explanation given to O'Connor₁ under the formula since such explanation requires that we must relate the explicandum "to what we know and not just to what we mistakenly believe." Yet it is just such knowledge that O'Connor₁ did not have for he did not know that the regularity of the patterns of events as they happen in nature applied to the particular instance of the misbehaving school child. It was a regularity that was previously unknown to him. O'Connor₁ then satisfied the psychological condition but fails the logical condition. With O'Connor₂ the situation is reversed since he knew, by and large, that events in nature occur in regular patterns and that the serious misbehaviour of the school child together with bad housing conditions constituted an instance of just such a regularity. O'Connor₂ was never reassured or enlightened since he never suffered from initial puzzlement.

O'Connor's model of explanation of an anomalous fact or a small group of facts by subsumption under a general law which was previously unknown to us fares no better than when the law was well known to us. In either case the psychological and logical conditions of the explanatory function of theory are mutually contradictory and work to render the

stipulative definition, of which the explanatory function is the "central criterion," equally contradictory. The stipulative definition, under the formula contained in the explanatory function, is not itself explanatory.

(b) Subsumption of General Laws Under Further General Laws

O'Connor's second method of relating the explicandum to what we already know consists in an extension of the first, that is, the subsumption of the general law which initially subsumed the anomalous fact or small group of facts "as an instance of a still more general law."¹⁷ The general regularity holding between the misbehaving school child and bad housing may, in its turn, become puzzling and assume the status of explicandum.¹⁸

O'Connor, however, does not approach the issue by way of explicating the subsumption of current general regularities since the model is inoperative in that context. As it is a mechanism for relating the explicandum to what we already know, current general regularities are themselves the further limits of what we already know and do not permit of further subsumption. A handier illustration comes from the history of science. Kepler's Laws of planetary motion,

¹⁷ Ibid., p. 85.

¹⁸ An upper limit to the regress is drawn by O'Connor at that point where a "unifying theory must not be so general that it loses its connexion with observable fact." (p. 86) Any such general theory is of no explanatory power since "it is compatible with any possible observation that we might care to make." (p. 87) One might well argue that the general law that events in nature, by and large, occur in regular patterns is compatible with any observation that we might care to make.

for example, "can be said to be explained when they are shown to follow from Newton's mechanics as a special case of Newtonian theory. Similarly, the Newtonian theory was itself explained in this way by the theory of relativity."¹⁹

The subsumption of a general regularity under further covering law meets, of course, with the same difficulties encountered with the subsumption of a fact or small group of facts under lower-level law for either the psychological or the logical condition remains unfulfilled. In the present case, where prior knowledge of the further law constitutes the background theory in terms of which the lesser theory is to be subsumed, the psychological condition is absent since the lesser theory engendered no puzzlement. If the view, in other words, is maintained that Kepler's Laws constituted but a special case of Newtonian mechanics and Newtonian mechanics a special case of relativity, neither Kepler's Laws or Newtonian mechanics could give rise to puzzlement from the Einsteinian perspective. Both are smoothly subsumed as special cases of relativity. On the other hand, where knowledge of the further covering law is absent, the psychological condition is operative but the logical condition cannot be met. Attention here will be given rather to O'Connor's view of the method of subsumption, the manner in which the determination can be made that the previous established regularity comes to constitute a special case of the further, more recent, general law which supersedes it. In

¹⁹Ibid., p. 86. Italics his.

what sense, in other words, can Kepler's Laws be shown to "follow from" Newton's mechanics as a special case? In what sense does there obtain a similar relation between Newton's mechanics and Einstein's relativity?

Kepler's Laws were in large part the expression of a Pythagorean mysticism, one in which number and form were seen as inherent in nature and made manifest in harmonious creation constituted by symmetry of number and of form. Newton's mechanics may be said to "explain" Kepler's Laws only if such laws were restricted to that amenable to subsumption under Newtonian mechanics, that is, if just the mystical element were exorcised from the Laws. In the Apollonian vision of reality underlying the Newtonian scheme, the view that saw reality in terms of a mechanical substratum beyond experience governed by differential equations, the Pythagorean mysticism of Kepler had no place. To say that Newtonian mechanics "explained" Kepler's Laws is (1) to adopt the Newtonian perspective underlying the mechanics and (2) to rule out that which does not conform to that perspective which, in effect, means ruling out the ontological matrix underlying Kepler's Laws. It is, then, only upon a view of Kepler's Laws so restricted that one can proceed to maintain that Kepler's Laws were "explained," or "followed from," Newtonian mechanics. In what way did relativity "explain" Newton's mechanics? How did the Newtonian theory "follow from" Einsteinian relativity as a special case?

Newton's was a universe predicated on a point of absolute rest, a concept wholly alien to the basic datum of

relativity founded upon the notion of the absolute and constant velocity of light. As with the restriction of Kepler's Laws to enable their subsumption under Newtonianism, Thomas Kuhn has shown that to maintain the explanatory efficacy of Newton's mechanics in Einsteinian terms, it is necessary to restrict the application of the mechanics to those phenomena which gave the mechanics their meaning.²⁰ In the absence of this restriction the theories are incompatible, and, far from Newtonianism "following from" relativity as a special case, relativity can be accepted only with the recognition that it proved Newton's mechanics wrong.²¹

²⁰ Thomas Kuhn, The Structure of Scientific Revolutions (Chicago: University of Chicago Press, 1970).

²¹ Kuhn explains their incompatibility in the following terms. Where " N_1 's" are a set of statements identical in form to Newton's laws of motion, gravity, etc., and where " E_1 's" embody a similar set of statements identical in form to Einstein's principles of relativity, there can be no relation of derivability of N_1 's to E_1 's.

Though the N_1 's are a special case of the laws of relativistic mechanics, they are not Newton's Laws. Or they are not unless those laws are re-interpreted in a way that would have been impossible until after Einstein's work. The variables and parameters that in the Einsteinian E_1 's represented spatial position, time, mass, etc., still occur in N_1 's; and they still represent Einsteinian space, time and mass. But the physical referents of these Einsteinian concepts are by no means identical with the Newtonian concepts which bear the same name. (Newtonian mass is conserved; Einstein's is convertible with energy. Only at low relative velocities may the two be measured in the same way, and even then they must not be considered to be the same.) Unless we change the definition of the variables in the N_1 's, the statements we have derived are not Newtonian. If we do change them, we cannot properly be said to have derived Newton's Laws, at least not in any sense of 'derive' now generally recognized. Ibid., p. 101. *Italics his.*

O'Connor's second illustration of the explanatory function of theory, of how we relate the explicandum to what we already know, and what we already know is a further general law, while the explicandum is a lower-level or historically more further removed general law, is seen to fail for reasons encompassed in the concept of subsumption itself. In the case of Kepler, Newton and Einstein, the knowledge conditions were of radically different sorts. They were, in effect, not talking about the same things, as the phenomena revealed in the light of their respective paradigms achieved meaning by virtue of those paradigms. To say, then, that the one was "explained" or "followed from" the other is to overlook the mutual irreducibility of these paradigms. O'Connor's own objectivist paradigm, however, attempts to hold the phenomena as stable, as independent of their explanatory frameworks and to advance the view that scientific progress is describable in terms of a formal relationship obtaining between them. Yet it is just this view of the cumulative advance of science resulting from a serial subsumption of previous axioms to their later counterparts which he has not shown and which, if Kuhn's analysis is to be accepted, never can be.

O'Connor's "central criterion" of a genuine theory, its explanatory function as revealed in the "standard case" of its scientific exemplars, has been shown to be itself lacking in explanatory force. The explanatory function of the stipulative definition viewed as reductionist subsumption, whether of anomalous facts under a general law or lower-level law under a further, more general law, presupposed its own

were apprehended in the course of dismissing Thomistic rational intuition, he likewise fails to indicate the nature of the deriviation of those scientific premises serving as the basis of ~~explanation~~ by reductionist subsumption of the explicandum to that which we already know. In spite of these difficulties, however, it is upon such grounds that O'Connor determines that educational theory falls short of the stipulative definition and the central criterion of its explanatory function, that it must be judged theory only as a "courtesy title."

B. A Courtesy Title

Under the central criterion of its explanatory function, O'Connor's stipulative definition of theory has been seen to fail its own criteria, that is, it is not itself explanatory under the formula. Nor has the stipulative definition or explanatory function served to illuminate the guidance function of theory as would be required according to his view of the nature of theory, as it does not contain within itself the rules for its own application. In other words, given the knowledge condition and given the instances to which such knowledge is relevant, O'Connor's programme of reductionist subsumption can proceed apace but in the absence of either his notion of theory "rotates idly." Nevertheless, it is by virtue of the explanatory function of genuine theory that O'Connor finds educational theory wanting. Where the term may be justified in its educational sense "only where we are applying the well-established experimental findings in psychology or sociology to the practice of education," it is

just these findings which remain at present elusive. This is so, O'Connor maintains, because, unlike the "sciences of nature" upon which rests practical theory properly conceived, such as that of medicine, the "sciences of man" are currently under-developed and do not themselves warrant the appellation "science." The findings of the "sciences of man" are not "well-established." In addition to its lacking proper scientific grounding, educational theory is seen to contain metaphysical statements and judgements of value, both prejudicial to a claim to theoretical status.

It will be maintained here that both deficiencies which O'Connor espies in educational theory which work to discredit its claim to the title are such by virtue of his own reductionist criteria as incorporated in his stipulative definition. It will be maintained that (1) his difficulty in assimilating the "sciences of man" to the "sciences of nature" does not result in the disqualification of educational theory as claimant to the title but rather in the disqualification of his own reductionist criteria. It will be maintained, in other words, that the faith O'Connor places in the eventual development of the "sciences of man" as embodied in some future well-established findings in psychology is the misguided outcome of just those criteria. In addition it will be maintained that (2) the difficulties O'Connor encounters in his attempts to justify the metaphysical statements and judgements of value which he sees as endemic in educational theory spring not so much from these statements and judgements but rather from the nature of his own objectivist meta-

physics and judgements of value which preclude such justification. It will be maintained finally, that O'Connor's conception of practical theory suffers from just those deficiencies attendant upon his view of theory in its paradigmatic sense, that is, that it is neither explanatory nor does it provide an effective guide to practice, that it fails its own psychological condition and that it fails to lay down the rules for its own application.

1. The Sciences of Nature and the Sciences of Man

(a) Why Education Is Like Medicine

Education, for O'Connor, is not a science which aims at the "increase of knowledge" but is rather, like medicine, "a set of practical activities connected by a common aim."²² Yet such practical activities may aspire to the status of theory to the degree to which they incorporate the findings of science in their practice.

Indeed, the more reliable and efficient a system of education becomes, the more firmly will its techniques be grounded in scientific findings. In this respect, the practice of education may be compared with the practice of medicine or engineering. Medicine is not itself a science. It aims not at the increase of knowledge but at a practical result, the prevention and cure of disease. However, in order that doctors can carry out their task effectively, they have to make use of the relevant scientific discoveries in their practical techniques; and they have themselves to know a certain amount of the sciences which bear upon their work. In particular, they must know a good deal of anatomy and physiology, the sciences

²²An Introduction to the Philosophy of Education,
op. cit., p. 93.

of the structure of the body and
its workings.²³

The claim of education to theoretical standing rests, then, on the degree to which its practice is "grounded in" scientific findings, the degree to which its practitioners "make use of" the relevant scientific discoveries in the pursuit of their "common aim." To the degree to which the practice of education is so grounded, to that degree will its practice become more efficient and reliable, the qualities of practical theory properly conceived. Like medicine, the claim of education to the status of practical theory is derivative upon its foundation on the relevant sciences and the tight theory-practice fit it has in relation to these sciences. The analogy of education and medicine, however, constitutes O'Connor's first step in discrediting education as an instance of practical theory. While education may look like medicine, it does not resemble it in terms of O'Connor's view of the practice of medicine as a procedural technology aimed at the realization of uncontentionous goals. Three points present themselves in relation to the issue at hand: (1) Is the theory-practice dichotomy in medicine as clear as O'Connor supposes? (2) Does making use of the relevant scientific discoveries in medical practice resemble that found in technological activity? (3) Is the analogy of education and medicine legitimate in terms of the uncontentionness of their goals?

²³Ibid.

Pure theory aims at the increase of knowledge, and that is what science does. Practical theory aims at the production of practical results and that is what medicine does. Education is like medicine and cannot aim at an increase of knowledge since education is directed at the production of practical results and not towards an increase of knowledge. But if the dichotomy is not simply tautological, that is, if "medicine" is such by definition just because it does aim at the production of practical results for that is what it is to do medicine, is the distinction as precise as O'Connor maintains? Could not the cancer researcher, viewed on the one hand under the aspect of aiming at the production of practical results, the prevention and cure of cancer, be said to be engaged in the exercise of practical theory while, on the other as viewed under the aspect of aiming at an increase in knowledge, be said to be engaged in the exercise of pure theory? Similarly, is it necessarily the case that the educational theorist, since his efforts are tied to educational considerations, is concerned only with the production of practical results and is engaged, in consequence, only in practical theory? Where such a theorist attempts to gain insight into the nature of human understanding, can he not be said to be aiming at an increase of knowledge and be engaged in pure theory as a result? If such is the case, is not O'Connor's dichotomy of pure theory aiming at an increase of knowledge and practical theory aiming at the production of results more a function of the purpose for which the activities are undertaken and less a function of the

intrinsic nature of the activities themselves?

The second and third points in relation to O'Connor's view of practical theory are inter-related, for what it is "to make use of" relevant scientific discoveries in practical activities is tied to his view of the uncontentious nature of the aim of these activities. Incorporated in the view of what it is to be a practical activity is the reduction of this aim to its most rudimentary formulation and a parallel restriction of the nature of practice to its reliability and efficiency in the attainment of those aims so reduced. For O'Connor, the goal of medicine consists in the platitudinous "prevention and cure of disease," and the set of practical activities concerned with that common aim are judged by virtue of their reliability and efficiency in securing that goal. Where the goal is taken in its minimal and uncontentious sense, the doctor is seen to "make use of the relevant scientific discoveries" when he prescribes two aspirin and plenty of rest. Such prescription, of course, reduces the nature of those practical activities and the nature of practical theory supporting those activities to the routine level of technological implementation. On the other hand, where the goal of medicine is taken at its upper limit, say the discovery of a vaccine, what it is to "make use of the relevant scientific discoveries" ceases to be so platitudinously obvious. But one need not take the goal of the "prevention and cure of disease" at this lofty level to counter the view that the set of practical activities embodied in medicine do not conform to

O'Connor's mechanistic conception of medical practice. What distinguishes healthy from pathological functioning is itself not always so obvious, nor is its treatment invariably and routinely reducible to the automatic selection of the relevant findings of physiology and anatomy. As O'Connor's "common aim" of that set of practical activities marking off the practice of medicine reduced to its minimal and platitudinous formulation, so what it is "to make use of the relevant scientific discoveries" masks the exercise of those activities under an omnibus description which fails to discriminate routine from discerning performance. That the goals of medicine are uncontentious and its practice routine is, for O'Connor, that which marks it off as an instance of practical theory. The carry-over is that education, being a practical theory, is likewise endowed. In the absence of that set of values and ideals embodied and expressed in the purposes for which knowledge and skills and attitudes are imparted and so directing the amount and types of training that is given, education must of necessity have aims which are boringly obvious which are attained by techniques of mechanical routine. That, then, is why education is like medicine.

Having so rendered the goals of medicine banal and its performance automatic, on the one hand, and having tied education to medicine so reduced on the other, O'Connor is now ready for his next step. While both education and medicine may be instances of practical theory serving to ground that set of practical activities aimed at the production of results measured in terms of their reliability and efficiency,

it will now be revealed that education, after all, falls short of the criteria which pick out practical theory correctly conceived.

(b) Why Education Is Not Like Medicine

Education may be like medicine in being a practical activity directed towards a common aim but it is not like medicine in respect to its theoretical base since it lacks those "natural laws that apply to the material with which we have to work."²⁴ There are, for O'Connor, two kinds of "natural laws," and the distinction between them points up both the greater efficiency and reliability found in the practical activity of medicine as opposed to that found in education, as well as the grounds upon which the former although not the latter, may aspire to the title "practical theory." Relative to medicine and education respectively, these laws are (a) the "laws of nature," those laws which "lie beneath the surface of things and have to be painfully elucidated by the standard methods of science," and (b) the "natural laws of human nature" which, conversely, are "clear in rough outline to an intelligent observer."²⁵ Where O'Connor, under the stipulative definition of theory, has rendered science as analytical with theory, and theory, properly conceived, has as its object the increase of knowledge, which in its turn is analytical with the painful elucidation of the laws of nature which lie beneath the sur-

²⁴Ibid., p. 94.

²⁵Ibid., p. 95.

face of things, it does seem clear that education, which appeals to the laws of human nature which do not lie beneath the surface of things but which are obvious to intelligent observers, cannot make a claim to the standing of practical theory. Practical theory is based upon the laws of nature which are not obvious and education is grounded upon those which are obvious, at least to intelligent observers. Now O'Connor is, without doubt, an intelligent observer. Since he maintains that education fails as practical theory not on the absence of its basis in natural laws but on that of their obviousness, will he show what these obvious laws of human nature might be?

By way of elucidating the obvious natural laws of human nature and at the same time revealing why education, which in his view appeals to these obvious natural laws has failed to achieve the standing of practical theory, O'Connor indulges in a little history. Oddly, the social sciences, whose business it is to uncover these obvious natural laws of human nature, have gotten off to a late start in comparison with the natural sciences which had for some time been industriously and painfully elucidating the laws of nature. The reason why they got off to a late start was just because these natural laws of human nature were so obvious. The social sciences were just beguiled by the palpable obviousness of the natural laws of human nature, and, so it seems, have only recently awakened to the task at hand.

One of the reasons why psychology, economics, sociology and the rest of the studies that we

call the social sciences developed so late is, paradoxically, just that we can learn a good deal about them from casual observation, provided that it is intelligent and critical. The rough regularities of behaviour and experience that we all notice in ourselves, our friends and our animals are sufficient to give us all a modest stock of psychological knowledge. We know roughly how we learn, how we are motivated, how our emotions work, and so on. Such knowledge is very limited, inaccurate and unorganized but it is sufficient to enable us to live our lives more or less successfully in contact with other people.²⁶

It might be argued that the reason why the social sciences, psychology, economics, sociology, and the rest developed so late was not so much because the natural laws of human nature upon which they rest were obvious to intelligent and critical observation but rather because the very conception of natural laws of human nature constituted an extension of the empirical and reductive methods of the natural sciences to the human realm. Such a view works to ease O'Connor's sense of paradox. In any event, in what sense can the "rough regularities of behaviour and experience" be counted as the natural laws of human nature? In what sense can these regularities that we notice in ourselves, our friends, or, failing that, the rough regularities we notice in our animals, conform to those governing the behaviour of inanimate phenomena and in terms of which we may subsume such behaviour and experience as relevant instances? What are these laws of human nature which determine how we learn, how we are motivated, how our emotions work, and so

²⁶ Ibid.

on? On the other hand, what exactly is the nature of that "casual observation" which is simultaneously "intelligent and critical?" Could it be that to be intelligent and critical in the observation of the rough regularities of behaviour and experience is to presuppose such laws in conformity with O'Connor's programme? Further, if the laws of human nature are so obvious when subjected to this casual yet intelligent and critical observation, why is it that the knowledge of these laws is "very limited, inaccurate and unorganized?" Could it be that such limitation, inaccuracy and disorganization is a consequence less of the late start of the social sciences and more the outcome of the fact that the rough regularities of human behaviour and experience are recalcitrant to the programme? Could it be that the failure of psychology and sociology and economics and so on to bring down the laws of human nature to the level of those resembling the laws governing the behaviour of gases rests upon a mistaken notion of what constitutes those rough regularities of behaviour and experience which we notice in ourselves and in our friends? Could it be, finally, that to withhold theoretical accreditation from education on the grounds of the imperfections of its scientific basis in comparison with that to which medicine makes appeal is only to show that education and medicine derive their theoretical components from radically different sources? Could it be that the set of values and ideals embodied and expressed in the purposes for which knowledge and skills and attitudes

are imparted and so directing the amount and types of training that is given, with which philosophy is concerned, does, after all, have something to do with that set of techniques for imparting knowledge, skills and attitudes, and in particular with that set of theories which purport to explain or justify the use of these techniques?

The similarity between education and medicine, each being a set of practical activities unified by a common aim, was more apparent, for O'Connor, than real. While medicine, conceived reductively and mechanically, has theoretical backing in the laws of physiology and anatomy, and by extension downward into biology, physics and chemistry, education is seen to lack comparable grounding in the inanimate world and fails, as a consequence, as an instance of practical theory properly understood. All, however, is not lost. It is, paradoxically, just the late start of the sciences of man, which, while presently proving inadequate as theoretical backing for education in comparison with the increase of knowledge in respect to the behaviour of inanimate phenomena provided by the sciences of nature, may yet betoken for education a future theoretical respectability. The sciences of man will do this, puzzlingly in view of the fact that the obvious laws of human nature upon which the sciences of man rest have yielded under their ministrations knowledge which is limited, inaccurate and unorganized, by increasing the reliability and efficiency of education in the face of the crush of numbers.

(c) The Sciences of Man

In addition to realizing that education rests upon the obvious laws of human nature and because of such obviousness the sciences of man have gotten started rather late, one must also realize that education is a creature of changing social circumstance. Unlike the ancient and mediaeval teacher who had to work with only a small body of students and had to impart only a limited amount of knowledge, his modern counterpart confronts a situation in which education "is given indiscriminately to the whole of the child population." In addition, modern teachers "have somehow between them to ensure that the whole of contemporary knowledge is transmitted to at least sufficient numbers to guarantee that it will be preserved and furthered."²⁷ This leap in student numbers and breadth of transmitted knowledge has had the consequence that the "commonsense methods" with which the ancient and mediaeval tutor managed required replacement, in the interests of greater reliability and efficiency, by those generated by the sciences of man. It is in the realm of methodology, of procedure, that education must cast its lot if it would aspire to theoretical standing.

Thus two of the basic aims of education nowadays require that educational methods shall be as efficient as possible. For this purpose, it is necessary that what we know of the sciences of man shall be applied to ensure this increased efficiency. Thus the analogy between education and applied skills like medicine or engineering is imperfect. Even to

²⁷ Ibid., p. 97.

be efficient on a small scale, medicine and engineering must be based on natural science. But education demands this only when it has so increased in scale and complexity that the laws of nature that are patent to intelligent observers prove an inadequate theoretical basis and need to be supplemented or replaced by the sciences of man.²⁸

Two points present themselves in connection with O'Connor's invoking the scale of education as the determining factor for the introduction of the laws of human nature as revealed by the sciences of man to bestow efficiency upon its exercise. The purpose of education must be unproblematic, much like those of medicine which consist in the "prevention and cure of disease." Indeed, for O'Connor, such purposes consist of little more than the effort "to see that practically everyone, however ill-suited by capacity or interest, can read and write sufficiently to fill up forms and understand official instructions."²⁹ The difficulty lies in determining the point on the scale when it can be seen that the laws of human nature which are patent to intelligent observers, those rough regularities we notice in ourselves, our friends and our animals, need to be supplemented or replaced by the sciences of man. Again, if there is no relation between the practice of medicine and the scale of its performance, since it relies on natural science and the increase of knowledge it has bestowed in respect to the laws of nature even on a small scale, why must there exist such a relation in education relying on the sciences of man

²⁸Ibid.

²⁹Ibid.

which will reveal the laws of human nature? If the laws of human nature are indeed laws such as the laws of nature, why should the scale of the practical activity which they embody be relevant to their application?

A second point relates to the nature of the relation between the laws of human nature which are patent to intelligent observers and those that provide backing for the sciences of man. O'Connor points out that not only do the laws of human nature which are patent to intelligent observers (LHN_1) need to be supplemented by those laws of human nature yet to be uncovered by the sciences of man (LHN_2), but that LHN_1 may very well need to be "replaced" by LHN_2 . While LHN_1 were never specified by O'Connor any more than that they constituted those rough regularities we notice in ourselves, our friends and our animals, one supposed they were simply limited, inaccurate and unorganized precipitates of LHN_2 . In what sense, then, can LHN_2 be said to replace LHN_1 ? Is the nature of the disjunction between LHN_1 and LHN_2 qualitative or merely a matter of degree? If the disjunction is qualitative, of what relevance is the scale of the enterprise of education since, if LHN_2 is to replace LHN_1 , the latter were never relevant in the first place? If, on the other hand, the disjunction is merely a matter of degree, if LHN_2 are in the nature of precision-tooled outcomes of that which we imperfectly grasp at present only under the aspect of LHN_1 , by virtue of what further set of laws do we determine that the break-point on the scale

has been reached which requires the replacement of LHN_1 by LHN_2 ? Further, if LHN_1 are only the limited, inaccurate and unorganized current embodiments of LHN_2 , what might the relation be between LHN_2 and the laws of nature themselves, those which have been painfully elucidated by the methods of science? Will LHN_2 ultimately be determined to be themselves only the limited, inaccurate and unorganized reflections of the laws of nature which serve to relieve puzzlement in the face of the anomalous behaviour of inanimate phenomena? O'Connor's next step in explaining the devolution of the sciences of man bears out just that supposition.

Psychology, for O'Connor, is paradigmatic of the sciences of man much in the same way that physics is for the sciences of nature. To contrast the one with the other will be to contrast the sciences of man with the sciences of nature, and it is to such a contrast that O'Connor next turns, with the initial admonition that one must not start "by making too sharp a division between the sciences of man and the sciences of nature."

Man is a part of nature. His body is as much subject as are the other parts of nature to the laws of physics, chemistry and biology. And if we look at the relations between the sciences, we do not find that there is any sharp discontinuity between the sciences peculiar to man and those common to man and the rest of nature. The laws of physics set the framework within which the laws of chemistry may be found. Chemistry sets a similar framework for biology and biology for psychology. In the same way, the laws of psychology are the limits within which the specialized sciences of man, economics, sociology,

and the rest, can be understood. Thus the sciences can be regarded as having the same sort of relation to each other as the members of a set of Chinese boxes, the more general and abstract setting the limits for the more specialized. In this way there is a clear continuity between the sciences of man and the sciences of nature, just as there is a clear continuity between mankind himself and the rest of the universe.³⁰

O'Connor's set of Chinese boxes constitutes, of course, just that kind of superior science that can be expected to answer those difficult and important questions about human life and man's place and prospects in the universe which he had warned us that philosophy could not offer, it being rather that laborious piecemeal effort of criticism and clarification of the foundation of our beliefs issuing out into only occasional and fragmentary glimpses of enlightenment. The glimpse of enlightenment O'Connor has retrieved here has been secured from the further perspective from which he has witnessed no sharp division, indeed, a clear continuity, between the sciences of nature and the sciences of man. From that further perspective which purports to interpret the universe on a grand scale O'Connor's glimpse has revealed a clear continuity of mechanistic, deterministic reductionism in which the laws of human nature to which the sciences of man direct their efforts are subject to, their framework or limits are set by, the laws of nature as painfully elucidated by the natural sciences. It is those natural sciences which provide the explanatory framework for

³⁰Ibid., pp. 98-99.

the laws of human nature and by virtue of which the specialized sciences of man may be understood. However, where O'Connor admonishes us not to make too sharp a division between the sciences of man and the sciences of nature, he appears to have made no division with the consequence that certain difficulties emerge in respect to his programme.

Initially and most obviously is that relating to O'Connor's explanation of his own pronouncement. How, in other words, is his glimpse of enlightenment minimally explicable in terms of his seamless subsumption of progressively more general and abstract Chinese boxes? In the absence of a further and more abstract Chinese box which sets the limits for his foundational box in which one will find the laws of physics, how can his glimpse of enlightenment consisting of the subsumption of the sciences of man under the sciences of nature be explained in terms of a collocation of atoms collectively constituting O'Connor's brain? As with proponents of mechanistic reductionism generally, O'Connor excuses himself from his own injunctions in the course of his own explication.³¹

³¹Marjorie Grene has pointed to the self-contradiction implicit in mechanistic-reductionistic accounts of purposeful behaviour as here shown by O'Connor. "For the person who states them," she maintains,

... does so responsibly—so there is at least one purposive agent and 'mechanism' (whether physicalistic or evolutionary) as a universal truth is false—or mechanism is true and the person who makes such statements is compelled by the laws of physics and chemistry, or by the course of evolution, to make these noises and is therefore making no knowledge claim and has in turn no claim on our attention. "To Have A Mind," Journal of Medicine and Philosophy, Vol. 1, No. 1 (1976), p. 182.

O'Connor's injunction not to make too sharp a division between the sciences of man and the sciences of nature is invoked, of course, in conformity with his reductionist scheme. But the fact is that there is a sharp discontinuity and one which rests on precisely that which does not conform to the scheme and one which O'Connor, in consequence, wishes to suppress. In terms of the discontinuity between the laws of physics and chemistry on the one hand and those of biology on the other, such discontinuity assumes the form of sentience or consciousness. In terms of the discontinuity between the laws of biology and the "laws of psychology," the discontinuity appears in the form of purpose. The thing is that neither consciousness or sentience operating at the biological level is explicable in terms of the laws of physics and chemistry, nor is purpose reducible to the laws of biology. The issue, of course, turns on O'Connor's conception of what is meant by "setting the framework" or "setting the limits," which, from the more general and abstract up the more specialized sciences of man such as psychology, sociology and economics and so on, human behaviour may be understood.

To take his example of the man in city dress diving off Westminster Bridge as an instance of such purposeful behaviour, whether it be to save a would-be suicide, win a bet, or to escape from the police, in what way might the laws of biology, those regulating the healthy physiological functioning of the diver, be said to explain his action in diving off the bridge? While such laws might well be said to account for his failure to dive successfully—he may be

physiologically incapable of performing the feat—O'Connor does not reveal how successful performance—he saved the suicide, he won the bet, he escaped from the police—may be explained by harmonious physiological functioning. Equally, O'Connor does not reveal how the diver's consciousness that he was on the bridge, the simple sentient awareness of his environment, might be explained by the framework laid down by the laws of physics and chemistry. As the laws of healthy biological functioning were inoperative in terms of an explanatory account of the diver's intentions, so the laws regulating the collocation of atoms or chemical components constituting the conditions of physiological health fail to comprehend that sentient awareness marking the successful operation of those biological laws. Similarly, how do such biological laws work to determine the laws of psychology, whatever they might be, and how do such laws, in their turn, set the limits within which the specialized sciences of man may be understood?

O'Connor's frameworks and limits are, of course, of the reductionist variety, a variety however, which fails to support the weight of its own explanatory function. Lower level principles, rising in order from physics and chemistry, through biology, psychology, and on to the specialized sciences of man may indeed set the limits of higher-level functioning but only in terms of setting the conditions of failure, not of success. Explanation of successful performance can proceed only in terms of higher-level principles of operation, principles which comprehend and co-ordinate those

at the next lower level. O'Connor's ontology of lower-level reduction introduced by way of prohibition on making too sharp a division between the sciences of man and the sciences of nature was itself intended to set the limits for his view of the explanatory function of theory as the subsumption of an anomalous fact or small group of facts under a general law and a general law under a further general law, which, in its turn, was to set the limits for what constituted a theory properly conceived. Yet it is just that sharp division which is required to render his scheme intelligible. In the course of advancing a programme of mechanistic reductionism, O'Connor has tacitly ~~invoked~~ both consciousness and teleology which the programme sought to suppress.

(d) The Inadequacies of the Sciences of Man

Although there existed, for O'Connor, a "clear continuity" between the sciences of man and the sciences of nature such that the latter stood to the former in the relation of more general and abstract Chinese box, there are, it seems, some four differences between them, each working to diminish the sciences of man in comparison with its paradigmatic use. Also, of course, the theoretical respectability of educational theory which makes appeal to such sciences of man falters as a consequence.

For O'Connor, the sciences of man, unlike those of nature, rest upon "an inside knowledge of the subject matter" with the consequences that, although it give us "some rough and ready knowledge of the uniformities of human behaviour,

it inhibits us from looking at them with the objective eye that the scientist needs."³² Where O'Connor, in his reductionist ontology, sought to establish the sciences of man as special cases of the sciences of nature in terms of which they derived their explanatory frameworks, we now discover that there exists a sui generis difference between the two which renders such subsumption inoperative. It was the fond, but now it seems unfounded hope, that under the aegis of the slow and painful elucidation of psychology, educational theory might achieve respectability when its theoretical foundations passed over from LHN₁ to LHN₂, the latter being nothing less than the laws of nature inscribed in human behaviour and made manifest in the specialized sciences of man. It now seems evident that the sciences of man are inextricably mired in LHN₁, those rough and ready regularities patent to intelligent observers who critically observe themselves, their friends and their animals. This is so because the sciences of man lack that "objective eye" which marks the activities of the practitioner in the sciences of nature. But if the inhibition in respect to looking at the uniformities of human behaviour with the objective eye is absolute, that is that the inside knowledge of the subject matter in itself precludes that objectivity found in the sciences of nature, how did O'Connor know that those rough and ready regularities of human behaviour were but the limited, inaccurate and unorganized manifestations of those

³² An Introduction to the Philosophy of Education,
op. cit., p. 99.

natural laws traceable with clear continuity to epistemological bedrock in chemistry and physics? Is not O'Connor himself in the same position as those labouring in the sciences of man? Is he not also equally bereft of that objective eye required to produce such a determination?

On the other hand, if the inhibition in respect to looking at the uniformities of human behaviour with the objective eye is relative, regardless whether such relativity attaches to the nature of those uniformities, the conditions of observation, or to the eye itself, O'Connor must show when it is that the objective eye that the scientist needs comes into operation, when the inside knowledge of the subject matter is transformed into outside knowledge.

Unfortunately, O'Connor does not explain what he means by the "objective eye" by means of which the sciences of man have been marked down. In what sense, for example, might the Keplerian, the Newtonian or the Einsteinian eye be said to be "objective"? Did Kepler, Newton or Einstein, in looking at the uniformities of nature with the objective eye that the scientist needs, transcend their respective interpretive frameworks in so doing? Or is there some "objective" difference between the interpretive frameworks of the natural scientist and those relating to the sciences of man, a difference by virtue of which the former but not the latter acquires the objective eye? O'Connor, in effect, must do more than simply tell us that the sciences of man, resting upon an inside knowledge of its subject matter, lacks

that objective eye characteristic of the natural scientist; he must show how the one is and the other is not possessed of objectivity. But it is this he does not do.

A further deficiency of the sciences of man when placed in contrast with the sciences of nature is that the sciences of man lack comparable permanence. The laws of nature to which the sciences of nature appeal are "the same as they were in the Old Stone Age," while the laws of human nature may be altered in much the same way "that wheat or maize has been altered by systematic plant-breeding."³³ O'Connor's permanency condition which grounds the laws of nature is, of course, little more than an assumption of the third-person perspective which confounds the laws of nature on the one hand with our understanding of them on the other. The Ptolemaic laws of nature governing the relations of the planets were not the same as the Copernican laws of nature comprehending identical phenomena, nor were the Newtonian laws of nature governing mass, motion, time and space the same as their Einsteinian counterparts. It is only if one assumes the latest perspective, here the Einsteinian, that one can say that the laws of nature were the same as they were in the Old Stone Age.

As to the laws of human nature, those unrevealed uniformities which may be altered in much the same way as one alters wheat or maize by systematic plant-breeding, O'Connor becomes rather elusive, maintaining that we could not

³³Ibid., p. 101.

. . . properly say that the laws of human nature had been altered (as a result of similar experiments). It would be rather that man, like any other part of nature, responds differently to different conditions and by altering the conditions we can provide new occasions in which previously hidden capabilities can be developed.³⁴

On one reading, the laws of human nature amply fulfil the permanency condition as laid down by the laws of nature. Presumably the laws of nature governing the growth of wheat or maize are the same now as they were in the Old Stone Age and if the laws of human nature are comparable to those determining the growth of wheat or maize the permanence condition is satisfied. In the same way, if experiments of a similar nature as those carried out on wheat or maize were carried out on human beings but we could not properly say that the laws of human nature had been altered, only that previously hidden capabilities had occasion to develop, no alteration is recorded and permanence is similarly secured. On the other hand, if there are different responses to different conditions as a result of similar experiments but such responses are seen to be "just like any other part of nature," the laws of human nature are like any other laws of nature, and the permanence condition brought to distinguish them fails.

Beyond the objectivity and permanence conditions distinguishing the sciences of nature from the sciences of man, O'Connor sees the latter to fall short by way of a limited scope of experimentation one has in comparison with the

³⁴Ibid., p. 102. Italics his.

former. It is tiresome but true that "the varying conditions to which we subject our material are restricted by the welfare of the human beings on whom we are working and by what we recognize to be their rights."³⁵ But it is no inadequacy of the sciences of man in themselves which limits the scope of experimentation on the material we subject to varying conditions. It is rather O'Connor's lack of proper zeal, a failure of nerve in permitting what we recognize to be the rights of human beings to impede or restrict the full range of conditions to which we might subject our material.

The final inadequacy of the sciences of man to which education must appeal and in so doing suffer comparable inadequacy in respect to its standing as theory properly understood lies, relative to the sciences of nature, in their respective levels of development."³⁶ It appears that the qualitative distinction marking the difference between the sciences of nature and the sciences of man in so far as the latter lacked the objective eye, that the knowledge derived from the uniformities of human behaviour was irretrievably inside knowledge of the subject matter, is, after all, only quantitative, a matter of their respective levels of development. O'Connor turns to the Victorian biologist T.H. Huxley's three-stage analysis of the development of science employing botany as illustration of the developmental deficiency of the sciences of man in contrast to the sciences

³⁵Ibid.

³⁶Ibid., p. 103.

of nature. The three stages consist of: (1) an initial stage of commonsense knowledge as with "the ordinary man's casual knowledge of plants"; (2) thence to the stage of "careful and exact observation of facts," together with the "intelligent classification of these facts to reduce them to manageable and comprehensible order"; and (3) to the comprehension of a "complex system of interacting causes and effects," where "the whole of the plant world and its environment is understood by the biologist."³⁷ While even for the sciences of nature the third stage "is never completely achieved," the sciences of man are, for O'Connor, "for the most part, in this second phase of development and in some of these development has not gone far enough to know if the third stage will ever be reached."³⁸

The taxonomy is, of course, the mirror image of O'Connor's explanatory function of theory where puzzlement was relieved by means of a graduated ascent from subsumption of anomalous fact or small groups of such facts 'under lower-level law to the subsumption of such lower-level law under more abstract and general law. The sciences of man and their knowledge of the laws of human nature to which they appeal have stalled out at stage two, such knowledge being very limited, inaccurate and unorganized because of the obviousness of such laws which, in its turn, resulted in the late start of the sciences of man. It now appears, however,

³⁷Ibid.

³⁸Ibid.

that the late start may well be irrelevant since it is problematic whether the sciences of man will ever reach that third stage of development in which the study of plants now rejoices, that level of higher-level law constituted by interacting causes and effects which relieves puzzlement in respect to the whole of the plant world and its environment. By extension, since the sciences of man cannot bear contrast with the sciences of nature as manifested in the study of plants, educational theory which for O'Connor appeals to such sciences cannot, in similar fashion, bear contrast to the practical theory of agricultural husbandry which finds its support in the science of botany. It is just a puzzling deficiency of man that his behaviour may very well never be reduced to that complex system of interacting causes and effects so remarkably evident in the behaviour of plants. We just do not know if that third stage will ever be reached. The deficiency, however, places O'Connor in a dilemma, for either he must abandon all talk of the sciences of man and the laws of human nature to which they appeal or abandon his ontology of materialistic reductionism.

In the case of O'Connor's ontology, if man is a part of nature and if we look at the relation between the natural sciences and find no sharp discontinuity between the sciences common to man and those common to man and the rest of nature, if the laws of physics and chemistry set the limits for biology and the laws of biology set the limits for psychology which in turn sets the limits for the specialized sciences

of man, why should we not be certain that the third stage will be reached? What can account for O'Connor's hesitance? If the sciences of man and the science of plants derive their theoretical support from that complex system of interacting causes and effects found ultimately in the sciences of chemistry and physics, what doubt can there be that the third stage is imminent? But why is it that the reductive chain, that clear continuity, has broken down? Why do the sciences of man continue to languish in stage two? Either the continuity is clear or it is not clear. If it is clear, there can be no doubt; if it is not clear O'Connor must re-assess his reductionism.

Alternatively, we see that the sciences of man and the laws of human nature which ground them are stuck at stage two where stage two involves the careful and exact observation of facts, their intelligent classification to reduce them to manageable and comprehensible order. The difficulty here is the source of that knowledge by virtue of which such facts may be carefully and exactly observed, by virtue of which they may be intelligently classified and reduced to manageable and comprehensible order. It cannot have come from stage one, the ordinary man's casual knowledge but rather presupposes prior knowledge of stage three, just that comprehension of the complex system of interacting causes and effects which renders the facts manageable and comprehensible. But the sciences of man and the laws of human nature on which they are based are in stage two. Therefore the

sciences of man, presently engaged in carefully and exactly observing the facts, intelligently classifying them to reduce them to manageable and comprehensible order, must now be in possession of the laws of human nature constituted by that complex system of interacting causes and effects in the light of which the whole of the human world and its environment is understood by the sciences of man. For to observe carefully and exactly, to classify intelligently, is to be careful, exact and intelligent just in terms of that complex system of interacting causes and effects. Will, then, O'Connor reveal what these laws of human nature are? If he cannot do so, O'Connor must re-assess his notion of his laws of human nature and his sciences of man.

The line of O'Connor's reasoning in denying to education the status of theory has been to attempt to show that the sciences of man and the laws of human nature to which they appeal do not stand comparison with the sciences of nature and the laws of nature upon which they are grounded. The Sciences of man would serve to explain or justify the practical theory of education only when such theory was based upon the well-established findings of psychology, the paradigm of the sciences of man. Yet it was just such well-established findings that were found wanting, and they were found wanting because the laws of human nature upon which psychology, in its turn, was based were seen to lack those features of objectivity, permanence, scope of experimentation and degree of development characterizing the laws of nature grounding the sciences of nature. The laws of human nature

supporting the sciences of man which in turn supported the practical theory of education were seen to be inadequate when compared with the well-established findings of the laws of nature when applied to botany. However, the explanatory function of theory in its scientific standard case was seen to fail its own central criterion in respect to relief of its puzzlement condition. In the programme of subsumption under covering law there was no such puzzlement with the consequence that the standard case of theory failed equally to account for its own guidance function in the face of the anomalous. In similar fashion, practical theory such as medicine which drew its support from the standard case was competent to guide practice only in those instances where the practical result it aimed at was unpuzzling and obvious. It equally failed to fulfil the guidance function of practical theory in so far as it did not contain within itself the rules for its own application. As such, education viewed as an instance of practical theory fares no worse than those which appeal to the natural sciences. Of course, the more obvious objection to O'Connor's denial of the title of practical theory to education on the basis of the absence of well-established findings in the parent science of man is that the laws of human nature upon which such findings purport to rest are the illusory products of his reductionist ontology. Where human nature may be taken as more than the body which is subject as much as are the other parts of nature to the laws of physics, chemistry and biology, where

it is taken, in its context of educational theory as grounding that set of values or ideals embodied and expressed in the purposes for which knowledge and skills and attitudes are imparted and so directing the amount and types of training that is given, it is not surprising that there existed no well-established findings in the sciences of man comparable to those found in physics, chemistry, biology or botany. Yet it is just such a view of human nature which O'Connor rejects. The consequence is that the failure, in his view, of educational theory to be regarded as an instance of practical theory owes less to the insufficiency of the purposes seen in terms of values and ideals which guide its practice than to the inadequacy of his attempts to elucidate its clear continuity downward into the laws of chemistry and physics.

In keeping with the formula established in his consideration of the nature of philosophical questions, O'Connor now withdraws from the attack on educational theory from the empirical wing to assume the offensive from the linguistic perspective. In addition to educational theory lacking proper grounding in the sciences of man because the sciences of man lack proper grounding in the laws of human nature, it is seen to fall short of the standard case of theory in respect to the presence of judgements of value. An elucidation of these judgements of value will proceed by a consideration of the "logical families of statements."

2. The Logical Families of Statements

In a manner similar to that where he attempted to re-interpret philosophical questions in terms of the usage in which such questions are put, O'Connor here attempts to elucidate the nature of educational theory by an analysis of the kinds of statements such theory employs. "It would be absurd," he points out, "to deny that education has a theoretical basis. What we should be clear about however is what job these educational theories do if they do not have the logical status of standard scientific theories."³⁹ Of course, if by "logical status" O'Connor means the fulfilment of the explanatory function of theory and a mechanical subsumption of anomalous facts or lower-level law under more abstract and general covering law, his standard scientific theories do not have that logical status either, as has been seen. What is of interest here, however, is the nature of that theoretical basis for the practical theory of education which it would be absurd to deny. Such a theoretical basis will be a function of the job these theories do, not in the sense of fulfilling that set of values and ideals embodied and expressed in the purposes for which knowledge and skills and attitudes are imparted but rather, oddly, if they do their job by incorporating theoretically admissible kinds of statements.

The first thing to note is that educational theories incorporate kinds of statements which

³⁹ Ibid., p. 104.

...are different in the sense that they belong to distinct logical families and for that reason need to be supported in quite different ways. Often indeed we find that the three kinds are mixed up together in the writings of a single man so that it is not easy to judge the value of what he is saying until we have distinguished the different logical components and evaluated them separately.⁴⁰

The distinct logical families of statements employed in educational theory are the metaphysical, judgements of value, and the family of empirical statements. When O'Connor points out that each of these three distinct logical families of statements "need to be supported in quite different ways" he appears to be re-invoking his principle of different sorts of evidence for different sorts of questions as in his treatment of philosophical questions. Once we have distinguished the different logical components often found mixed up together in the writings of a single man we proceed to evaluate them separately on the basis of the distinct logical family in which the relevant statement is found. Metaphysical statements are evaluated quite differently from judgements of value, and both are evaluated in quite a different way from the distinct family of empirical statements. Nothing could be clearer, yet is this quite what O'Connor has in mind? Clarification is not long in coming when he commences evaluation of the distinct family of metaphysical statements found in educational theory.

⁴⁰ Ibid., pp. 104-105.

(a) The Metaphysical Family of Statements

For O'Connor metaphysical statements in educational theory abound in the writings of Plato, the mediaeval scholastics, and in modern Christian writers. "Statements of this kind," O'Connor points out,

. . . are not believed, in the first place, just because they form part of an educational theory. They are accepted rather because they feature in a philosophy or a theology which is already believed on other grounds. But they occur in educational writings naturally enough because they are the sort of statements which seem to have an important bearing on education.⁴¹

⁴¹Ibid., p. 105. Among the modern Christian writers it is Jacques Maritain who O'Connor appears to see as most given to making metaphysical statements in educational theory which are believed on other grounds. Maritain's asking of pseudo-questions derives, for O'Connor, from the same source. Where metaphysical pseudo-questions are recognized as such by virtue of their setting no limits within which an answer may be given, Maritain's questions, such as his "What are we?" serving to commence philosophical thinking fails "by setting the limits too exactly." For O'Connor, Maritain would reject a naturalistic answer ("You are a human being brought up in English middle-class society in the twentieth century . . . and so on") as well as alternative metaphysical answers ("You are just a fortuitous concourse of atoms"):

If therefore the questioner expects answers of this very specific kind and shows his expectations by rejecting any other answers, he is not putting a genuine question. For precisely this reason, such questions cannot serve as a starting point, as Maritain suggests, for philosophical discussions. For they are the disguised conclusions of arguments on natural religion, and very debatable conclusions at that. (p. 117, italics his)

O'Connor's determination that Maritain's questions are pseudo-questions on the grounds that he has set his limits too exactly is odd since it is on just these grounds that O'Connor has ruled such questions to be pseudo-questions. In other words, O'Connor has set his limits exactly as to what constitutes a pseudo-question but his limits do not happen to be Maritain's limits. Indeed, under O'Connor's own criteria of a "real" question, that where the questioner knows "what kind of answer he is expecting," Maritain's questions constitute such real questions. On the other hand, and using

To make sense of this passage it must be remembered that educational theory for O'Connor consists in that purporting to explain or justify the set of techniques for imparting knowledge, skills and attitudes, and which appeal to the sciences of man and paradigmatically, to that of psychology. That set of values or ideals embodied and expressed in the purposes for which such knowledge, skills and attitudes are imparted constitute the proper realm of philosophy which, by definition, can offer nothing to educational theory. Statements which form part of educational theory, therefore, are psychological statements and not philosophical or metaphysical statements. Such philosophical or metaphysical statements, consequently, must be believed on other grounds than "educational grounds." They are believed because they feature in a philosophy or theology which, in their turn, are believed on still further grounds. Where educational theory is conceived to be independent of the purposes for which education is given, it is tautological to maintain that metaphysical statements must play no part because they are believed on other grounds than educational theory. Statements such as these, featuring as they do in philosophy or theology, occur naturally enough and seem to have an important bearing on education only for those who have not grasped this central truth.

the same formula, O'Connor himself appears not to be putting a genuine question since he shows his expectations by rejecting any other answers than the specific kind he expects, they being the disguised conclusions of arguments on reductionist materialism and very debatable conclusions at that.

By way of illustrating such statements where they occur naturally enough in educational theory, O'Connor points to Plato's educational proposals which "are based on the beliefs that man is essentially a soul or spirit in temporary association with a material body, that this soul was created before the body and will survive its dissolution and that the real object of education is 'improvement of the soul.'"⁴² The distinction between soul and body is, for O'Connor, a metaphysical one for "It has never been demonstrated by any recognized process of argument."⁴³ In his distinction in respect to the "logical families of statements" one initially supposed that such families were "logically" distinct in that they appealed to reasons of an epistemologically discrete nature, that metaphysical statements were to be supported by metaphysical reasons, and so on. The term "logical" has now taken on its narrower connotation, that of a "recognized process of argument" where by that is meant a valid process of inference from premises known to be true to conclusions which are true as a consequence. By bringing arguments from the narrower connotation to criticize the descriptive sense of "logical" as in the "logical family of statements," O'Connor has violated his own categories which, as he maintained, "need to be supported in quite different ways."

⁴²Ibid.

⁴³Ibid.

O'Connor's next move against metaphysical statements is in a similar vein. Where he initially saw such statements to fail on the basis of the fact that they did not conform to the canons of logic, he next sees them to fall short in so far as they do not satisfy the criteria of the empirical family of statements.

We have seen that the main difficulty about claims of this kind is that there is no well established way of confirming them. It is therefore impossible to say exactly what is being claimed or even to be sure that such statements have cognitive meaning at all. Propositions of this kind do not always show their characteristics on their faces. But they may usually be recognized because however much they might look like ordinary statements of fact, they are basically unlike them in at least one way: they cannot either be confirmed or refuted by evidence which can be checked and assessed by established and recognized methods. It is important that, whether or not we suppose that such statements are meaningful or provable, we should at least be able to recognize them. For it is hardly possible to understand them if we do not appreciate their logical status.⁴⁴

Where O'Connor first showed us that metaphysical statements, statements which need to be supported in ways peculiar to the distinct logical family to which they belong, did not conform to demonstration by any recognized process of argument, that being simple deductive inference, he now shows us that the same family of statements cannot be established by those ways peculiar to the empirical family of statements, that is by confirmation by observation and experiment. Such failure to support metaphysical statements

⁴⁴Ibid., p. 106.

by evidence which can be checked and assessed by established methods is not to be attributed to the methods but to the statements since they do not always show their character on their faces. They may look like ordinary statements of fact but they are basically unlike them. Yet it is here that it is O'Connor's argument which does not show its character on its face since he is doing little more than attempting to impugn metaphysical statements merely by illustrating the inadequacy of his criteria to comprehend them. In rounding out his attack on metaphysical statements O'Connor invokes the Humean dictum that the evidence for any conclusion must contain statements of the same logical sort as the conclusion itself. O'Connor does not appear to appreciate that he has violated the injunction by drawing conclusions as to the merits of metaphysical statements based upon statements of a logical and empirical sort.

(b) The Valuational Family of Statements

O'Connor's second family of statements consists of those incorporating judgements of value. In order to judge the value of what that single man is saying in his writing on educational theory where the three kinds of statements may be mixed up together, it is necessary to isolate these judgements of value and to reveal them "for what they are."

An undiagnosed value judgement is a source of intellectual muddle. Once we recognize it, we realize that it is not 'self-evidently' true and beyond all criticism. For however important and inevitable our valuations are, we have seen that their

justification is a very perplexing problem. If we realize this we shall tend not to be dogmatic or fanatical about them.⁴⁵

Since that set of values and ideals embodied and expressed in the purposes for which knowledge, skills and attitudes are imparted belong to the realm of philosophy, and philosophy under the definition can have nothing to offer for educational theory which purports to explain or justify a set of techniques for imparting knowledge, skills and attitudes, it is perplexing just how it is determined that such theory can be seen to be value-free since our valuations are both important and inevitable. Again, if value judgements are inevitable and educational theory properly conceived is that wherein such value judgements have been "diagnosed," is not the diagnosis itself then "muddled" since it proceeds from valuations which have not, at that time, been themselves diagnosed? Is there regress here? Would O'Connor indicate how we shall tend not to be dogmatic or fanatical about those further valuations on the grounds of which we isolate those judgements of value under scrutiny in order to reveal them for what they are? Might these further valuations be self-evidently true and beyond all criticism? O'Connor has shown us how we may recognize metaphysical statements. We have seen that such statements lie beyond his logical criteria of recognized process of argument as well as his empirical criteria of confirmation or

⁴⁵Ibid., p. 107. Italics his.

refutation by evidence which can be checked and assessed by established and recognized methods. We have seen that metaphysical statements which, like judgements of value and empirical statements, must be supported in quite different ways and that such metaphysical statements cannot be supported by ways which lie outside their distinct logical family. We have seen that this disqualifies metaphysical statements from educational theory correctly understood.

Now the question is how we shall recognize judgements of value, how we shall diagnose them so we shall not be led into intellectual muddle, how we shall reveal them for what they are. We shall do this by strict adherence to the reasons for the support of such judgements of value for it is a distinct logical family and needs to be supported by reasons other than those drawn from the metaphysical and empirical families of statements.

Value terms employed in statements incorporating judgements of value are not like ordinary descriptive terms as viewed in relation to their denotative referents, for they are seen by O'Connor to diverge relative to their connotation or meaning. Thus, two people might dispute whether a whale was a fish. On the one hand the dispute might centre over the connotation of "fish," that is, over those characteristics something had to have in order to be called a "fish." On the other hand the disputants might agree on the question of connotation but remain at odds over the denotative question, that is, whether or not the whale possessed these characteristics. The denotative question falls under the

empirical family of statements for its support, as it may be settled by reference to observing whether or not the whale indeed possessed these characteristics. However, the connotation or meaning of the term "fish" is a more perplexing problem, for the settlement of the denotative issue presupposes agreement on the question of connotation. The issue, O'Connor points out, is "not so indubitably a factual matter and cannot be settled quite so easily."⁴⁶ The issue extends, of course, to his logical families of statements and serves to throw into relief the inadequacy of his logical or empirical families in supporting or explaining the metaphysical or valuational family of statements. As settlement of dispute over whether the whale is or is not a fish presupposes agreement as to what counts as a fish and upon which the empirical determination of whether the whale is a fish may proceed, the settlement of disputes over metaphysical statements or judgements of value may not be arbitrated by appeal to the empirical family of statements but presupposes that family of statements. It is in terms of connotation derived from metaphysical and valuational statements that empirical statements acquire their meaning. Nor are such disputes merely linguistic for common usage, as O'Connor realizes, fails just where it is that common usage which is in question. Where the question of meaning is at issue, his criteria of usage, logical deducibility and verification are of no avail. We do not learn how the dispute at the level of connotation as to whether the whale is a fish is to be resolved.

From his struggles with the whale O'Connor next confronts the issue of judgements of value in so far as they relate to purposes for action. As with disputes over the denotative definition of "whale" which might be resolved empirically provided the disputants previously agreed over what counted as a fish, such terms as "good" or "bad" mean little more than "successfully" or "efficiently" and can be settled by reference to empirical fact provided consensus over the goals of action was previously established. When the disputants are at cross-purposes, however, what it is to be "good" or "bad" viewed instrumentally are of no relevance. "If A and B are driving a car from London to Manchester," O'Connor muses, "they can settle a dispute about the quickest route by consulting a road map. But any such discussion of ways and means will be premature or pointless if A wishes to go to Manchester and B to Land's End."⁴⁷ O'Connor's perplexity continues, for the problem of purposes are "philosophically puzzling in having no obvious or agreed way in which they can be verified or refuted. This seems a serious problem."⁴⁸ If judgements of value in educational theory are either explicitly judgements of purpose or presuppose such judgements, how will O'Connor attempt to adjudicate conflict of purpose without recourse to philosophy which deals with that set of values and ideals embodied and expressed in the purposes for which knowledge, skills and attitudes are

⁴⁷ Ibid., p. 55.

⁴⁸ Ibid.

imparted, which, as we have seen, plays no role in his conception of educational theory?

As with the nature of philosophical questions, O'Connor moves to resolve the dilemma by way of the linguistic route subsequent to the collapse of his empirical criteria. He will do this by "looking at the ways in which such statements are both like and unlike statements we do know how to verify."⁴⁹ For example, he shows us that the statement "'Beethoven's seventh symphony is a great work' is grammatically the same kind of statement as the factual statement 'Beethoven's seventh symphony is written in the key of A major.'"⁵⁰ Now the grammatical similarity may mislead one into thinking that the term "great" has the same sort of independent factual standing as does the "key of A major," and by extension that such terms as "good," "true," etc. are similarly endowed. For those who were misled, however, he reveals that "there are good reasons to doubt it can be defended without serious qualification."

Those philosophers who have maintained objective theories of morals have, in general, supported their position in one of two ways. (a) Sometimes they have tried to deduce statements about our duties or about the ultimate good from statements of a scientific kind about the nature of man or from metaphysical statements about the nature of God or the relations of God to man. (b) Often, however they have claimed to have direct intuitions or, in a metaphorical sense of the word, perceptions of values.⁵¹

⁴⁹ Ibid., p. 56. Italics his.

⁵⁰ Ibid., Italics his.

⁵¹ Ibid., p. 57. Italics his.

The "serious qualification" O'Connor brings to unhorse the claims of those philosophers who have tried to deduce statements of value from statements of a scientific or metaphysical kind or of those who claim a direct intuition or perception of values is, of course, introduced illegitimately from the logical family of empirical statements. Smith or Jones, for example, could consult a thermometer if they disagreed over whether a room was hot or cold. O'Connor triumphantly concludes that "There are no such objective tests for checking our supposed intuitions of values."⁵² The objection might be raised that if Smith or Jones did not agree as to the connotation of "hot" or "cold" there is no more reason for their dispute to be settled by consulting a thermometer than if they had ~~disputed~~ over whether the whale was a fish when they did not agree what constituted a "fish." O'Connor invokes Hume once more with the observation that "if these theories contain a notion of obligation in their premises, the argument is unnecessary and if it is not contained there, the argument is invalid."⁵³ Since metaphysical statements and direct intuitions of value do contain such a notion in their premises, the argument, under the ruling, is unnecessary; on the other hand, since it is just such statements of a scientific kind about the nature of man which purport not to contain such a notion in their premises, it is O'Connor's argument itself which is invalid.

⁵²Ibid., p. 59.

⁵³Ibid.

Having shown us that statements of value are like statements we know how to verify in that they may be grammatically similar and how they are unlike statements we know how to verify in that recognized processes of argument, or confirmation or refutation by evidence which can be checked and assessed by established and recognized methods are inoperative in that they cannot be so verified and, presumably, confident that he has demolished the realist conception of value, O'Connor passes on to a consideration of the subjectivist justification of judgements of value. We may hear children arguing as to whether "Marmalade's nice," but, "As we grow more sophisticated about these matters, we learn to distinguish genuine statements of fact from those expressions of taste or personal preference that are disguised as objective claims by their grammatical form."⁵⁴ Being "sophisticated" here is shorthand for seeking the relevant empirical data for checking and assessing the statement, there being, however, no such data to assess expressions of "personal emotion." In the face of the conundrum presented by what is and what is not "nice," O'Connor's criteria fail to determine the merits of marmalade.

With the profound deliverance that statements of value are like statements we know how to verify grammatically but are unlike them in that they cannot be verified like statements we know how to verify, O'Connor next considers the "expressive function of language" which is nothing more than

⁵⁴Ibid., p. 60.

the emotive view regarded from the third person. The expressive function, he points out, "must be sharply distinguished from its use in describing our private feelings or in stating that we have them."⁵⁵ O'Connor does not indicate how the expressive function may be distinguished from describing our private feelings or in stating that we have them; but the reason he makes such a distinction is presumably under the impression that the expressive function does not, while the descriptive or stating function does, have a denotive reference that can be run under empirical check. "Marmalade's nice," for example, may be an expressive function of language, a description of one's private feelings about marmalade, or a report stating that we have these feelings about marmalade. How will O'Connor sharply distinguish them and, more importantly, how will he bring his empirical family of statements to bear upon the verification of the description or statement while excluding the simple expression? And in what sense does the distinction itself have relevance when O'Connor points out that judgements of value "are not merely descriptions of my habitual or momentary states of mind. They are in some sense prescriptive or mandatory and not only for me but for everyone."⁵⁶

In an attempt to elaborate some comprehensible theory of value, one on which his criteria will have some purchase, O'Connor moves to integrate the expressive function of personal emotion, the imperative function of universal prescrip-

⁵⁵ Ibid., pp. 62-63. Italics his.

⁵⁶ Ibid., p. 62.

tion, and the "persuasive" function of judgements of value, that intended to sway the opinion of others. While it is difficult to distinguish the expressive from the persuasive since the latter is but the former in the ears of an interlocutor, the imperative is to be distinguished from the persuasive since the former "can be supported by reasons." Yet one would have thought to be persuasive is to employ reasons. In any event, the result of the integration is set forth as follows.

When I utter a moral judgement of the form 'X is right' where X is any action or class of actions of which I approve, my judgement has three functions. First it expresses my own attitude to the action or even states that I have the attitude. That is, 'X is right' expresses or states my approval of X. Secondly the judgement has an imperative element. It directs my hearers to approve also. But it is clearly useless merely to command anyone to experience an emotion or assume an attitude, since even if my hearers are prepared to obey my commands, emotions and attitudes cannot be assumed at will. However the emotive or expressive component of the judgement works together with the imperative component to influence the audience by communicating to them some of my own attitude of approval. In this way, the first two components of the judgement working together have a persuasive effect which⁵⁷ either would lack without the other.

It is, of course, perplexing as to just what all this might mean in terms of justifying judgements of value. How, in other words, can such judgements be justified by the way we happen to use words? So what if the expressive component of judgements of value work together with the impera-

⁵⁷ Ibid., p. 66. Italics his.

tive component to have a persuasive effect on the audience which either would lack without the other? Are judgements of value then to be justified in terms of the numbers of those who have been persuaded? If the imperative component is to be distinguished from the persuasive by virtue of the fact that it can be supported by reasons, are not these reasons more relevant to the justification of judgements of value than their persuasive effect? What, then, are these reasons, and how might they be justified by the way we happen to use words? It would seem that such justification on the grounds of usage suffers from comparable perplexity as did their attempted justification on empirical grounds, for, as in the case of the fish, disputes over connotation cannot be settled by the way we happen to use words when it is precisely the way we happen to use words which is at issue.

Having apparently forgotten that he did not tell us how we might distinguish the expressive function of language in judgements of value from stating or giving information that we have them, O'Connor views his handiwork and finds it wanting in any case.

It seems paradoxical to claim that the process of justifying or validating moral judgements can ever be reduced to the interplay, however, subtle and complex, of the informative, the expressive and the persuasive uses of language. For to claim this looks very like repeating in a disguised form the error, exposed by Hume, of trying to deduce statements of value from statements of fact.⁵⁸

⁵⁸Ibid., p. 69.

It appears, after all and by his own admission, that O'Connor's attempt to justify or validate moral judgements by means of their reduction to the subtle and complex interplay of the uses of language has been abortive. It appears further that his attempt to diagnose judgements of value in order that they might not persist as a source of intellectual muddle by means of appeal to linguistic and empirical criteria has failed since they are not those distinctive means of support of the logical family of such judgements of value. As with the logical family of metaphysical statements, O'Connor has revealed them for what they are only in the diminished sense that his criteria are inoperative in their elucidation. But the thing is that empirical and linguistic criteria are O'Connor's distinctive means of support. One can only hope that, in his state of continuing perplexity, he will not be dogmatic or fanatical about them.

(c) The Empirical Family of Statements

Where educational theory properly understood consists in that which purports to explain or to justify those techniques for imparting knowledge, skills and attitudes and in which philosophy conceived as that set of values or ideals expressed or embodied in the purposes for which such knowledge, skills and attitudes are imparted can play no part, what does O'Connor conceive to be that quite different way in which the distinct logical family of empirical statements in educational theory, those "capable of being supported by the evidence and observable fact" may themselves be sup-

ported? For O'Connor the empirical family of statements are of two sorts, marked off by the advent of experimental psychology which constitutes the watershed of educational theory correctly conceived.

The first of these is relatively common in the writing of those theorists who lived before psychology became established as an experimental science. They consist of recommendations for educational practice. These recommendations may of course be made on theoretical grounds but they have been adopted rather because of their efficiency in giving results.⁵⁹

Such, for example, was the case with the theories of Pestalozzi, Froebel and Montessori whose influence was "due more to their precepts and their practical achievements than to their theoretical teachings."⁶⁰ Now if "education" at the theoretical level is characterized by a set of theories which purport to explain or to justify that set of techniques for imparting knowledge, skills and attitudes, how can such a set of techniques for imparting knowledge, skills and attitudes be supported by appeal to the pragmatic sanction of efficiency in giving results without reference to those recommendations for educational practice which are in their turn grounded on that set of values and ideals embodied in the purposes for which knowledge, skills and attitudes are imparted? How, in other words, can the adoption of the practical achievements of Pestalozzi, Froebel and Montessori be characterized independently of

⁵⁹Ibid., p. 107.

⁶⁰Ibid.

their theoretical teachings by virtue of which those practical achievements may be identified as achievements? In addition to puzzlement over how the results of a theory might be identified, to say nothing of being adopted, in independence of its grounding theory, in what way does O'Connor maintain that a "recommendation for practice" belongs in that logically distinct family of empirical statements, those that can be supported by the evidence and observable fact? Where his failed attack on the metaphysical family of statements and his perplexity over the justification of judgements of value originated in his empirical and linguistic criteria, here he covertly introduces what is clearly a judgement of value drawing on metaphysical notions of purpose to support his empirical family of statements. Even if such recommendations for educational practice emerged before the advent of experimental psychology, the only way their efficiency in giving results might be rated is in respect to the non-empirical components of "education" by means of which they come to count as "results." In other words, O'Connor appeals for support to just that which he discounted in his consideration of the metaphysical family of statements and the family of judgements of value. If Pestalozzi wanted to go to Land's End and Froebel to Manchester, in what sense would the Froebelians adopt Pestalozzi's recommendations for educational practice on the grounds of their efficiency in giving results?

Reflection on the different ways the distinct family of empirical statements need to be supported leads O'Connor to reject his own criterion of pragmatic efficiency.

The fact that a well conducted school using the Dalton plan or Montessori or Froebel methods produced good results is, of itself, no justification whatever of the supposed theoretical background to these practices. If indeed a representative group of schools using, say, project methods of teaching consistently got better results than a comparable group of schools using other methods, that would be some evidence in favour of Dewey's educational theories which the project method was intended to apply. But no very convincing evidence of this sort seems to be available at present.⁶¹

Where the distinct family of empirical statements was previously seen to draw its support from its efficiency in producing results, where recommendations for practice were adopted on the grounds of such efficiency, we now see that such efficiency in giving results is no justification of the theoretical grounding of those recommendations for educational practice. In dodging the question of what, then, does constitute the nature of support for the logically distinct family of empirical statements, O'Connor has simply turned the equation around to maintain that one can get good results in that set of techniques for imparting knowledge, skills and attitudes but that such techniques do not serve to justify that set of theories which purport to explain or to justify them. The trick is to hold "good results" and "better results" constant and in independence of that in

⁶¹Ibid., p. 108.

terms of which "good" and "better" are defined and have meaning, and then to ponder on the nature of the relation between the two, an exercise comparable to that in which O'Connor previously attempted to determine whether one's collection of relevant facts was relevant to that to which the facts referred. Where one has, on the one hand, "good results" defined, of course, in the barest and most rudimentary form of being able to understand instructions and to fill up forms correctly, and on the other a range of educational theories which purport to explain or to justify them, theories which, by definition, have nothing to do with those values or ideals expressed in terms of the purposes for which knowledge, skills and attitudes are imparted, it is of no great surprise that one cannot tell just how those theories may be justified or explained by those "good results."

In the absence of the pragmatic sanction then, what is the manner in which the logically distinct family of empirical statements, those being capable of support by the evidence and observable fact, need to be themselves supported? O'Connor, in effect, maintains that the statements capable of being supported by the evidence and observable fact are justified and explained by their being capable of being supported by the evidence and observable fact. It is just that the statements capable of being supported by the evidence and observable fact in the case of educational theory are not the same as the statements capable of being supported by the evidence and observable fact in scientific

theory. The logically distinct family of empirical statements as they appear in educational theory, in other words, are not the same as the logically distinct family of empirical statements as they are seen to crop up in physical and chemical theory, for, unlike the empirical statements or good results in educational theory, those found in scientific theory work to falsify the theoretical grounds with which they are incompatible. Employing psychiatry as a case analogous to that of education, O'Connor sees no such tight theory-practice fit as that which obtains in science. In the practice of psychiatry,

. . . it is found that although the theories are incompatible with one another, the techniques as used by skilled practitioners all seem to produce sufficient results to justify their continued use. And this would be impossible if the techniques were in fact tied as closely to their supposed theoretical foundations as is the case with physical or chemical theory and its applications. We must rather suppose that the theories of the psychiatrists are rationalizations of their practice rather than genuine reasons for them.⁶²

The view is that incompatible theories in education may issue into sufficient results to justify continued practice, where incompatible theories in physics and chemistry could not produce comparably sufficient results thereby disqualifying those techniques attached to deficient physical and chemical theory. The sufficient results are, of course, empirical statements capable of being supported by evidence and observable fact, and the argument reduces to the tautology

⁶²Ibid.

that statements capable of being supported by the evidence and observable fact are those that are capable of being explained or justified by the evidence and observable fact. Newtonian theory will produce sufficient results in that it will produce empirical statements capable of being supported by Newtonian theory and will likewise support the techniques employed to produce those sufficient results. Similarly, Einsteinian theory will produce sufficient results in that it will produce empirical statements capable of being supported by Einsteinian theory and will support those techniques employed to produce those sufficient results. But Newtonian theory and Einsteinian theory are incompatible. Therefore, it is impossible to employ Newtonian techniques in the production of Einsteinian sufficient results. The production of these sufficient results, of these empirical statements capable of being supported by the evidence and observable fact, is, then, little more than the demonstration of their theoretical foundation, operations performed under Kuhn's paradigm of "normal science." The model, of course, is inoperative in the discrimination between competing incompatible theories as well as even the recognition of incompatibility. The thing is, why should not equal incompatibility hold between, say the Deweyian and Froebelian theoretical foundations? It is only where the results are held to their uncontentious minimum that a similar incompatibility does not obtain. Sufficient results defined in terms of rudimentary literacy and numeracy does not disqualify either the Froebelian or Deweyian theoretical

foundations, but neither would sufficient results defined minimally in terms of a description of the free fall of an object disqualify either the Newtonian or Einsteinian theoretical foundation. Where such sufficient results, however, are defined in terms of the upper limits of Froebelianism, in terms of the release of innate characteristics of the child, such sufficient results may be well deemed insufficient from the Deweyian theoretical background stressing problem-solving and social re-construction and work to disqualify the Froebelian theoretical foundation.

In addition to the question of "sufficient results" is that of the nature of incompatibility between theories in education which are seen to disqualify those techniques associated with those theories. O'Connor's view is based on the notion that Dalton, Montessori, Froebel and Dewey are at odds in the same way that the Ptolemaic and Galilean systems were at odds over the nature of the universe. Where educational theory is seen to subsist apart from those values and ideals embodied and expressed in the purposes for which knowledge, skills and attitudes are imparted, one is simply left with that being capable of support by the evidence and observable fact which, of course, is meaningless in so far as purposive behaviour is concerned. But incompatibility in educational theory is not total in the sense that acceptance of one theory logically involves rejection of the others. There does not exist a relation of simple logical exclusivity one to the other so that one who adopts the techniques of Deweyianism must logically embrace experimentalism

and reject the theoretical foundations of Dalton, Montessori and Froebel in their entirety. Similarly, one who adopts a theoretical foundation is not logically committed to adopting its entire range of prescriptions for practice, and all that this shows is that theory and practice in education, much as with non-normal theory and practice in science, do not stand in a relation of logical implication.⁶²

⁶²Scriven sees no logical relation between the empirical statement and its theoretical foundation in O'Connor's sense. "Certainly," he points out,

there are no exact logical rules for inferring the right theoretical axioms from observations, but it has been held that the converse is true. The relationship of the axioms to the observations has sometimes been thought to be deductive. But it is clear from any attempt to set out the deduction, using any theories more sophisticated than the gas laws, that this is not true. ("Explanations, Predictions, and Laws," op. cit., p. 216.)

For Clive Beck, O'Connor's view of the loose practice-theory fit in educational theory working to disqualify educational theory as a contender for the title, is to misconstrue the "nature of implication" between educational theory and practice, an implication where

. . . it is not at all anomalous that people who agree on some theoretical matters will arrive at differing practical conclusions, or that people who disagree on some matters will arrive at the same practical conclusions. Of course, it is anomalous if people who are supposed to agree on everything arrive at different conclusions. And traditionally it has been supposed that two educators who have embraced the same "ism" do agree on everything to do with education. But this is an extraordinary supposition to make, and it should not be simply accepted by those who are engaged in discussion of the nature of educational theory and its relation to practice. (Educational Philosophy and Theory: An Introduction [Boston: Little, Brown & Company, 1974], p. 315.) Italics his.

The view that educational⁶³ theory in its pre-psychological days consisted in little more than rationalizations for practice forces O'Connor to explain how such practice came to transcend the level of simple random activity. This he attempts by comparing the introduction of a new teaching technique to the "empirical insight of the herbalist in the early stages of medicine. Practice comes first; but its theoretical justification has to wait for the scientific development that can explain its success."⁶³ O'Connor does not tell us just of what such "empirical insight" might consist, nor, in the absence of that set of values and ideals embodied and expressed in the purposes for which knowledge, skills and attitudes are transmitted, on just what such "empirical insight" is based. Where "empirical" is by definition that family of statements which can be supported by the evidence and observable fact, and that which can be so supported is so by logical derivation from its theoretical framework, what constitutes the role of "insight" in the model? To be "empirical," in other words, is to exclude such insight. And how is it that practice, such as that in medicine, must wait for the relevant scientific development to explain its success? Does not this make of medicine, and indeed, of all science nothing more than a rationalization of its early practice? At what point then, does such rationalization rise to the level of well-established theory so as to exclude practice based on incompatible

⁶³ An Introduction to the Philosophy of Education, op.cit., p. 109.

theory? O'Connor must determine how the advent of "scientific psychology" has transformed the "empirical insight" of the herbalist in educational theory so that "we no longer have to rely on practice to suggest theory."⁶⁴

Where theory before psychology, for O'Connor, constituted merely a rationalization of practice, after psychology

. . . it is experiment rather than practice which now suggests theory. The relationship between theory and practice has become a reciprocal one. Theory directs practice and practice corrects theory. Present-day knowledge of perception, learning, motivation, the nature of 'intelligence' and its distribution and development, the causes of educational backwardness, and many other matters of this kind enable us to amend educational practice in the expectation of improved results. We have, in other words, a body of established hypotheses that have been confirmed to a reliable degree.⁶⁵

What we have here is little more than a chronicle outlining the establishment of conventional practice leading by degrees to a body of confirmed hypotheses which then come to direct the relevant practice. Practice in the pre-psychological period rested in isolation, theory being little more than its rationalization; then practice began to "suggest" theory although the nature of the modification is not clear; then a break-point is reached where practice becomes "experiment" and rationalization becomes "theory," with a symbiotic relation consisting of direction and correction obtaining between the two. But beyond a formalization

⁶⁴ Ibid. .

⁶⁵ Ibid. Italics, his.

of practice and rationalization, what is the nature of the difference in qualitative terms between them and experiment and theory? How are they to be distinguished from the "empirical insight" of the herbalist whereby the one but not the other may lay claim to the title of "theory"? If theory defines the parameters of experiment in psychology as the "empirical insight" of the herbalist defined the parameters of his practice, in what way does experiment correct theory? When, for example, has behaviouristic experimentation falsified behaviourism? In addition, if experimental psychology now consists in a body of established hypotheses which have been confirmed to a reliable degree and such hypotheses guide experimentation regarding perception, learning, motivation, "intelligence," educational backwardness and many other matters, will O'Connor show what these hypotheses are and how they have been reliably confirmed? O'Connor directs his attention to learning theory, "one of the best developed field of psychology," but it appears that the body of hypotheses in that realm are neither established nor confirmed to a reliable degree.

The processes of human and animal learning have been very thoroughly studied by experimental methods for over fifty years. The great mass of accumulated results of this work has greatly improved our understanding of how we learn but it has not yet been condensed into a single overall theory. There are several theories of learning all of which seem to be compatible with most of the known facts without being necessitated by them. No one of them fits the facts so perfectly as to exclude all its rivals. What are still needed are crucial experiments

which will enable the psychologists to decide between one theory and another. Thus even the best examples of theories in the sciences of man are less closely tied to their supporting facts than theories in the sciences of nature.⁶⁶

It is puzzling to determine exactly how learning theory in psychology can contain a body of established hypotheses which have been confirmed to a reliable degree and which enables us to direct experiment in the expectation of improved results, yet at the same time such hypotheses are at variance with themselves and still further that they are compatible with most of the known facts about learning. Could it be that such theories are variable relative to their respective "empirical insights" into the nature of learning which yield variable explanations of that process, explanations which are identical to the "known facts" and with which these theories then find themselves in surprising harmony? Could it be that O'Connor's puzzlement originates in that objectivist dilemma of determining if one's relevant facts are relevant to that to which the facts refer? Could it be that learning theory has not yet been condensed into a single overall theory just because conflict exists at the level of the meaning of learning, a level at which O'Connor found the resolution as to whether a whale was a fish so perplexing? O'Connor calls for a "crucial experiment" to resolve the dilemma, yet if theory directs experiment in what sense could there be such a theory-free crucial experiment? On what grounds will the crucial experiment be

⁶⁶Ibid., p. 110.

conducted and how will such experiment serve to correct itself in the absence of its theoretical foundation? And why should the best example of theory in the sciences of man be less closely tied to its supporting facts than theory in the sciences of nature, since in either case such facts are facts because of such theories?

O'Connor has not shown how the theoretical component of experimental psychology, nor experimentation which is guided by and corrects that component, differs in any fundamental way from the recommendations for educational practice which marked the writings of those theorists who lived before psychology became an experimental science. There is only a formal difference between pre-psychological insight grounding recommendation for educational practice and psychological theory guiding and being corrected by psychological experiment. Since both rest on that set of values and ideals expressed and embodied in the purposes for which knowledge, skills and attitudes are imparted, which in their turn are embodied and expressed in the logical families of metaphysical statements and judgements of value, he has not shown the distinct way in which his logical family of empirical statements, those comprising his view of what educational theory consists to the exclusion of metaphysical statements and judgements of value, can itself be supported. In view of the failure of his reductionist empirical criteria to account for the quite different ways the distinct logical families of statements need to be supported, it may equally be said that the distinction itself cannot be supported.

Finally, because of a similar failure of his criteria to comprehend the nature of educational theory, O'Connor's relegating of such theory to the status of "courtesy title" cannot be supported.

In the present chapter consideration has been given to the second component of O'Connor's conception of "education," that set of theories which purport to explain or to justify those techniques for imparting knowledge, skills and attitudes at the level of practice as formulated in independence of that set of values or ideals embodied and expressed in the purposes for which such knowledge, skills and attitudes are imparted. It has been seen that O'Connor's own stipulative definition did not satisfy its own explanatory function of theory as its logical conditions presupposed knowledge of that which generated initial puzzlement. Since there was no initial puzzlement and no satisfaction of the psychological condition, the explanatory function of theory could not account for its own guidance function in the face of the anomalous. The guidance function in O'Connor's model was reduced to a mechanical subsumption of what was to be explained under present knowledge consisting of laws of increasing generality. Yet he simultaneously held to an objectivist view of the explicandum, holding the phenomena as stable and independent of their explanatory frameworks. The stipulative definition, then, did not meet its own central criterion nor could it account for explanation in the first person, the genesis of its own axioms, or of radical theory change as with Kepler, Newton

and Einstein, apart from that higher-level context which in educational theory is set forth in terms of the values and ideals embodied and expressed in the purposes for which knowledge, skills and attitudes are imparted. Of course, O'Connor's model of explanation appealed throughout to its own higher-level context, that of materialistic or empirical reductionism, where such purposes were seen to be explicable in terms of the laws of human nature grounded ultimately in those of inanimate nature itself. Yet his failure to produce such laws of human nature upon which his sciences of man were based was seen not as a failure of his explanatory context and the explanatory force of such sciences but rather as inadequacy in their current development where "development" simply means their amenability to subsumption under the laws of nature. Here O'Connor's logical condition of the explanatory function of theory failed in the face of the anomalous, that is, of conscious and purposive human behaviour. His own background theory proved incapable of subsuming such behaviour under natural laws of increasing and inanimate generality. It was, however, on such a basis that O'Connor determined that educational theory could be conceived only in the diminished sense of "courtesy title."

A similar deficiency of his empirical and reductionist explanatory background theory was seen to obtain in his attempt to account for his logically distinct families of statements as incorporated in such educational theory. His own metaphysical criteria could not comprehend those values

and ideals expressed in the purposes for which knowledge, skills and attitudes are imparted since the empirical family of statements derive their meaning by reference to such purposes. Similarly, his empirical family of statements proved inoperative in confrontation with the anomalous in the form of disputed connotation, and the appeal to usage in the form of the various functions of language was seen to be irrelevant in questions relating to judgements of value since it was the meaning and purpose of such judgements and not their linguistic function which was at issue. Finally, his own empirical family of statements encountered difficulties in terms of their quite different ways of support. The pragmatic means of support for empirical statements failed since efficiency in giving results is tied to the purposes in terms of which those results are appraised, purposes which lie beyond empirical criteria. Support for empirical statements and concurrent disqualification of educational theory in terms of its empirical statements was then seen to consist in a theory-practice relation such that the acceptance of empirical statements and the techniques employed to produce them would lead to the rejection of the theoretical backing of competing sets of empirical statements. However, the view that educational theory is deficient in this respect, that educational theories may be incompatible yet produce sufficient empirical statements, rests upon the view that such statements can be characterized independently of such theories, that facts can be identified and assessed apart from their theoretical under-

pinning. But this is no more true in science than it is in education.

O'Connor's mechanistic and reductionist account of the explanatory function of theory and his relegating educational theory to the status of "courtesy title" on the basis of that account has omitted any formulation of the nature of that activity, that is, what it is to employ theory in the process of explanation. Without some explanation of what it is to explain something, the explanatory function of theory is not explanatory. In effect, the explanatory function of theory becomes its own explicandum. In the present context of O'Connor's definition of "education," it is now that third component which requires clarification, that is, that set of techniques for imparting knowledge, skills and attitudes. Where such techniques involve teaching and teaching involves learning, what is the nature of that activity in which one comes to comprehend, where the psychological condition of puzzlement is relieved? The inadequacy of O'Connor's account of explanation and, by extension, what it is to learn, becomes clearer in his analysis employing the stipulative definition, of an event within the standard case of theory, that of science.

CHAPTER III

THE NATURE OF LEARNING: D.J. O'CONNOR AND THE DISCOVERY OF NEPTUNE

"Education" for O'Connor consists of that tripartite construct comprised of purposes, theories and techniques. The set of values and ideals embodied and expressed in the purposes for which knowledge, skills and attitudes are imparted and so directing the amount and type of training that is given constitutes the object of philosophy. It was the scientific method which revealed that different sorts of questions required different sorts of evidence, yet O'Connor's philosophizing about the purposes of education revealed only that the method itself was inapplicable to the resolution of such purposes. The second component of "education," that set of theories which purport to explain the third, that set of techniques for imparting knowledge, skills and attitudes, was seen to fail its own central criterion as laid down by the stipulative definition of theory, that "logically interconnected set of hypotheses confirmed by observation and which has the further properties of being both refutable and explanatory." Under the explanatory function of theory, the stipulative definition could not account for its own puzzlement condition and O'Connor's attempt to label educational theory a "courtesy title" came to rest on a failed attempt to formulate the logical condition of the stipulative definition in the form of a reduction of purposive human behaviour to instances of the laws of inanimate nature. O'Connor nowhere explains that set of techniques for imparting knowledge,

skills and attitudes, that is, what is involved in the activity of teaching nor, conversely, what is involved in the activity of learning, a rather central notion in any account of educational theory. Both, presumably, are of such uncontentious obviousness as not to require clarification. In order, then, to test the validity of the stipulative definition in terms of the third component of "education," it is necessary to engage discussion at the level of the "standard case."

As with other philosophical analysts, science for O'Connor provides the model of theory in terms of which the components of the stipulative definition are fulfilled as well as the model of the method constitutive of the activity of knowing and by extension that of learning.¹ Indeed, it is by virtue of this method that science becomes paradigmatic

¹"The model or paradigm of theories in this, the most important sense of the word," O'Connor points out, "is to be found in natural sciences and particularly in the more developed sciences like physics and astronomy." An Introduction to the Philosophy of Education, op. cit., p. 76. R.S. Peters sees science as "the supreme example of reasoning in action not just because of the opportunities for criticism which it provides, but also because of the agreements which it permits by means of its testing procedures. These guarantee objectivity and the escape from arbitrariness." ("Reason and Passion" in R.F. Dearden, et al., Education and the Development of Reason [London: Routledge & Kegan Paul, 1972], p. 221.) C.D. Hardie maintains that "the criterion for the meaningfulness of any question or problem, adopted by practising scientists, must now be accepted for the whole of knowledge." ("Philosophy of Education in a New Key," Educational Theory, Vol. X [1960], p. 257.) G.L. Newsome reports that:

Analytic philosophers strongly contend that truths about human experience and the universe cannot be discovered by philosophical means. Matters of empirical fact and truths about the world are discovered or established by science—not by philosophers. ("Analytical Philosophy and Theory of Education," in J. Park, ed., Selected Readings in Philosophy of Education [New York: Macmillan & Company, 1964], p. 342.)

of theory. This method is the hypothetical-deductive method and it has its origins, for O'Connor, in "accounting for unusual facts."

This method of accounting for unusual facts is a very characteristic pattern of scientific, as well as of everyday thinking. It contains three steps: (1) the proposal of a hypothesis to account for an unexpected or anomalous fact; (2) the deduction from this hypothesis that certain other facts are observable; (3) the checking of this deduction by observation. This pattern of thinking is often called the hypothetical-deductive method.²

As O'Connor's stipulative definition of theory is a product of the hypothetical-deductive method of reasoning, its validity as well as that of the view of knowing and learning which it incorporates, will turn on the degree to which that method constitutes the impersonal and objective passage from the proposal of a hypothesis to account for an anomaly to the checking of deduced facts by observation. For such impersonality and objectivity is just that upon which science's claim to paradigmatic status rests, just that which marks it off from other ways of thought peculiar to non-scientific patterns of thinking. As has been seen, philosophizing without regard to the mode of thought exemplified in the developed sciences is not to keep our minds free from nonsense, and educational theory can be considered as such only by virtue of courtesy since it has failed to conform to the epistemological injunctions embodied in the study of inanimate nature. However, it will be argued here that while scientific thinking

²O'Connor, An Introduction to the Philosophy of Education, op. cit., p. 78.

does indeed resemble everyday thinking, it does not do so in the sense understood by O'Connor. It will be argued here that his view of scientific thinking as constituted by the hypothetical-deductive method encounters difficulties in just those areas which are seen to ground its claim to constitute the "standard case" of theory, its paradigmatic status in respect to what it is to come to know, and by extension, the exemplary standard of the learning process. It will be argued, in effect, that the hypothetical-deductive method is a process which is not so much "objective" and impersonal but which is rather supported and sustained at key points by the "unobjective" and personal participation of the scientist engaged in the pursuit of scientific knowledge, these key points being those of hypothesis generation, the nature of empirical inference, the content of the activity of observation, and the character of verification or refutation. It will be maintained that the process of scientific thinking incorporated in the hypothetical-deductive method rests for its coherence upon each of these elements which transcend a strictly empirical or positivistic characterization, and in so doing works to undermine an objectivist view of that process as well as that of everyday thinking and learning conceived as diminished manifestations of that characterization. The basis of the analysis will be one of O'Connor's own choosing, the discovery of Neptune in 1846.

A. The Proposal of a Hypothesis to Account for an Unexpected or Anomalous Fact

To illustrate the hypothetical-deductive method in action O'Connor chooses what would appear to be a safe example, selected from astronomy, one of the "more developed sciences," and one which, since it transpired over one hundred years ago, is not currently anomalous. Two steps feature in the first movement of the hypothetical-deductive method, the initial recognition of behaviour as being anomalous and, secondly, the generation of a hypothesis to account for the anomaly thus perceived. How does O'Connor view these two steps?

(1) The Nature and Recognition of Anomaly

"In the year 1781," O'Connor explains,

. . . the planet Uranus was discovered by Sir William Herschel. As soon as its discovery was announced, astronomers began to collect observations in order to compute its orbit and they were soon able to predict the path of the new planet. But although the behaviour of Uranus at first conformed to the predictions of the astronomers, it began after a few years to diverge slightly from them. By the year 1840, the discrepancies between the observed path of Uranus and its predicted path were large enough to show that the behaviour of the planet could not be accounted for by the gravitational forces that were then known to act upon it, that is to say, the gravitational pulls due to the sun and to those planets known at the time. But it is important to notice that although the discrepancy between observation and prediction was sufficiently large by 1840 to need an explanation, it was still far too small to be observed by the naked

eye. (It amounted at that date to about ninety seconds of arc or one part in thirty-six hundred of a right angle.)³

Before dealing with the recognition of the anomalous behaviour of Uranus, a comment might be made about the discovery of that planet by Herschel. Uranus had been sighted on at least seventeen different occasions by the most eminent astronomers of Europe who had dismissed it as yet another star.⁴ Herschel himself had sighted it on four successive nights in 1769 and saw no motion that would indicate it was anything other than a star. Twelve years later, after constructing his own telescope, Herschel sighted it again, this time noticing its un-star-like motion. He had recognized Uranus' anomalous behaviour, and to account for it he announced he had discovered a new comet. Only after several months of failed attempts to fit the new sighting to a cometary path did Herschel accept the suggestion that the orbit was not cometary but planetary. Uranus had been discovered. The point is that Herschel, for a period of twelve years when he saw Uranus as another star and for several months when he saw it as a comet, did not recognize its behaviour as anomalous with planetary orbit because he did not anticipate anomaly, which is hardly surprising since all of the known planets had been discovered and their orbital

³Ibid., p. 79.

⁴The figure is Kuhn's, op. cit., p. 114. W.M. Smart's "John Crouch Adams and the Discovery of Neptune," (Nature, Vol. 158, No. 4019, November 1946), a summary address given to the Royal Astronomical Society on October 8, 1946, on the occasion of the centenary celebrations of the discovery of Neptune, puts the figure at 19.

periods charted by the Babylonians. After the discovery of Uranus, the astronomers of Europe were prepared to find additional planets and in fact found some twenty of them both within and without our solar system during the first fifty years of the nineteenth century.

O'Connor's account of the discovery of Neptune starts with the recognition of the anomalous behaviour of Uranus. It was behaving oddly to the point that it was gradually diverging from the predictions of the astronomers in the sense that a gulf was opening between their observations and their calculations of its future orbit. By 1840 the observed path of Uranus was sufficiently discrepant with astronomical expectations so that its path could not be accounted for by the gravitational forces then known to exist. However, what O'Connor's account of scientific discovery as embodied in the hypothetical-deductive method does not indicate is the initial recognition of anomaly. By what formal procedure did the astronomers determine that these discrepancies were "large enough" to constitute anomalous behaviour? How, in other words, does the method establish when discrepancy between observation and prediction is "sufficiently large" to demand an explanation? Why was the explanation by Herschel that Uranus was a planet not rejected since it did not act like one?

Anomaly is, in effect, nothing other than a test or trial of that antecedent theory in the light of which it is recognized as anomalous, yet which is set aside as a dis-

crepancy in the hope that further findings will reconcile it with its background theory. But it is just such a test or trial of antecedent theory which the hypothetical-deductive method cannot comprehend for, like the logical conditions in explanation by subsumption under more general covering law, the model demands the inviolability of such antecedent theory under which all anomalies can be automatically accommodated. In effect, there can be no real anomaly in the framework of the hypothetical-deductive method since it depends for its efficacy on the one-directional deduction of conclusions from premises known to be true. It is only after anomalous behaviour has been determined to have been temporarily deviant and that it can be assimilated to antecedent theory that it can function as a mechanism of demonstration.⁵

⁵The relationship of anomaly and background theory or "paradigms" has been pointed out by Thomas Kuhn. In the course of "normal science," science conducted under a dominant picture of reality, a paradigm-resistant anomaly may be encountered engendering "paradigm crisis" and "revolutionary science" aimed at a radical alteration of background theory to accommodate the anomaly. The emergence of a new paradigm Kuhn likens to a "gestalt switch," a "conversion" based on "personal and inarticulate considerations." Discovery, for Kuhn,

. . . commences with the awareness of anomaly, i.e., with the recognition that nature has somehow violated the paradigm-induced expectations that govern normal science. It then continues with a more or less extended exploration of the area of anomaly. And it closes only when the paradigm theory has been adjusted so that the anomalous has become the expected. Assimilating a new sort of fact demands more than additive adjustment of theory, and until that adjustment of theory is completed—until the scientist has learned to see nature in a different way—the new fact is not quite a scientific fact at all. (Kuhn, op. cit., pp. 52-53.)

It is, of course, just this violation of paradigm-induced expectations with the possibility of ensuing paradigm crisis presented by anomaly which the hypothetical-deductive method passes by.

In addition to misconceiving the nature of anomaly itself as a test of that background theory by virtue of which it is appraised as anomalous, O'Connor's hypothetical-deductive method, as indicated, glosses over the unformalizable process of recognition that behaviour of a specific sort does, in fact, constitute anomalous behaviour. For there are no rules of procedure determining that point at which anomaly is established, such being rather the personal assessment of the scientist in the live situation. Smart's account gives insight into the unformalized nature of anomaly recognition.

When, shortly after 1781, an approximate orbit had been calculated for Uranus, it was suggested by Bode that perhaps the planet had been observed previously as a 'star'; the search of the catalogues proved surprisingly successful, for no fewer than nineteen authentic observations of Uranus had been recorded, the earliest by Flamsteed (the first Astronomer Royal), who designated it 34 Tauri. In the nomenclature of the time, these pre-discovery observations of Uranus are known as the 'ancient observations,' those after the discovery as the 'modern observations.' In the second decade of the last century the accurate establishment of the planet's orbit was undertaken by Bouvard, who was soon faced with a peculiar difficulty. If he used the 'ancient observations' alone, he obtained an orbit differing unmistakably from the orbit derived from the 'modern observations' alone, these covering nearly forty years. In this dilemma he rejected the 'ancient observations' entirely, on the plea that they carried much greater observational errors than the 'modern observations,' and his tables of Uranus, published in 1821, were based entirely on the latter. But soon Uranus was seen to be falling behind its predicted position; by 1832 the error in longitude was $1/2'$, and in 1837 Airy (the Astronomer Royal) reported that the errors were 'increasing

with fearful rapidity'; the anomalous behaviour of the planet had now become the most puzzling problem in contemporary astronomy.⁶

Bouvard's decision to base his "tables of Uranus" on the "modern observations" covering some forty years after the planet's discovery by Herschel, rather than on the "ancient observations" which extended over a period twice as long but which were discrepant with the "modern observations" was based upon his personal judgement which, in its turn, was based upon the conviction that Uranus was a planet and not a star. It was on the basis of such conviction that he rejected the "ancient observations" as carrying "much greater observational errors" than the post-discovery observations, yet there was no "objective" criterion by which such rejection might be justified. It was upon this conviction that he based his calculations of Uranus' path, yet it was upon these same calculations that the behaviour of Uranus was seen to have become anomalous to the point where Airy regarded its orbital irregularity as "fearful." The reason it was fearful was, of course, that the "modern observations" may well be wrong, that Uranus was not a planet after all, or even that the forces of Newtonian gravitation had been miscalculated, the last actually being one of the hypotheses to account for the anomaly. Nineteenth-century astronomy was on the brink of a Kuhnian "paradigm crisis" for such ad hoc hypotheses serve to throw background theory itself into question. It is this anomalous nature of anomaly, central to the practice of

⁶Smart, op. cit., p. 648.

science but suppressed in the hypothetical-deductive method viewed in objectivist terms, which demands the exercise of unformalized and personal judgement of the scientist. The point here is that the initial recognition of anomaly is not itself the outcome of some prior employment of the hypothetical-deductive method or any other act of formal inference but rather of an intuitive grasp of a discrepancy grounded upon theoretical premises which may well be inarticulate in the actual process of that recognition. It is only by ignoring this core of personal estimation that O'Connor can rest his case that the natural sciences provide the model or paradigm of theories and the standard case of the knowing process.

(2) The Generation of a Hypothesis to Account for Anomaly

From O'Connor's objectivist standpoint the proposal of a hypothesis is seen to be automatic while, in the case of multiple and conflicting hypotheses proposed to account for a particular anomaly, their selection is determined by observational results. His account of the generation of a hypothesis to account for the anomalous perturbations of Uranus is both short and simplistic.

Various hypotheses were proposed to account for this divergence between theory and observation. One suggestion among several was that a very distant and hitherto unobserved planet existed whose gravitational attraction for Uranus caused the perturbations of its orbit from the expected course.⁷

⁷O'Connor, An Introduction to the Philosophy of Education, op. cit., p. 79.

As with anomaly recognition, O'Connor's view of the origins and discrimination of competing hypotheses falls short of the full story. Smart's more detailed analysis of the proposals to account for the discrepancies indicates that the genesis and discrimination of hypotheses are not susceptible to the application of any formal rule.

Several suggestions were offered to account for the phenomenon; the law of gravitation might not be exactly according to the inverse square of the distance (a suggestion regarded by Airy as possible even so late as 1844); the existence of a resisting medium—an ever-popular hypothesis—was put forward; perhaps the errors in the positions of Uranus were due to a massive satellite (how this escaped observation was not stated); perhaps about the time of discovery in 1781 Uranus had been hit by a comet, this suggestion being made, of course, to explain the difference in the orbits derived separately from the 'ancient' and 'modern' observations; and finally, it was hazarded that the discrepancies—or, technically, the perturbations—resulted from the attraction of an undiscovered planet far beyond the bounds of Uranus. Airy himself had no doubt about the last hypothesis, for he wrote: 'If (the anomalous behaviour of Uranus) be the effect of any unseen body it will be very nearly impossible ever to find out its place.'⁸

The hypothesis that a very distant and hitherto unobserved planet existed whose gravitational attraction for Uranus caused the perturbations of its orbit from the expected course was, if the Astronomer Royal were to be taken as authoritative, the least likely of all those suggestions proposed to account for this divergence between theory and observation. Given that a hypothesis is antecedent to the

⁸ Smart, op. cit., p. 648.

observation of its consequences then, on what grounds would O'Connor maintain, within the framework of the hypothetical-deductive method, that the various hypotheses were proposed?⁹ It can only be that those who proposed them believed that the perturbations of Uranus were caused, respectively, by errors in the calculations of Newtonian gravity, the existence of a resisting medium, the presence of a satellite, the impact of a comet, or the existence of an undiscovered planet. It would seem that the generation of a hypothesis to account for an unexpected or anomalous "fact" rests, then, upon personal assessments that such are in fact true insights into the nature of reality. As with the recognition of anomaly, the proposal of a hypothesis is not the outcome of some prior application of the hypothetical-deductive method but rather presupposes that in terms of which the method can get started. Hypothesis proposal is antecedent to the method, emerging from a grasp of background theory brought to bear on anomalous behaviour. Moreover, such background theory is

⁹ Abraham Kaplan writes in this connection that:

We must be able to entertain a hypothesis before we have a way of checking it, even before we know whether the laws of nature would permit a way, for it is sometimes by such inquiry that we can determine what the laws of nature are (the theory of relativity is usually cited in this connection). Our conception of what is possible, even of what is logically possible, grows with the growth of knowledge. As a result, the situation is not that we first establish what propositions are meaningful, then determine which of them are true. Truth and meaning move forward hand in hand. ("Concepts," in Van Cleve Morris, ed., Modern Movements in Educational Theory [Boston: Houghton Mifflin Co., 1969], p. 178.)

itself not an object of further hypothesis in the act of proposing a hypothesis—the astronomer does not dispassionately hypothesize regarding his hypothesis while hypothesizing—but it is rather the fiduciary framework housing his hypothesis and which serves as the basis of his commitment to that particular hypothesis. Yet it is, of course, just this foundation of belief which O'Connor's formalistic and objectivist account of the scientific process as encapsulated within the hypothetical-deductive method which is suppressed in the course of illustrating his paradigm of theory and the "standard case" of what it is to come to know.

Tied to the question of the proposal of a hypothesis to account for an unexpected or anomalous "fact" is that of hypothesis discrimination among a range of competing hypotheses proposed to account for that anomaly. Five hypotheses were proposed to account for the perturbations of Uranus, each of them "live" hypotheses in the sense that any one of them might be a true explanation of the anomaly. The issue is, how does the hypothetical-deductive method account for the assigning of greater coefficients of probability to the one rather than to the others? On the basis of what objective grounds might one say that the existence of an undiscovered planet provided the right explanation where the impact of a comet, the presence of a satellite, the existence of a resisting medium, or errors in the calculations of Newtonian gravity did not? Obviously, the method can provide no such grounds. Hypothesis discrimination and selection does not consist in the dispassionate testing of all possible hypotheses

but rather that which the scientist believes has a high chance or degree of probability of being true, and further, he may well be unable to give any formal account of why he holds to one hypothesis rather than another. Accounts like O'Connor's function only with the benefit of hindsight, they never employ open or live scientific questions but only those achievements believed to have been indubitably established. In doing so, however, they overlook the fundamental quality of committed belief in the truth of the chosen hypothesis, a belief based upon an unformalized act of personal assessment by virtue of which an aspect of reality is revealed.¹⁰

Concealed in the first step of O'Connor's hypothetical-deductive method by which science attains paradigm status is the personal evaluation of the scientist who proposes a hypothesis or selects a particular hypothesis among competing hypotheses proposed to account for anomaly. While it is

¹⁰ Gerald Holton remarks that such assessment of the probability of hypotheses by the scientist is akin to aesthetic discrimination.

To understand what almost any working scientist feels when he has to evaluate an hypothesis seems to be difficult for those who are not actually engaged in creative scientific work. Hence it will be useful to develop a field that can fairly be called the aesthetics of science. For these matters are still decided in practice on the basis of which Copernicus confessed, apparently so vaguely yet so correctly, to have made his decision against accepting 'the planetary theory of Ptolemy and most other astronomers, although consistent with the numerical data'; one of his chief objections was that he found their sort of evidence not 'sufficiently pleasing to the mind.' (Gerald Holton, "Einstein, Michelson and the Crucial Experiment," Isis, Vol. 60, Part 2, No. 202 [Summer, 1969], p. 177.)

ultimately upon such an evaluation that hypotheses are both proposed and selected, one which may well be incapable of any sort of formal articulation and which thereby marks science and scientific knowing as analogous to other forms of non-paradigmatic cognition, it is only by circumventing the act of unformalized assessment that O'Connor can maintain that science provides the standard case by which other forms of thought must be measured.¹¹ However, by the suppression of even the acknowledgement of such evaluation, his hypothetical-deductive method is incapable of explaining its first step.

B. The Deduction from This Hypothesis that Certain Other Facts Are Observable

The second step in O'Connor's hypothetical-deductive method of scientific discovery maintains that there is a

¹¹ Holton points to the appeal of science to "informal" articulation by way of the justification of hypothesis assessment.

This helps to explain the significance of the passionate and 'unscientific' language generally used to describe such hypotheses, and incidentally points to gradations of aesthetic or 'psychological' acceptability. Thus we have found in the scientific literature characterizations of the following kinds for acceptable ad hoc hypotheses: 'not inconceivable,' 'reasonable,' 'plausible,' 'fundamental,' 'natural,' 'appealing,' 'elegant,' 'likely,' 'assumed a priori to get desired results,' 'auxiliary,' or 'working hypotheses.' On the other hand, when an ad hoc hypothesis is rejected, we see it described in the following way: 'artificial,' 'complex,' 'contrived,' 'implausible,' 'bothersome,' 'unreasonable,' 'improbable,' 'unlikely,' 'unnecessary,' 'ugly.' Sometimes 'ad hoc' itself is applied in the pejorative sense, and then it has such meaning. (Ibid., p. 178.)

deductive or logical relationship between a proposed hypothesis and that which the hypothesis has been proposed to explain. It is not entirely clear what O'Connor might mean by this. Adams' hypothesis was that an unseen planet was causing the anomalous behaviour of Uranus and that his calculations would determine its position thereby rendering it observable. In other words, his hypothesis of an unseen planet is identical to his belief in the existence of that unseen planet. On one reading, O'Connor's construction would seem to mean nothing more than if the calculations determining the existence and location of the unseen planet were correct, that is, if there actually were a planet and it actually was where the calculations predicted it would be, there exists a deductive relation between Adams' belief and the fact of the planet's existence and location. Conditional upon the truth of the premise, the existence of the unseen planet, and conditional upon the validity of the inference, here the accuracy of Adams' calculations, the conclusion in the form of the cause of the perturbations of Uranus might be secured by deductive inference. While the syllogism is logically persuasive, it is, like all such syllogisms, tautological with its premises yet it is just those premises, the existence of the unseen planet, which is at issue. As an explanation of the process of the discovery of that unseen planet, it is simply absurd.

On another reading, O'Connor has simply conflated Adams' hypothesis of the existence of the unseen planet with

the existence of that unseen planet, and maintains that a deductive relation holds between the two identities. In other words, there can be deduced from Adams' hypothesis that there exists an unseen planet certain other facts, these certain other facts being that there exists an unseen planet. The fact that it will cease to be unseen and become observable is a purely contingent matter depending upon the truth of the hypothesis, that is, that there is an unseen planet. If the hypothesis were false, if there did not exist an unseen planet, then, of course, the deductive relation would not hold for there would not be other facts which were observable. This bit of intelligence can hardly be re-assuring to those engaged in scientific discovery. The issue comes down to what O'Connor has in mind by a deductive relation between hypothesis and certain other facts.-

(1) The Deductive Relation between Hypothesis and Certain Other Facts

While both Adams in England and Leverrier in France shared the unobserved planet hypothesis to account for the perturbations of Uranus, others did not. The puzzling thing is that if the relation between hypothesis and certain other facts revealed in the light of that hypothesis is deductive, how is it that different scientists take different views of the same hypothesis? Are they simply being illogical? O'Connor chooses to avoid the issue and concentrates rather on the striking fact that ~~two~~ astronomers shared the same hypothesis. Yet even here the nature of the inference em-

ployed by each between hypothesis and certain other facts does not appear to be deductive.

Now it is a difficult computation for an astronomer to work out the perturbations of a planetary orbit caused by another planet of known weight, size and position. But to perform the inverse calculation and deduce from the observed irregularities of one planet's orbit the size and position of another yet unobserved planet which causes them is a very much more formidable task. And to do this over a hundred years ago without the assistance of modern calculating machines was a mathematical feat of the highest distinction. Yet two astronomers, J.C. Adams in Cambridge and Leverrier in France, carried out this calculation independently of each other and predicted the position in the sky where the new planet might be seen with a telescope.¹²

For O'Connor, Adams and Leverrier deduced the size and position of the unobserved planet on the basis of their inverse calculations, working from known irregularities of Uranus to the cause of these irregularities which was as yet unobserved. If O'Connor is suggesting that this is simply a deductive relationship, albeit in reverse, then historically his account of the discovery of Adams and Leverrier is false. In addition to the questionable logical validity of inferring from known conclusions back to indubitable premises, there were lacunae in the calculations of Adams themselves which preclude the possibility of any formal deductive process. These lacunae consisted, in Smart's account, of two groups of unknowns which were themselves recalcitrant to deductive inference.

¹²O'Connor, An Introduction to the Philosophy of Education, op. cit., pp. 79-80.

The problem to which Adams devoted his energies during 1843-46 was one of considerable complexity. On the hypothesis of the unseen planet, the orbital elements as deduced by Bouvard must be somewhat erroneous, for the observed positions of Uranus which he used must be affected by perturbations of which he was unaware; the corrections of Bouvard's orbital elements of Uranus constituted the first group of unknowns in the mathematical formulation of the problem; to these must be added the mass of the hypothetical planet and the elements of its orbit. Owing to the way in which the mean distance of the new planet entered into the equation, of condition it was necessary, if the problem was to be made practicable, to assume some value for this mean distance.¹³

In the framework of the reverse deduction even the conclusions from which Adams was to deduce his premises in the form of the unseen planet, were, in effect, a group of unknowns. By what rule did Adams correct these conclusions, the erroneous orbital elements of Uranus as calculated by Bouvard? In effect, Adams was "deducing" from incorrect conclusions to premises which were not only not known to be true but which were merely hypothesized as being true, an exercise which hardly fulfils the conditions of logical inference. In addition, the valid inference condition of logical deduction can hardly be said to have been satisfied since Adams had "to assume some value" for both the mass of the hypothetical planet as well as its mean distance.

In what sense, then, might one say that the inferential process of Adams which required the assumption of values

¹³ Smart, op. cit., p. 648.

was a deductive one? It is only if O'Connor is using the term in some extended sense which he has not explained that Adams might be said to have "deduced" the existence of the unseen planet from calculations based upon the perturbations of Uranus. Similarly, his view that the achievement was one of the highest distinction since it was performed "without the assistance of modern calculating machines" is to extend the deductive nature of scientific discovery while overlooking its anticipatory and projective character, in this case set within the framework established by Herschel's prior discovery which anticipated the possibility of additional undiscovered transuranic planets. Such a characteristic is not attributable to calculating machines but rather to those who use them.¹⁴

¹⁴Holton maintains that scientific discovery viewed as "the inexorable pursuit of logically sound conclusions from experimentally indubitable premises" is little more than a "current myth," supported by "systematizers, axiomatizers, textwriters, and others (who) may yearn for linearized sequences both in scientific work itself and in accounts of it." (Holton, op. cit., p. 157.) His view of the relationship between hypothesis and the reality which it is designed to reveal is incorporated in a "Fingerspitzengefühl."

Rather, what is required is a feeling for the state of affairs, a 'Fingerspitzengefühl,' which not only distinguishes the quality of insight of different scientists but also forces them to take often quite different views of the same hypothesis. I use the dangerous word 'feeling' deliberately, because it indicates accurately the difficult-to-define locus where judgments of the scientific relevance of hypotheses are made. (Ibid., p. 182.)

Holton goes on to maintain that the "experimentalist fallacy" of imposing a logical sequence, reverse or otherwise, on scientific discovery must be resisted. In relation to Ein-

The basis of O'Connor's view of a deductive relationship holding between a hypothesis and certain other facts rests upon his positivistic conception of the nature of scientific facts, a view originating in a third-person perspective in which the facts are "out there" in a universe in which the scientist himself is absent.¹⁵ In a sense there stein's theory of relativity as an example, he points out that:

Not only is it false to the actual development of thought processes that may have led to major scientific discoveries; not only might the doctrine inhibit creative work in science if it were to be taken too seriously; but also, by drawing attention primarily to the external visible clay that provides factual support and operational usefulness for the developed theory, it does not do adequate justice to the full grandeur of the theory. The basic achievements of Einstein's theory was not to preserve hallowed traditional conceptions of mechanism; it was not to produce a logically and tightly structured sequence of thoughts; it was not to build on a beautiful and pedagogically persuasive experiment. Rather, the basic achievement of the theory was that even at the cost of sacrificing all these, it gave us a new unity in the understanding of nature. (Ibid., p. 197.)

¹⁵In his "Schooling and the Culture of Positivism: Notes on the Death of History," (Educational Theory, Vol. 29, No. 4 [Fall, 1979]), Henry A. Giroux remarks that:

The central assumption by which the culture of positivism rationalizes its position on theory and knowledge is the notion of objectivity, the separation of values from knowledge and methodological inquiry alike. Not only are the 'facts' looked upon as objective, but the researcher himself is seen as engaging in value free inquiry, far removed from the untidy world of beliefs and values. Thus, it appears that values, judgements and normative-based inquiry are dismissed because they do not admit of either truth or falsity. (p. 269)

Giroux sees positivism and its third-person perspective as ultimately rendering man passive, supporting the status quo, and

are facts out there existing in independence of the scientist but the third-person view fails to account for the fact that established scientific facts become such by the interaction of the scientist with those "facts," an interaction in which the background theory of the scientist works to incorporate the phenomenon within the system upon which the theory is based. Neptune's existence was not a "fact" prior to its establishment by nineteenth-century astronomy that it was a fact, that is, one would not say after its discovery, "I used to see a star but now I see a planet." While Neptune existed as a planet before its discovery, its discovery as a planet established it as a scientific fact, as a part of the conceptual framework ordering astronomical observation. After its discovery one would say, "I used to see a star but I was mistaken. I now see a planet."

As Kuhn has pointed out, not all facts even within the exercise of "normal science" have identical standing, for not eliminating history as a legitimate knowledge framework, all of which boil down to the same thing.

Objectivism is the cornerstone of the culture of positivism in public education. Adulating 'facts' and empirically based discourse, positivist rationality provides no basis for acknowledging its own historically contingent character. As such, it represents not only an assault on critical thinking, it also grounds itself in the politics of 'what is.'
(Ibid., p. 276.)

R.D. Bramwell ("Education and the Two Traditions of Science," Educational Theory, Vol. 28, No. 3 [Summer, 1978]) sees the third-person "logical-empirical" tradition to have limited use in education as opposed to the first-person "hermeneutic-dialectic" tradition. "Even physicists these days," he remarks, "doubt the strict objectivity of what they do." (p. 226)

only are they paradigm-dependent but they vary to the degree to which they can articulate that paradigm. He distinguishes three sorts of facts or "focii for normal science."

First is that class of facts that the paradigm has shown to be particularly revealing of the nature of things. By employing them in solving problems, the paradigm has made them worth determining both with more precision and in a larger variety of situations. At one time or another, these significant factual determinations have included: in astronomy—stellar position and magnitude, the periods of eclipsing binaries and of planets; in physics—the specific gravities and compressibilities of materials, wave lengths and spectral intensities, electrical conductivities and contact potentials; and in chemistry—composition and combining weights, boiling points and acidity of solutions, structural formulas and optical activities. Attempts to increase the accuracy and scope with which facts like these are known occupy a significant fraction of the literature of experimental and observational science.¹⁶

Facts in science are not, then, as O'Connor would seem to suppose, pre-paradigmatic phenomena existing in the universe but rather, in the present case, past achievements made possible by means of a paradigm through which they attain their meaning. It is in terms of that paradigm which they commence and continue to be of interest, serving to "reveal that nature of things" with greater precision and scope. O'Connor's objectivist or positivistic view of scientific facts, that facts are such by virtue of their simple existence in the world regardless of whether they are known or unknown, places them as facts on one level of signifi-

¹⁶Kuhn, op. cit., p. 25.

cance. In the absence of a paradigm or explanatory background theory to bestow significance upon the scientific fact, which is such relative to the degree that it can, in the normal practice of science, articulate that background theory or paradigm, there ceases to be a criterion of relevance to which the scientist might appeal to determine just which "facts" are more or less worthy of articulation. The speed of water flowing down a gutter would have equal standing, if measured precisely, with astronomical discovery since both facts exist objectively in reality, and both would be equally demanding of further exploration. For there is no explicit rule which may be determined by objective means just which phenomena will permit refinement of the paradigm in terms of accuracy and scope, this being rather a matter of the personal assessment of the scientist. Indeed, in the absence of paradigmatic relevance, even accuracy and scope do not constitute sufficient conditions. T.W. Richards won the Nobel Prize in 1914 for a very accurate determination of atomic weights, but after it had been established that atomic weight varies accidentally in proportion to the concentration of isotopes in those elements, Richard's measurements could be dismissed as "of little interest and significance as the determination of the average weight of a collection of bottles, some of them full and some of them more or less empty."¹⁷ The facts of science, then, are established as facts by the paradigm but it is indeterminate as to the degree to which they are

¹⁷F. Soddy, The Interpretation of the Atom (London: 1932), quoted in Michael Polanyi, P.K., op. cit., p. 136.

thought to be useful in solving problems and refining the scope of that paradigm.

Kuhn's second class of facts are more closely tied to the paradigm than those selected and employed by the paradigm in solving problems, these being in the nature of "demonstration facts." Such facts are those which, "though often without much intrinsic interest, can be directly compared with predictions from paradigm theory."¹⁸ By way of illustration Kuhn gives such facts as those derived from special telescopes to demonstrate Copernicus' prediction of annual parallax or Foucault's apparatus to show that the speed of light is greater in air than in water.

Kuhn's third class of scientific facts are those used as the basis of articulating some of the residual ambiguities of the paradigm itself, such as improving the values of the gravitational constant. The point is that these attempts to refine the paradigm would not have been conceived nor carried out "without a paradigm theory to define the problem and to guarantee the existence of a stable solution."¹⁹ After Herschel's discovery of Uranus, Adams' efforts to determine the existence of an unseen planet constituted such an articulation of residual ambiguities of the existing paradigm extended to comprehend transuranic planets, a paradigm which bestowed upon his subsequent discovery the status of "fact." It was not an instance of revolutionary science,

¹⁸ Kuhn, op. cit., p. 26.

¹⁹ Ibid., p. 28.

where the very notion of the nature of a fact undergoes alteration. For Priestly, the "fact" was de-phlogisticated air where for Lavoisier the fact was oxygen; for Aristotelian physics the "fact" was restrained fall, where for Galileo the fact was the motion of the pendulum; for pre-Daltonian chemistry the "fact" was that solutions were mixtures, where for his successors the fact was that they were compounds; for Ptolemy the "fact" was that the sun was a planet, where for Copernicus the fact was that it was a star; for Newton the "fact" was that the centre of the universe was at absolute rest, where for Einstein the fact was that absolute rest did not exist.

The purpose of this consideration of what constitutes scientific facts has been to show that such facts are the outcomes of the acts of comprehension by scientists which are based upon and guided by conceptual frameworks or paradigms. It has been to suggest that the scientific fact, in order to be a scientific fact, must be apprehended under some aspect which establishes it as a fact and which renders it thereby meaningful. It has been to suggest that the scientific fact is not to be identified with a simple phenomenon or natural event on the basis of which science might then pin its claim to some form of "objectivity" seen as transcending man's conceptual apparatus and thereby come to constitute the "standard case" of theory and knowledge in O'Connor's sense of the term. In so far as it is the outcome of that conceptual apparatus, background theory, or paradigm, the

scientific fact does not differ from other facts which are the outcomes or achievements of non-scientific paradigms. Yet it is upon this ambiguity as to what constitutes a "fact" that O'Connor appeals his case. He has maintained, in the first step of the hypothetical-deductive method, that a hypothesis is proposed to account for an anomalous or unexpected fact. In the present case, the hypothesis was that of an unseen planet, the anomalous or unexpected fact the perturbations of Uranus. The second step involved a deduction from this hypothesis, the unseen planet, to certain other facts. But what are these certain other facts? It cannot be simply the unseen planet since the deduction, as indicated above, would be between identities. It must be that those certain other facts are observable. Observation must be that by which O'Connor hopes to establish the objectivity of the scientific fact and so secure for science its standing as the "standard case." What, then, is involved in observation?

(2) That Certain Other Facts Are Observable

It is by observation, in O'Connor's positivistic conception of science and its objectivist conception of scientific knowing, that the scientific fact is established as a fact and by virtue of which it bases its claim to constitute the exemplar of the knowing process generally. It was by observation that anomaly or an unexpected fact initially was espied and which generated the hypothesis which was proposed to account for it. It is by the observability of these certain other facts that the hypothetical-deductive

method aspires to emerge from the subjective netherworld of hypothetical speculation to ground itself in the realm of the interpersonally visible. From observed anomalous fact to certain other facts which are observable, it is clearly observation which closes the circle. At the heart of the positivistic conception of science, here manifested in an empirical objectivist view of philosophical analysis in educational theory, is the central role of the economical and dispassionate recording of observations. Nor does observation establish a fact as a fact alone, serving as the linchpin of empiricist rationality and the yardstick of evidential adequacy. It also serves to ground empirical conceptions of science as paradigmatic, for a theory which conflicts with observation should be abandoned forthwith or one that is not immediately testable by observation should be so revised in order that its predictions are restricted to observable magnitudes. There are, however, certain difficulties attached to the view of observation as maintained in the positivistic scheme which modify its criteriological role in the knowing process.

The fact is that the simple classification of observables as observables transcends the activity of observation itself. To observe something is not simply to record a series of retinal imprints made by objects which happen to fall within the field of vision but rather to purposively isolate the object of observation as distinguished from the rest of the visual field. We can, in other words, see things without observing them. We can see a camouflaged object as

patches of colour without actually observing that object, which, after all, is the purpose of camouflage. To observe a camouflaged object will require a conscious re-organization of our visual field so that what was heretofore patches of colour will not be the object of conscious awareness but rather that which is secondary or peripheral to such conscious awareness. Similarly, one strains one's eyes to observe an object seen under poor lighting conditions, or one seen at a distance. Conversely, the intentional nature of observation is shown by the fact that one can, by unfocusing one's gaze, dissolve that previously observed as an object into its constituent colour patches, reversing the process of observation. As with the establishment of the "facts," observations then are not simply objective data impinging on the retinae within a given visual field but are purposeful achievements, however rudimentary, of the observer.

In addition, in so far as observations are purposeful integrations of visual experience, they rely for their coherence upon a framework which is antecedently accepted as true and which is itself not, at that time, an object of further observation. Observations, in effect, are acts of personal judgement which are both intentional and irreducible to any formal rule, for any rules of observation can be derived only from prior observations that we have accepted as true before we knew these rules. As we cannot observe ourselves observing an object without destroying the initial observation of that object, this being the intentional or

vectorial quality of observation, so we cannot conform to prescriptions for observing an object prior to observations previously accepted as determining that the object under observation is one of a particular sort. In other words, observations themselves incorporate a framework of belief or personal accreditation of the rightness of the very act of observation, a framework which at that time is not itself an object of observation nor grounded in any formal rule.²⁰ Adams, then, did not simply "observe" the perturbations of Uranus under the aspect of simple celestial phenomena but read them as pointers to the location of the hypothesized unseen planet, much as patches of colour are read as pointers to the object camouflaged to conceal its presence. It is this purposeful yet indeterminate quality of the act of observation, one which marks it as an act of personal discrimination resting upon a basis of accreditation not simultaneously an object of further scrutiny, which is suppressed in objectivist accounts such as that of O'Connor in the hope

²⁰In his "Philosophical Foundations of Religious Education," Educational Theory, Vol. 28, No. 4 (1978), R. Laura points to the act of implicit accreditation as being as central to the process of scientific reasoning as it is to religious reasoning, such accreditation being located in the framework of belief underlying both forms of rationality. "The theist's belief," he points out,

... determines the nature of theistic reasoning somewhat in the same way that the principles of induction determine the nature of scientific reasoning. Just as to engage in scientific reasoning we must implicitly subscribe to the principle of induction, so to engage in theistic reasoning, we must implicitly subscribe to a belief in the existence of God. (p. 315.)

of establishing its impersonal and objective standing and of securing for the hypothetical-deductive method its paradigmatic status in the knowing process.

The personal element involved in direct observation is compounded in the case of indirect or instrumental observation. Indeed, it is questionable whether the two kinds of observation can be said to be equivalent. As A.S. Carson remarks,

When we test the air temperature with a thermometer, are we observing the heat when we see the mercury rise in the same way that we observe a typewriter we are looking at directly? And when the path of a proton is noted by a trail of vapour in a cloud chamber, is that observation in the same sense as either the testing of air temperature or seeing the typewriter? Strict empiricists differ on what counts as observation.²¹

Observation mediated by instrument readings, in addition to incorporating the intentional discrimination which marks direct observation, may either serve to magnify such personal factors or it may introduce a range of secondary features into the activity which render it still further a matter of informal assessment. As seeing the mercury rise in the thermometer is a step removed from a direct observation of heat increase, so, as Carson points out, the determination of

²¹A.S. Carson, "Two Problems of Educational Theory," British Journal of Educational Studies, Vol. XXVIII, No. 1 (February, 1980), p. 23. Carson also points to the observation of "black holes" in astronomy which, since they emit no light, are unobservable in principle. Yet such black holes are an observational datum of current astronomy. Under strict empiricist criteria, such theories "would have to be regarded as unacceptable: in a similar vein much of science—of what scientists do—would have to be ruled out of court." Ibid., p. 24.

the path of the proton in the cloud chamber is "an inductive inference based upon prior unconfirmed proton theory."²²

Observation in this case, in other words, is guided by a theoretical framework in atomic physics which is not only unconfirmed but known to be unconfirmed yet which still functions as the anticipatory matrix within which the path of the proton is observed. The proton theory in terms of which the proton is observed is not itself an object of observation and, further, the determination of the proton's path in terms of its correspondence with such theory is not itself amenable to further check without or beyond that theory. The flight of the proton is not simply a datum of objective existence in terms of its comprehension by the physicist but rests upon an antecedent explanatory framework and, in this case, one which may well be wrong. In addition, of course, instrumental observation relies necessarily on the assessment of the accuracy of those instrument readings which is itself a further personal determination, as is skill in interpreting their significance and in projecting predictions made upon them. Incorporated in the interpretation of instrument readings is the assumption of random error which, in its turn, demands the employment of unformalized interpretive skills in assessing the proper correspondence between sets of instrument readings and the sets of numbers

²²Ibid.

accepted for the purposes of measurement.²³

The point that is being made here is that O'Connor's view of the nature of the activity of observation, whether direct or mediated by way of instrument readings, is not constituted by the simple and dispassionate recording of such observations but rather resides in the unformalized application of background theory and the equally unformalized interpretation of the results of such application. To deduce from a hypothesis that certain other facts are observable, where such facts are facts just because they are observable, is to overlook the fact that observation does not consist in some sort of passive activity whereby phenomena are duly noted but rather in the form of intentional achievement. As such, scientific observation contains within itself elements which work to undermine positivistic notions of that activity such as that of O'Connor, which are seen to serve as the basis of "objectivity" in its exercise. In addition to mis-

²³Polanyi (P.K., op. cit.) gives the example of such interpretive skill in the chemist's assessment of correspondence between instrument readings and the determination of the proportion of elements in a chemical compound. Chloroform (CHCl_3) consists of one part carbon measured in units of 12 grams, one part hydrogen measured in units of 1 gram, and three parts hydrogen measured in units of 35.5 grams. When measured by unit weights, the composition of a cloroform compound may be 1:1:3 (for chloroform), 1:3:1 (for methylchloride) or 1:2:2 (for methylene dichloride). "To ascertain a simple proportion of integers from a measurement of weights," Polanyi points out,

. . . demands that we go beyond the method of ascertaining measured quantities from sets of instrument readings, as we do for the verification of predictions in classical dynamics. We must take the further step of identifying arithmetical proportions of measured quantities with integer fractions. (p. 42.)

construing what it is to observe something, O'Connor's second step in the hypothetical-deductive method incorporates the view that if certain other facts which were deduced from the hypothesis were not observable, this would serve to discredit the hypothesis from which they were deduced. In other words, a theory should be abandoned if it conflicts with observation. This is to take us to the third step of his hypothetical-deductive method.

C. The Checking of This Deduction by Observation

Returning to O'Connor's account of Adams' discovery, the anomalous behaviour of Uranus had been detected and the hypothesis of an unseen planet had been advanced to account for the anomaly. The deduction from this hypothesis, that certain other facts, the unseen planet, would be observable was, of course, incorporated in the initial proposal of the hypothesis to account for the anomalous behaviour of Uranus. According to O'Connor,

It remained to carry out the third step of the hypothetical deductive scheme and confirm by observation the existence of the new planet in its predicted place. It needed a good telescope, a trained observer and an accurate star map. The search was not systematically undertaken until nearly a year after Adams had completed his calculations. In September 1846 Galle in Berlin, acting on a suggestion from Leverrier, made the predicted observation, and a new planet, later to be called Neptune, was discovered.²⁴

²⁴O'Connor, An Introduction to the Philosophy of Education, op. cit., p. 80.

As with the activity of proposing a hypothesis to account for anomaly in step one and deducing from this hypothesis that certain other facts are observable in step two, O'Connor's checking of this hypothesis by observation conceals features which do not accord with his formal account of discovery. The confirmation of Adams' calculations, O'Connor suggests, would be rather a routine matter for anyone sufficiently trained in astronomical observation, in possession of a good telescope, and guided by an accurate star map. The facts of the case do not appear to bear him out.

§

(1) Verification

On 9 July, 1846, Airy wrote to Challis, the director of the Cambridge Observatory and one who O'Connor would have to admit was a trained observer, directing him to undertake a search for the new planet using the Northumberland Telescope, the most advanced instrument of its time. Airy had informed Challis of the longitude of the new planet on the basis of Adams' calculations. From 29 July to the end of the following September Challis made no fewer than 3,150 observations, concluding only with the news of Galle's sighting at Berlin. In spite of the fact that Challis was a trained observer, had used the best telescope extant, and knew the longitude of the unseen planet, he reported no positive results. It was only after Galle's sighting and in the ensuing storm over who, in fact, should be accorded the discovery, Adams of England or Leverrier of France, that

certain facts were revealed. It seems that Challis, according to Smart's account,

. . . had very little faith in the outcome of theoretical investigations for detecting a new planet; he seemed to undertake the laborious series of observations merely because Airy was firm on the matter; and when he had embarked on the observational programme it never occurred to him to discuss his observations as they proceeded—except in the instance recorded earlier, and the comparison in this case was merely a test of the adequacy of the two separate observational methods he had adopted. Challis comes out of the Neptune episode as a sceptic and procrastinator, perhaps not earning, however, the almost brutal judgement passed on him by the historian of the Royal Astronomical Society.²⁵

Whether or not Challis' failure in sighting Neptune showed him to be a sceptic and procrastinator, what it did show was that he was not prepared to observe Neptune, that his background conceptual framework, in this case consisting of his lack of faith in Adams' theoretical investigations for detecting the new planet, did not provide the anticipatory matrix constituting just that personal element underlying the observational activity. That such an anticipatory heuristic framework guides observation appears confirmed by the fact that, although he reported no positive results, Challis had indeed sighted Neptune four times! For Challis, the checking of Adams' deduction from his hypothesis that certain other facts would be observable was hardly the routine,

²⁵Smart, op. cit., pp. 649-50. The "instance recorded earlier" refers to 29 September when, according to Smart, "before the news of the discovery at Berlin had reached Cambridge, Challis, impressed with Leverrier's insistence that the planet would show an unmistakable disk, noted against a star: 'It seems to have a disk.'" Ibid.

mechanical exercise as portrayed by O'Connor. Smart continues:

Except for a comparison of his observations on July 30 and August 12, Challis made no attempt to discuss the fruits of his toil, despite the sense of urgency which Airy's importunity and his own knowledge of Le Verrier's June paper would have seemed imperative to one who had even a modicum of faith in the results of mathematical analysis. Comparing his observations of August 12 with those of July 30, Challis noted that the first thirty-nine stars on the former date agreed with the observations on July 30; if he had gone to star number forty-nine he would have seen that this star was absent from the records of July 30; this star was the planet.²⁶

The determining factor, then, in Challis' failure to sight Neptune could be attributed less to his training and equipment and more to his lack of a "modicum of faith" in the efficacy of Adams' mathematical calculations, a lack which inhibited him from cross-checking his observations on the nights of 30 July and 12 August. Challis had "observed" Neptune on three other occasions without knowing he had done so because, in effect, he was not looking for Neptune.

There is a final twist to the story of the discovery of Neptune, one which works to throw O'Connor's view of verification as the simple checking of the deduced hypothesis by observation into further doubt. After the sighting at Berlin, Adams used Challis' observations to calculate the elements of Neptune's orbit since they were, 'ironically, the most exhaustive available. The outcome of Adams' efforts revealed that his initial calculations, those upon which

²⁶Ibid., p. 649. Italics added.

Challis had made his observations, were wrong. Any observation employing them would have discovered nothing. "The surprising result of Adams' and other calculations," Smart writes,

. . . was the comparatively small value of the semi-major axis of Neptune's orbit; this was thirty astronomical units as against about thirty-five used in Adams's and Le Verrier's solutions; no wonder that Pierce of Harvard was led to declare that Neptune was not the planet resulting from mathematical analysis and that its discovery must be accounted a happy accident.²⁷

It was not, after all, the precise inverse calculations of Adams and Leverrier which had thrown current astronomical theory into near crisis but rather their conviction in respect to their hypothesis that the perturbations of Uranus could be explained only by the presence of an unseen planet, and it was this conviction that created the anticipatory framework which led to the discovery of Neptune by those who shared it. Further, Adams' initial revision of Bouvard's equations was an heuristic surmise or projection grounded in that conviction and not the outcome of formal application of the hypothetical-deductive method, as was, of course, Bouvard's prior rejection of the "ancient observations." As it turned out, Adams' inverse calculations were based upon a revision of a rejection of observations that were correct. Neptune, as it turns out, had been sighted as early as 8 May, 1795, as well as two nights later by Lalande.

²⁷ Ibid., pp. 651-652. Italics his. It might be remembered that Leverrier also calculated the position of Vulcan, lying between the sun and Mercury, which current astronomical theory maintains does not exist.

Once again, however, it was the absence of that "modicum of faith" in the veracity of the observations that proved decisive. In reference to the 10 May sighting, Smart remarks that:

This observation was marked 'doubtful,' and it seemed bad luck that, out of so many thousand observations of stars, the only one that mattered in this connexion should be reckoned by Lalande to be unworthy of confidence. Subsequent references to Lalande's manuscripts revealed the interesting fact that Lalande had observed the 'star'—as he believed it to be—on May 8,²⁸ as well as on May 10; as the observations on the two nights were discordant he discarded the first and included only the second in his catalogue, labelling them as 'doubtful.'

"Doubtful," "unworthy of confidence," Lalande "believed" it to be a star—all exercises of personal judgement incorporated in the third step of O'Connor's hypothetical-deductive method as applied to one of the "more developed sciences" and in terms of an illustration selected to manifest the smooth operation of that method. The actual process of the discovery of Neptune has shown that O'Connor's "checking this deduction by observation" is no more an impersonal and formalized procedure than was the recognition of anomaly and the proposal of a hypothesis to account for it. To verify something would seem to require the same powers for recognizing rationality in nature as does the initial act of discovery, such verification being relative to the evidence selected to establish it, where such evidence, in its turn, is selected in the light of heuristic projection grounded in anticipatory

²⁸Ibid., p. 652.

background theory and in terms of which it is assessed. Suggested in O'Connor's third step is the existence of some formal rule whereby verification might be effected, but the discovery of Neptune has shown that any such rules, if indeed they may be said to exist at all, must be utterly ambiguous as to both their formulation and application. The discovery of Neptune has shown that verification rests upon a conception of the nature of things by which the astronomer is guided, and that within the framework of differing conceptions the same "observation" will yield contrary evidence and conflicting results.

O'Connor's objectivist account of verification rests upon the positivist verifiability principle where meaning is the method of verification. The principle, however, can be contested on theoretical grounds as well as those shown by an analysis of verification in practice. The principle assumes, for the verification principle is itself unverifiable, that there can be only two meaningful modes of discourse, analytic and synthetic propositions. The first derive their meaning from the logical relationship between the subjects and predicates of such propositions so that their truth is a function of tautology of their terms. Analytic propositions, because of the purely formal nature of the meaning so derived, contain no truth beyond that contained in their premises. The verifiability principle is advanced to distinguish such propositions from their synthetic counterparts, the meaning and "truth content" of which is empirical and contingent, derived as they are from observation. Unlike

analytic propositions, no logical contradiction is involved in their denial. Objectivism, in its positivistic manifestation as with O'Connor, lays it down that the two classes are mutually exclusive and jointly exhaustive of all meaningful statements. As Harry Broudy remarked in connection with current analysis in educational theory, "he who cannot speak in the language of logic or science is condemned to philosophical silence."²⁹ One must choose between empty tautology or empirical verifiability. Consequently, in its own terms, the verifiability principle must itself be either analytic or synthetic, and to be meaningful in a non-tautological sense, it must establish itself on synthetic grounds.

But the verifiability principle cannot itself be an empirical or synthetic proposition based on constant conjunction since it serves as a principle of selection which, on non-empirical and a priori grounds, rejects all non-empirical statements as meaningless. As the principle presupposes the validity of the observational criteria it employs, criteria which are themselves not the further objects of verification, it belongs to that class of non-empirical propositions it has rejected as meaningless. Again, to say that the meaning of a statement is its method of verification, where such method of verification is restricted to the relevant modes of observation, is to simply render verification analytical with observation and the principle reduces to tautology. To verify or to check a deduction by observation

²⁹Harry Broudy, "The Role of Analysis in Educational Philosophy," Educational Theory, Vol. XIV, No. 4 (October, 1964), p. 262.

is to simply observe that deduction since that is what "verify" means.

In cases where the deduction cannot be immediately tested by direct observation the verification principle may assume the form of operationalism, the view that different operations define different concepts rather than their restriction to their relevant modes of observation. This variation on the verification principle, however, cannot account for the principle of selection of alternate possible operations on the same data, why one set of operations as opposed to another is given operational status. Yet the fact is that certain operations and not others are selected, not on the basis of principles derived from operationalism since there appears to be none, but rather because some and not others hold particular promise for the articulation of the theoretical background to which such operations are tied. Where the principle of verification assumes the form of meaning as the method of verification then, the principle provides no guidance. In the case of Neptune, whether to proceed by way of a re-calculation of the law of gravity, an examination to determine the presence of a resisting medium, a search for a uranian satellite, an investigation for traces of impact from a comet, or, finally, seeking a transuranic planet, the principles of operationalism can provide no counsel. Indeed, if operations themselves and their resultant measurements constitute what it is to verify something, there can be no basis other than a non-operational one for determining that

two or more operations are congruent or, in fact, that they are measuring the same thing.³⁰

Finally, in addition to the tautological nature of what it is to verify something by observation, and, in its operationalist manifestation of the verification principle, what is the nature of what is measured as well as the question of the commensurability of the operations themselves, there are variations on the theme of the tacit appeal to the non-empirical realm which the principle has been erected to reject. "Experience," for example, is restricted to that of sensory experience but the nature of experience so viewed is presupposed rather than established as just that exclusive avenue by which verification may proceed.³¹ If such

³⁰ Abraham Kaplan ("Concepts," in Van Cleve Morris, ed., Modern Movements in Educational Philosophy, op. cit.) illustrates the problem in relation to measuring the age of the universe.

Present estimates of what is misleadingly called 'the age of the universe' are of the order of six billion years or so; what makes this figure of scientific interest is that about a dozen lines of inference from correspondingly different observational data lead to substantially the same magnitude. Operationally we would have to say that twelve different 'ages' are in question. Even though in these terms it would remain of scientific interest that they all have approximately the same numerical value, the significance of this fact would be obscured. We should like to be able to say that it is because they all measure the same thing, and this statement is precisely what operationalism must deny. (p. 41.)

³¹ Van Cleve Morris ("Dilemma in Educational Philosophy," Educational Theory, Vol. XV, No. 4 [October, 1965]) remarks that for those philosophers of the "scientific-analytic bias" all "experience" is limited to "entities in the world other than himself."

In this connection, I am reminded of the fact that when propositions such as 'I

experience is to be limited to sense experience, the difficulty lies in the fact that sense impressions, of course, are not themselves verifiable by further sense impressions and the principle must appeal to some dimension beyond that encompassed by the principle itself, unless "experience" as here understood is to be elasticized to comprehend that which has little in common with unmediated retinal imprints. But it is just such experience so elasticized which the principle seeks to rule out. In addition, to check a deduction by observation covertly appeals to a supra-sensible realm in terms of which the reports of such checking acquire meaning. If the verifiability principle demands possession of the relevant experiences in the light of which the deduction might be checked, on what grounds, in the absence of such a realm, can congruence of such possession itself be checked

exist' or 'Existence precedes essence' are held up for analysis, the analytic philosopher often dismisses them as emotive, as merely reports on the state of feeling of the speaker. Am I to conclude that a 'state of feeling' is not a real datum in the world? Besides, how easy is it to regard these propositions as entirely non-cognitive? It seems to me that sentences of this sort serve to record in a conceptual way the understandings that real, live human beings have of themselves in the world. Are we being told that these understandings are not empirical? You see, some but not all experiences are let into the philosophical workshop. This is what I am calling the scientific-analytic bias. (p. 268, italics his.)

For a further critique of empirical objectivism grounded in the third-person view of sensory experience see D.B. Gowin, "Can Educational Theory Guide Practice?" Educational Theory, Vol. XIII, No. 1 (Jan. 1963).

since such experiences occur uniquely within the individual? Sensory verificationism³² finds itself susceptible to those difficulties encountered by operationalism for one can, in effect, never know that one's checking is commensurable with another's.³²

(2) Falsification

As noted above, O'Connor dropped the descriptive and predictive functions of theory for that of refutability,³³ that by which theory retains "that essential connection with objective fact that their truth will require."³⁴ In the context of Neptune, Adams might have checked his deduction by observation, and, on finding that such observation failed to turn up the transuranic planet, proceeded to deduce that his deduction that certain other facts were not, after all,

³²G.L. Lucas has, in addition, pointed to the inherent ambiguity of the principle in his "Some Second Thoughts About Metaphysics in Education Theory," Educational Theory, Vol. XX, No. 2 (Spring, 1970) in connection with statements which are only partially verifiable.

If the meaning of a statement is to know its method of verification, then to the extent that it cannot be verified it cannot be understood. The question naturally arises how, if a statement is only partially verifiable, it is to be understood insofar as it is not verifiable. This objection applies to empirical propositions as much as to metaphysical utterances since, if the former are truth functions of a set of simpler statements all of which need to be confirmed, one can conceive of empirical propositions the subsidiary components of which may be unverifiable. (pp. 133-134, italics his.)

³³See above, Chapter II, p. 68.

³⁴"The Nature and Scope of Educational Theory," op. cit., p. 52.

observable. The third step of the hypothetical-deductive method is a two-edged sword, the sharper of which for some is not verification but refutationism or falsificationism.³⁵ However, falsificationism is open to identically the same objections that undermined objectivist accounts of verification.

Falsification, like verification, presupposes the validity of the observational criteria it employs, criteria which are themselves not the further objects of falsification. Similarly, to say that the meaning of a statement consists of the modes of observation in terms of which the statement might be falsified is to render the activity of falsification tautological with those modes of observation employed to falsify it and the principle, like that of verification, reduces to logical analyticity. Again, falsification cannot of itself discriminate among the operations in terms of which a deduction might be falsified, nor are the sense impressions by which that deduction is falsified falsifiable by further sense impressions. As with reports of verification by observation, falsification of itself cannot provide the grounds of interpersonal commensurability in terms of which consensus on falsification is established. The falsification or refutability principle, like that of verification, is itself unfalsifiable or irrefutable in its own terms.

O'Connor's refutability condition of theory in its paradigmatic sense as here incorporated in the third step of

³⁵ See particularly Karl Popper, Objective Knowledge: An Evolutionary Approach (London: Oxford University Press, 1972).

the hypothetical-deductive method leading to scientific discovery misconceives the activity of refutation as it misconceived the activity of verification and for the same reason. This is the objectivist reification of the scientific fact. The condition supposes that one can check the deduction, hypothesis or theory against stable and theory-free reality. But reality, the scientific fact, is such by virtue of the conceptual framework by which it is established. When one engages in the activity of refutation or falsification one does not refute or falsify a theory in terms of its congruence with "objective" reality but rather one refutes or falsifies one theory in terms of another theory.³⁶

In addition to the objectivist reification of the scientific fact against which theories or hypotheses are to be refuted, refutability itself is seen as being more "objective" than outright verification in the sense that nothing is being positively advanced. It incorporates that healthy

³⁶ Kuhn. op. cit., points out that:

No process yet disclosed by the historical study of scientific development at all resembles the methodological stereotype of falsification by direct comparison with nature. That remark does not mean that scientists do not reject scientific theories, or that experience and experiment are not essential to the process in which they do. But it does mean—what will ultimately be a central point—that the act of judgement that leads scientists to reject a previously accepted theory is always based upon more than a comparison of that theory with the world. The decision to reject one paradigm is always simultaneously the decision to accept another, and the judgement leading to that decision involves the comparison of both paradigms with nature and with each other. (p. 77.)

skepticism O'Connor viewed as so beneficial as a prior condition to the clarification of philosophical questions. With the third step of the hypothetical-deductive method the refutability condition is regarded as engendering a posture of tentativism in both the act of checking the deduction by observation as well as in the appraisal of the deduction so checked, for one can never be sure if one's own refutation will not in time be itself refuted. Seen as that by which theory retains that essential connection with objective fact that its truth will require, refutability is considered to add a dimension to the impersonal nature of observational check. Beyond a direct comparison with nature which might work to disconfirm the deduction, the condition is understood to further attenuate the personal element incorporated in the activity of checking the deduction. Indeed, under the Popperian injunction, all knowledge, even that so far verified by observational checking, stands in jeopardy of imminent falsification.³⁷ However, in much the same way that the

³⁷Kenneth Conklin ("Knowledge and Hypothesis," Philosophy of Education Society, Proceedings of the 33rd Annual Meeting, 1977) has pointed to the "irrational" element in the Popperian brand of refutationism where such rationality resides in the exercise of critical justification by reasons.

Popper and his followers are dogmatic about their skepticism—they are proud of being ignorant. The only way dogmatism could be intellectually acceptable is if it occurs as a natural outgrowth of absolute knowledge, i.e., if one is so certain of what he knows that the certainty justifies the inviolable holding and proclaiming of some doctrine. But no follower of Popper could claim to have such knowledge, and no believer in critical rationalism would cite one thing as a justification of another. Thus a Popperite's dogmatic commitment to skepticism is irrational: it is not something he will ever allow to be successfully criticized. (p. 115.)

verifiability principle is unverifiable and stands in consequence to the deduction to be checked as an article of faith, so refutationism rests on the belief in the unfalsifiability of the falsification principle. A thorough-going skepticism, of course, precludes the very utterance of its own premises since they must, by definition, be likewise the objects of doubt. Yet even in the case of watered-down objectivist tentativism, the assessment that a deduction is falsified by observation entails the prior acceptance or belief in the background theory by which the deduction was falsified.³⁸

Finally, and in conjunction with those difficulties which were seen to surround refutationism in respect to its reification of the facts of nature in terms of which a theory was falsified as well as the paradoxically fiduciary nature of refutationism itself, is the nature of the falsifying activity. If the doctrine lays it down that one can never be sure of the truth of any theory since it is in danger of imminent falsification, how can one be sure that the new theory is more true than the one that has been falsified and what, specifically, is the nature of the process by which such a determination might be established? In other words, how does one know when a theory, hypothesis or deduction has been effectively falsified? Here refutationism

³⁸Kuhn (op. cit.) remarks that:

Once a first paradigm through which to view nature has been found, there is no such thing as research in the absence of any paradigm. To reject one paradigm without simultaneously substituting another is to reject science itself. (p. 79.)

appears to take us no farther than verificationism. As there were seen to exist no formal rules whereby the objectivity of the scientific method might be vindicated in terms of confirming an observation, so there are seen none for refuting one. The very existence of anomaly in scientific practice appears to falsify the falsification doctrine since it constitutes just that category of observations which, strictly speaking, should falsify the theory with which it is anomalous. But anomaly does not do this. In association with anomaly, falsification doctrine tells us no more than verificationism regarding the formal rules by which discordant observations are assigned the status of bothersome discrepancy, irregularity marginal to their theoretical basis, or fundamental counter-instance demanding theory rejection. The checking of a deduction by observation, whether such checking involves the verification of that deduction or its falsification, involves elements which are not comprehended by any formal application of the third step of the hypothetical-deductive method, elements of a distinctly informal, personal and inexplicit nature. Yet it is upon the basis of just such formal application that O'Connor has sought to establish the method as the paradigm of theory and exemplar of the knowing process. However, in the absence of some account of these elements, the method, beginning with the proposal of a hypothesis to account for an unexpected or anomalous fact, through the deduction from this hypothesis that certain other facts are observable, to the checking of this deduction by observation, must be considered incomplete

at best.

The present chapter has been an attempt to show that the third component of "education" as understood by O'Connor, that set of techniques for imparting knowledge skills and attitudes, is misconceived. The approach has been of necessity oblique, since teaching and, by extension learning, are considered by O'Connor to be matters of concern for the "sciences of man," and in particular that of psychology. In order to scrutinize his view of the learning process it was necessary to analyse the activity in its exemplary manifestation, that of scientific discovery and more particularly in its archtypical form in one of the "more developed sciences," that of astronomy. Where science for O'Connor is paradigmatic of rational activity by virtue of its method and its method is constituted by the hypothetical-deductive method, its status as paradigm rests on the degree to which that method incorporates the "objective" passage through its three steps. However, it has been shown that at key points in the actual employment of the method, that is, the nature of hypothesis generation in terms of which a hypothesis is proposed to account for anomaly, the nature of empirical inference by which the deduction is made from the hypothesis that certain other facts are observable, and the nature of verification or falsification by means of which the deduction is checked by observation, other factors must be considered. In the absence of such a consideration, the method has been seen to encounter difficulties which render its claim to paradigmatic status without foundation. The point of this

discussion has not been to discredit the nature of the learning activity as it is manifested in discovery science but rather O'Connor's conception of that activity, as well as his legislating that conception as the benchmark against which other forms of learning must be measured. For it is these "other factors" which serve as the basis of any cognitional process, and which cannot be reduced, as O'Connor has attempted to do, to formalistic, objectivist and impersonal modes of procedure.

At the heart of the objectivist enterprise is the refusal to countenance all knowledge which is not derived from sources and methodologies which can be demonstrated independently of reference to those other factors of judgement and assessment resting upon a basis of responsible commitment or belief. In the quest for a de-personalized certainty free of the taint of human intervention, objectivism results ultimately in an ontologically mechanistic conception of man and, epistemologically, in a denial of man's capacity for independent thought. In O'Connor's particular brand of objectivism, that deriving from logical positivism, the source of knowledge is seen to lie in a view of reality in which the knower, in any active sense, is deemed to be absent. A reality so conceived provides those ineluctable "facts" of experience which man can only passively record, a reality which extends to embrace the recorder himself who is but another "fact." The methodology is that of observation, here to be understood as that unmediated and non-committal interface between phenomenon and its chronicler. Yet it is just in its zeal for objective certainty that objectivism such as O'Connor's

reveals those voluntary elements it proclaims to transcend, in its reductive materialism it discloses its own metaphysics which it denounces as "nonsense," and in its epistemological formalism it incorporates those components it seeks to suppress.

CHAPTER IV

TOWARDS PERSONAL KNOWLEDGE: OBJECTIVISM IN LINGUISTIC PHILOSOPHICAL ANALYSIS

Where O'Connor's empirical objectivism sought to bestow objectivity on the knowing process by way of the reification of the scientific fact and method as that by which knowledge claims must be measured, linguistic objectivism seeks to avoid the accreditation of man's unformalizable powers of knowing by appeal to ordinary usage, by appeal to the word. O'Connor's brief foray into linguistic philosophy rested ultimately on those statements we know how to verify by scientific means. The more broadly based linguistic analysis of R.S. Peters and Paul Hirst seeks to secure the objective grounds of knowledge not merely upon scientific grounds but upon ordinary usage as employed in all those modes of experience in which claims to knowledge are made. However, the difficulties which arose with O'Connor arise, mutatis mutandis, with Peters and Hirst. By means of an internal criticism of their views, it is possible to show that more is involved in the employment of ordinary usage and the analysis of such usage than is permitted by their own criteria, that they, in fact, appeal to just those unformalized powers which they seek to render objective.

The present chapter is of a transitional nature, for it constitutes, on the one hand, an extension of the criticism aimed at O'Connor's appeal to usage; on the other it empha-

sizes the need for a new kind of knowledge theory, one incorporating explicitly the personal act of commitment as the basis of the knowing process. Such a process, for Polanyi, was both personal yet founded upon a realist metaphysics. In his cognitive triad constituting the act of meaning articulation, the person in possession of the concept employs the word to bear upon a reality independent of both word and concept. Where O'Connor's empirical objectivism, in the course of the de-personalization of our mental processes, reified observable reality at the expense of the concept and the word, the linguistic objectivism of Peters and Hirst reifies the word with which the concept is conflated, at the expense of reality. There is, in effect, nothing upon which the word, standing in mirror relation with the concept, may effectively bear. But in the absence of that reality to which usage points, the issue of usage conflict results either in cognitive paralysis or, in the case of definitional stipulation, in violation of the canons of the "revolution in philosophy." To render explicit this insufficiency is the purpose of the present chapter.

The structure employed will follow that of the first three chapters dealing with O'Connor. First, the nature of philosophical inquiry as viewed by Peters will be considered, corresponding to O'Connor's examination of the nature of philosophical questions. This will be followed by an analysis of Hirst's portrayal of the nature of educational theory corresponding to O'Connor's view of it as a "courtesy title."

Finally, both Peters' and Hirst's conception of the nature of learning will be examined, corresponding to O'Connor's account of the discovery of Neptune.

A. The Nature of Clarification: R.S. Peters and Second-Order Conceptual Analysis

1. The Lessons of the "Revolution in Philosophy"

For Peters the "revolution in philosophy" consisted less in the recognition of the purgative effects philosophical inquiry has on our beliefs in keeping our minds free from nonsense as with O'Connor, and more in the way of the apprehension of its second-order or spectatorial quality.¹ In fact, the "revolution in philosophy" was constituted for him by just the "explicit recognition of the second-order character of philosophical inquiries."

The distinctive feature of philosophical inquiries which accounts for the specta-

¹The distinction is one of emphasis, for Peters stresses the process rather than the product of philosophical analysis. However, where he does concern himself with the product, he is just as much the fabulist as O'Connor. For example, he maintains that by means of analysis, "the individual can improve his understanding and purge his beliefs and attitudes by ridding them of error, superstition and prejudice." ("Democratic Values and Educational Aims," Teachers College Record, Vol. 80, No. 3 [February, 1979], p. 472.) In his Reason and Compassion (London: Routledge & Kegan Paul, 1973) Peters remarks that "Conscious, explicit attempts must be made to falsify assumptions, to find exceptions to the rules; for only in this way can a body of reliable assumptions and rules be built." (p. 78) Again, he points out that "To discover something, to falsify the views of one's predecessors, necessarily opens fresh things to be discovered, fresh hypotheses to be falsified." ("The Justification of Education," in R.S. Peters, ed., The Philosophy of Education [London: Oxford University Press, 1972], p. 250.) Unlike O'Connor, Peters does dispute that falsification need proceed on empirical grounds alone. See his critique of Hobbes on these grounds. (R.S. Peters, Hobbes [Middlesex: Penguin, 1956]:)

torial role of the philosopher, is their second-order character, their concern with forms of thought and awareness expressed in Socrates' questions 'What do you mean?' and 'How do you know?' and in Kant's questions about what is presupposed in our forms of thought and awareness. In asking such questions about concepts and the grounds of knowledge, philosophers ponder upon and probe into manifold activities and forms of thought in which they and others already engage.²

The first lesson of the "revolution in philosophy" is, then, that the philosopher's perspective in philosophical inquiry is spectatorial and the nature of his inquiries second-order. As such, he is not concerned with first-order studies, those relating to our direct understanding of the world, but rather with the forms of thought and awareness which first-order studies incorporate and in which he and others already engage. As a consequence it is not given to the post-revolutionary philosopher to "issue high-level directives for education as well as pronounce on God, freedom, immortality, and the meaning of life."³

Tied to his second-order pondering and probing, of course, is his spectatorial role. In his pondering upon and probing into the concepts and grounds of knowledge which flourish at the first order, the new philosopher abjures prescription since such is inconsistent with that role. Rather, he is the patient cartographer of those forms of

²"The Philosophy of Education," in J.W. Tibble, The Study of Education (London: Routledge & Kegan Paul, 1966), pp. 60-61.

³"The Aims of Education—A Conceptual Inquiry," in The Philosophy of Education, op. cit., pp. 26-27.

thought and presuppositions through which reality is cognized at the first-order. His role is that of detached recorder. "To paraphrase Wittgenstein," Peters observes, "conceptual analysis leaves everything as it is."⁴

In doing second-order work, the new philosopher as spectator leaves his first-order philosophical views behind. In questions relating to the traditional branches of philosophy, to metaphysics, knowledge theory and ethics, the spectator, in the course of probing and pondering becomes second-order to himself. For example, Peters writes that in respect to questions dealing with the justification of punishment in the schools, "Complex and difficult questions in ethical theory are raised as soon as anyone asks this type of question in a determined way. They cannot be answered satisfactorily without a good deal of hard, clear thinking of a philosophical kind."⁵ The good deal of hard, clear thinking is, of course, hard, clear thinking of a first-order philosophical kind, just that kind which the "revolution" has revealed is not the province of the philosopher as spectator. For the spectator makes no attempt to answer the substantive issue, these being "further questions." In his pondering upon and probing into the manifold activities and forms of thought in which he and others already engage, the spectator remains resolutely second-order.

⁴"Education and the Educated Man," in R.S. Peters, Education and the Education of Teachers (London: Routledge & Kegan Paul, 1977), p. 19.

⁵"The Philosophy of Education," op. cit., p. 82.

If the first lesson of the "revolution in philosophy" has shown that the philosopher qua philosopher is by nature spectatorial, the second lesson reveals the object of his pondering and probing. Having eschewed the high-level directive, it was thought, Peters writes, that "In recent times, after the 'revolution in philosophy,' there is a danger of too little being claimed."⁶ What is claimed is that second-order conceptual analysis clarifies the grounds of knowledge employed in first-order studies, functioning rather in the manner of dispassionate illumination. While it makes no decisions, Peters maintains, what second-order analysis does do is "to spotlight the point at which decisions have to be made."⁷ The spotlight may also be used tactically, as with the "growth model" of education which "cannot remain for long romantically aloft once the glare of philosophical analysis is turned upon it."⁸ Analysis renders things at the first-order explicit, it clarifies without commitment. It is a philosophical overture. In respect to the concept of "needs," for example, Peters points out that "Analysis helps to make explicit the value judgements that lie behind statements of need, but, of itself, does nothing to justify them. In this respect it serves as a prolegomena to moral philosophy."⁹

⁶"The Aims of Education—A Conceptual Inquiry," *op. cit.*, p. 26.

⁷*Ibid.*, p. 17.

⁸"Education as Initiation," in R.D. Archambault, ed., Philosophical Analysis and Education (New York: Humanities Press, 1972), p. 94.

⁹P. Hirst and R.S. Peters, The Logic of Education (London: Routledge & Kegan Paul, 1970), p. 40.

In pointing the spotlight one might mistakenly think that there is something which the spotlight is pointed at. (This is to misconceive the purpose of analysis, which "is not to reveal some essence which ordinary language reflects, but to get clearer about how things are and what is to be done."¹⁰ Things are what they are, and analysis will reveal them for what they are. All that is claimed by conceptual analysis is "a detached and clear-sighted view of the shape of issues and institutions."¹¹

In his second-order pondering upon and probing into the forms of thought and awareness found at the first-order, how, exactly, does the spectator proceed to render our concepts explicit, how does he manage to get clearer about how things are and what is to be done? The third lesson of the "revolution in philosophy" reveals that he does this by the examination of usage, by the consideration of ordinary language. But what is it to examine usage? The "revolution in philosophy" has shown that two "misunderstandings" had heretofore attached to such examination. By getting clearer about these, we shall get clearer about the activity of clarification.

The first misunderstanding as revealed by the "revolution" was that usage could be clarified by way of definition. To formulate such a definition prior to examination of usage,

¹⁰ Ibid., p. 89.

¹¹ R.S. Peters, Ethics and Education (London: George Allen & Unwin Ltd., 1966), p. 45.

however, is being prescriptive and persuasive. It is not to be detached. It is to be first-order, and clarification of concepts is second-order. Peters explains that while "education" may be conceived of in valuative terms by those engaged in its practice, "it might be mistakenly suggested that all that needs to be done is to pick out certain criteria that seem central to one's understanding of education and lay them down as a stipulatory preliminary to the issues to be discussed. This, I think, would be a pretty pointless and presumptuous procedure."¹² The reason why picking out certain criteria that seem central to one's understanding of the concept of education and laying them down as a stipulatory preliminary to the issues to be discussed is pointless and presumptuous is that the revolution has shown that such definitional procedure is to be insensitive to the myriad uses of a term. Peters is not insensitive. "It might be thought that the obvious way of beginning a study in the philosophy of education," he writes at the outset of his Ethics and Education,

. . . would be to formulate a definition of 'education' and to see whether it would fit all examples of it. To proceed in this way, in the middle of the twentieth century, would reveal a certain insensitivity to one of the main contentions of the recent 'revolution in philosophy.' For Wittgenstein, one of the leaders of this revolution, argued with great subtlety that philosophers from Socrates to Moore had been mistaken in thinking that a formula could be found which would encompass the different uses of a word like 'justice'

¹²"Democratic Values and Educational Aims," op. cit., p. 463.

or 'knowledge' in which they were interested. The uses of a word are not always related by falling under a definition as in geometry where definitions are provided for terms such as 'triangle.' Rather they often form a 'family' united 'by a complicated network of similarities overlapping and criss-crossing; sometimes overall similarities, sometimes similarities of detail.'¹³

In keeping with his spectatorial stance, the new philosopher is without pre-conception in thinking a definitional formula can be found which would encompass the different uses of a word like "education" in which he is interested. His sensitivity in this regard is tied to a second "misunderstanding" revealed by the revolution which underwrites the first misunderstanding. "Another widespread misunderstanding, in addition to that of formulating definitions," Peters continues,

. . . is the assumption that all words have meaning on the model of names which are associated with some typical referent. This has led to the position, as in Plato's theory of Forms, of abstract referents for abstract terms such as 'justice,' and of mysterious inner entities and processes to which words like 'mind' or 'intuition' might refer.¹⁴

The second misunderstanding is correlative with the first, since to formulate a definition of an abstract term such as "education" is to mistakenly suppose that the term has meaning on the model of names, that it is associated with some typical abstract referent to which the term draws attention. Now if it is pointless and presumptuous to lay down criteria that seem central to one's understanding as a

¹³Ethics and Education, op. cit., p. 23.

¹⁴Ibid., p. 24.

stipulatory preliminary to the issues to be discussed, if it is insensitive to formulate a definition of an abstract term on the mistaken supposition that it is associated with some typical referent, what is it that one does when one goes about clarifying a concept so that one might, at the second-order, get clearer about how things are and what is to be done? How does one spotlight those families formed by a complicated network of overlapping and criss-crossing similarities?

While the formulation of a definition of an abstract term like "education" is misconceived if it is believed it is associated with some typical abstract referent, Peters shows us that:

This does not mean, however, that there are no criteria of 'education' which are co-extensive with most of its central usages. It only means that terms in a natural language develop a life of their own and send out shoots which take them far away from the central trunk of the concept. But this does not imply the abandonment of the criteria; rather it leads us to distinguish between the central and peripheral uses of the term.¹⁵

What, then, are these "criteria of 'education'" which are co-extensive with most of its central usages and how does their determination differ from the insensitive practice of formulating definitions along the model of abstract names associated with some typical abstract referent? How is the "central usage" of the concept to be distinguished from its "peripheral uses," the "central trunk" from its "shoots"? What is this

¹⁵ Ibid. Italics his.

"natural language" of which Peters speaks?

In the following section it will be maintained that (1) second-order conceptual analysis is not the detached, spectatorial mapping of concepts employed at the first-order as Peters suggests, that he does not himself engage in such second-order clarification, and that it is impossible to do so; (2) that Peters does not leave everything as it is but insinuates his own value-laden pre-conceptions into the detached and clear-sighted view of the shape of issues and institutions, that analysis is not prolegomena but epilegomena; (3) that the activity of second-order conceptual clarification employs just those "misunderstandings" it claims to reject in the course of rendering our concepts explicit, that it is definitional by way of incorporating those typical abstract referents for abstract terms. In other words, it will be maintained that commitment and accreditation are intrinsic to the act of knowing. Where this commitment is disavowed, as with the spectator, the concept rendered explicit is an empty concept; where it is avowed, the spectator stipulates and ceases to be second-order. Either first-order activities are presupposed in second-order clarification or that exercise is incoherent. Prior and tacit possession of those concepts to be clarified is not an option to second-order analysis for in their absence the scheme collapses. To establish these contentions it will be attempted to analyse Peters' analysis of the activity of the second-order clarification of concepts.

2. The Activity of Second-Order Conceptual Analysis

The lessons of the "revolution in philosophy" have revealed that second-order conceptual analysis is spectatorial in nature, that it makes no attempt to answer the substantive question but merely to render explicit the forms of thought and awareness operative at the first-order. This is to be done by the examination of words, to see what principle or principles govern their use which, in turn, is done by distinguishing the central from the peripheral uses of the term. As such second-order conceptual analysis is, by definition, concerned with the clarification of concepts, a preliminary clarification of the activity of conceptual analysis demands illumination in respect to the nature of that which is to be analysed. What, in other words, is a concept?

a) What is a Concept?

For Peters a concept is not an image or a picture since "we can have a concept of 'punishment' without necessarily having a picture in our mind of a criminal being hung or a boy being beaten."¹⁶ If it is not an image, Peters asks, is "to have a concept then to be able to use the word 'punishment' correctly? . . . This ability to relate words to each other would also go along with the ability to recognize cases to which the word applied."¹⁷ Peters replies to his own question that to be able to use the word "punishment"

¹⁶The Logic of Education, op. cit., p. 3.

¹⁷Ibid. Italics his.

correctly is not to be equated with having the concept, that "it won't quite do for two reasons." The first of these is that it would be restrictive to say that children, "who behave differentially towards their mother very early in their lives, have no concept of their mother until they can use the word 'mother.'" ¹⁸ By extension with the inability of being able to use a word correctly as not being equated with the lack of possession of the concept, Peters maintains that the possession of the concept is not to be associated with the broader ability "to make discriminations and to classify things together if they are similar."

To be able to use a word appropriately is a sophisticated and very convenient way of doing this. Indeed it could be regarded as a sufficient condition for the possession of a concept though not a necessary one. In other words, we would probably be prepared to say that a person had the concept of 'punishment' if he could relate the word 'punishment' correctly to other words such as 'pain' and 'guilt' and apply it correctly to cases of punishment. But the absence of this ability would not straightaway lead us to say that he had not the concept. ¹⁹

The concept, then, is to be clearly distinguished from its appropriate use. While the ability to employ appropriate usage is a very convenient and sophisticated way of determining the possession of the concept, such an ability must not be identified with the possession of the concept. Again, and in similar fashion, the ability to use a word appropriately, to make discriminations and to classify things

¹⁸ Ibid., pp. 3-4.

¹⁹ Ibid., p. 4.

together if they are similar, cannot be regarded as a necessary condition for possession of the concept, although it may be regarded as a sufficient one. As with the absence of the ability to use the word, the absence of the broader ability does not necessarily imply the absence of the concept. Clearly, there is disjunction between appropriate usage on the one hand and the attribution of the possession of the concept on the other.

The second reason why the ability to use the term correctly and to classify things together if they are similar will not quite do is that

. . . both types of ability seem to presuppose something more fundamental, namely the grasp of a principle which enables us to do those things. Locke said that an idea is 'the object of understanding when a man thinks' and this is probably as near as we can get to saying what a concept is. But it is singularly unilluminating. As, however, our understanding of what it is to have a concept covers both the experience of grasping a principle and the ability to discriminate and use words correctly, which is observable in the case of others as well as ourselves, there is, amongst philosophers generally, a tendency to rely on this publicly observable criterion. For it is possible to say more about it than it is about the subjective side. The public criterion is necessary to identify having a concept, but having a concept is not identical with it.²⁰

Peters' line of reasoning is as follows: the ability to use a term correctly or to make discriminations and to classify things together if they are similar are not to be taken as a necessary condition for the possession of the con-

²⁰Ibid. Italics his.

cept since both abilities presuppose a more fundamental ability, the experience of grasping a principle or concept; the experience of grasping this principle or concept is distinct from the ability to use words correctly and to make discriminations, but it is not possible to say much about this experience from the subjective side; therefore, the tendency, amongst philosophers generally, is to use the publicly observable criterion, that of using words correctly and making discriminations and classifying things together if they are similar, as necessary for identifying having a concept although the concept so identified is not identical with the concept. But the question immediately arises as to how one might confidently attribute concept possession by the public criterion since, by definition, there exists a gap between the concept as possessed and the attribution of such possession. If X, for example, uses the word "punishment" correctly, relates it correctly to other words such as "pain" and "guilt," and applies it correctly to cases of punishment, Y, employing the publicly observable criterion, may attribute possession of the concept to X but, under the ruling, since such attribution is not identical to the concept, Y may simply be wrong about X's possession of the concept of punishment. On the other hand, if X does not use the word "punishment" correctly, does not relate the word to other words such as "pain" and "guilt" and does not apply it correctly to cases of punishment, Y, employing the publicly observable criterion, may not straightaway say that X does

not possess the concept of punishment. Clearly, the disjunction between the attribution of the concept by reliance upon the publicly observable criterion and the identification of the concept cannot be bridged by appeal to the publicly observable criterion. In spite of this lacuna, Peters proceeds on the basis of the efficacy of just such an inference. The reason given is that it is possible to say more about this public side than it is about the subjective side but, of course, Peters is employing just this subjective side to attribute possession on the public side. Peters is employing his experience of grasping a principle on the subjective side, an experience he nowhere explicates, to attribute possession on the public or objective side. He is in prior possession of the concept and it is by virtue of such prior possession that he attributes the correct use of words, the ability to make appropriate discriminations and to correctly classify things together if they are similar. While it may not be possible for Peters to say much about the subjective side, it is that by which he endorses possession on the public side while simultaneously disavowing such endorsement by way of appeal to usage, to the publicly observable criterion. But it is upon the basis of such endorsement on the subjective side that he, Peters, has correctly grasped the principle in order that he can observe comparable ability in the case of others. Further, such is his commitment to the criterion, not only does he appeal to it in the case of his observation of others but in the case of himself. He maintains, in other words, that he can, by virtue of the publicly observable

criterion of usage, come to observe himself in the experience of grasping a principle. Of course, he does not indicate just how this is done, it being on the subjective side about which it is not possible to say much. It is, however, just this suppressed self-endorsement on the subjective side that renders specious the detached, spectatorial posture assumed in second-order analysis of concepts.

b) The Activity of Clarification

The possession of a concept, then, is not to be equated with the ability to use words appropriately since such an ability is not a necessary condition for such possession, nor, equally, is possession to be equated with the ability to make discriminations and to classify things together if they are similar since such ability presupposes the more fundamental grasp of a principle which enables us to do these things. How, then, does second-order conceptual analysis proceed? What does Peters do when he analyses a concept? Oddly, in view of the foregoing, Peters reveals that:

As the concept in question is usually one the possession of which goes with the ability to use words appropriately, what we do is to examine the use of words in order to see what principle or principles govern their use. If we can make these explicit we have uncovered the concept.²¹

In spite of the fact that there was seen to exist no identity between possession of the concept and the publicly observable criterion of appropriate usage, it is just by such a criterion, after all, that Peters' second-order conceptual

²¹Ibid.

analysis proceeds. He appears to see no regress in the equation. If disjunction exists between the concept and the attribution of its possession, in the absence of an endorsement of the initial attribution the appropriateness of that attribution must become itself the object of further assessment in terms of its appropriateness. But here the gap between concept and attribution of its possession and the regress to which it gives rise in the absence of accreditation from the subjective side, and that is what reliance on the publicly observable criterion means, has been suppressed with the assertion that one can, indeed, uncover the concept by an examination of usage. For here the possession of the concept "usually" goes with the ability to use words appropriately.²² Some concepts, presumably, do not go along with the ability to use words appropriately, but usually they do. Unfortunately Peters does not show how the distinction is to be made, it having been effected, no doubt, on the basis of some more fundamental grasp of a further principle which is not itself a concept which goes along with the ability to use words appropriately.

Having bridged the gap between the concept and attribution via the publicly observable criterion, what is it,

²²For some puzzlement might arise from Peters' stated view that concepts in philosophy derive their interest from the fact that they are "contested concepts." Education is like politics and unlike engineering, he has maintained, for they "cannot be adequately conceived of as related to any agreed or non-controversial ends. This, by the way, is one of the reasons which makes them both philosophically interesting in ways in which engineering is not." ("The Place of Philosophy in the Training of Teachers," in Education and The Education of Teachers, op. cit., p. 139.)

precisely, that Peters does when he examines the use of a word to render the principle or principles underlying it explicit and thereby uncover the concept? Oddly, having shown that appropriate usage is not to be taken as a necessary condition for possession of the concept, what is involved in the examination of the use of words to see what principle or principles govern their use is the attempt to uncover the logically necessary condition for the use of that word.

i) In Search of the Logically Necessary Condition

In their quest for the principle or principles governing the appropriate use of words, pre-revolutionary philosophers, according to Peters, slipped up by attempting "to do this by trying out definitions."

Now there is a strong and a weak sense of 'definition' in such cases. The weak sense is when another word can be found which picks out a characteristic which is a logically necessary condition for the applicability of the original word. Thus, to revert to our case of 'punishment,' a logically necessary condition for the use of the word is that something unpleasant should be done to someone. Part of our concept of 'punishment,' therefore, is that something unpleasant should be inflicted.²³

In second-order conceptual analysis it is the weak sense of definition in the form of the logically necessary condition which is sought, as the strong sense is limited to "artificially constructed symbolic systems, such as geometry,

²³The Logic of Education, op. cit., pp. 4-5. Italics his.

where we lay down tight conditions for the use of words such as 'triangle.'²⁴ This cannot be done in conceptual analysis for, since "words are employed in a much looser way in ordinary language, such as 'courage' and 'justice,' we would be hard put to it ever to find such a tight set of defining characteristics. In conceptual analysis we usually settle for making explicit defining characteristics in the weak sense."²⁵ The importance of the logically necessary condition in the second-order analysis of usage cannot be over-emphasized, for it is that by which philosophy is set apart from other studies. "In attempting to make explicit the rules behind our usage of words, and thus to get clearer about our concepts," Peters points out,

... it is important to distinguish logically necessary conditions from other sorts of conditions that may be present. To understand this difference is, in fact, to understand the difference between doing philosophy and doing science.²⁶

Preliminary perplexity in regard to Peters' weak sense of definition in the form of the logically necessary condition arises from the fact that it is, after all, a definition. Did not Peters report that Wittgenstein had argued with great subtlety that philosophers from Socrates to Moore had been mistaken in thinking that a formula could be found which would encompass the different uses of words like "justice" or "knowledge" in which they were interested? But

²⁴ Ibid., p. 5.

²⁵ Ibid.

²⁶ Ibid. Italics his.

their "formula" was not an artificially constructed symbol system as found in geometry where we lay down tight conditions for the uses of a word like "triangle." While they may have been interested in determining the defining characteristics of justice rather than the way we happen to use the term "justice," Peters has not argued, with great subtlety or otherwise, just how their definitions differ from his logically necessary conditions, how theirs was a "formula" and his is something else. Now if Peters' logically necessary conditions do constitute definitions, and he has not shown how they do not, he is in violation of one of the main contentions of the "revolution in philosophy." If, on the other hand, his logically necessary conditions are not definitions, that they are, in fact, something else, just how can he find another word which picks out a logically necessary condition for the applicability of the original word? How, in other words, did Peters know that a logically necessary condition for the term "punishment" is that something unpleasant should be inflicted? On his showing thus far, it would seem that Peters must either surrender his weak sense of definition or renounce his revolutionary credentials.

The ambiguity is not lost on Peters, who proceeds to do some second-order work on Wittgenstein's families of criss-crossing and overlapping similarities found in the use of words. "Now though much of what has been called conceptual analysis seems to consist in looking for logically necessary conditions for the use of a word, and hence concerned with

'definition' in the loose sense," Peters maintains,

. . . it has become fashionable in recent times to deny that it was ever possible to produce such definitions. Ordinary language is not static; it is a form of life. If we think that we have got a concept pinned down, we are apt to come across a case where we would naturally use the word but where the condition which we have made explicit is not established. We might think, for instance, that a necessary condition of using the word 'punishment' is that something unpleasant should be inflicted on the guilty. Yet we do talk of boxers taking a lot of punishment. And of what are they guilty? Wittgenstein has made this general point by taking the example of 'games.' He claimed that there is no one characteristic in terms of which roulette, golf, patience, etc., are called 'games.' Rather they form a 'family' united 'by a complicated network of similarities overlapping and crisscrossing; sometimes overall similarities, sometimes of detail'—rather like the similarities between faces of people belonging to the same family. There is, he argued, no one characteristic or group of characteristics that all games possess in order to be called 'games.'²⁷

Now either conceptual analysis consists either in the attempt to render the logically necessary conditions for the use of a word explicit, to give a definition in the weak sense, or it does not. Peters, clearly, maintains that it does, but this is just what it has become fashionable in recent times to deny, Wittgenstein being a leader of this fashion. Where the logically necessary condition or a group of logically necessary conditions may be taken as the equivalent of one characteristic or group of characteristics, the fashionable philosophers have determined there to be no

²⁷Ibid., p. 6.

logically necessary conditions. Is Peters to be out of fashion? Is he, in his own words, to be "insensitive" to one of the main contentions of the "revolution in philosophy" and to be methodologically "presumptuous" and "pointless" in the bargain? As a matter of fact, he is. Peters adheres to his weak sense of definition in the form of the logically necessary condition.

For Peters, what Wittgenstein's injunction to the effect that it is not ever possible to produce definitions in the sense of looking for the logically necessary conditions for the use of a word does is "to warn us that we may not always be successful in our search for logically necessary conditions for the use of a word. But sometimes we may be."²⁸ Peters does not show just how we will know that we are successful in our search for the logically necessary condition but proceeds to attack the fashionable view that it is not ever possible to do so. The thing is, Peters points out, if there is no one characteristic or group of characteristics that all games possess in order to be called "games," but rather if they form families united by a complicated network of similarities, how, exactly, "would we know which samples to lay out in order to look for the similarities?"

Why did not Wittgenstein take gardening or getting married as examples of games? Does this not show that there is some more general principle which underlies calling things 'games' which he might have overlooked? It might be argued that gardening or getting married might be ranked by some-

²⁸Ibid.

one as games. But this brings out that whether something is a game or not does not depend on any single observable property of the sort that makes a thing a triangle. Rather it depends on how a human being conceives an activity. A necessary condition of calling a thing a game is, surely, that it must be an activity which is indulged in non-seriously. Now non-seriously does not mean that the player lacks involvement in it or that he does not give his attention to it. Rather, it means that he can conceive it as not being part of the 'business of living.'²⁹

Whether the fashionable followers of Wittgenstein would hesitate in applauding Peters' rendering of "games" in the sense of roulette, golf and patience as being just the sort of thing that Wittgenstein had in mind is of no concern here. What is of concern are two points in that rendering which tell equally against Peters as they do against the recent fashion.

The tendency amongst philosophers generally, as Peters has informed us, has been to identify possession of the concept by way of the publicly observable criterion, by the ability to discriminate and use words correctly, an ability which is observable in the case of others as well as ourselves, although the concept was not identical to it. In the same way, however, that the determination as to whether something is a game or not does not depend upon an observable property of the sort that makes a thing a triangle, that is, the overt activity of the one engaged in the game, but rather depends upon how a human being conceives the activity, so the determination as to whether one is in posses-

²⁹Ibid.

sion of a concept does not depend upon the publicly observable criterion of the ability to discriminate and use words appropriately which is observable in the case of others as well as ourselves, but rather on how a human being conceives such usage and discrimination. In other words, the observability criterion which Peters invokes against the determination as to whether something is a game or not,—one cannot tell by means of the observability criterion,—applies equally against himself. But if one cannot tell by way of the publicly observable criterion whether one is in possession of the concept, Peters must show how one does, in fact, infer from that criterion to the attribution of possession of the concept.

In similar fashion, Peters' perplexity as to how Wittgenstein would know, in the absence of a defining characteristic or group of characteristics that all games possess in order to be called games which samples to lay out in order to look for similarities, comes back to roost. For how does Peters, in the absence of prior possession of the concept, know which samples to lay out in order to look for the logically necessary condition for the use of a word in order that he might render it explicit and thereby uncover the concept? As Wittgenstein must have had prior possession of the concept of "games" in order to look for their familial similarities, so Peters must be in prior possession of the more general principle governing the use of a word in order to look for the logically necessary condition. But, on the one hand, it is just such prior possession which is disavowed by the spectator in his detached examination of appropriate

usage which yields up that clear-sighted view of issues and institutions. On the other, this more general principle is just that typical abstract referent ruled out of bounds as a "misunderstanding" by the "revolution in philosophy."

What Peters has done so far is to initially maintain that the "revolution in philosophy" has laid it down that philosophical inquiry does not proceed by way of formulating definitions for the use of a term and to see whether it would fit all examples of it. To do so was to be "insensitive" to the uses of language in the middle of the twentieth century and, procedurally, it was to be both "pointless" and "presumptuous." That said, Peters then proceeded to formulate just such a definition, albeit in the "weak sense" of incorporating the logically necessary condition for the use of a word, bearing in mind that appropriate usage did not constitute a necessary condition for possession of the concept. But, alarmingly, fashionable philosophy has denied there exist such logically necessary conditions, that language is a form of life and that counter-examples will always be found to dis-establish the logically necessary condition uncovered by examination of appropriate usage. Rather than from logically necessary conditions, words derive meaning from membership in families of criss-crossing and overlapping similarities.

Adhering to his logically necessary condition, Peters retorted that the fashionable philosophers must be in possession of the concept of what it was to be a "family," else how did they know which samples to lay out to look for

genealogical affinity. To call something a "game" required that it must be regarded "non-seriously." But the same objection of prior possession applied with equal force to himself, since Peters must be in similar possession of the concept in order to know what samples to lay out in order to look for the logically necessary condition. Peters now attempts a reconciliation with the "revolution in philosophy," for the view of the fashionable philosophers to the effect that there exist no logically necessary conditions for the use of a word "brings out two points which Wittgenstein himself made. The first is that we must not look for the defining characteristics in any simple, stereotyped way, with the paradigm of just one type of word before us. The second is that concepts can only be understood in relation to other concepts."³⁰

ii) On Not Being Stereotyped

Of course, one does not want to be simple or stereotyped in the search for the logically necessary condition with the paradigm of just one type of word before one, but the question does remain as to how Peters knows which types of words to lay out in order to look for their defining characteristics independently of prior possession of the concept embodied in stipulated paradigmatic usage. If one cannot proceed with the paradigm of just one type of word before one, by what means will Peters discriminate the central

³⁰ Ibid., pp. 6-7.

from the peripheral uses of the term? How will he distinguish the trunk from the shoots? And if he cannot proceed in any simple, stereotyped way with the paradigm of just one type of word before him, how will he distinguish those logically necessary conditions for the use of a word which may be successfully uncovered from those that may not, since success in these affairs is only partial?

When we do ~~not~~ look for the logically necessary condition for the use of a word in any simple, stereotyped way, with the paradigm of just one type of word before us, what we do is to

. . . proceed by taking cases within their denotation and trying out suggestions about defining characteristics. This is how Socrates, for instance, proceeded in the early part of the Republic in order to get clearer about 'justice.' He took different cases and tried out suggestions such as 'justice consists in giving every man his due,' 'justice is in the interest of the stronger,' and so on. In this way we gradually make explicit the link between words which reflect our conceptual structure.³¹

Now, to the untutored it is not apparent just what the distinction might be between taking cases within their denotation and trying out suggestions about their defining characteristics on the one hand, and the insensitive practice of formulating a definition and seeing whether it would fit all examples of it, on the other. For does not taking cases within the denotation of a word presuppose prior formulation of that denotation in terms of which such cases are taken? Is it not in terms of such a formulation that suggestions about their defining characteristics are tried out? If Peters is

³¹Ibid., p. 7.

not in such prior possession of the denotation of a word, that is, of its definition, and in consequence thereby also in possession of its paradigmatic usage, how will he know which cases to lay out to uncover its defining characteristic, its logically necessary condition? What Peters is making explicit here is either the link between words which reflect our conceptual structure and in which case he is being definitional and therefore insensitive, or he is making explicit the link between words and his conceptual structure, in which case he is being simple and stereotyped. In either case, the exercise is not exploratory but confirmatory.

Confusion arises in Peters' account between the word and the concept and the nature of the link that binds them in the absence of the reality upon which such words are made to bear. In the epistemological mirror-house of Peters' linguistic idealism, the word reflects the concept and the concept reflects the word, but, without that typical abstract referent ruled out by the "revolution in philosophy" as a "misunderstanding," there is no reason why they should do so. Yet it is just by such a typical abstract referent that the link is made between word and concept, that which the concept comprehends while employing the word as an articulate pointer. In the absence of that typical abstract referent, the word and the concept jointly are meaningless, while viewed separately they trail off into fragmented incoherence. In Peters' account, there is nothing for the concept to conceive, there is nothing for the word to articulate.

iii) Understanding Concepts in Terms of Other Concepts

If not being simple or stereotyped in the search for the logically necessary condition with the paradigm of just one type of word before us appears to be no different from the insensitive practice of formulating a definition to see whether it would fit all examples of it, what is it to seek the logically necessary condition by way of understanding a concept in terms of other concepts? What one does here is to

. . . pay attention to what we mean by using a word in the sense of the job that we conceive of the word as doing in the context in which we employ it. For words are not just noises or marks on paper; they are more like tools. They do specific jobs in social life.³²

In spite of the fact that there is amongst philosophers generally a tendency to rely upon the publicly observable criterion of usage to identify possession of the concept since it is possible to say more about it than it is about the subjective side, it is about the subjective side that Peters now speaks. Examined from the objective side, words would be just like noises or marks on paper. But the meaning of a word is a function of the purpose the speaker has in uttering it, and the purpose the speaker has is a function of the context in which he employs it. Words are employed for a purpose and that purpose is their meaning. But if concepts can only be understood in terms of other concepts, what remains of the examination of appropriate usage to see what principle or principles govern their use since under-

³²Ibid.

standing is attained not at the level of usage but at the level of the concept? And how, if concepts can be understood only in relation to other concepts, does Peters know which concepts to lay out in order to look for the one which will provide the logically necessary condition for the use of the original concept? The issue of the attribution of the possession of the concept, on the objective side, remains untouched. Unless Peters simultaneously broadens what it is to be a "concept" and what it is to "examine" the appropriate use of words, egress from the dilemma appears difficult. For if words reflect our conceptual structure and the concepts comprising that structure are characterized by their purpose, there must be something intended or pointed to in terms of that concept. But this is that typical abstract referent ruled out by the "revolution in philosophy." On the other hand, unless Peters broadens what it means to "examine" the appropriate use of words to comprehend the seat of that purpose, he runs foul of those mysterious inner entities and processes such as "mind" and "intuition" branded equally as specious by the revolution. His reconciliation with the "revolution in philosophy" would appear to be driving him further from, not closer to, its main lessons.

If understanding concepts must be done in terms of other concepts and concepts themselves must be understood in terms of their purposes, in terms of the job we conceive of the word as doing in the context in which we employ it, it must also be understood, Peters points out, that the jobs words do are legion and that, moreover, many of these jobs

are not to be understood in terms of other words.

Obviously one of the main jobs that words do is convey information, to describe things and situations. But this is only one of their jobs. Sometimes we use words to warn people. At other times we use words to suggest courses of action to people. At other times we use words to express what we wish. And so on. The use of words, in other words, is a form of purposeful behaviour, but it has to be understood in terms of other non-linguistic purposes that people have in their social life.³³

If the use of words must be understood in terms of other non-linguistic purposes that people have in their social life, how is it that we can uncover the concept, can reveal the logically necessary condition for the use of the word, by means of the examination of language? Where one word may well be used in the context and with the purpose of conveying information, describing things and situations, warning people, suggesting courses of action, expressing what we wish, and so on, how, by an examination of the word are we to arrive at the logically necessary condition for its use so as to uncover the concept? To say that people must employ words to articulate their non-linguistic purposes and that comprehension of these purposes involves an examination of these words is, in one sense, to platitudinously observe that we do not know what people mean unless they say what they mean. On the other hand, to say that the use of a word is to be understood only in terms of the non-linguistic purposes people have in their social life and that the concept so

³³ Ibid.



understood as governing the use of that word is conditional upon that purpose is to say something, but it is also to reject the "widespread misunderstanding" as revealed by the "revolution in philosophy" and to embrace the typical abstract referent with which words and concepts are associated. In either case Peters has not shown just how one does understand purposeful behaviour.

The first step in effecting reconciliation with the "revolution in philosophy" revealed that Peters was being pre-revolutionary, that he was being simple and stereotyped; the second step saw him evading platitude only by way of embracing those referents, entities and processes barred by the revolution. But what has happened to the logically necessary condition which was the point of the enterprise? This is, after all, that by which doing philosophy and doing science are to be distinguished, it was that for which second-order conceptual analysis usually settled.

To paraphrase Peters' observation on the popular view of education, the logically necessary condition for the use of a word is "rather like the Kingdom of Heaven in former times. It is both within us and amongst us, yet it also lies ahead. The elect possess it, and hope to gather in those who are not yet saved. But what on earth it is is seldom made clear."³⁴ It is, it seems, the quest rather than the capture of the logically necessary condition which is paramount. The first thing to note is that the quest for the logically neces-

³⁴"Education as Initiation," op. cit., p. 88. Italics his.

sary condition by way of second-order conceptual analysis is not conducted by "an indiscriminating analysis of any old concepts . . . such as 'clock' and 'cabbage.'" ³⁵ Thus reassured, we may then brace ourselves to the realization "that the inability to emerge with a neat set of logically necessary conditions for the use of a word like 'knowledge' or 'education' is not necessarily the hallmark of failure." ³⁶ The reason why it is not the hallmark of failure, in spite of the fact that it was that for which we usually settled, is that, au courant, "we should have become clearer about how things are and about the sorts of decisions that have to be faced in dealing with them." ³⁷ One of the principal things we should have become clearer about is that "crude view" which maintains that "there must be some essence in the nature of things which our concepts reflect." ³⁸

We have not, of course, become clearer about how things are nor has our philosophical crudity been mitigated by the foregoing analysis of Peters' rendering of second-order conceptual analysis. What has become clearer, however, is the nature of his linguistic objectivism as contained in the reification of usage and what is involved in the spectatorial examination of such usage aiming at the uncovering of the logically necessary conditions for the use of words. What has become clearer is that the appeal to usage as an account of the knowing process fares little better, under scrutiny, than

³⁵ The Logic of Education, op. cit., p. 9.

³⁶ Ibid., p. 10.

³⁷ Ibid., p. 11.

³⁸ Ibid., p. 12.

O'Connor's appeal to empirical fact. Where the attempt to de-personalize the knowing process by appeal to empirical verification sought but failed to eliminate the tacit and unformalizable personal element by which such verification proceeded, so the comparable attempt to do so by appeal to usage apart from that upon which such usage is brought to bear by the personal act of the knower utilized throughout the very act which the appeal to usage was designed to suppress.³⁹

³⁹ An illustration of such an attempt may be found in his "Education and Educated Man: Some Further Reflections" (Education and the Education of Teachers, op. cit., pp. 3-21). While in prior possession of the concept, by virtue of which he knows which samples to lay out in order to look for their similarities, Peters purports to render explicit the logically necessary conditions of value and knowledge he initially ascribed to "education" (see his "Education as Initiation," in Archambault, op. cit., pp. 87-111) and thereby uncover the concept. What he wants to do is to ask "prior questions about whether any conditions that begin to look like logically necessary conditions for the correct application of the term 'education' have been provided." (p. 4) He initially raises and then meets the counter-example to the cognitive condition in talk about "Spartan education"—they "had nothing to pass on except simple skills and folk-lore"—by invoking, on the one hand, his prior possession of the value condition. People who speak in this way use the phrase "with reliance purely on the first condition, in the sense of bringing up their children in what is thought valuable." (p. 5) On the other hand, for those who speak in this way, he stipulates diminished conceptual development, they "have not advanced to the level where they make a distinction between 'education' and 'training' or 'bringing up' and one word might function in a much more differentiated way." (p. 5) They have not, in other words, made Peters' distinction. Further, for those who have made the distinction yet who insist in speaking about "Spartan education," they are being anachronistic since "the same words are sometimes used in the more general way in which they were once used." (p. 5) In spite of such stipulative prior possession, however, Peters claims the counter-example "is a difficult one to meet." (p. 5)

Peters then proceeds to raise and then meet the counter-example to the value condition embodied in those who "regard being educated as a bad state to be in." (p. 8) As he raised the value condition to counter the objection to the knowledge condition, so here he raises the knowledge condition to meet the objection to the value condition. If, he points out, "they do not regard knowledge and understanding as valuable at all, then they give quite a different content to

B. The Nature of Educational Theory: Paul Hirst's Domain of Theoretical Discussion and Investigation

Where O'Connor's elucidation of "education" at its highest level of generality consisting of that set of values

the concept of being educated, for their values are quite different." (p. 6) As the objectors to Peters' knowledge condition had not made his distinctions, so the objectors to his value condition do not have his values. Peters' prior possession of the concept by virtue of which he knew which samples to lay out to look for their similarities has laid it down, of course, that both conditions are logically necessary. "Education" relates to some processes in which a desirable state of mind develops, but what it means to be "desirable" is to have knowledge and understanding. Conversely, possession of knowledge and understanding is what it means to have a desirable state of mind. Yet it is by the simple examination of usage that Peters has purported to show that the logically necessary conditions for "education" can be made explicit and the concept thereby uncovered.

While the debate, of course, is really over for Peters at this point, he claims to find the counter-example to the value condition "very serious" and that we seem "to have reached a very serious impasse in our attempts to simplify the analysis, whichever way we attempt to do it." (p. 10) Peters will simplify the analysis, however; and he will do so in a manner inconsistent with his own distinctions and admonitions. In spite of the fact that he has maintained that to do philosophy is to distinguish the logically necessary conditions from other sorts which may be present and to understand this is to understand the difference between doing philosophy and doing science, and, in addition, as etymological conditions, like empirical conditions, are contingent and not logical conditions—it is "a matter of contingent fact that we value knowledge and understanding" (p. 5)—and further, in spite of his admonition that "Arguments from etymology, of course, establish very little" (p. 10), it is to etymology that Peters turns to cut the Gordian knot. What etymology shows us is the term "education" was employed in the "more general sense" with reliance on the value condition in times prior to the Industrial Revolution, but that after the Industrial Revolution and with the advent of formal instruction for the masses the term has come to have a connection with knowledge and understanding which we value. It is by breaking the connection between "education" and the "educated man" that we may speak appropriately with reliance on the value condition alone in respect to the former, but with respect to the latter we speak with reliance upon both conditions, just that sense of the term which Peters was in prior possession.

and ideals embodied and expressed in the purposes for which knowledge, skills and attitudes are imparted and so directing the amount and types of training that is given proceeded by way of an attempted clarification of the nature of philosophical questions, so Peters sought similar elucidation at a comparable level by way of a clarification of the activity of second-order conceptual analysis. Owing to the nature of his empirical objectivist criteria embodied in what it was to be a "fact," O'Connor's clarification failed to reveal the nature of those questions, the sort of evidence relevant to answering them, or the method by which this might be achieved. In similar fashion, owing to the nature of his linguistic objectivist criteria embodied in what constituted appropriate usage, Peters' clarification failed to uncover the logically necessary condition for such usage, that by which it was appropriate. O'Connor's second component of "education," it will be recalled, consisted in a set of theories which purport to explain or to justify the use of those techniques for imparting knowledge, skills and attitudes. The outcome of his analysis of educational theory, that is, that it can be counted as an instance of theory properly conceived only by virtue of courtesy, was seen to be vitiated by the fact that his own stipulative definition of what it was to be a theory failed to meet his own criteria since it was neither explanatory in its own terms nor could it engage questions of value by which it might be justified. In view of his special concern with questions of educational theory among linguistic philosophers, it is appropriate to turn to the

account of Paul Hirst as counterpart to O'Connor's second component of "education."⁴⁰

Unlike O'Connor for whom educational theory was only a diminished instance of the exemplary model as found in the natural sciences since such theory failed to conform to the inferential pattern of deductive subsumption under laws of increasing generality, Hirst maintains that educational theory does, in fact, constitute a respectable claimant to the title as it provides the basis for decisions which have to be made in educational practice.

Responsible educational principles need to be formed by a serious attempt to build together whatever knowledge, values and beliefs are relevant to the practical issues. And further, it means that between philosophical beliefs and educational practice we must envisage a domain of theoretical discussion and investigation concerned with forming these principles. To this domain, which I shall refer to as educational theory, philosophical beliefs make their own distinctive contribution alongside social theory, psychological theory, and so on.⁴¹

⁴⁰In particular see his seminal paper "Liberal Education and the Nature of Knowledge" in R.D. Archambault, Philosophical Analysis and Education, op. cit., and in R.S. Peters, The Philosophy of Education, op. cit., and in P. Hirst, Knowledge and the Curriculum (London: Routledge & Kegan Paul, 1974). See also "Philosophy and Educational Theory," British Journal of Educational Studies, Vol. 12, No. 1 (November, 1963) and in J.W. Tibble, The Study of Education, op. cit., as "Philosophy and Education," as well as "The Nature and Scope of Educational Theory" in Langford and O'Connor, New Essays in the Philosophy of Education, op. cit., and "Human Movement, Knowledge and Education," The Journal of Philosophy of Education, Vol. 13 (1979), and more recently "Professional Authority: Its Foundations and Its Limits," op. cit.

⁴¹"Philosophy and Educational Theory," British Journal of Educational Studies, op. cit., p. 52.

As conceived by Hirst, educational theory is then of a composite nature, being a domain of theoretical discussion and investigation comprised of contributory disciplines such as philosophy, social theory, psychological theory, and so on. The domain has as its concern the formulation of educational principles which come to act as prescriptions for educational practice. Unlike O'Connor, who reduced educational theory to the outcomes of undeveloped psychology, Hirst ranks philosophical beliefs as equally central, beliefs which "are considered conjointly with many other elements before any particular principles for educational practice are explicitly formulated."⁴²

There are two points to which attention will be drawn in respect to Hirst's domain of theoretical discussion and investigation, points which Hirst must establish to ground his view of educational theory. These are: (1) What is the nature of the distinction between the contributory elements and the domain of theoretical discussion and investigation of which they are comprised? and, (2) What is the manner in which they make their distinctive contribution, what is the nature of the inferential process in terms of which they are built together, the process by which they are "considered conjointly"? In other words, Hirst must show the criteria by which discipline is to be distinguished from domain on the one hand, and on the other how such a domain is not constituted by a process of deductive subsumption

⁴²Ibid.

from the relevant sciences as with O'Connor but by one other than deduction.

By way of clarifying what is involved in his domain of theoretical discussion and investigation, Hirst reveals three misconceptions which have dogged discussion of educational theory. These are, respectively, the traditionalist misconception, the misconception that educational theory constitutes an autonomous discipline, and finally, the misconception that philosophy has only peripheral significance for educational theory.

1. Three Misconceptions About Educational Theory

a) The Traditionalist Misconception

While Hirst does not dispute that philosophy, seen as a "system of metaphysical, epistemological, and ethical beliefs that provides a theory of what is ultimately real and ultimately important in life must have some significant contribution to make to educational ideals and practices," he does dispute the manner in which this contribution is viewed by the "traditionalists."

While it is obvious that there is some connection between philosophy and education, the traditional view takes this to be one of direct implication assuming that thoroughly valid principles for determining educational practice can be readily inferred straight from philosophical beliefs.⁴³

The reason why principles determining educational practice cannot be inferred straight from one's system of

⁴³Ibid., pp. 51-52. Italics his.

metaphysical, epistemological, and ethical beliefs, that there does not exist a relation of direct implication between them, is that such a view is "too simple." The reason why the view that one's philosophical beliefs determine one's educational principles is too simple is because the relationship between them is "necessarily complex."

It is too simple because it implies that on philosophical grounds alone we can satisfactorily answer certain questions about educational practice. This, however, is not so. By their very nature all such questions are necessarily complex and any answer based on philosophical beliefs only must therefore be regarded as ill-considered.⁴⁴

If it is ill-considered to base one's answers to educational questions on philosophical grounds alone because educational theory, upon which one's answers to educational questions are based is necessarily complex, what Hirst must show, as an extension of the first point, is how philosophy as a contributory discipline differs from the domain of educational theory, how philosophy, viewed as that system of metaphysical, epistemological and ethical beliefs that provides a theory of what is ultimately real and ultimately important in life, is but one of a range of contributory disciplines comprising such educational theory. Secondly, and as an extension of the second point, Hirst must show, since educational theory cannot be inferred straight from philosophical belief, just how it is to be inferred. If educational theory is not deduced from prior philosophical

⁴⁴Ibid., p. 52.

presupposition, are there perhaps non-deductive modes of inference operative at the level of educational theory proper by virtue of which other contributory disciplines, in addition to that of philosophy, may be admitted to the theory? This leads Hirst to his second misconception.

b) Educational Theory as an Autonomous Discipline

The thing is that if educational theory is not to be conceived of as a direct outcome of philosophical belief but rather constitutes a distinct domain of theoretical discussion and investigation, neither is it to be conceived of as an autonomous discipline possessed of its own criteria by means of which its contributory disciplines might be assessed. For it is by virtue of such possession that a discipline is autonomous, by virtue of which it is a discipline, and these criteria are just what educational theory lacks. "There is the impressive claim," Hirst points out,

. . . that the theory of education is an autonomous discipline. Philosophical beliefs and other branches of knowledge are said to contribute to this discipline but their contributions are assessed by criteria that are within the theory itself. Educational principles are thus formed within a theoretical framework that is in some genuine sense free from, independent of, all other disciplines, including philosophy.⁴⁵

While it may have been impressive, for Hirst the claim is false since educational theory lacks the criteria marking off distinctive types of judgement in terms of which the disci-

⁴⁵Ibid., p. 55.

plines are said to be autonomous. Broadly, distinctive types of judgement belong to those found in the pursuit of theoretical knowledge while educational theory concerns itself with the pursuit of practical knowledge. "As far as I am aware," Hirst maintains,

. . . no judgements of quite this exclusive character have been shown to occur and it is therefore difficult to accept the claim in this extreme form. The formation of educational principles does certainly involve particular acts of judgement and these do not seem to be of a kind that occurs in the pursuit of theoretical knowledge in say the sciences or history. They are in fact practical judgements as to what ought to be done in education made on the basis of much knowledge and experience. In this way educational theory draws on a great variety of specialist disciplines, but consists of much more than a collection of pieces of knowledge. A building together of these elements occurs when in the judgements rational educational principles are formed. Practical judgements are, however, not unique to educational theory for in everyday affairs and in political and social theory, for example, the same process is to be found.⁴⁶

Clearly, Hirst's view of educational theory rests upon epistemological grounds, upon the form of judgement employed in the theory. Educational theory involves practical judgement, where the contributory disciplines involve theoretical judgement. It is this distinction which precluded the view that educational theory was directly inferred from philosophical belief since philosophy is a pursuit of theoretical knowledge and educational theory is a pursuit of practical knowledge. That is why the view was too simple. It is also this distinction which precludes the view of educational theory as an autonomous discipline since practical

⁴⁶Ibid., pp. 56-57.

judgement as found in educational theory employs theoretical judgement in its pursuit of practical knowledge, it "draws upon" such judgement and builds together out of these judgements rational educational principles. Besides, practical judgement as found in educational theory is also found in political and social theory as well as everyday affairs. Now since Hirst's theory of educational theory depends for its coherence upon epistemological grounds, what is demanded is nothing more or less than that which has been demanded so far, that is, the distinction between the contributory elements comprising the domain of theoretical discussion and investigation to be here set forth in terms of the criteria grounding the types of judgement that occur in the pursuit of theoretical knowledge, in the range of contributory disciplines of which philosophy is but one. Also what is demanded is the nature of practical judgement itself as it is found in educational theory. What is it, in the absence of criteria specific to educational theory, for such judgement to draw on, to build together, and to consider conjointly the range of such contributory disciplines?

Where educational theory has been seen to be not autonomous but derivative from a range of contributory disciplines, it has also been seen that it can not be directly inferred from philosophical belief since the theory is not simple but complex. The same complexity criterion is employed by Hirst to counter attempts, notably by O'Connor, to reduce educational theory to its empirical components drawn

from the relevant sciences. This is the third misconception about educational theory, as it ignores the central role philosophy plays in its construction.

c) The Peripheral Significance of Philosophy for Educational Theory

Scientific theory, like philosophical belief, embodies a type of judgement employed in the pursuit of theoretical knowledge where educational theory embodies that type of judgement employed in pursuit of practical knowledge. Science is a discipline, education is a domain. Science is homogeneous as to the distinctive form of judgement in terms of which its subject matter is assessed; education is heterogeneous as to its form of judgement, drawing upon the contributory disciplines of which science in general and psychology in particular, is but one. For Hirst, attempts such as O'Connor's to reduce educational theory to its empirical components fail as such attempts do not grasp that:

Educational theory is in the first place to be understood as the essential background to rational educational practice, not as a limited would-be scientific pursuit. Even where O'Connor momentarily recognizes this he nevertheless fails to recognize the complex kind of theory that is necessary to determine a whole range of practical activities. He therefore falls back on his scientific paradigm maintaining that the theory must be simply a collection of pieces of psychology.⁴⁷

In addition to, or by extension of, the complexity condition, what the empirical reductionists do not understand

⁴⁷ Ibid., p. 59.

is the central role philosophy plays in its contributory role to educational theory. The empiricists generally, and O'Connor in particular, seem to think that philosophy is only of peripheral significance, only an accessory to the theory, where the fact is that its contribution ranks on a par with the other disciplines which are cojointly considered.

The final impression that is left is that philosophy is no more than an accessory to the theory, useful only where difficulties of a logical or conceptual kind arise. If we reject the scientific model as thoroughly false and artificial, with it can go too the idea that philosophy is only of peripheral significance even if by philosophy we still mean an analytical activity.⁴⁸

There may, of course, be some difficulties of a logical or conceptual kind with Hirst's final impression. Philosophy is seen by the empiricists as an accessory to the theory where by "accessory" is meant useful only where difficulties of a logical or conceptual kind arise, yet philosophy is simultaneously seen by Hirst as central even if, by philosophy we mean an analytical activity. But philosophy meant as an analytical activity is philosophy seen as useful only where difficulties of a logical or conceptual kind arise. However, the point is made. Science, like philosophy, must take its place alongside the other contributory disciplines which inform the domain of theoretical discussion and investigation. However, the same qualifications which arose in the case of the traditionalist misconception and the misconception that

⁴⁸Ibid., p. 60.

educational theory comprised an autonomous discipline arise in the case of the misconception that philosophy is only of peripheral significance in the building together of an educational theory. To ground his view of educational theory, Hirst must show the nature of the distinctive types of judgement employed in the contributory disciplines, how they vary relative to each other since each makes its distinctive contribution, and how they differ from practical judgement, that type of judgement employed in the domain of educational theory which draws upon, builds together, and cojointly considers offerings from the contributory disciplines, all without its own sui generis criteria of judgement. Hirst's educational theory rests upon the foundation of the contributory disciplines. If the contributory disciplines are found wanting, the superstructure of his educational theory will fall of its own weight.. His contributory disciplines are, of course, his "forms of knowledge." Can Hirst establish his forms in terms of their own criteria and can he distinguish the forms thus established from the domain of theoretical discussion and investigation which they serve to support?

2. The Forms of Knowledge

Hirst's forms of knowledge constitute his justification for the curriculum as found in traditional liberal education, a justification appealing to the nature of knowledge itself where "no metaphysical doctrine of the connection

between knowledge and reality is any longer being invoked."⁴⁹

The forms comprise some seven discrete noetic realms possessing concepts peculiar to the form, distinctive logical structures, and yielding expressions testable against experience.⁵⁰ It shall be maintained here that, by abandoning the "metaphysical doctrine" of the connection between knowledge and reality Hirst, in the fashion of Peters, proceeds to identify the concept with usage and thereby renders the con-

⁴⁹"Liberal Education and the Nature of Knowledge," in Peters, The Philosophy of Education, op. cit., p. 100.

⁵⁰Hirst lists the distinguishing features as follows:

- (1) They each involve certain central concepts that are peculiar in character to the form. For example, those of gravity, acceleration, hydrogen, and photosynthesis characteristic of the sciences; number, integral, and matrix in mathematics; God, sin, and predestination in religion; ought, good, and wrong in moral knowledge.
- (2) In a given form of knowledge these and other concepts that denote, if perhaps in a very complex way, certain aspects of experience form a network of possible relationships in which experience can be understood. As a result the form has a distinctive logical structure. For example, the terms and statements of mechanics can be meaningfully related in certain strictly limited ways only, and the same is true of historical explanation.
- (3) The form, by virtue of its particular terms and logic, has expressions of statements (possibly answering a distinctive type of question) that in some way or other, however indirect it may be, are testable against experience. This is the case in scientific knowledge, moral knowledge, and in the arts, though in the arts no questions are explicit and the criteria for the tests are only partially expressible in words. Each form, then, has distinctive expressions that are testable against experience in accordance with particular criteria that are peculiar to the form. Ibid., p. 102.

Hirst lists a fourth, that each form "has developed particular techniques and skills for exploring experience and testing their distinctive expressions, for example, the techniques of the sciences and those of the various literary arts." (Ibid., pp. 102-103). This fourth feature shall be here considered as part of the third feature.

cept, and by extension the forms of knowledge upon which they are based, tautological with such usage. It will be maintained that the distinctive logical structures are pre-supposed in the identification of such appropriate usage, and that the tests against experience, in just those forms other than the empirical and deductive forms which Hirst seeks to ground his range of contributory disciplines, similarly appeal to, yet fail to justify, that pre-supposed identification of appropriate usage. It shall be maintained, in effect, that Hirst cannot justify his forms of knowledge by appeal to his linguistic criteria, that he in fact incorporates the "metaphysical doctrine" his forms have been erected to reject and, finally, that he does not show on the basis of such criteria how the forms of knowledge are to be distinguished from the domain of theoretical discussion and investigation to which they contribute. What, then, are these central concepts, distinctive logical structures and tests against experience by which the forms of knowledge are to be differentiated from the domain of theoretical discussion and investigation?

a) Central Concepts and Distinctive Logical Structures

The forms of knowledge constitute a linguistic description of Hirst's view of the structure of knowledge. It is descriptive in that it does not give an account of the process by which that structure is acquired but rather one of that

structure once acquired.⁵¹ It is linguistic in that the forms in general, and the concepts and logical structures indigenous to the forms in particular, are identified with their verbal expression.⁵² By way of explicating the nature of the central concepts and distinctive logical structures—the reason for the union of the first two features shall become apparent—Hirst points out that

. . . all aspects of meaning necessitate the use of concepts and it is only by virtue of conceptualization that there is anything we can call meaning at all. And no concepts can be the basis of shared meaning without criteria for their application. But the criteria for the application of a concept, say 'X,' simply are the criteria for the truth of statements that say something is an 'X.' By this chain of relations, that meaning necessitates concepts, that concepts necessitate criteria

⁵¹Issue with Hirst has been taken on this basis by Robert Halstead ("Cognitive Structures and Forms of Knowledge," The Proceedings of the Philosophy of Education Society, 33rd Annual Meeting, 1977) who disputes the view that "we can settle questions of the nature of an individual's understanding by analysis of the logical structure of collective knowledge." (p. 212) Halstead distinguishes Hirst's "descriptive thesis" embodied in the claim that "mental abilities must be characterized in terms of the forms of knowledge so that descriptions of mental abilities such as thinking effectively do not cut across the forms. That is, describing someone as thinking effectively in mathematics is different from describing someone as thinking effectively in the arts," (p. 207) from his "development thesis," that "there is necessarily an identity between the achievement of knowledge and the development of a mind." Halstead maintains that "the development thesis does not follow from the description thesis, and hence Hirst has not provided a connection between the forms of knowledge and an individual's understanding." (p. 209)

⁵²"The labels that I have used for distinct forms of knowledge," Hirst writes, "are to be understood as being strictly labels for different classes of true propositions." "The Forms of Knowledge Re-Visited," in Knowledge and the Curriculum, op. cit., p. 82.

of application and that criteria of application are truth criteria for propositions or statements, the notions of meaning and true propositions, and therefore meaning and knowledge, are logically connected.⁵³

What is claimed, then, is that a proposition or statement is true because the concepts employed in the statement or proposition are done so in conformity with the criteria of their application, and the criteria for the application of these concepts are identical with the truth criteria for propositions and statements. In other words, the criteria for the application of a concept that something is an "X," these criteria being the distinctive logical structure of the form of knowledge embodying that concept, are meaningful if the statement that something is an "X" is true. Conversely,

⁵³"Curriculum Objectives," in Knowledge and the Curriculum, op. cit., p. 64. Issue with Hirst as to the identification of meaning and truth has been taken by R.D. Smith ("Hirst's Unruly Theory: Forms of Knowledge, Truth and Meaning," Educational Studies [Oxford], Vol. 7, No. 1 [1981]). "What I say may be meaningful but not true," Smith, maintains,

... what is both meaningful and true may still not count as an item of knowledge for a person who cannot give any credentials for holding it. Any theory in which sense or meaning were supposed to be determined by truth conditions would be an 'incoherent hybrid': the natural units of meaning are sentences, and truth cannot be a property of them. (p. 18)

Smith claims that Hirst confuses the "technical sense" of the criterion for the application of the concept of objectivity, that which "enables us to have the concept in our scheme of things," with its "non-technical sense," the "grounds for applying a conception in particular cases" with the consequence that "The standard by which we judge a sentence meaningful is not the standard by which we judge true or false the statement which the sentence is used on a particular occasion to make." (p. 21) Unfortunately, Smith does not reveal what these standards might be and how they are employed to distinguish the meaningful on the one hand, from the true or false on the other.

a statement or proposition would be meaningless or false if the criteria for the application of a concept are not the truth criteria for those statements or propositions embodying that concept. So, the criteria for the application of a concept, say "man," are the criteria for the truth of a statement or proposition that embody the concept that something is a man. Let the criteria for the application of the concept "man" be "rational animal." Therefore, the statement or proposition "Man is a rational animal" is meaningful if the statement or proposition "Man is a rational animal" is true. By this chain of reasoning, the statement or proposition "Man is a rational animal" necessitates the concept "man" which necessitates the criteria for the application of the concept, "rational animal," which are the truth criteria of the proposition or statement "Man is a rational animal." Conversely, where the concept is "dog," the statement or proposition "Dog is a rational animal" is false and therefore meaningless since the criteria for the application of the concept "dog" are not the truth criteria for the proposition or statement "Dog is a rational animal." But the logic of presupposition can in no way establish the distinction. Simple tautology is the outcome of presupposing the truth criteria for propositions or statements in the criteria for the application of the concept. One must, in other words, be in prior possession of the concept before one can apply the criteria for the application of the concept which then, by circularity, become the truth criteria for the propositions or statements embodying the concept. In a manner similar to

Peters' concept mirroring the word in the absence of those typical abstract referents for abstract terms, here we see the conflation of concept and word in the absence of that "metaphysical doctrine" which maintains the connection between knowledge and reality.

Further, Hirst's tautological rendering of the central concepts and distinctive logical structures peculiar to the forms of knowledge cannot show how such concepts and structures are to be differentiated from their counterparts in the domain of theoretical discussion and investigation. Under the formula, let "learning" be the concept and "the acquisition of knowledge by study" be the criteria for its application. So, the proposition or statement "Learning is the acquisition of knowledge by study" is meaningful where the criteria for the application of the concept do, in fact, constitute the truth criteria for the proposition or statement "Learning is the acquisition of knowledge by study." Conversely, the proposition or statement "Learning is changed behaviour" is not meaningful where the criteria for the application of the concept do not constitute the truth criteria for the proposition or statement "Learning is changed behaviour." Just what the distinction might be between "the acquisition of knowledge by study" and "changed behaviour" is, of course, never addressed. Again, the formula does not show why "good" is to count as a central concept to the moral form of knowledge and "learning" does not count as a central concept to the domain of theoretical discussion and investigation. The distinction must have been achieved by means other than Hirst's

chain of relations.

If the first two features of the forms of knowledge, the central concepts and distinctive logical structures peculiar to those forms, are little more than an attempt to objectify the structure of knowledge in linguistic terms by way of the logic of presupposition, what of the third feature, that by which "each can be distinguished by their dependence on some particular kind of test against experience for their distinctive expressions."⁵⁴

b) The Tests Against Experience

Basic to Hirst's contention that it is the "central feature" of the forms that they are such by virtue of their tests against experience is that such tests are form-specific, that is, one does not employ the empirical tests of physical science to moral, aesthetic, religious, or philosophical expressions. "The sciences," Hirst points out, "depend crucially on empirical experiment and observational tests, mathematics depends on deductive demonstrations from certain sets of axioms. Similarly, moral knowledge and the arts involve distinct forms of critical tests though in these cases both what the tests are and the ways in which they are applied are only partially statable."⁵⁵ Oddly, however, in spite of the fact that Hirst maintains that such form-specific tests, that by which the forms are to be counted as forms, are in some cases only partially statable, he simultaneously maintains that the

⁵⁴"Liberal Education and the Nature of Knowledge," op. cit., p. 103.

⁵⁵Ibid.

tests are necessarily public in nature, that

. . . such tests are public in the sense that anyone in possession of the relevant knowledge may be able to test them. For it is a necessary feature of knowledge as such that there be public criteria whereby the true is distinguishable from the false, the good from the bad, the right from the wrong. It is the existence of these criteria which gives objectivity to knowledge; and this in turn gives objectivity to the concept of liberal education.⁵⁶

⁵⁶Ibid., p. 101. Hirst is emphatic about the publicity of the tests, that such publicity is logically necessary to the forms.

If the public terms and criteria are logically necessary to specifying what the abilities are, however, then no adequate account of liberal education in terms of these can be given without a full account in terms of the public features of the forms of knowledge with which it is concerned. Indeed the latter is logically prior and the former secondary and derivative. Ibid., p. 93.

Is to be public to be statable? Halstead takes issue with Hirst's legislating the publicity criterion for concepts and their tests on the grounds of epistemological conservatism and arbitrariness. "If experience is structured in a strong sense of fully public concepts," Halstead remarks,

. . . it would appear that experience could not influence conceptual change in any way. Indeed, it is difficult to see how conceptual change could ever take place.

The reason for this is that Hirst's public criterion

. . . must mean that insofar as I have a concept, I have it as it is articulated in the form of knowledge which is its natural home. 'Concepts are fully public' must mean this, else the claim fails to function as a bridge between the forms of knowledge and any individual's knowledge or understanding. But what reason is there to suppose that concepts are fully public in this sense? ("Cognitive Structures and Forms of Knowledge," op. cit., p. 211.)

If objectivity is given to Hirst's liberal education by the objectivity of knowledge and objectivity is given to knowledge by the tests against experience in terms of which the expressions embodied in the forms of knowledge may be checked and that these tests are public in nature, will Hirst show what these tests are even if he is only in partial possession of the relevant knowledge and may only partially state them? Will he do this for the forms other than those of the sciences and mathematics to establish his complete line of contributory disciplines? And will he do this in a way that makes clear that while his forms of knowledge other than the sciences and mathematics may appeal to public tests, the domain of theoretical discussion and investigation may not? A brief analysis of the distinctive expressions of the artistic form of knowledge as tested against experience will suffice.

While we talk of the arts as being cognitive, Hirst remarks,

. . . whether this is justifiable and there is a form of knowledge in the arts, depends on whether or not artistic works themselves have features parallel to those of propositions with related objective tests.⁵⁷

What, then, are these features artistic works may or may not have which are parallel to propositions with related objective tests? Hirst points to a parallelism contained in Wittgenstein's language games which

⁵⁷"The Forms of Knowledge Re-Visited," op. cit., p. 87.

. . . suggest that works of art can well be seen as symbolic expressions having meaning, simply because they have properties logically related to those of propositions. Recent reconsiderations of the concept of truth, and the correspondence theory in particular, suggests that the notion of truth is centrally a demand for objective judgement, and there is nothing to be gained by restricting it to one particular form of judgement. In that case, works of art might well be seen as judgeable in a manner logically equivalent to that appropriate to propositions.⁵⁸

Something stronger is needed, however, than simply maintaining that the artistic form of knowledge has its own particular type of judgement and specific tests against experience on the grounds that nothing is to be gained by limiting such types of judgement and specific tests against experience to one particular form of judgement. What must be shown is how works of art might well be seen as judgeable in a manner logically equivalent to that appropriate to propositions and, at the same time, render non-tautological the terms in which such propositions are judged to have meaning. Where meaning logically necessitated both concepts and the criteria for their application, where such criteria were tautological with the truth criteria of propositions, so the meaning of works of art and the tests by virtue of which they are to count as a form of knowledge are equally tautological. Let the demand for objective judgement suggesting the notion of truth be made relative to the proposition "This painting is great art," which is itself the articulation

⁵⁸ Ibid., pp. 87-88.

of the symbolic expression whereby works of art have meaning, the logical equivalent to those properties by which it is judgeable. The demand for objective judgement will reveal that the concept "great art" necessitates criteria for the application of the concept and the criteria for the application of the concept are the truth criteria for propositions. Therefore, the proposition "This painting is great art" will be both meaningful and true if, in fact, the painting is great art. In the test against experience of distinctive expressions found in the form of artistic knowledge, what the concept is together with the criteria for its application remain forever hidden, as, of course, are the truth criteria for the propositions in terms of which such expressions are formulated. On the other hand, given the tautologically self-validating tests against experience found in the forms of knowledge, Hirst does not show how such tests may not apply to the domains of theoretical discussion and investigation, just how educational theory is to be distinguished from its contributing disciplines on the grounds that its distinctive expressions are not testable against experience in accordance with particular criteria peculiar to the theory. For if the forms of knowledge other than that of science and mathematics may lay claim to the status by virtue of the fact that their symbolic expressions have properties logically equivalent to those of propositions which may be tested against experience, what is there to prevent educational theory from claiming similar status?

Hirst's account of educational theory as that domain of theoretical discussion and investigation distinct from the range of contributory disciplines upon which it draws has been shown to encounter serious difficulties at crucial points. In respect to the domain itself, he has not shown the nature of that practical judgement, the inferential process, by which the disciplines are built together, drawn upon, or co-jointly considered, nor, in the absence of criteria proper to the domain, how it is possible to do so. Yet it was axiomatic that the domain was distinct from the contributory disciplines on the grounds of just this form of practical judgement. In addition to the absence of criteria whereby it may admit all, some, or none of the contributory disciplines, it is difficult to see how Hirst's educational theory could even identify the practical issues it is designed to resolve, let alone how it would culminate in the formation of rational educational principles in the pursuit of such a resolution. The distinction between the domain of theoretical discussion and investigation and its contributory disciplines depends for its coherence, in addition to some characterization of the nature of practical judgement peculiar to the domain, upon some comparable characterization of those disciplines themselves. It has been shown, however, that the forms of knowledge, in terms of their central concepts, distinctive logical structures, and tests against experience for their distinctive expressions are tautological with their linguistic formulation, where such formulation rests upon prior possession of the concept in terms of which the forms of knowledge are identified and

distinguished. In other words, Hirst's rendering of the features of the forms presupposes just that "metaphysical doctrine" of the connection between knowledge and reality which the forms themselves were intended to transcend. For it was by virtue of such unaccredited prior possession of meaning that Hirst knew what the criteria for the application of the concept were in the first place, and, of course, what the truth criteria were for those distinctive propositions and statements which could then be tested against experience. By the reification of usage in the form of such propositions and statements, Hirst's linguistic objectivism provides neither an explanation of the nature of educational theory in relation to his second misconception, nor a counter to empirical reduction in relation to the third. What such objectivism does show, however, is the incorporation of his own philosophical belief in the formulation of his views of such educational theory, just that misconception he charged the traditionalists with as being too simple.

C. The Nature of Learning

The third component of "education" for O'Connor consisted in the techniques for imparting knowledge, skills and attitudes which, for the present purpose, has been taken to be his theory of learning. In the case of O'Connor, an analysis of his learning theory was undertaken obliquely by way of an examination of his view of its paradigmatic embodiment in scientific discovery since such theory in its purely educational setting was for him reducible to an as yet undeveloped

psychology. It has been seen that the hypothetical-deductive method which, for O'Connor, incorporated the process of scientific discovery failed to account for non-objective elements at each stage of that process. To conclude the present chapter a comparable analysis of the nature of learning as viewed from the perspective of linguistic analysis shall be attempted. Specifically an internal criticism of the nature of learning, as considered by Peters and Hirst will be attempted, employing the premises laid down by the former in respect to the nature of clarification and by the latter in respect to the nature of educational theory. It will be maintained that, as with O'Connor, each account fails to eliminate the tacit and unformalizable element in the learning process, an element which the appeal to usage was designed to render objective.

1. R.S. Peters and Learning in the "Full Sense".

Central to Peters' account of what constitutes a learning or educational process is the "task-achievement" distinction where, as "finding" is the achievement relative to the task of "looking," so "being educated" is the achievement relative to the task of the "processes of education," of learning. Involved in the task aspect of learning are some three conditions, the consciousness, the performance, and the explicitness conditions. For processes of education to count as such, the learner "must know what he is doing, must be conscious of something that he is trying to master,

understand, or remember."⁵⁹ The consciousness condition rules out things like conditioning and hypnosis as processes of education. Again, educational processes "must involve attention on his part and some type of action, activity, or performance by means of which he begins to structure his movements and consciousness according to the public standards immanent in what has to be learnt."⁶⁰ Peters does not specify what does not count as a performance condition on the part of the learner, but, from the perspective of the teacher, things like praise or blame do not constitute educational processes properly conceived "for their connection with what is learnt is purely extrinsic."⁶¹ Of particular relevance here, however, is the explicitness condition characterizing learning processes, a condition which rules out processes Peters refers to as "picking things up."

My reluctance to call such goings-on processes of education is not just due to the fact that what is passed on may be trivial or undesirable, but to the difficulty of conceiving them as tasks on the part of the teacher or of the learner. From the teacher's point of view he is explicitly trying to get children on the inside of a form of thought or awareness; to do this he uses certain methods. . . . If learners are so drawn, then identification, suggestion, and other such indeterminate transactions may occur. These are not 'learning' in a full sense; for they are different from explicit imitation or copying, where

⁵⁹"What is an Educational Process?" in R.S. Peters, ed., The Concept of Education (London: Routledge & Kegan Paul, 1967), p. 10.

⁶⁰Ibid.

⁶¹Ibid.

something is explicitly attended to for assimilation. They happen to people; they are not achievements.⁶²

While triviality or undesirability may equally attach to processes which involve explicit trying, imitation, or copying and is therefore irrelevant to the distinction between learning in a "full sense" and "picking things up," what is central here is Peters' notion of explicitness. For learning to be such in a "full sense" it must be an explicit process. Indeed, explicitness comprehends the conscious and performance conditions, since one must be explicitly conscious of what one is learning and the performance, to count as educational, must be an explicitly educational performance. If explicitness means anything it means being specifiable, with the consequence that learning in a "full sense" must be a specifiable process for that is what distinguishes it from the "indeterminate transactions" covered by "picking things up."

Now to clarify a concept for Peters, it will be recalled, is to examine the use of words to see what principle or principles govern their use. If we can make these explicit we have uncovered the concept. In order for Peters' explicitness condition to qualify as that grounding learning in a "full sense," therefore, he must make explicit just this condition as the principle governing the use of "learning." He must, in other words, render explicit the explicitness condition of the concept of learning so that such learning in

⁶²Ibid., pp. 11-12.

his "full sense" may clearly be distinguished from those indeterminate transactions involved in "picking things up." For Peters there are three processes which count increasingly as educational processes, these being training, instruction and learning by experience, and the teaching and learning of principles. In the interests of brevity, in view of the fact that the teaching and learning of principles constitutes the most elevated instance of the concept of learning, it being that which provides the "understanding" in his knowledge and understanding criteria of education,⁶³ and, finally, as the grasp of the principle is that upon which the second-order analysis of concepts proceeds, attention will be directed to the third process of learning alone. It will be maintained that Peters does not uncover the concept, that he does not render explicit the explicitness condition, and that he does not distinguish learning in the "full sense" from those goings-on or indeterminate transactions which he was reluctant to call processes of education.

a) The Teaching and Learning of Principles

i) The Learning of Principles

For Peters the understanding of principles transcends "the accumulation of extra items of knowledge" which mark off instruction and learning by experience. What is involved is

... reflection on what we already know,
so that a principle can be found to

⁶³ See Ethics and Education, Chapter I, "The Criteria of Education."

illuminate the facts. This often involves the postulation of what is unobservable to explain what is observed. So it could never be lighted upon by 'experience.'⁶⁴

If the learning of principles involves reflection on what we already know and reflection on what we already know involves the postulation of what is unobservable to explain what is observed, Peters must give some account of what is involved in the postulation of those unobservables, that is, of principles, in order to establish the learning of principles as an educational process in a full sense, and he must do this explicitly. In the absence of such an account it might well be asked whether those "facts" upon which reflection is directed are such by virtue of their having been previously illuminated by a conceptual scheme which is such, in its turn, by virtue of the fact that it is structured in terms of those very principles which Peters' reflection is charged to discover. How, in other words, does one postulate that which is unobservable to explain what is observed since what is observed is such by virtue of that which is unobservable? Egress from the dilemma, one similar to that of O'Connor's reification of the observed fact in independence of the principle in terms of which it is understood as a fact, is not achieved by the introduction of lower-level rules to explain what is observed prior to principle-generating reflection.

The basic requisite is that people should first acquire in some way or other the low-level rules or assumptions which the principles illuminate. It is both logi-

⁶⁴"What is an Educational Process?", op. cit., p. 18.

cally absurd and educationally unsound to suppose that people could attain the necessary understanding of principles without first having acquired quite a lot of knowledge; for principles provide backing to rules or assumptions at a lower level of generality.⁶⁵

If principles provide backing to rules or assumptions at a lower level of generality which, in their turn, provide backing to the acquisition of quite a lot of knowledge, the issue simply reverts to what is involved in the acquisition of those lower level rules or assumptions? To say that people first acquire these low level rules or assumptions "in some way or other" does not fulfil the explicitness condition by which the learning of principles may come to count as an educational process in the "full sense." For while it might be logically absurd and educationally unsound to suppose that people could attain the necessary understanding of principles without first having acquired quite a lot of knowledge, it would be equally logically absurd and educationally unsound to suppose that people could acquire quite a lot of knowledge in independence of those low-level rules or assumptions which illuminate it or, indeed, that it could be counted knowledge at all. The characterization of the learning of principles as an educational process in the "full sense" as one of increasing generality ascending from the learning of low-level rules or assumptions which bestow coherence on quite a lot of knowledge requires some explicit account of the learning of those low-level rules or assumptions. The point gains

⁶⁵ Ibid.

emphasis: where Peters points out that "There is, of course, nothing absolute about what constitutes a principle. It is merely a higher-level assumption or rule that can be appealed to in order to substantiate and give unity to lower order ones."⁶⁶ If there is nothing absolute about what constitutes principles, they are simply higher order rules or assumptions that substantiate and give unity to lower order ones, then the same process of learning will apply equally to both higher and lower level rules and assumptions. Peters, unfortunately, gives no greater specification to what is involved in the acquisition of higher-level principles than he did to lower-level rules.

People are brought to a grasp of principles by a mixture of explanation and selective survey of the many. Words like 'insight' are used in connection with the grasp of principles. It is difficult to state precisely what is meant by such words, but once people have it very little in the way of further practice is necessary as it is in the case of skills.⁶⁷

Peters' difficulty in stating precisely what is meant by words like "insight" flows not only from the nature of that process but also and more pointedly in the present case, from the requirements of the explicitness condition which must characterize an educational process so that it may be counted as learning in the "full sense." If Peters has difficulty in stating precisely what is meant by such words this does not excuse him from distinguishing them from those "indeterminate

⁶⁶ Ibid.

⁶⁷ Ibid., pp. 18-19.

transactions" and goings-on he was reluctant to call processes of learning properly understood, processes which were to be differentiated from "picking things up." It is, after all, by virtue of their explicitness, their specifiability, that processes of learning in their "full sense" are to be conceived. In the absence of such specification Peters' own conception of learning at its most fundamental level fails to meet his own criteria of learning in a "full sense" for such learning is, in fact, different from explicit imitation or copying where something is explicitly attended to for assimilation.

Peters' account of learning in the "full sense" has given neither a specification of what is involved in the acquisition of low-level rules or assumptions in terms of which quite a lot of knowledge is acquired nor what is involved in the acquisition of higher-level assumptions or principles which provide unity to lower-order ones. The question is now turned around to be viewed from the perspective of teaching. Where words like "insight" were used in connection with the grasp of principles, we now learn that "The typical term for the educational process by means of which people are brought to understand principles is 'teaching.'"⁶⁸ In the absence of an account of the learning of principles in explicit terms, will Peters give some specifiable characterization of what is involved in their teaching?

⁶⁸Ibid., p. 19.

ii) The Teaching of Principles

The teaching of principles involves the passing on of "a body of knowledge in such a way that a critical attitude towards it can also develop."⁶⁹ In order that teaching of principles may conform to an educational process in its "full sense," what is involved in passing on a body of knowledge in such a way that a critical attitude towards it can also develop and can "such a way" be given explicit characterization?

Given that critical thought about the assumptions in which we are nurtured rather goes against the grain, it will only develop if we keep critical company so that a critic is incorporated within our consciousness. The dialogue within is a reflection of the dialogue without. This is a paradigm of an educational situation; for educational processes are those by means of which public modes of thought and awareness, which are mainly enshrined in language, take root in the consciousness of the individual and provide avenues of access to a public world.⁷⁰

If the dialogue within is a reflection of the dialogue without and the dialogue without is constituted by public modes of thought and awareness which are mainly enshrined in language, what are those public modes of thought and awareness enshrined in language which shall render explicit the activity involved in the teaching of principles so that it may be seen to be an educational process in the "full sense"? In what way might "incorporating a critic" or "taking root" be

⁶⁹ Ibid.

⁷⁰ Ibid., pp. 19-20.

rendered specifiable in those modes? And, once so rendered, can equal specification be given so that they might be distinguished from those "indeterminate transactions" which characterize goings-on such as "picking things up?"

To say, on the one hand, that the transmission of critical thought is enshrined in language and it is by virtue of such thought so enshrined that critical thought takes root in the consciousness of an individual is to say nothing more than that critical thought, to be critical, must be articulated. To say this, however, is to say less than that explicit process constituting that transmission. On the other hand, to identify such critical thought with its articulation in terms of public modes of thought and awareness where such modes are public in the sense of conventionalized public usage is to somehow incorporate critical thought within those very modes which are simultaneously the objects of such criticism. How, in other words, is critical thought to be critical when it shares with the object of its criticism those very principles which constitute the basis of such criticism? In the absence of conflicting views of that typical abstract referent for abstract terms, Peters presents us with the choice of platitude or of quietism.

In an attempt to render explicit what it is to incorporate the critic in our consciousness Peters turns to the Socratic method of question and answer whereby the learner is brought "to probe into his presuppositions and to make them explicit."

If this process continues for quite a time the learner gradually takes the questioner into his own mind and begins to develop the form of thought himself. He can come to formulate his own objections to his assumptions and keep on reformulating what he thinks or proposes to do until he hits on something to which he can find no objections.⁷¹

The difficulty with Peters' objector winnowing his way down to epistemological bedrock is that neither the criteria in terms of which he comes to formulate objections to his own assumptions nor the grounds of those further assumptions on which those criteria are based and in the light of which he formulates those objections are themselves explicit. In the absence of such criteria and further assumptions, in the process of question and answer whereby the learner probes his presuppositions and makes them explicit are all objections admitted into his own mind or only some? And how is the objector to adjudicate conflicting objections to those presuppositions which he has placed under review? And what are the criteria marking off those assumptions to which he finally can find no objection? Is not Peters' objector, in fact, an objectified, rationalistic phantasm for does not the very nature of the questions he asks, the objections he formulates to his own presuppositions, depend in their turn on further presuppositions and do not these further presuppositions have considerable bearing upon those to which he can find no objection? What objections, for example, will the empiricist find to the presupposition of the verifiability

⁷¹Ibid., p. 20.

principle? Is not the impartial objector himself as presented by Peters as an account of the teaching and learning of principles based upon assumptions of Peters to which he can find no objection?

In respect to the teaching of principles embodied in the transmission of critical thought, Peters concludes that success may be achieved only if such principles

. . . are passed on in the right way at the right time and if they are informed by that passion for truth which lies at the heart of all of them. Without this, critical discussion can degenerate into verbal legerdemain, and a parade of principles can be equivalent to name-dropping. Whether such a passion is due to fostering the natural curiosity of the child, is caught from those who are already possessed by it, or develops because an individual is confronted by conflicting opinions, is difficult to determine.⁷²

But it is, of course, an explicit account of what is involved in being "passed on" both in the "right way" and at the "right time" that Peters' educational process relative to the teaching of principles demands in order to be counted education in his "full sense." Similarly, in order that the learning of principles be accorded an education process in the "full sense," some explicit rendering must be given in respect to the acquisition of that passion for truth which animates the learning of principles in terms of greater specification than "fostering," being "caught," or "develops," since such processes do not appear to differ markedly from "picking things up." However the teaching and learning of principles

⁷²Ibid., p. 21.

is viewed in Peters' account, whether they are passed on, fostered, caught or developed, the process is both inexplicit and unspecifiable. As a consequence his account fails to meet his own criteria laid down in the task sense of education, that of explicit imitation or copying but resembles rather those "indeterminate transactions" he was reluctant to call education in a "full sense."

To summarize, an attempt has been made here to analyse Peters' notion of an educational process in its "full sense" relative to the teaching and learning of principles, where by "full sense" is meant the specifiability of the process. The analysis employed the premises as laid down by Peters in respect to the nature of clarification of concepts where such clarification constitutes rendering explicit the modes of thought and awareness at the first-order from the perspective of the second. Insofar as such second-order clarification of the concept of the teaching and learning of principles aimed at rendering explicit the principles governing the use of "teaching" and "learning" and thereby uncovering the concept, Peters' second-order clarification has not met with success. Where the teaching and learning of principles in its "full sense" was to be distinguished from those "indeterminate transactions" involved in "picking things up" by virtue of the explicitness of the processes characterizing the former, at every stage of the clarification analysis revealed that such teaching and learning of principles resembled the latter. Where the learning of principles was distinguished from instruction and learning by experience by

virtue of reflection on what we already know, such reflection involving the postulation of what is unobservable to explain what is observable, Peters could give no explicit account of this postulation. Equally, no explicit account was given for the acquisition of low-level rules or assumptions for which higher-level rules provided backing. In respect to the learning of such higher-level principles Peters pointed out that words like "insight" are used in connection with the process by which they are attained but could provide no logically necessary conditions for the use of the term, no explicit specification of the task sense involved in that process. Conversely, he could give no explicit specification of what was involved in the teaching of principles beyond the indeterminate transaction of passing on a body of knowledge so that a critical attitude towards it developed. Indeed, given the nature of those public modes of thought and awareness in terms of which such critical thought was passed on, it is difficult to see how a critical attitude could develop towards it since such modes simultaneously encapsulated the principles governing that body of knowledge in terms of which it was conceived as knowledge and the objects of that critical attitude. Finally, the explicitness condition which distinguishes an educational process in the "full sense" was not met in respect to the criteria by which the incorporated Socratic objector formulated his own objections to his own assumptions until he could find that to which he could no longer object. Where the second-order clarification of concepts involves the examination of words

to see what principles or principle governs their use, Peters has not shown in a fashion which satisfied his explicitness condition for educational processes in their "full sense" what principle or principles govern the concept of the teaching and learning of principles. Indeed, it may well be said that educational processes in their full sense are distinguished not so much by the explicitness of those processes but rather by their character as indeterminate transaction.

2. Paul Hirst and Learning to Think Historically

As has been seen, Hirst's notion of educational theory rested upon his discipline-domain distinction where, by the exercise of practical judgement, the domain of theoretical discussion and investigation comprising such theory drew upon the range of contributory disciplines which were themselves the outcomes of theoretical judgement possessing distinctive concepts, logical structures and tests against experience. On the one hand, however, it was seen that Hirst could give no characterization of what was involved in the exercise of such practical judgement, of what it was to draw upon the contributory disciplines in the absence of sui generis concepts, structures, and tests, and on the other it was seen that his linguistic formulation of the concepts, structures, and tests against experience peculiar to the exercise of theoretical judgement involved in the contributory disciplines themselves yielded only tautology in the absence of prior and non-linguistic possession of those concepts, structures and

tests. Where meaning necessitated concepts and concepts necessitated criteria for their application, such criteria being those for the truth of statements employing the concept, Hirst could give no account of the manner in which the truth of such statements might be determined, the very thing which was to lend objectivity to his liberal education in independence of appeal to "metaphysical" realism. In view of such a theoretical base, what coherence can there be in his understanding of the nature of learning? Where the learning of a form of thought means coming to think in conformity to the concepts, structures and tests against experience peculiar to that form, it will be maintained here that Hirst's view of learning inherits the circularity evident in his general account of the forms of thought. To illustrate this contention a brief account of what is involved in learning the historical form of knowledge will be sufficient.

When we teach, Hirst points out,

What we want is that pupils begin, however embryonically, to think historically, scientifically, or mathematically; to think in the way distinctive of the particular subject involved and even to achieve some style and imagination in doing so. Thus before we can carry out any empirical investigations of teaching methods we are faced with the difficult task of getting clear what is involved in, say, thinking historically, and thus in learning to think in this way.⁷³

In getting clear about what is involved in thinking historically and in learning to think in this way the first

⁷³"The Logical and Psychological Aspects of Teaching," in Peters, The Concept of Education, op. cit., p. 45.

thing to do is to examine the results of such thinking, "thinking which, irrespective of the private thought sequence involved, results in propositions which constitute valid historical accounts and explanations."⁷⁴ When one examines those propositions which constitute valid historical accounts and explanations it is seen that:

Historical thought necessarily involves the recognition of the rules that govern the meaningful use of concepts and the validity of the propositions, but this involves no necessary temporal order to thought. Just as playing chess involves making moves in accordance with the rules of chess, though it involves no one particular order of moves, so thinking historically involves thinking in accordance with historical criteria though it involves no particular sequences of thought.⁷⁵

Now if getting clear about what is involved in thinking historically and learning to think in this way involves, in its turn, the recognition of the rules that govern the meaningful use of concepts and the validity of propositions, such rules being those historical criteria in accordance with which one thinks when one thinks historically, what are those rules, what are those criteria? And just what is the manner of determining that one is, in fact, thinking in accordance with them?

For First the criteria of historical thought cannot be clarified by empirical investigation for while such investigation may open up "possibilities," "it remains true that there must first be clear logical analysis of what criteria

⁷⁴Ibid., p. 46.

⁷⁵Ibid., p. 47.

distinguish historical thought."⁷⁶ To gather together instances of historical thinking is ill-advised since "effective teaching of a subject necessarily depends on knowing certain features which characterize it, which can only be disclosed by logical analysis of the meaning of 'historical thinking.'"⁷⁷ Will Hirst then disclose to us now by such logical analysis just what these rules and historical criteria are which govern the meaningful use of historical concepts and the validity of historical propositions?

Well, what has to be understood is that what is implied in learning to think historically "involves coming to understand historical propositions, and this in turn involves learning the use of a network of related concepts. It is necessarily the case that any area of knowledge can only be mastered in so far as the use of concepts according to the complex rules that relate them to each other is acquired."⁷⁸ If understanding the rules and historical criteria which govern the meaningful use of historical concepts and the validity of historical propositions involves learning the use of a network of related concepts which in turn involves mastering the complex rules that relate them to each other, will Hirst now disclose what these concepts are and how they are related by these complex rules?

⁷⁶ Ibid.

⁷⁷ Ibid.

⁷⁸ Ibid., p. 48.

Well, the fact is that there exists a "logical order" consisting of two levels. The "logical grammar" is "the network of relations between particular concepts, relations by virtue of which meaningful propositions can be formed."⁷⁹ For example,

In religious discourse you cannot use the term God in any old way. He is not an object or being in space and time, he has no extension or colour. He does not act as a human acts. We must, therefore, stick strictly to the rules for the use of terms or we do not have meaning.⁸⁰

The "logical grammar," then, lays it down that terms cannot be used in any old way, that to say something like "God is green" would be to make a mistake since one has not stuck strictly to the rules for the use of the terms "God" and "green," rules which collectively comprise a network of relations governing the concepts concerned. But if no appeal is being made to "metaphysical" realism, if no extra-linguistic referent for the term "God" is being invoked, Hirst must show why one cannot use the term in any old way. He must, in other words, show what these rules are by virtue of which meaningful propositions can be formed.

In addition to the "logical grammar," the "logical order" is comprised of the "logical sequence" which itself is a

... network of relations between propositions in terms of which valid historical or scientific explanations are formed. The

⁷⁹ Ibid., p. 51.

⁸⁰ Ibid.

logical analysis of historical or scientific explanations seeks to make plain the criteria for valid explanations in this area. But using these formal criteria in any given case does, of course, presuppose the validity of the propositions in terms of which the explanations are given. . . . Any explanation of the repeal of the corn laws in 1846, for instance, must rest on valid propositions about the economic effects of the laws, the famine in Ireland, the political policy of Peel and so on.⁸¹

Where the "logical grammar" consisted of a network of relations between particular concepts in terms of which meaningful propositions can be formed, a network consisting of unexplicated rules for the use of terms, so the "logical sequence" similarly consists of a network of relations holding between propositions in terms of which valid explanations can be formed. Valid explanations, in other words, are formed from valid propositions which, in turn, are formed by sticking to the rules for the valid use of concepts. The validity of an explanation then presupposes the validity of the propositions in terms of which the explanation is given, and the validity of the propositions is presupposed in terms of the validity of the concepts related according to the rules governing these concepts. In the "logical order" in terms of which there is meaning ascending from the concept through the proposition to the explanation, the "logical sequence" appeals for its validity to the "logical grammar" but it is just the validity of the "logical grammar," the meaningful use of concepts, which has not been established. To take

⁸¹Ibid., pp. 51-52.

the illustration of the repeal of the Corn Laws, Hirst's valid explanation requires a valid network of propositions in terms of which the explanation is given which, in its turn, requires a valid network of concepts which are, in their turn, valid by virtue of being related according to the rules. A valid explanation of the repeal of the Corn Laws then consists of valid propositions about the economic effects of the Laws, valid propositions about the famine in Ireland, valid propositions about the political policy of Peel and so on. And whether or not these propositions are valid depends on whether or not the concepts employed in the economic, famine, and political propositions are valid, which, in turn, depends upon whether they are employed in conformity with the rules. But what, again, are these rules? And how is validity to be determined by virtue of sticking to the rules when to stick to the rules is to presuppose just such validity? Does not the contention that valid historical explanation, and by extension learning to think historically, requires a valid network of propositions which in turn requires a valid network of concepts beg the very question at issue, that is, what it is to be valid and how such validity is to be assessed? If learning to think historically involves learning the "logical order" of historical explanation which involves learning the "logical grammar" and "logical sequence" as employed in such explanation, some account must be given of the rules governing the network of relations of that grammar and sequence. What are they?

It seems, at length, that the rules governing the meaningful use of concepts as well as the rules governing the network of relations between propositions employing such concepts all culminating in valid historical explanation are by no means clear. While in mathematics and the sciences

. . . there is frequently such an order and new concepts are often explicitly composed in this tight way by defining them from other concepts. In many other areas of discourse, in moral or historical matters for instance, such conceptual relations are far from common, the relations are not hierarchical in this way. But in so far as there are elements of conceptual order in any subject the teaching of it must of course fully respect them.⁸²

With this observation Hirst takes his leave of the question of what it is to think historically and in learning to think in this way, an observation tantamount to the admission that both his account of valid historical explanation given in terms of valid propositions employing concepts which are valid by virtue of sticking to the rules is itself invalid, as well as the fact that his logical analysis of the meaning of "historical thinking" has failed to disclose the criteria which distinguish such thought. Passing by the question as to just how the practice of innovative mathematics or discovery science is frequently the outcome of logical derivation in a tight way from other concepts, Hirst's account of what it is to learn to think historically has revealed that there exists no hierarchical relations or "conceptual order" of the sort he has tried to impose upon

⁸²Ibid., p. 53.

that process. As with the case of the exercise of practical judgement in the domain of educational theory as well as in the case of theoretical judgement in the forms of knowledge comprising the contributory disciplines to that domain, Hirst's rendering of the nature of learning by way of appeal to linguistic objectivism incorporated in appropriate usage has not succeeded in getting clearer about what is involved in that activity.

The foregoing chapter has attempted to establish that efforts to objectify the knowing process from the perspective of linguistic objectivism meet with the same difficulties as those discovered in similar efforts from the perspective of empirical objectivism. As more is involved in that process in the context of empirical verification, so more is involved in the context of appeal to appropriate usage. Where O'Connor's clarification of the nature of philosophical questions raised the objectivist criterion of an impersonal consensus to determine the relevance of evidence adequate to settle those questions, his empirical criteria failed to reveal either the nature of the evidence relevant to them or the method by which they might be answered. Similarly, Peters' clarification of the nature of philosophical analysis employing the linguistic criteria embodied in the "revolution in philosophy" failed to uncover the concept in the form of the logically necessary condition for the use of a word. Where O'Connor's view of educational theory as a "courtesy title" was undermined by the failure of his own stipulative

definition of what it was to be a theory in terms of satisfying its own criteria, so Hirst's domain of theoretical discussion and investigation, in addition to lacking any characterization of the nature of practical judgement involved in the domain, rested upon his "forms of knowledge" which were distinguished by peculiar concepts, structures, and tests all standing in tautological relation with their linguistic formulation. Finally, where O'Connor's empirical criteria grounding his notion of the nature of learning as embodied in the hypothetical-deductive form of inference failed to account for non-objective or personal elements at each stage of that inference, so, on the one hand, Peters failed to make explicit the nature of learning as embodied in either the learning or teaching of principles so that learning might count as education in its "full sense," and, on the other, Hirst's account of learning as incorporated in his "logical order" proved to be founded upon a presupposed but unestablished validity of concepts, propositions and explanations. At the outset the present study was said to assume the form of a test with Polanyi's concept of "objectivism" posing the problem. On the basis of that test it can be maintained that such objectivism does, in fact, exist in philosophical analysis in education, that it is to be found in the analytical activity of clarification itself and in the views of educational theory and the nature of learning derived from the presuppositions incorporated in that activity. Furthermore, it has been found, as Polanyi maintained, that such objectiv-

ism is self-defeating in educational thought as elsewhere.

The present chapter has been of a transitional nature, its purpose having been to extend the criticism aimed at O'Connor's empirical objectivism to a comparable objectivism found in linguistic analysis all by way of emphasizing the need for a knowledge theory which takes full account of the non-objective or personal ingredient located at the heart of the knowing process. It has been the hypothesis of this thesis that such a theory has been provided by the principles of "personal knowledge" and it is to an explication of that theory that attention is now directed.

CHAPTER V

PERSONAL KNOWLEDGE AND PHILOSOPHICAL ANALYSIS IN EDUCATION

A. Philosophical Analysis in Education

Polanyi's theory of personal knowledge as embodied in the structure and process of tacit knowing, together with a theory of a stratified and hierarchical reality with which that structure and process are in isomorphic relation, constitutes a coherent alternative to objectivist epistemologies serving to ground philosophical analysis in education relative to the categories under review, that is, the activity of philosophical clarification, educational theory, and the nature of learning. It is not intended that personal knowledge be viewed as necessarily the only theory of knowledge which might be so employed but, owing to the essentially tacit or personal quality it ascribes to all noetic acts coupled with an ontological realism in terms of which such acts have point and by which their validity is affirmed, it at one time transcends the objectivist hegemony now ascendant in educational thought, whether of empirical or nominalist inspiration, without appeal to either romantic or sceptical subjectivism. By virtue of its triadic structure together with its dynamic process of interiorization-projection towards a reality which is independent yet comprehensible, it escapes the charges of mysticism or obscurantism objectivism presents in its defence. It is the recognition of such

reality which precludes irresponsible romantic whimsy; it is the requirement of commitment which precludes the paralysis of the sceptic.

Polanyi elaborated his theory of personal knowledge initially in protest against a positivistic conception of knowing as found in the natural sciences. Such a conception, embodying at one time the submission of the knower to "objective" tests, rules, and a formalization of the procedure by which they were to be applied, together with the adoption of a posture of doubt and detachment to his claims to know, constituted just that exteriorization which was for personal knowledge the quintessence of the destruction of meaning.

Where the positivistic conception of knowing has spread to the realm of educational thought and has come to serve as its epistemological exemplar, the theory of tacit knowing comes as a direct challenge, affirming responsible commitment of the knower as the proper locus of all knowledge acts. For those to whom the grounds of sensory verification prove too narrow as the sanction of epistemological validity yet who seek impersonal criteria in the form of rules of usage, personal knowledge serves to reveal the tacit roots of such usage together with the incoherence of analysis exercised under its auspices without reference to that reality upon which it is brought to bear. Personal knowledge, then, constitutes a particularly suitable antidote to the twin manifestations of objectivism in educational thought, whether of the empiricist or nominalist variety.

The first four chapters of this thesis have employed Polanyi's theory of personal knowledge as exemplified in the theory of tacit knowing as the tacit base for an internal analysis of O'Connor's three components of "education" both in reference to O'Connor himself as well as to the linguistic objectivism as found in Peters and Hirst, that is, in the realms of philosophical clarification, educational theory, and the nature of learning. By means of such an internal analysis it has been revealed that such objectivism appeals in its exercise to tacit roots which place objectivist pre-suppositions in default. Where such tacit roots have been explicitly rejected in the hope of obtaining some impersonal and incorrigible noetic criteria, internal analysis has shown that such rejection can lead to contradiction, incoherence, and the destruction of meaning. An explicit statement of these claims can now be made.

1. Philosophical Clarification

As has been seen, philosophical reflection for Polanyi consists in his "bringing to light, and affirming as my own, the beliefs implied in such of my thoughts and practices as I believe to be valid." Such an affirmation constitutes an attempt to formulate a "programme of self-identification." That philosophical reflection is so constituted follows from the structure and process of tacit knowing and is therefore to be distinguished sharply from the activity of clarification where, it is supposed, one can proceed to clarify one's beliefs in the absence of further beliefs, where it is main-

15
 tained that one can retrieve some pristine noetic residuum by way of a critically detached process of interior attrition. In terms of the structure of tacit knowing such beliefs constitute the subsidiary term by virtue of which one's thoughts and practices are validated and cannot, in the absence of some further subsidiary framework, become the focal target of critical thought in which they are presupposed. But there is no further framework beyond one's ultimate beliefs which might serve as a subsidiary framework. Therefore, philosophical reflection of necessity is constituted by a programme of self-identification. In terms of the process of tacit knowing, philosophical reflection culminating in that programme of self-identification necessarily involves committed indwelling in such beliefs as one believes valid, necessarily involves an interiorization of them in an act of focally attending to something else in their light. As such, they are unspecifiable in that act, being irreducible to further beliefs by virtue of which their validity might be assessed and, equally, such beliefs are irreversible in the affirmation of that programme. One cannot, in affirming one's beliefs as one's own, render them external to their affirmation and towards which one might then strike an attitude of doubt or detachment. Any critical clarification of one's beliefs, where by critical is taken to mean just that posture of doubt or detachment, leads to the destruction of meaning or epistemological paralysis. Further, the programme of self-identification consisting in the affirmation of one's ultimate beliefs claims in its exercise that such

beliefs are not merely subjective figments but rather that the focal target of such beliefs constitutes a reality independent of one's passive, interior states. The programme of self-identification affirms that one's beliefs are of universal validity, else the affirmation is simply the affirmation not to believe. In either case, and whether directly or obliquely, philosophical reflection and inquiry does, after all, concern itself with those difficult and important questions about human life and man's place and prospects in the universe. It does, after all, issue those high-level directives for education as well as pronounce on God, freedom, immortality, and the meaning of life.

O'Connor's programme of self-identification, of course, consisted in bringing to light and affirming as his own the beliefs implied in such of his thoughts and practices as he believed to be valid which, in a nutshell, consisted of the affirmation that "metaphysical" questions, since they were not amenable to the criteria of verification or falsification, were invalid. To engage in that activity of criticism or clarification as enjoined by the injunctions of the "revolution in philosophy" is, of course, to engage relative to the content one ascribes to what it is to clarify something, and what it is to clarify something will, in its turn, vary relative to the beliefs implied in such thoughts and practices as one believes valid. For O'Connor, such beliefs were those of standard empiricism, with the consequence that his activity of criticism and clarification involved keeping his mind free from non-empirical nonsense. The difficulty

was, however, that such empiricism being itself a subsidiary framework of belief, invalidates the claim to "objectivity" in the course of such criticism or clarification; and insofar as that framework of subsidiary belief cannot be validated under its own criteria and is itself "metaphysical" under the definition, the activity is self-contradictory and destructive of meaning.

For Peters the programme of self-identification consisted in bringing to light and affirming as his own the beliefs implied in such of his thoughts and practices he believed to be valid which amounted to the belief that the retrieval of meaning lay in uncovering the concept by way of revealing the logically necessary condition for the use of a word. The reason why he believed this rested upon his subsidiary framework of linguistic nominalism. For Peters, the "revolution in philosophy" did not enjoin that activity of criticism or clarification aimed at freeing one's mind from non-empirical nonsense since there existed no typical abstract referent which the word denoted. Neither, for that matter, was there any mysterious inner entity or process by which the word may be so brought to bear. There was only usage. The activity of criticism or clarification therefore meant distinguishing the central from the peripheral use, the trunk from the shoots, all of course, from the perspective of the detached spectator. The difficulty was, however, that Peters' nominalism did in fact constitute a subsidiary framework of belief, with the result that the spectatorial posture itself was in default. In so far as his programme

of self-identification adhered to its own principles, on the other hand, in so far as it issued no high-level directive or prescription, Peters could not attribute simple possession of the concept in others by way of the public criterion; he could not determine what the logically necessary condition for the use of a word was since he did not know what samples to lay out to look for its defining characteristics; he could not understand concepts in terms of other concepts since the word and the concept were identical and the uses of words were legion. Where Peters adhered to his own criteria embodied in the programme of self-identification, in other words, his activity of criticism or clarification resulted in the destruction of meaning.

2. Educational Theory

A theory, for Polanyi, is like a probe or pair of spectacles, that by which one examines other things in its light. As one cannot examine one's spectacles in the act of looking through them at something else, so a theory is functionally unspecifiable in the act of employing it to examine that which it renders meaningful. But this sense of theory-in-use is not the sense conveyed by O'Connor's second component of "education," it being rather the question of what is to count as theory properly conceived and, more specifically, what is to count as educational theory. However, the structure and process of tacit knowing still function in such an assessment. In order to determine whether a theory is to count as such, one must rely subsidiarily upon

further theory in terms of which accreditation will be bestowed or withheld. To determine whether a theory is to count as theory is, in effect, to rely on antecedent metatheory which is ultimately philosophical in nature, being identical here with reliance upon that programme of self-identification by which one affirms as one's own the beliefs implied in such of one's thoughts and practices as one believes to be valid. It is at the level of such metatheory where O'Connor and Hirst part company.

O'Connor has assured us that second-order clarification directed towards that set of values or ideals embodied and expressed in the purposes for which knowledge and skills and attitudes are imparted and so directing the amount and types of training that is given, that is, the proper province of philosophy, has nothing to do with that set of theories which purport to explain or justify the use of techniques for imparting knowledge, skills and attitudes, such theories being the proper province of educational theory. But, since educational theory in the tripartite construct only purports to explain or justify the use of such techniques but in fact does not do so, it is theory only by virtue of courtesy. However, O'Connor's criteria of what constitutes theory bear a striking resemblance to his empiricist programme of self-identification, those beliefs implied in such of his thoughts and practices as he believes to be valid. His criteria, in other words, constitute just that set of values and ideals which he explicitly rejected as having nothing to do with the second component of "education." In simultaneously reject-

ing and employing his own tacit basis for the determination of what is to count as educational theory, O'Connor finds himself in contradiction with his own premises. In addition to self-contradiction, O'Connor's reductionist programme also serves to destroy that by which educational theory derives its meaning. As his own conception of theory failed to satisfy its own criteria of explanation, for nothing was ever puzzling where the explicandum was smoothly subsumed under antecedent true belief, it equally fails to comprehend that embodied in any list of educational aims, however carefully they may be disguised by their proposer. But that which is so embodied is nothing other than ~~these~~ values and ideals which lie at the level of philosophy and philosophy, under the definition, can have nothing to offer to theory. Such values and ideals eluded O'Connor's criteria, there being no settled way of verifying them, yet they are inevitably found in educational theory. In the act of rendering meaningless that by which educational theory derives its coherence, O'Connor then proceeded with his only option, that of withholding the attribution of theoretical respectability.

Unlike O'Connor who maintained that there existed no relation between that set of values and ideals which was the object of philosophy and educational theory which purported to explain or justify the use of techniques for imparting knowledge, skills and attitudes, in spite of the fact that his clarification of such theory as deserving the title only by virtue of courtesy rested squarely upon just that relation,

for Hirst the issue was some determination of the nature of that relation lest educational theory be reduced to a collection of pieces of psychology. Philosophy was to play a central role in educational theory even where, by philosophy, was meant only the clarification of difficulties of a logical or conceptual kind. The difficulty was to elucidate the manner in which philosophy did so contribute but where, on the one hand, there did not exist a relation of direct implication since philosophy was but one of a range of contributory disciplines, and, on the other, where educational theory did not constitute an autonomous discipline in its own right, whereby, on the basis of its own sui generis criteria, it might select from among its contributory elements theoretical knowledge relevant to its practical concerns, with what ought to be done. The puzzle was to determine what it was to draw upon and cojointly consider offerings from the range of contributory disciplines in the absence of such criteria and where philosophy itself was but one of such disciplines.

Of course, Hirst does not mean by philosophy only the clarification of logical or conceptual difficulties since he employs it to advance his notion of educational theory, and does so by direct implication. In what may be taken as his subsidiary programme of self-identification he utilizes a rationalistic idealism appealing for validity to a nominalist conception of usage. It is rationalistic and idealist in the sense that his forms of knowledge sought incorrigible noetic criteria by reference to the concepts internal to the forms themselves, without reference to

"metaphysical realism"; it was nominalist in the sense that such concepts, as well as their logical structures and tests against-experience, were tautologically validated in terms of their appropriate usage, by the correct use of the term which was identical to the concept within a particular form of knowledge. In so far as Hirst knew that educational theory was not a form but a domain since it lacked just these sui generis concepts, structures and tests, his claim that there exists no relation of direct implication between philosophy and educational theory is in contradiction with his actual practice. In so far as Hirst adhered to his criteria of the identity of concept and correct usage, he could not tell us how one knew, in fact, that one was using the term correctly, nor, in view of his linguistically objectivist rendering of his forms of knowledge, could he tell us how one did, in fact, draw upon and cojointly consider those offerings to educational theory so that one might know what ought to be done. In the absence of the activity of tacit knowing involving the ability to integrate and apply the forms of knowledge and which itself is not any one of these forms but which is rather presupposed in their use, a view of educational theory which appeals to them for support is incoherent.

3. The Nature of Learning

Since comprehension, that act of relying upon subsidiary clues while integrating them into the focal entity which they jointly constitute which then becomes the meaning of those clues, can never in the theory of personal knowledge

be absent from any act of knowing, so it can never be absent from any act of learning, such being but a special case of knowing taken in the context of schooling. Viewed from the perspective of the learner, the activity of learning parallels in its structure and process the range of conscious acts from that of perception through to that of discovery. Indeed, learning taken from the perspective of the learner is discovery. Whether it be the words of the teacher or the text of a book, the subsidiary clues are interiorized in the act of integrating them into the focal coherence which is their meaning. The learner is necessarily committed to these clues in the act of learning since he cannot simultaneously make them the objects of focal attention which would result in the destruction of that meaning they were intended to convey. As with discovery, the act of learning is unspecifiable as it involves the crossing of that "logical gap" separating such clues from their coherent integration. There exist no prescriptions for the acquisition of "connoisseurship," no formula determining the act of comprehension. Yet the learner must give allegiance to the truth of the teacher's own integration in terms of which he directs his focal attention on that forming its basis. To exteriorize the tacit base of learning is to destroy the learning it was intended to produce. In the theory of personal knowledge, all learning is, at least initially, a process of apprenticeship, requiring that the learner believe before he can learn.

As with the nature of theory, O'Connor's view of the process of learning as embodied in the hypothetical-deductive method was a direct outcome of his philosophical presuppositions. His third component of "education," like the second, was implicit in the first. To view the proposal of an hypothesis to account for an unexpected or anomalous fact, the deduction from this hypothesis that certain other facts are observable, and the checking of this deduction by observation as the objective and paradigmatic expression constitutive of the act of learning, is to rely on antecedent philosophical belief, here in the form of standard empiricism.

O'Connor's clarification of the process of learning by reference to that method is therefore in obvious contradiction with his own contention that philosophy can have nothing to offer to a theory of learning. As a consequence, O'Connor joins those writers he charged with trading in metaphysical statements such as Plato, the mediaeval scholastics and modern Christian writers for his statements in regard to learning are not believed just because they form part of an educational theory but because they feature in a philosophy which is already believed on other grounds.

Where such tacit roots in the form of philosophical presupposition are explicitly rejected by way of an attempt to secure impersonal epistemological criteria, the outcome is not heightened clarity but destruction of meaning. An impersonal proposal of an hypothesis to account for anomaly failed to determine how anomaly is itself recognized as well as the process of hypothesis generation; the deduction

from this hypothesis that certain other facts are observable traded on a positivistic notion of what it was to be a fact, the suppression of the nature of the inference involved, and the unspecifiable quality of the act of observation; the checking of this deduction by observation glossed over the indeterminate character of verification and falsification by way of appeal to a principle which transcended the model it was intended to exemplify. In the course of his clarification of the nature of learning then, where O'Connor fulfilled the conditions of tacit knowing in the form of subsidiary reliance on antecedent philosophical belief yet rejected the validity of such conditions, he was guilty of self-contradiction; where his clarification proceeded on the basis of that rejection, the model did not so much clarify the nature of learning but rather rendered it incomprehensible.

From his second-order perch Peters assumed the spectatorial posture in his attempt to uncover the logically necessary condition for what it was to learn in the "full sense." Principal was the explicitness condition, that learning to count as learning does so by virtue of the specificity of the task sense of the term, a condition which ruled out things like picking things up. Peters' own task, then, was to render explicit the explicitness condition by way of uncovering the concept of learning. The inexplicitness of the concept, however, remained romantically aloft in spite of the glare of Peters' analysis which was directed at it. He could not render explicit what it was to learn

principles, how one postulates what is unobservable to explain what is observable, nor could he uncover the logically necessary condition grounding the acquisition of higher-level principles where, in violation of the lessons of the "revolution in philosophy," he observed that words like "insight" are used. Similarly, his quest for the logically necessary condition for the teaching of principles proved abortive. To teach principles is to engage in Socratic dialogue whereby the student comes to incorporate his own critic who then proceeds to formulate objections to his own assumptions until he hits on something to which he can find no further objections, resulting in a noetic residuum of unimpeachable clarity. The difficulty is that the criteria in terms of which the critic formulates his objections to his own assumptions are, in that act, inexplicit and tacit, the subsidiary programme of self-identification constituted not by an objective noetic residuum but by one's ultimate beliefs in such thoughts and practices as one believes to be valid. Where Peters' uncovering of the logically necessary condition constitutes such an affirmation of belief in respect to the nature of learning, his objectivist presuppositions are in default; where the logically necessary condition is sought in terms of an explicit and impersonal usage, the result is destruction of meaning.

In Hirst's clarification of the nature of learning by way of an elucidation of what it was to come to think historically, the circularity of word and concept becomes patent.

To learn to think historically was to come to recognize the rules which govern the meaningful use of historical concepts and the valid use of historical propositions, all issuing out into valid historical explanations. To learn to think historically, in other words, was to give valid historical explanations by sticking to the rules which determined the meaningful use of historical terms and the valid use of propositions embodying such terms. However, Hirst never did show what these rules were, whether they were the rules which governed the network of historical concepts or terms, the rules by which meaningful historical propositions may be formed employing those terms, or the rules governing the relations between such propositions thus formed so that one might then give valid historical explanations. The model reduces to the view that if the terms employed in forming meaningful propositions were valid, such propositions being meaningful by virtue of the validity of those terms, then the historical explanations given in terms of those meaningful propositions were valid. An historical explanation was valid by virtue of sticking to the rules for the meaningful use of propositions which were meaningful by virtue of sticking to the rules for the valid use of historical terms or concepts. Of course the entire question of validity and meaningfulness, one rather central to coming to think historically and in learning to come to think in this way, is never touched.

Where Hirst is in possession of such meaningfulness and validity so that he can recognize a valid historical explana-

tion when he sees one, he is so by way of a subsidiary awareness of that ~~interpretive~~ framework in terms of which that explanation derives its validating power, not by sticking to any objectively conceived rules governing the behaviour of concepts, propositions and explanations; where, on the other hand, he employs such rules to account for the validity of historical explanations and grounds a view of historical understanding generally in their terms, the outcome is not greater objective clarity but rather incoherence in respect to the concept of historical validity, of what is involved in thinking historically, and what is involved in learning to think in this way. With Hirst, as with O'Connor and Peters, internal analysis has revealed that epistemological objectivism in the realms of philosophical clarification, educational theory, and the nature of learning either appeals covertly to tacit roots and thereby throws its own presuppositions into default or, where such tacit roots are explicitly rejected, whether in the form of empirical verification or by appeal to the rules of usage, such rejection culminates in the destruction of that which philosophical analysis purported to clarify. But what, then, are these "tacit roots"? What is Polanyi's theory of personal knowledge, his concept of tacit knowing?

B. Polanyi's Theory of Tacit Knowing

1. The Structure of Tacit Knowing

a) Perception: The Tacit Integration of Subliminal and Marginal Clues

Perception for Polanyi was "the very paradigm of the structure which I have postulated for all kinds of knowledge at all levels."¹ It was that which provided "the bridge between the higher creative powers and bodily processes,"² that which at one time manifested the purposive character of apprehension and the reality of the "gestalten" or coherent entities thereby apprehended.³ Sensations were not objectified

¹"The Scientific Revolution," The Student World, Vol. 3 (1961), p. 293.

²The Tacit Dimension (New York: Doubleday & Co., Inc., 1967), p. 7.

³Polanyi acknowledged his debt to Gestalt psychology which had demonstrated that we recognize a whole by seeing its parts differently than when it is seen in isolation. However, he went beyond Gestalt theory in two important ways: he gave the act by which "gestalten" are perceived a "logical structure" and he ascribed purposeful intervention to the perceiver who saw them. "I have covered the same ground in somewhat modified terms," he writes,

... in order to bring out the logical structure in which a person commits himself to certain beliefs and appreciations, and accepts certain meanings by deliberately merging his awareness of certain particulars into a focal awareness of a whole. This logical structure is not apparent in the automatic perception of visual and auditory wholes from which Gestalt psychology derived its prevailing generalizations. (P.K., op. cit., p. 57.)

In The Study of Man (Chicago: University of Chicago Press, 1959) Polanyi emphasizes the intentional nature of his theory of perception which further distinguishes it from Gestalt psychology.

Psychologists have described our perception of gestalt as a passive experience,

primary data impinging indifferently and at random upon passive sensory faculties but were, in themselves, without significance until integrated by our perceptual powers. It is in the act of perceptual integration that structure and purpose meet, an act that is tacit in the sense that it relies upon clues which cannot be specified in the performance of that act itself. In spite of the fact, for example, that one's hand moving in front of one's face is seen at different angles and under varying illuminations, it appears as one, unchanging object distinct from its background by virtue of such powers of perceptual integration. The achievement of coherence rests upon the integration of variables both within the perceptual field and within the perceiver himself, variables which Polanyi has termed, respectively, "marginal" and "subliminal" clues.

2) Marginal Clues

Marginal clues are those "numberless items that contribute to my seeing my hand in front of me. They are known to me mainly by observing the various deficiencies caused by cutting out these several items."⁴ Observing one's hand moving towards the eye through a pinhole in a piece of paper, the hand appears to swell or grow larger rather than approach

without envisaging that it represents a method—and indeed the most general method—for acquiring knowledge. They were probably unwilling to recognize that knowledge was shaped by the knower's personal action. (p. 28)

⁴ Chapter II, "Personal Knowledge," in Meaning, op. cit., p. 33.

the eye. Such de-realization results from the elimination of the marginal clues lying in the field of vision which could be viewed in themselves, if so desired, but which in the act of perceptual integration are purposefully relegated to the background. Were such marginal clues viewed directly in themselves, the same de-realization would occur as in the case of their elimination. The point is that in the act of perception, nothing is ever observed as such in itself.

"What we see and hear," Polanyi points out, "depends in a thousand ways on the preparedness of our mind and on our intelligent participation in making out what it is that we see and hear."⁵

ii) Subliminal Clues

Unlike the marginal clues which may or may not be observed in themselves the subliminal clues in perceptual integration cannot be observed directly.

The main clues on which perception relies are in fact deeply hidden inside the body and cannot be experienced in themselves by the perceiver. Though we may notice the strain in our eyes and are aware of the position of our head, the intricate pattern of internal stimuli arising from the adjustment of the lenses of our eyes, from the muscles controlling the convergence of the eyeballs, from the inner ear, etc., and the elaborate system by which our perception makes us aware of the data in the appearance of the objects

⁵"On the Modern Mind," op. cit., p. 16.

we are looking at, these can hardly be experienced in themselves at all.⁶

The marginal clues which are found in the field of vision yet which are peripheral in the sense that they are not the objects of explicit attention, together with the subliminal clues which are largely unspecifiable in themselves, are made, in the act of perceptual integration, to bear upon their joint target which is the object of explicit or focal attention. The structure of tacit knowing maintains that there is and that there can be no focal awareness of an object without the roots of such awareness lying in the realm of the inexplicit, of subsidiary awareness. Further, such subsidiary awareness as constituted by the tacit reliance upon marginal and subliminal clues is to be distinguished from focal awareness in qualitative terms. "Focal and sub-

⁶"The Unaccountable Element in Science," Philosophy, Vol. XXXVII, No. 139 (January, 1962), p. 10 (*italics his*). Also in Philosophy Today, Vol. 6, No. 3/4 (Fall, 1962), and in Grene, Knowing and Being, op. cit. "It may seem strange," Polanyi points out in "Science and Religion: Separate Dimensions or Common Ground," op. cit., p. 6 (*italics his*):

... to identify the way the internal data of perception determine the external image of the perceived object with the relation between the parts of a whole and the whole which they form. But I am only identifying the structure of knowing of these two relations.

The structure is one of reliance or dependency upon such clues while simultaneously directing conscious attention towards the object perceived. We rely upon the constellation of marginal and subliminal clues "for attending to their joint meaning which in this case" (that of perception) "appears to us in terms of the shape, colour, size, position, and other visible features of an object." ("Tacit Knowing: Its Bearing on Some Problems in Philosophy," in Grene, Knowing and Being, op. cit., p. 162.)

subsidiary awareness," Polanyi emphasizes, "are definitely not two degrees of attention but two kinds of attention given to the same particulars."⁷ One may see a vase at the centre of a framed picture or one may see two faces separated by an empty space, or, similarly, one may see a black spot on a white background or a white background with a hole in it. In either case, the particulars are identical and what one sees focally depends upon which grouping of particulars has been cast into the subsidiary mode. Nothing is predetermined in perception. "There is always a measure of choice in our manner of perception," Polanyi points out, "and whenever we see something in one way we cannot see it at the same time in a different way."⁸

iii) The Triadic Structure of Perception

In looking at our hand moving across our field of vision we are attending focally to an object separated from

⁷"Knowing and Being," *Mind*, Vol. 70 (1961), p. 463 (italics his). (Also in Grene, op. cit.) Polanyi equally distinguishes subsidiary awareness from sub-conscious or pre-conscious awareness on the grounds that the latter, unlike the former, does not figure in a logical or structural relation.

The relation of clues to that which they indicate is a logical relation similar to that which a premise has to the inference drawn from it, but with the important difference that tacit inferences drawn from clues are not explicit. They are informal, tacit. ("The Structure of Consciousness," op. cit., p. 316, italics his.)

⁸"The Nature of Scientific Convictions," in F. Schwartz (ed.), Scientific Thought and Social Reality: Essays by Michael Polanyi, Psychological Issues, Vol. VIII, No. 4, Monograph 32 (New York: International Universities Press, Inc., 1974), p. 55.

the subliminal and marginal clues integrated into the appearance of that object. The subsidiary clues residing in the mode of subsidiary awareness collectively constitute the "proximal term" while the object of focal awareness constitutes the "distal term."⁹ But the proximal term is not linked to the distal term of its own accord. "The relation of a subsidiary to its focus," Polanyi maintains, "is formed by the act of a person who integrates one to the other."¹⁰ The act of integration becomes clearer in the viewing of a stereo picture than in the case of observing our hand, since here the proximal and distal terms are the same thing but viewed differently.

Their joint image might be regarded as a whole, composed of the two pictures as its parts. But we can get closer to an understanding of what is going on here if we note that, when looking through a stereo viewer, we see a stereo image at the focus of our attention while we are aware of the two stereo pictures in some peculiar non-focal way. We seem to look through these pictures, or past them, while we look straight at their joint image. We are indeed aware of them only as guides to the image on which we focus our attention. I can describe this relationship of the two pictures to the stereo image by saying that the two pictures function as subsidiaries to seeing their joint image which is their joint meaning.¹¹

⁹Polanyi's usage is drawn from the language of anatomy. See The Tacit Dimension, op. cit., p. 10.

¹⁰"Personal Knowledge," in Meaning, op. cit., p. 38 (italics his).

¹¹"Logic and Psychology," The American Psychologist, Vol. 23 (1969), p. 29 (italics his).

The two examples, the moving hand and the stereo picture, bring out the two-fold nature of the triadic structure of tacit awareness. When the subsidiary clues are separated from their focal target as with the moving hand, the person (A) relies tacitly on the marginal and subliminal clues (B) in the act of integrating them in their bearing on the object of focal attention (C). When the subsidiaries are identical with their focal target as with the stereo picture, the person (A) integrates the clues in the form of the two pictures (B) into the image which they jointly constitute (C). The point is that it is the person who necessarily performs the integration, an integration by virtue of which the triadic structure is both initiated and sustained. In the absence of such tacit integration the triadic structure collapses and there is no perception.

The triadic structure of perception in which subsidiary clues are brought to bear upon their target by the perceiver is amplified in four "aspects" Polanyi attributes to tacit awareness. The vectorial quality of the clues directed towards their focus constitutes the "functional aspect" of tacit awareness. Subsidiary awareness is subsidiary only by virtue of its function in the triad, the proximal pole of the proximal-distal relation. "In subordinating the subsidiary to the focal," Polanyi points out, "tacit knowing is directed from the first to the second." I call this the functional aspect of tacit knowing. Since this functional relationship is set up between the kinds

of awareness, its directedness is necessarily conscious."¹² By virtue of their so functioning, the subsidiaries undergo a transformation in appearance—they look different than they did in isolation. This transformation Polanyi calls the "phenomenal aspect" of tacit awareness in which "We are aware in general of the proximal term of an act of tacit knowing in the appearance of its distal term; or, in other words, we are aware of that from which we are attending to another thing, in the appearance of that thing."¹³ As a result of the transformation of the subsidiaries into their focal image, the distal term becomes the "meaning" of those subsidiaries, that by which the subsidiaries gain their coherence. The stereo image, for instance, is the meaning of the individual stereoscopic pictures. This is the "semantic aspect" of tacit awareness."¹⁴ Finally, there is

¹²"The Logic of Tacit Inference," in Grene, Knowing and Being, op. cit., p. 141 (italics his). Also in Philosophy, Vol. XLI, No. 155 (Jan. 1966).

¹³"Science and Man's Place in the Universe," op. cit., p. 59 (italics his).

¹⁴In The Study of Man (Chicago: University of Chicago Press, 1959) Polanyi writes, in respect to the semantic aspect of tacit awareness, that:

We may say that when we comprehend a particular set of items as parts of a whole, the focus of our attention is shifted from the hitherto uncomprehended particulars to the understanding of their joint meaning. This shift of attention does not make us lose sight of the particulars, since we can see a whole only by seeing its parts, but it changes altogether the manner in which we are aware of the particulars. We become aware of them now in terms of the whole on which we have fixed our attention. (pp. 29-30, italics his.)

the recognition of that which tells us what tacit awareness is an awareness of. The "ontological aspect" of tacit awareness "thus implies the claim that its result is an aspect of reality which, as such, may yet reveal its truth in an inexhaustible range of unknown and perhaps still unthinkable ways."¹⁵ In the triadic structure of perception, then, it is the semantic and phenomenal aspects of tacit awareness which lie on the perceiver's side of the triad, the ontological which lies on the side of the perceived, and the functional aspect of tacit awareness which united the two.

b) The Triadic Structure of Skills and Skilful Knowing

i) Skills

The triadic structure constituting the act of perception is extended by Polanyi to comprehend the exercise of skilful performance. Where in perception the subsidiary clues were integrated tacitly by the perceiver in the act of integrating them to bear upon the object of focal attention, in skilful performance it is the premisses underlying the skill which are integrated subsidiarily by the performer in its successful execution. "Indeed," Polanyi maintains,

... the premisses of a skill cannot be discovered focally prior to its performance; nor even understood if explicitly stated by others, before we ourselves have experienced its performance, whether by watching it or by engaging in it ourselves. In performing a skill we are therefore acting on certain premisses of which we

¹⁵"The Logic of Tacit Inference," op. cit., p. 141.

are focally ignorant, but which we know subsidiarily as part of our mastery of that skill, and which we may get to know focally by analysing the way we achieve success (or what we believe to be success) in the skill in question.¹⁶

In the execution of skilled performance, then, it is the performer who fulfils the functional component in its exercise, the integration of a complex pattern of muscular co-ordination in accordance with the premises or rules while attending focally to its proper execution which then becomes the "meaning" of that co-ordination. The point is that such performance, like perception, relies upon elements which are necessarily tacit: one can no more be told explicitly how to ride a bicycle by reference to the antecedent premises underlying that skill than one can be told explicitly that a picture contains a vase and not two faces. In each case, whether in the form of subsidiary awareness of perceptual clues or of the rules guiding successful practice, there

¹⁶ P.K., op. cit., p. 162. As an example of the premises underlying skilful performance, Polanyi gives the case of the cyclist.

The rule observed by the cyclist is this. When he starts falling to the right he turns the handlebars to the right, so that the course of the bicycle is deflected along a curve towards the right. This results in a centrifugal force pushing the cyclist to the left and offsets the gravitational force dragging him down to the right. This manoeuvre presently throws the cyclist out of balance to the left, which he counteracts by turning the handlebars to the left; and so he continues to keep himself in balance by winding along a series of appropriate curvatures. A simple analysis shows that for a given angle of imbalance the curvature of each winding is proportional to the square of the speed at which the cyclist is proceeding. (Ibid., pp. 49-50)

resides a residuum of ineffability resistant to formulation, a residuum which is not marginal but rather central to the structure of both perception and skilled performance.

ii) Skilful Knowing

The Recognition of Comprehensive Entities. The triadic structure found in the exercise of acts of perception and skills is extended by Polanyi to that of skilful knowing where knowledge comprises the distal pole in the proximal-distal relation.¹⁷ Such knowledge may consist in the recognition of a comprehensive entity, that is, one comprised of multiple particulars and where such recognition transcends simple perception of objects by virtue of its cognitive content. The comprehensive entities which may be recognized by such skilful knowing may be as simple as that of a neighbour's face. We recognize him daily and we would be able to distinguish him in a multitude, yet we cannot specify the content of such knowledge explicitly either in the form of the particulars constituting the joint image of his face, particulars upon which we subsidiarily rely in the act of integrating them into that image, or in the form of explicit specification of that integration in terms of which the features are so constituted. Yet it is in terms of that integration which such features derive their meaning. "I

¹⁷ For Polanyi, there is no distinction in structural terms between "knowing that" and "knowing how." In The Tacit Dimension (op. cit., p. 7) he points out that "These two aspects of knowing have a similar structure and neither is ever present without the other. . . . I shall always speak of 'knowing,' therefore, to cover both practical and theoretical knowledge."

have said that we can never be sure of identifying the particulars of a physiognomy," Polanyi maintains. "I may add now that they could never be identified at all except by attending to the physiognomy as a whole."¹⁸ In perception the subliminal and marginal clues provided the subsidiary element in the triadic structure where such clues were integrated by the perceiver in their bearing upon their focal target; in skilful performance it was the rules or the premises underlying the performance which provided the subsidiary component. In the recognition of comprehensive entities as an instance of skilful knowing, whether it be simply the recognition of a familiar physiognomy or the expert recognition of a specimen as being true to type, there is a double indeterminacy. While the features comprising the subsidiary particulars upon which recognition takes place are themselves unspecifiable, they are related functionally to their focal target, to their joint integration which is itself not explicitly specifiable, yet that by which the particulars acquire their coherence. In the recognition of comprehensive entities, the triadic structure of awareness pre-figured in perception remains intact, while its proximal and distal terms become increasingly tacit.

Articulation. "We must realize," Polanyi points out, . . . that to use language is a performance of the same kind as our integration of

¹⁸"Clues to an Understanding of Mind and Body," in T. J. Good, The Scientist Speculates (New York: Basic Books, Inc., 1967), p. 73.

visual clues for perceiving an object, or as the viewing of a stereo-picture, or our integration of muscular contractions in walking or driving a motor car, or as the conducting of a game of chess—all of which are performed by relying on our subsidiary awareness of some things for the purpose of attending focally to a matter on which they bear.¹⁹

In the triadic structure of skilful knowing as exemplified in the articulate use of language the framework remains the same with the exception that the terms of the structure have radically altered. "The less tangible the focus," Polanyi maintains, "the more purely mental is its object: from a meaning that consists in an object we pass to a meaning consisting in a conception."²⁰ Where the proximal pole in perception was comprised by the subliminal and marginal clues, in skilful performance by the rules of that performance, and in the recognition of comprehensive entities by the particulars as comprehended by their joint image, in articulation language itself is thrown into the subsidiary mode and made to bear upon its focal target in the form of the conception of an object or an experience, a conception which is the meaning of that articulation. In the denotative or descriptive use of language the person (A) relies subsidiarily on the term (B) in the act of making it bear upon the conception (C) as conveyed by that term while, conversely,

¹⁹"Sense-Giving and Sense-Reading," Philosophy, Vol. XLII, No. 162 (October, 1967), pp. 321-22. Also in Marjorie Grene, Knowing and Being, op. cit., and in T.A. Langford and W.H. Poteat, eds., Intellect and Hope: Essays in the Thought of Michael Polanyi (Durham: Duke University Press, 1968).

²⁰Ibid., in Grene, op. cit., p. 190.

the comprehension of denotation or description involves the person (A) integrating the term (B) into its conception (C) in terms of his comprehension of that term. Indeed, for Póányi communication involving denotation and comprehension of that denotation constitutes a "triad of triads."²¹

Deductive Inference. The triadic structure of skilful knowing found in the articulate use of language in which a person relies subsidiarily on a term in the act of making it bear upon a conception comprehending either the denotation of an object or the description of an experience carries

²¹ Polányi gives the example of one writing a letter to a friend.

Suppose we travel in a country we have not visited before. By the end of the morning we will be full of new experiences and may report them by letter to a friend so that he may read our message and try to understand our experiences. This is a sequence of three integrations. The first is an intelligent understanding of sights and events, the second the composing of a verbal account of this experience and the third the interpretation of this verbal account with a view to reproducing the experience which it reported. The first two integrations are the work of one person, while the third is by another person, the friend addressed by the first. We may note also some variation in the character of the three consecutive integrations. The first triad is mainly cognitive; it has the structure we met in the process of perception and, more strikingly perhaps, in the identification of a specimen by an expert. The second triad, which puts the results of the first into words, resembles more the performance of a practical skill, while the third returns once more to the cognitive type which integrates clues into a meaningful experience. The first triad is more a sense-reading, the second more a sense-giving and the third, once more, a sense-reading. (Ibid., in Philosophy, pp. 305-306, italics his.)

over to that found in deductive systems with the difference that it is now the deductive system itself which is relied upon in order to convey the conception which is its meaning. In the construction of deductive systems there is the designation of undefined terms which are then relied upon subsidiarily in the operation of that system. Similarly, the deductive system taken as an aggregate of such terms asserts, in effect, that it says something about something; that its efficacy as a formula will enable its user to distinguish that which satisfied the formula from that which does not. Such efficacy of the system is then relied upon subsidiarily in the course of its operation. Finally, in prescribing the operations themselves in terms of which the system is to be manipulated for the production of new assertions, the reliability of such operations becomes a third component of subsidiary reliance for the one employing system. At each of these points within the formalization of meaning found in deductive inference, its operation, Polanyi points out,

. . . can be said to function as a deductive system only by virtue of unformalized supplements, to which the operator of the system accedes: symbols must be identifiable and their meaning known, axioms must be understood to assert something, proofs must be acknowledged to demonstrate something, and this identifying, knowing, understanding, acknowledging, are unformalized, operations on which the working of a formal system depends. We may call them the semantic functions of the formal system. They are performed by a person with the aid of the formal system, when the person relies on its use.²²

²² P.K., p. 258 (*italics his*).

Inductive Inference. Whether in the form of the assessment of probability or in the process of verification or falsification, inductive inference appeals to empirical observation. In the triadic structure of skilful knowing, such empirical observation relies itself on an antecedent grasp of the nature of things.

All empirical observation rests ultimately on the integration of subsidiaries to a focal center. All such integrations—from perception to creative discoveries—are impelled by the imagination and controlled by plausibility, which in turn depends upon our general view about the nature of things.²³

Attempts to formalize the procedures of inductive inference in the form of probability theory maintain that, for any hypothesis having a finite initial probability of being true, subsequent evidence will confirm that hypothesis until the degree of probability reaches certainty. The structure of tacit knowing in which the subsidiary awareness in the form of our general view of the nature of things provides the basis for empirical inference presents difficulties, however, in accepting such formalization. "In order that the method should work in practice," Polanyi observes,

. . . the frequency of H being true must be not merely finite but of quite appreciable magnitude. Life is too short to allow us to go on testing millions of false H's in order to hit on a true one. It is of the essence of the scientific method to select for verification hypotheses having a high chance of being true. To select good questions for investigation

²³Chapter IX, "Truth in Myths," in Meaning, op. cit., p. 144.

is the mark of scientific talent, and any theory of inductive inference in which this talent plays no part is a Hamlet without the prince.²⁴

As there exists no formal rule for the selection of hypotheses having a high probability of being true, such selection being the act of the scientist relying upon his subsidiarily-held view of the nature of things, so there exist no formal rules for verifying or falsifying those hypotheses once selected, such verification or falsification relying in its turn upon his view of the nature of things which he brings to bear upon that decision.

There are no strict rules for discovering things that hang together in nature, nor even for telling whether we should accept or reject an apparent coherence as a fact. There is always a residue of personal judgement involved in deciding whether to accept or reject any particular piece of evidence be it as a proof of a true regularity or, on the contrary, as a refutation of an apparent regularity. This is how I saw and accepted the fact that, strictly speaking, all empirical science is inexact.²⁵

If assessments of probability as well as verification and falsification resist objectivist formalization since their exercise relies on observation which relies in turn upon subsidiary particulars embodied in one's conception of reality, the paradigmatic expression of scientific inquiry, that of discovery, is even more unspecifiable in terms of the structure in which its procedures are incorporated. While structurally

²⁴P.K., op. cit., p. 30 (*italics his*).

²⁵"Genius in Science," Encounter, Vol. XXXVIII, No. 1 (Jan. 1972), p. 48.

similar to the act of perceiving one's hand moving in front of one's face or in viewing a stereo picture, the exercise of skilful knowing exemplified in discovery extends the subsidiary coefficient across the triadic structure to embrace not only the proximal pole of the from-to relation in the form of an antecedently and tacitly adopted view of the nature of things, but also the distal pole in terms of an as yet uncomprehended coherence in the nature of things upon which one's antecedent view is brought to bear. From the initial recognition of a problem through the quest to resolve it to the actual discovery itself, the paradigmatic expression of science, and of knowing and learning generally, unspecifiability touches the structure at each stage. Scientific enquiry is structurally akin to that found in perception rather than that found in formal accounts of inductive inference being always in the form of "a tension alerted by largely unspecifiable clues and directed by them towards a focus at which we sense the presence of a thing—a thing that, like a problem, embodies the clues on which we rely for attending to it."²⁶ As an extension of skilful knowing as found in the recognition and elucidation of comprehensive entities and the art of denotation, scientific knowing in its most intense manifestation continues in the form of relying subsidiarily on one thing while attending focally to something else.

²⁶"The Unaccountable Element in Science," op. cit., p. 11.

Knowing Life. Finally, the structure of tacit knowing in the form of a person integrating subsidiary clues in their bearing upon their object of focal attention carries over to the recognition of life itself, from its most humble expressions to that of feats of exceptional intelligence. At its lower extremity, life is comprehended in terms of the triadic structure embodied in the recognition of comprehensive entities such as that found in the case of physiognomies.²⁷ As one rises in the scale of life, however, the focal target of comprehension becomes increasingly unspecifiable as in the case of scientific discovery, but with the added difference that the focus also becomes increasingly intangible. In the knowledge of higher life forms, such a focus is constituted by the mind.

²⁷The knowledge of animate life at its lower levels carries over, for Polanyi, from the knowledge of inanimate matter but the subsidiary term comprised of an antecedent view of the nature of things is replaced, in rough outline, by an antecedent comprehension of the nature of animate being. The study of such life, however, still involves a largely observational quality. As Polanyi points out,

Morphology, physiology, animal psychology—they all deal with comprehensive entities. None of these entities can be mathematically defined and the only way to know them is to comprehend the coherence of their parts. This is how the existence of plants and animals was recognized long before zoology and botany; how the difference between life and death was recognized long before physiology, and the difference between intelligence and mindless stupidity was known long before these matters were studied by science. What is more, this still is how scientists themselves must recognize these things, before they can undertake their study. ("Science and Religion: Separate Dimensions or Common Ground?", op. cit., p. 8, *italics his*).

We know a living being by an informal integration of its coherent parts. Such knowledge combines two terms, one subsidiary, the other focal, that are known in different ways. The particulars of living beings are known as such by attending from them to their joint meaning which is the life of the organism. And this includes the senso-motoric center of the animal as well as the human mind, as the bearer of intelligence and responsibility. Thus the tangible focal objects of exact science have been split into two halves. We have the tangible bodies of living beings that are not viewed focally, while at the focus of our attention we have such intangible things as life and mind.²⁸

As we ascend still further in the scale of intelligent life to comprehend exceptional feats of intelligence, the tangible bodies of living beings standing in subsidiary relation to the object of focal attention in the form of the mind seen as the seat of purposive activity are replaced by the articulate manifestations of that mind which are relied upon in the act of focally attending to the intelligence itself which is the meaning of those manifestations.

Just as we assimilate the symptoms of a disease by attending focally to the disease itself, and as we assimilate the printed text by attending to its meaning, so we assimilate the workings of another man's mind by attending to his mind. In this sense we may be said to know his mind by dwelling in its manifestations. Such is the structure of empathy (that I would prefer to call conviviality) which alone can establish a knowledge of other minds²⁹ and indeed of any living being whatever.

²⁸"The Logic of Tacit Inference," in Philosophy, op. cit., p. 13 (italics his).

²⁹"The Scientific Revolution," op. cit., p. 299.

The triadic structure of tacit knowing, pre-figured in perception yet seen to persist in the performance of skills as well as skilful knowing ranging from acts of simple recognition of physiognomies up to the comprehension of mind's articulate manifestations, has served to show that there exists necessarily a tacit or personal element in every perceptual or cognitive performance, that there can be nothing which is the focal or explicit object of attention or of knowledge in independence of subsidiary particulars brought to bear upon it by the act of a person intentionally so engaged. But what is it to bring subsidiaries to bear upon a focus of attention, to integrate such subsidiaries into their joint appearance, to dwell in the manifestations of another's mind? And what is the nature of that joint appearance so integrated, those manifestations so indwelt? Here we pass from the structure of tacit knowing to its process.

2. The Process of Tacit Knowing

a) The Proximal Term: Indwelling

The process by which the subsidiary particulars in the triadic structure of tacit knowing are made to bear upon their object of focal awareness, or are integrated into a coherent whole, is constituted by the process Polanyi calls "indwelling." His metaphorical use of the term is meant to convey the intimate nature of the relationship with that residing in the subsidiary mode of awareness, a relationship analogous to that collection of things which is known almost

exclusively by relying on it for the purpose of attending to something else.

Our body is a collection of such things; we hardly ever observe our own body as we observe an external object, but continually rely on it for observing these objects outside, and for manipulating them for our own purposes. Hence we may identify the knowing of something by attending to something else as the kind of knowledge we have of our own body by living in it. This kind of knowing is not an I-It relation, but rather a way of existing, a manner of being. We might call it an I-Myself or I-Me relation.³⁰

To indwell in something is, then, to render it subsidiary, to make it function as the proximal pole in the proximal-distal structure of tacit knowing. To make something function in the subsidiary mode is, on the ~~one~~ hand, to assimilate its particulars to ourselves where the act of indwelling is "an interiorization of its parts, by virtue of which we come to dwell in these parts, this indwelling being logically similar to the way we live in our body."³¹ On the

³⁰Ibid., p. 294. Polanyi points to indwelling as a way of existing or manner of being as "roughly coextensive with the existentialist conceptions of being in our body and in the world."

When I say that we expand our understanding of things outside by interiorizing their particulars and attending from them to the entities they form, this corresponds to Sartre's vision of man acquiring existence en soi by invading the world with his projects. The opening of this connection should be illuminating to both sides. For my part, I see in it confirmation of my view that an adequate theory of knowledge must involve a true conception of man and the universe and itself be supported by it. ("Science and Religion: Separate Dimensions or Common Ground?", op. cit., p. 8.)

³¹"Science and Man's Place in the Universe," op. cit., p. 63 (*italics his*).

other hand, by the very act of rendering the particulars subsidiary, indwelling possesses a vectorial or projective quality since such particulars are subsidiary by virtue of the fact that they are relied upon for the purpose of attending focally to something else. It is the function of the subsidiary level of awareness in the from-to structure of tacit knowing that renders it subsidiary. Such projection by indwelling in the particulars of that outside the body does not differ from that commonly occurring in the use of tools or probes.

The way we use a hammer or a blind man uses his stick shows in fact that in both cases we shift outwards the point at which we make contact with the things we observe as objects outside ourselves. While we rely on a tool or a probe, these are not handled as external objects. We may test the tool for its effectiveness or the probe for its suitability, e.g., in discovering the hidden details of a cavity, but the tool or the probe can never lie in the field of these operations; they remain necessarily on our side of it, forming part of ourselves, the operating persons. We pour ourselves out into them and assimilate them as parts of our existence. We accept them existentially by dwelling in them.³²

From the dynamic view of the process of knowing as constituted by a symbiotic movement of assimilation and projection, Polanyi ascribes certain basic characteristics to the activity of indwelling. Although not inherent to the activity itself, the first of these might be seen to be its extent.

³² P.K., op. cit., p. 59.

i) The Range of Indwelling

All purposeful human action is achieved by indwelling in the premises of an activity or parts of an entity which come to function then in the same way as does our body when we attend from it to things outside. "All knowledge falls into one of these two classes," Polanyi points out,

. . . it is either tacit or rooted in tacit knowledge. The ideal of a strictly explicit knowledge is indeed self-contradictory; deprived of their tacit coefficients, all spoken words, all formulae, all maps and graphs, are strictly meaningless.³³

As we dwell in tools and probes so that they become extensions of our being, so we dwell in our intellectual tools and probes, our theories and our more generalized views of the nature of things. Such theories and views, for Polanyi, are not constructs held in detachment from ourselves in terms of which reality is then observed but rather that which is presupposed in order that reality can be observed, in order that it should make sense. Such reliance brings out the characteristic of the committed or fiduciary nature of indwelling.

³³"Sense-Reading and Sense-Giving," op. cit., p. 195. "Through Indwelling," Polanyi maintains,

. . . I participate in comprehensive entities, from my own body and the objects I perceive, to the lives of my companions, and the theories we employ to understand inanimate matter and living beings. I partly transform myself in that which I am observing and thereby extend my range of knowing to include knowledge of all the hierarchies, from inanimate matter to the frameworks of our convivial settings and the firmament of obligations which supervene the operations of our intelligence within these frameworks. ("Transcendence and Self-Transcendence," Soundings [Spring, 1970], p. 93.)

ii) Commitment

Since they necessarily rely upon the tacit roots in terms of which they are made, all knowledge claims constitute a commitment to those claims. For implied in those tacit roots is the prior accreditation of reality by virtue of which such claims are made.

To hold knowledge is indeed always a commitment to indeterminate implications, for human knowledge is but an intimation of reality, and we can never quite tell in what way reality may yet manifest itself. It is external to us; it is objective; and so its future manifestations can never be completely under our intellectual control.³⁴

The point is that while contingency may attach to all knowledge as viewed from without, the actual claim to know is at base an act of faith, presupposing the "a-critical" acceptance of the subsidiary framework upon which the claim is grounded.³⁵

³⁴"Faith and Reason," The Journal of Philosophy, Vol. XLI, No. 4 (October, 1961), p. 244.

³⁵Polanyi's use of the term "a-critical" means that one cannot stand functionally in the posture of being critical, uncritical, or non-critical relative to one's own tacit framework in the act of using that framework to make a knowledge claim. In other words, one cannot actively doubt, consciously refrain from doubting, or intentionally adopt an attitude of impartiality simultaneously while making any assertion.

Where there is criticism, what is being criticized is, every time, the assertion of an articulate form. It is our personal acceptance of an articulate form that is judged to have been critical or uncritical, and this judgement expresses our appraisal of the tests to which we have subjected the articulate form or the articulate operation before accepting it. It is the mind granting this acceptance which is said to have been acting critically or uncritically. . . . In the sense just specified, tacit knowing cannot be critical. Animals, like men, may be alert against delusions. A young dog is

To dwell in a tacit framework is to be committed to that framework, and any criticism of that framework must have its subsidiary basis in another framework to which one is then committed.³⁶ This essentially "fiduciary" nature of indwelling resting on commitment serves as the basis of Polanyi's "post-critical philosophy."

iii) Unspecifiability

The process of tacit knowing by indwelling in the subsidiary particulars by means of which they are integrated into

more rash than an old fox. The hesitations of a chimpanzee in solving a problem may impose a strain upon him. But systematic forms of criticism can be applied only to articulate forms, which you can try out afresh again and again. We should not apply, therefore, the terms 'critical' or 'uncritical' to any process of tacit thought by itself; any more than we would speak of the critical or uncritical performance of a high-jump or a dance. Tacit acts are judged by other standards and are to be regarded accordingly as a-critical. (P.K., op. cit., p. 264, italics his.)

³⁶ Polanyi's point is not that all criticism is unfounded but that it, in its turn, rests upon a-critical belief. Indeed, it is towards the objectivist reification of doubt or generalized scepticism that he directs his own criticism.

The method of doubt is the logical corollary of objectivism. It trusts that the uprooting of all voluntary components of belief will leave behind unassailed a residue of knowledge that is completely determined by objective evidence. Critical thought trusted this method unconditionally for avoiding error and establishing truth. (P.K., p. 269)

For Polanyi, belief and doubt are logically equivalent. Contradictory doubt ("I doubt P") is equivalent to "I believe not-P"; agnostic doubt ("I believe P is not proven") is to imply "The acceptance of certain beliefs concerning the possibilities of proof." (Ibid., p. 273) Equally, "reasonable doubt" is, in effect, "to rely on something that cannot be reasonably doubted, that is, in legal phrase, a moral certainty." (Ibid., p. 274)

6 a comprehensive entity is both structurally and functionally unspecifiable. Both structural and functional unspecifiability are corollaries of knowing viewed as an act of commitment. As one cannot scrutinize one's spectacles in the act of looking through them, so

... we cannot ultimately specify the grounds (either metaphysical or logical or empirical) upon which we hold that our knowledge is true. Being committed to such grounds, dwelling in them, we are projecting ourselves to what we believe to be true from or through these grounds. We cannot therefore see what they are. We cannot look at them since we are looking with them. They therefore must remain indeterminate.³⁷

Structural unspecifiability points to the fact that acts of tacit knowing, ranging across the noetic spectrum from perception to the knowledge of other minds, cannot be reduced to an analysis of that which is explicitly known in terms of such acts. Skills are irreducible to motion studies, physiognomies to a list of their features, perception to physiology, language to its rules, knowledge to its tests.

Functional unspecifiability, similarly, points to the fact that acts of tacit inference are irreversible, that acts of tacit knowing cannot be formalized according to explicit rules of procedure in which the operation may be traced back to its origins by a series of formal steps. Polanyi sees two kinds of irreversibility.

One consists in the fact that we may not be able to identify all the clues which

³⁷ Chapter III, "Reconstruction" in Meaning, op. cit., p. 61 (italics his).

we have integrated in establishing their joint meaning. The other kind goes beyond this. It is due to the fact that when we shift the focus of our attention from the meaningful result of tacit integration, and focus on the subsidiaries, their integration is wiped out. The subsidiary particulars cease to have a bearing on their prospective target and are reduced to an aggregate of meaningless objects. The first kind of irreversibility can be called contingent, by contrast to the second, that is logically necessary.³⁸

In the act of tacit integration then, one cannot by the application of formal rules step outside the act itself to assess the validity of its own procedures. One cannot view focally both the features of a physiognomy and the physiognomy itself and formally gauge the accuracy of the integration as one cannot, at the same time, attend to both the premises and conclusions of tacit inference to formally test their derivation. One cannot, in equal fashion, focally view the word and that denoted by it by way of testing the appositeness of that word according to prescribed rules, nor can one, all at once, attend to one's view of the nature of things, and to the reality with which it is in correspondence while simultaneously applying a calculus of harmony. Indeed, to attempt to do so is to point to a further characteristic, not of indwelling but rather of objectivist attempts to reject it.

³⁸"The Body-Mind Relation," in W.R. Coulson and C. Rogers, eds., Man and the Science of Man (Columbus, Ohio: The Charles E. Merrill Publishing Co., 1969), p. 88.

iv) The Destruction of Meaning

If meaning is achieved by the interiorization of particulars integrated into their joint appearance, the destruction of meaning is achieved by the exteriorization of those particulars; if the achievement of meaning necessarily implies commitment, detachment and doubt in respect to such commitment implies disintegration of meaning; if the process by which meaning is attained implies unspecifiability in terms of formal procedures, a procedural formalism leads to meaninglessness. Exteriorization, detachment and formalism are the definitive characteristics of objectivism.

The functional relation of subsidiary and focal awareness is not effected without agency but rather is formed by the act of a person who integrates the one to the other and such a relation, Polanyi points out, "lasts only so long as a person, the knower, sustains this integration."³⁹ If, however, in the interests of obtaining knowledge free of this personal coefficient, the from-to relation is either reduced to its focal component or is formalized according to some explicit procedure, the result is not a heightened awareness but rather an exteriorization, an objectification yielding only meaningless alienation." "If," Polanyi maintains,

. . . in allegiance to the ideal of total lucidity, I claim to know directly and distinctly aspects I actually only rely on subsidiarily, all comprehensive entities are destroyed; a program of self—and world—destruction results, a 'world'

³⁹Chapter II, "Personal Knowledge," in Meaning, op. cit., p. 38.

composed of bits of matter in motion in which nobody lives.⁴⁰

In default of the commitment entailed relative to the tacit element embodied in acts of perception, the performance of skills and of skilful knowing arising from distrust of our participation in all noetic acts, such a programme of exteriorization extends from sensory de-realization through a psychology focussing on overt behaviour to philosophies of either absurdity or mechanism. To exteriorize perceptual clues is to attend to them rather than from them and so to destroy visual coherence. In attending to his fingers rather than to the music the pianist paralyses his performance. The behaviourist looks at pieces of mental behaviour, identifiable as coherent only within a context of a tacit integration which he rejects as unscientific. The Sartrean looks inwards towards his project in confrontation with the absurdity of a bare and contingent factuality, while the objectivist looks outwards to empirical tests, logical entailment, or the rules of usage to escape responsibility for his claims to knowledge.

But if the destruction of meaning results from the attempt to reify the objects of knowledge by exteriorization of those objects in independence of the tacit acts of the knower in terms of which they derive their coherence, does not the process of tacit knowing in the form of indwelling lead straightway to the spectre of subjectivistic relativism, the very thing the appeal to objectivist criteria sought to —

⁴⁰"Transcendence and Self-Transcendence," *op. cit.*, pp. 92-93.

avoid? Here we meet the final characteristic of personal knowledge, the paradox of self-set yet impersonal standards.

v) Impersonal Standards

In the preface to Personal Knowledge Polanyi clearly distinguishes the personal element necessarily embodied in all acts of knowing from subjectivistic relativism. While all knowing involves a-critical acceptance of and commitment to subsidiarily held beliefs which remain unspecifiable in the act of knowing itself in the sense that they cannot be simultaneously employed and critically tested, this, he points out, "does not make our understanding subjective."

Comprehension is neither an arbitrary act nor a passive experience, but a responsible act claiming universal validity. Such knowing is indeed objective in the sense of establishing contact with a hidden reality; a contact that is defined as the condition for anticipating an indeterminate range of yet unknown (and perhaps yet inconceivable) true implications. It seems reasonable to describe this fusion of the personal and the objective as Personal Knowledge.⁴¹

Personal knowledge, then, is not to be distinguished from a subjective relativism on the grounds that such knowledge contains a personal component, since all forms of knowing necessarily contain that component of commitment to subsidiarily held particulars or cognitive frameworks. To maintain that it is to be so distinguished is merely to be committed to that objectivist ideal in terms of which such commitment rules itself out.

⁴¹ P.K., op. cit., pp. vii-viii (italics his).

Personal knowledge is to be distinguished from subjective relativism, however, on the basis of the interconnected grounds of the nature and intent of that knowledge. Tacit knowing, by indwelling in the particulars of a comprehensive entity or by relying subsidiarily upon that which is brought to bear upon its focal target, is necessarily an affirmation of a claim to know. Subjectivism, whether in the form of an arbitrary act or the articulation of a passive experience, is not an affirmation. "When someone feels hot or tired or bored," Polanyi maintains,

. . . this pervasively affects his state of mind, but does not imply any affirmation beyond that of his own suffering. . . . On such grounds as these, I think we may distinguish between the personal in us, which actively enters into our commitments, and our subjective states, in which we merely endure our feelings. This distinction establishes the conception of the personal, which is neither subjective nor objective. In so far as the personal submits to requirements acknowledged by itself as independent of itself, it is not subjective; but in so far as it is an action guided by individual passions, it is not objective either. It transcends the disjunction between subjective and objective.⁴²

The acknowledgement of requirements by personal knowing which are independent of itself, the claim to universal validity, distinguishes tacit knowing from subjectivism by virtue of its intent. Tacit knowing is not an arbitrary act but rather sets to itself impersonal standards seen to be independent of its exercise yet which it seeks to satisfy, and in terms of which it assesses its own validity. Where

⁴²Ibid., p. 300 (*italics his*).

such tacit knowing is embodied in practical knowledge, im-
personal standards lie in the fulfilment of a purpose and,
as Polanyi remarks, "It is in the light of this purpose that
certain things may be defined as tools and certain movements
may be said to be rationally co-ordinated. The economical
and effective achievement of this purpose sets a standard to
our skill."⁴³ Where, on the other hand, Polanyi continues,

. . . the emphasis of our knowing lies in
recognizing or understanding a thing, the
effort of acquiring or skillfully applying
such knowledge may be said to be guided by
our attention. A biologist, a doctor, an
art dealer, a cloth merchant acquire their
expert knowledge in part from textbooks,
but these texts are useless to them without
the accompanying training of the eye, the
ear and the touch. . . . This is generally
true: every act of personal knowing sets
up a standard of excellence.⁴⁴

In addition to the fact that personal knowledge may
be distinguished from subjectivism on the basis of its nature
as affirmation and the establishment of standards against
which its exercise may be measured, the most profound distinc-
tion, which is but an extension of those standards embodied
in the attainment of purpose and the achievement of attention,
is the recognition of an independent reality. "We can account
for this capacity to know more than we can tell," Polanyi
points out,

. . . if we believe in the presence of an
external reality with which we can estab-
lish contact. This I do. I declare myself

⁴³"On the Introduction of Science into Moral Subjects,"
in Schwartz, Scientific Thought and Social Reality: Essays
by Michael Polanyi, op. cit., p. 93.

⁴⁴Ibid.

committed to the belief in an external reality gradually accessible to knowing, and I regard all true understanding as an intimation of such a reality which, being real, may yet reveal itself to our deepened understanding in an indefinite range of unexpected manifestations. I accept the obligation to search for the truth through my own intimations of reality, knowing that there is, and can be, no strict rule by which my conclusions can be justified. My reference to reality legitimates my acts of unspecified knowing, even while it duly keeps the exercise of such acts within the bounds of rational objectivity. For a claim to have made contact with reality necessarily legislates both for myself and others with universal intent.⁴⁵

Tacit knowing is then both an integrative and projective indwelling ranging throughout the spectrum of conscious human activity. It of necessity involves a commitment which is functionally unspecifiable in that process of indwelling, a commitment which does not render it "subjective" since it is by reference to an independent reality that its affirmations are directed and by virtue of which they receive their sanction. What, then, is the nature of this reality with which tacit knowing makes contact?

b) The Distal Term: Reality

i) The Existence of Reality

The theory of personal knowledge maintains that reality exists, that it is independent of the knower, that it is hierarchical and varies inversely as to tangibility, and that it

⁴⁵"Knowing and Being," Mind, op. cit., p. 467.

is cosmologically emergent.⁴⁶ As one cannot in the act of tacit integration step outside that act to test its validity by means of the application of formal rules, so one cannot step outside both reality and the act by which it is cognized to test whether that comprehended corresponds to reality as such and in itself. While reality so cognized is conceived as independent of the knower for it is believed it will not vanish like a mirage, formal criteria for assessing correspondence between the knower and the known is an objectivist chimaera, where, that is, reality is recognized at all. Yet, as one is necessarily committed in the act of tacit integration both to the subsidiary particulars upon which one relies and consequently to the validity of the affirmation or recognition of that in which such integration results, so one is committed to the reality of both the particulars and the coherence achieved by their integration. Polanyi points to the example of Copernicus and his followers who believed that the heliocentric system was real and not a mere figment because they believed "that the existence of harmonious order is a denial of randomness, and order and randomness are mutually exclusive. Moreover, anything that is random is meaningless, while anything that is orderly is significant."⁴⁷

⁴⁶Polanyi's theory of cosmological emergence constitutes a counterpart to his epistemology of creative thought, where evolution is traced to the intensification of higher level principles which transcend the conditions in which they operate. In the interests of relevance to the issues here, the theory will not be considered directly.

⁴⁷"Science and Reality," op. cit., p. 191.

It is this relation of reality and significance or order which leads Polanyi to reject the notion of the identity of reality with tangibility, a notion derived from the positivistic view of the identity of reality and observability.⁴⁸

For Polanyi the relation of reality and tangibility was not direct but inverse.

What is most tangible has the least meaning and it is perverse then to identify the tangible with the real. For to regard a meaningless substratum as the ultimate reality of all things must lead to the conclusion that all things are meaningless. And we can avoid this conclusion only if we acknowledge instead that the deepest reality is possessed by higher things that are least tangible.⁴⁹

⁴⁸It was radical positivism of the late 19th century which

. . . taught that science consisted merely in establishing functional relations between the data derived from our senses and that any claim that went beyond this was undemonstrable. A reality underlying mathematical relations between observed facts was a metaphysical conception, without tangible content. (Ibid., p. 178.)

⁴⁹"On the Modern Mind," op. cit., p. 15 (*italics his*). As a consequence of the inverse relation of reality and tangibility, the human mind is more real for Polanyi than the body.

At whatever level we consider a living being, the center of its individuality is real. For it is always something we ascertain by comprehending the coherence of largely unspecifiable particulars, and which we may yet expect to reveal itself further by an undetermined range of future manifestations. Thus the criteria of reality are fulfilled. The human mind in particular is real in this sense, and indeed more real than the lower centers of individuality. For an intelligent person's mind is expected to reveal itself over a far wider range of indeterminate manifestations, than the lower centers which control his growth or appetitive action. ("Knowing and Being," Mind, op. cit., p. 469.)

Reality, then, is given but its coherence is shaped by an act of personal knowledge, the act of indwelling by which meaningful patterns are appraised. It does not consist in random collocations of objects since the attribution of randomness presupposes the recognition of orderly pattern in terms of which randomness may be identified. Those meaningful patterns constitute reality, and their degree of reality varies directly with their potentiality for revealing an indeterminate range of future manifestations. "To say that an object is real," Polanyi maintains, "is to anticipate that it will manifest its existence indefinitely hereafter."⁵⁰ Polanyi then distinguishes clearly the meaningfulness and therefore the reality of comprehensive entities from simple inanimate objects which have come into existence by the spontaneous integration of chemical and physical forces, comprehensive entities which are such by virtue of the fact that their composition is due not to spontaneous integration but rather to principles which guide their activity. The consideration of such principles takes Polanyi's analysis of reality beyond its simple existence to that of its structure.

ii) The Structure of Reality: Operational Principles and Boundary Conditions

Comprehensive entities function for a purpose and this purpose is achieved by the characteristic interaction of their parts operating in conformity with certain principles

⁵⁰"Genius in Science," op. cit., pp. 44-45.

which are definitive of that entity. Such principles are not reducible to those parts, an irreducibility Polanyi illustrates by reference to a comprehensive entity in the form of a grandfather clock.

We have a solid tangible inanimate object before us—let us say a grandfather clock. But we do not know what it is. Then let a team of physicists and chemists inspect the object. Let them be equipped with all the physics and chemistry ever to be known, but let their technological outlook be that of the stone age. Or, if we cannot disregard the practical incompatibility of these two assertions, let us agree that in their investigations they shall not refer to any operational principles. They will describe the clock precisely in every particular, and in addition, will predict all its possible future configurations. Yet they will never be able to tell us that it is a clock. The complete knowledge of a machine as an object tells us nothing about it as a machine.⁵¹

The clock has tangible, independent existence, yet viewed as an object it is as meaningless as an independent datum of sense. Thus viewed, the clock has the minimal reality of the stone, yet it is more than a stone for it is composed of parts functioning in relation to a whole which, in turn, has as its purpose the telling of the time. Being more meaningful than the stone it is more real, but such reality can be grasped only in terms of its part-whole structure.

The parts of the clock, its particulars, are controlled by the laws of physics and chemistry in accordance with which it maintains its structure. However, it is a clock and not a mere random collocation of these parts. As a clock it is,

⁵¹ P.K., *op. cit.*, p. 330 (italics his).

then, not controlled by the laws of chemistry and physics but rather by the principles controlling the structural integration and operation of those parts. These principles, since they apply to a higher level than the laws of physics and chemistry, cannot therefore be accounted for by such laws. They are the operational principles of a comprehensive entity, of the clock itself.⁵²

This is Polanyi's principle of "dual control" which governs the operation of all comprehensive entities. The operational principles which control the functioning of the comprehensive entity, here the grandfather clock, constitute the higher principles while another set of principles, those of chemistry and physics, controls the parts of the clock. Both sets, of course, do not operate in independence of each other. The higher operational principles harness the "boundary conditions" left open by the operation of the lower principles. The principles of physics and chemistry governing the pieces of wood and metal of the grandfather clock do not require that this collocation of wood and metal be, in fact, a grandfather clock. It is the operational principles in the form

⁵²Polanyi classifies operational principles as being of three general sorts.

They can be laws of nature, like the laws of mechanics; or be principles of operation, like those of physiology, as, for example, those controlling muscular contractions and co-ordination; or they can be principles laid down for the use of artifacts, like the vocabulary of the English language or the rules of chess. ("The Body-Mind Relation," op. cit., p. 94.)

of structural principles derived from technology, which bestow a particular organization and purpose on the wood and metal. Although such structural principles rely on the lower principles of physics and chemistry for their functioning and such lower principles may account for the failure of the higher principles, the operational principles are not determined by the lower principles. The successful operation of the grandfather clock, in other words, cannot be fully accounted for by the laws of physics and chemistry since if the clock were smashed these laws would still continue to operate. The structural principles, however, would not. As the higher principles are not determined by the lower, so they cannot be reduced to them in explanatory terms. Where the operational principles determine the nature of the entity and how it is to be conceived, the lower principles function as the conditions only. This is why the complete physical and chemical description of the grandfather clock would never tell us what it is.

Polanyi extends the principle of dual or marginal control beyond that of machines to characterize all those entities constituted by a part-whole relationship. Implicit in such an extension is the teleological framework of explanation in terms of which such entities are to be apprehended. Such entities may be those conveying information and are irreducible, like the grandfather clock, to explanation based on lower level principles. The contents of a book, for example, cannot be reduced to a physical and chemical topography of paper and ink, nor can any message be similarly reduced to

that bearing the message.⁵³ Likewise, as one passes from the inanimate to the animate realm, the principle of dual control is seen to persist, with the difference that the structural operational principles of technology are replaced by the "organismic principles" of life. As the laws of inanimate nature were harnessed, in the case of the machine, by the structural principles of technology, so in the case of animate life they are harnessed by the operational principles of morphology at the macrocosmic level of evolution and by the operational principles of physiology at the microcosmic level of the individual sentient being. As the structural principles could not be explained in terms of the laws of physics and chemistry, so the laws of physiology resist similar formulation. But the laws of physiology leave open, in turn, their boundary conditions in terms of which such sensory-motor faculties may be directed, these being controlled by the operational principles of intelligent perception and behaviour, that is, of the mind. "Though the laws of physics and chemistry," Polanyi points out,

. . . apply to the particulars of the body, they do not determine the manifestations of the mind; their function is to offer an opportunity—an admittedly limited and pre-

⁵³Polanyi has applied the principle of dual control and teleological explanation to his theory of cosmological emergence by way of rejecting the view that the discovery of DNA accounts for a reduction of life to physics and chemistry. "If DNA is regarded as bearing a pattern that forms part of an organism and as transmitting information through this pattern," he points out, "then such a pattern is to be classed likewise as a morphological feature of the organism, and hence irreducible to terms of physics and chemistry." ("Life Transcending Physics and Chemistry," Chemical and Engineering News, Vol. XLV [August, 1967], p. 62.)

carious opportunity—for the mind to live and manifest itself. Our sense organs, our brain, the whole infinitely complex interplay of our organism offer to the mind the instrument for exercising its intelligence and judgement, and, at the same time, they restrict the scope of this enterprise, deflecting it by delusions, obstructing it by sickness, and terminating it by death.⁵⁴

Finally, and this points to the limits of the exercise of intelligence objectivist theory maintains would not exist in the absence of its impersonal criteria, the principles of intelligence leave open their own boundary conditions in terms of which such intelligence is to be exercised.

Just as the sensory-motor levels of life leave themselves open to the control of the intelligence, so the principles of intelligence leave open its powers to the still higher principles of responsible choice. Human beings exercise responsibilities within a social setting and a framework of obligations which transcend the principles of intelligence. Responsible choice in a convivial setting controls the indeterminate powers of intelligence and sets the boundary conditions for their operation.⁵⁵

The convivial setting within which the exercise of responsible choice takes place is constituted by the firmament of obligations functioning in the form of the ultimate premises upon which the modes of knowing within a culture are based and to which allegiance is implicitly given by those who exercise intelligence in those modes. At the level of culture operational principles cease to be merely functional and become normative. Structural principles here yield to

⁵⁴"Faith and Reason," op. cit., pp. 245-246.

⁵⁵"Transcendence and Self-Transcendence," op. cit., p. 91.

moral standards. Insofar as such standards are set by man as the measure of his achievements and that by which he must measure future achievements, they are personal, yet insofar as they are of universal intent in that they are seen to constitute the grounds for the quest for an independent reality, they are impersonal. And insofar as they are acknowledged as valid in terms of that quest, such standards lay down obligations to be fulfilled in the course of its pursuit. Paradoxically, Polanyi's highest stratum of reality presents man with standards which he himself has established, yet to which he must also submit. Yet such standards derive their sanction not by simple self-authorization but rather by their serving as the premises of man's affirmation as embodied in the various communities of superior knowledge to have made contact with an independent reality which has revealed itself to him, in its ever-deepening dimensions, in their light. In the same way in which such independent reality is not static but "emerges" through the dynamic harnessing of its own boundary conditions by its own operational principles to produce novel manifestations of itself, the most striking being the ascent from protoplasm to man, so such communities of superior knowledge resting upon the standards of responsible choice functioning as the operational principles of intelligence do not constitute the guardians of settled dogma. Rather they preside over a "dynamic orthodoxy," one whose survival "depends on its constant self-renewal through the originality of its followers."⁵⁶ Such originality, of course, may serve to alter

⁵⁶"The Republic of Science: Its Political and Economic Theory," in Grene, Knowing and Being, op. cit., p. 70. Polanyi's concept of "superior knowledge" is here considered only in its ontological context. Its epistemological function is treated below, pp. 388-392.

the very standards upon which a community rests, mirroring emergence in autonomous reality. Reality, then, is real in the sense that it is independent, yet reality attaches also to the premises through which it is cognized and made meaningful, that is, to the standards of responsible choice which ground superior knowledge. What remains to be considered is the manner in which reality is made meaningful, the manner in which it is accessible to mind.

c) Isomorphism: Indwelling in Reality

A stratified and hierarchical reality structured according to the principles of dual control is the ontological counterpart of tacit knowing; tacit knowing, structured according to one who either integrates subsidiary particulars into their joint appearance or makes them bear upon their focal target, is the epistemological counterpart of a hierarchical and stratified reality. In terms of tacit knowing, we dwell in the particulars of a comprehensive entity while attending focally to the coherence which that entity constitutes. In terms of a theory of a hierarchical and stratified reality, we dwell in the boundary conditions of a comprehensive entity while attending focally to its operational principles which give coherence to those conditions and render that entity meaningful. "Tacit knowing," Polanyi points out,

. . . integrates the particulars of a comprehensive entity and makes us see them forming the entity. This integration recognizes the higher principle at work on the boundary conditions left open by the lower

principle, by mentally performing the workings of the higher principle. It thus materializes the functional structure of tacit knowing. It also makes it clear to us how the comprehensive entity works by revealing the meaning of its parts. Here we have the semantic aspect of tacit knowing. And since a comprehensive entity is controlled as a whole by a higher principle than the one which controls its isolated parts, the entity will look different than an aggregate of its parts. Its higher principle will endow it with a stability and power appearing in its shape and motions and usually produce also additional novel features. Here we have the phenomenal aspect of tacit knowing. And finally, we are presented also with an ontological counterpart of the logical disintegration caused by switching our attention from the integrating centre of a comprehensive entity to its particulars. To turn our attention from the actions of the higher principle, which defines the two-levelled entity, and direct it to the lower principle controlling the isolated parts of the entity is to lose sight of the higher principle and indeed of the whole entity controlled by it. This mirrors the destruction of a comprehensive entity when it is pulled to pieces. The logical structure of tacit knowing thus covers in every detail the ontological structure of a combined pair of levels.⁵⁷

In uniting the (a) structure of tacit knowing, the dynamic triad in which the person attends from something to something else, throughout the (b) range of tacit knowing, from perception, skilful performance, the recognition of comprehensive entities, articulation, inference and knowing life, to the (c) process of tacit knowing in the form of an interiorization and projection, together with the concomitant characteristics of unspecifiability in the sense of irre-

⁵⁷"The Structure of Consciousness," op. cit., p. 218 (italics his).

ducibility and irreversibility of that process, all directed towards the recognition or comprehension of (d) an independent reality, the isomorphic relation of tacit knowing and reality becomes evident.

i) Indwelling in Perception

While it is the object in space which provides the image thrown on the retinas, the fact is that it is not one image but two, with a slight and explicitly unspecifiable difference between them. It is by means of indwelling in these two images that we integrate them into coherent sight, that we tacitly adjust the bifocal impressions in the act of localizing the object against its background. Yet both the images and the process of integration are unspecifiable in the sense that the images themselves cannot be explicitly distinguished nor can the act, once achieved, be reversed. "Neither the clues to integration nor the process of integration," Polanyi remarks, "can be described by the person performing the integration."⁵⁸ If an interiorization of the external clues to perception is provided by indwelling in them so as to yield localization, so a projective indwelling in the internal subliminal clues endows them with meaning in the form of the object on which they bear.⁵⁹ Destruction of meaning may result

⁵⁸"Science and Man," The Proceedings of the Royal Society of Medicine, Vol. 63 (September, 1970), p. 974.

⁵⁹In "Body and Mind," (op. cit., p. 202) Polanyi points out that:

Both the input and output of a neural process are meaningless, except for having a bearing on the mental experiences of the subject. There are neural processes which have no such bearing, because they are purely physiological functions—for example

from either unfocussing the bifocal impression or by dis-attending from or focally attending to, the subliminal clues. But, having been so integrated in the act of perceptual integration, the perceiver affirms his act in accrediting its object with reality. Such affirmation rests on the fact that perception is a conscious, purposeful act, one seeking "to satisfy standards which it sets to itself."

The muscles of the eye adjust the thickness of its lens, so as to produce the sharpest possible image of the object on which the viewer's attention is directed, and the eye presents to him as correct the picture of the object, seen in this way. This effort anticipated the manner in which we strive for understanding and satisfy our desire for it, by seeking to frame conceptions of the greatest possible clarity.⁶⁰

the functions of the sympathetic system. But I am concerned with the analysis of the conscious process. I can repeat therefore that the bearing by which we understand both the input and output of a neurological process must be established by ourselves, by our integration of the behavioural and neural signs of this input and output. The neural functions supply these signs but they do not supply their interpretation. (Italics his.)

⁶⁰ P.K., op. cit., p. 96. Since perception does not consist simply in the passive recording of retinal imprints, in cases of illusion the ordinary standards of correct perception are overridden to conform to higher standards of perception, tacitly incorporating past comprehension to correct present experience. Polanyi refers to an experiment of Ames in which a ball set against a featureless background is inflated and is seen, under ordinary standards of perception, to be coming closer. To be seen correctly, reference is made to a "primordial standard," one which "induces us to flout, in the case of the inflated ball, the contrary evidence of our retinal images."

Indeed, it induces us to intervene actively in producing false evidence of the ball's approach to our eyes, by a misplaced effort

Perception therefore satisfies both the structure of tacit knowing as well as its process, including that of interiorization and projection, its unspecifiability, and the affirmation of a reality thus perceived in conformity with standards which it has set to itself.

ii) Indwelling in Skills

The structure of skilful performance was seen to consist in the performer attending subsidiarily to the premises underlying the skill in question while he attended focally to its execution. As such a structure was also seen to be continuous with that found in perception, so also is the process of indwelling in skills continuous with its perceptual counterpart.

To ride a bicycle one interiorizes a complex pattern of muscular co-ordination in conformity with the premises of that skill while projecting forward one's focus, in the manner of the blind man with his stick, to the execution of that skill. It is such purposeful projection which serves to render the particulars on which it relies unspecifiable either in the sense of their being reducible to mechanical analysis or reversible in the sense of their being subject to formulation in explicit rules. Such irreducibility and irreversi-

of visual accommodation, undeterred by the fact that this destroys the sharpness and the binocular correspondence of our retinal images. The process illustrates clearly the active principle which seeks to establish a coherence between all the clues of visual perception, so that our subsidiary awareness of them in terms of what we see shall satisfy us of having truly comprehended the things seen. (Ibid., p. 97.)

bility is manifested, as with perception, in any attempt to teach their exercise by analysis or rule. "Rules of art can be useful," Polanyi points out in reference to these arts of doing," but they do not determine the practice of an art; they are maxims, which can serve as a guide to an art only if they are integrated into the practical knowledge of the art. They cannot replace this knowledge."⁶¹

In terms of an isomorphic relation between such indwelling and a stratified reality to which it corresponds, the successful performance of a skill like riding a bicycle may be said to be the outcome of a dwelling in the boundary conditions of that skill, the co-ordination of muscular patterns in conformity with the premises of balance, while attending focally to the operational principles which harness them. While we become unconscious of the actions by which we achieve a standard of performance in a skill, Polanyi remarks, "This lapse of consciousness is accompanied by a newly acquired consciousness of the experience in question, on the operational plane."⁶² Such experiences, in the exercise of skills, correspond to the reality of objects integrated into coherent wholes in acts of perception. And, as with the eye adjusting the thickness of its lens to produce the sharpest possible image of the object by way of satisfying standards of vision, so in the exercise of skills it is the impersonal standards of effective achievement which guide

⁶¹Ibid., p. 50.

⁶²Ibid., pp. 61-62.

and graduate the quality of the performance, from a minimum standard embodied in remaining upright on a bicycle to those, at the upper end of the scale, which mark the style and grace of the athlete or dancer.

iii) Indwelling in Acts of Skilful Knowing

Indwelling in the Recognition of Comprehensive Entities. The process of tacit knowing, involving the reliance on interiorized particulars while projecting focally to the object upon which they are made to bear or integrated into the appearance of that object, together with its characteristics of commitment, unspecifiability, impersonal yet self-set standards, and an isomorphic relation with the operational principles and boundary conditions of the reality which it engages, carries over from acts of perception and the performance of physical skills to the recognition and elucidation of comprehensive entities. With such recognition or elucidation of comprehensive entities, however, there lies a cognitive component setting it apart from lesser acts of indwelling. With the recognition of comprehensive entities we pass from simple perception and skilful doing to the act of comprehension.

Understanding—comprehension: this is the cognitive faculty cast aside by a positivist theory of knowledge, which refuses to acknowledge the existence of comprehensive entities as distinct from their particulars, and this is the faculty which I recognize as central to the act of knowing. For comprehension can never be absent from any process of knowing, as it is indeed

the ultimate sanction of any such act.
 What is not understood cannot be said to
 be known.⁶³

We understand a machine like the grandfather clock by indwelling in its particulars, the parts themselves and the boundary conditions left open by the assembly of those parts, while we attend focally to the principles of design and the purpose these principles subserve. The parts themselves are specifiable for we can take the clock apart and examine the pieces, but such an examination does not explain how the clock works. The principles of operation which comprehend the lower principles of physics and chemistry are, in the case of the clock, equally specifiable, being nothing more than the principles of engineering which constitute the clock as being a clock. While the principles at both levels are specifiable however, the operation of the clock can be understood only by an unspecifiable act of tacit integration in which the two are mutually comprehended and it is upon the basis of this integration that the reality of the clock is affirmed.

Similarly, we comprehend a familiar physiognomy by interiorizing the features which are relied upon subsidiarily while projecting them into their joint image, the face itself. The act is unspecifiable since the face cannot be recognized by a reduction to its features. Similarly, the act is irreversible since once recognized the face will remain familiar.

⁶³"The Scientific Revolution," op. cit., pp. 291-292.

Yet the act of tacit knowing manifested in the recognition of a familiar physiognomy submits to its own standards of correctness, that it is this face and not another which one has recognized, and further, it affirms that it is real, that it is not an arbitrary integration without correspondence to reality.

Similarly, comprehensive entities are elucidated as well as simply recognized. The diagnostician attends from the symptoms which he has interiorized to project focally to their meaning, the suspected disease, yet this tacit integration resists either reductive explanation given in terms of those symptoms or in terms of reversible rules of procedure by which they might be integrated on their bearing. Whether it be in the form of the disease of the diagnostician, the specimens of the taxonomist, the bouquet of the wine-taster, or the texture of the cotton-classer, the range of unspecifiability in the elucidation of comprehensive entities surpasses that entailed in their simple recognition not so much on the grounds of the indeterminate quality of the interiorized particulars but rather on the basis of the ineffable quality of projection. For here skilful knowing involves what Polanyi has called "connoisseurship," the art of skilful knowing which can be specified only in vague maxims which presuppose rather than replace a tacit knowledge of their objects.⁶⁴ For the

⁶⁴ Connoisseurship for Polanyi is not limited to everyday pursuits but is intrinsic to the practice and teaching of science itself.

Whenever connoisseurship is found operating within science or technology we may assume that it persists only because it has not been possible to replace it by a measurable grading. . . . The large amount of time

adept practitioners of these arts of skilful knowing however, the standards by which they are exercised are self-set yet are impersonal in the sense that effective practice is determined by reference to them as well as in the sense that the entities elucidated are real, subsisting independently of any particular act of elucidation.

Indwelling in Articulation. As reality varies inversely as to its tangibility and as, with language, we pass from a meaning consisting in an object to one consisting in a conception, articulation constitutes at one time the most intense manifestation of indwelling and that in terms of which the most real is endowed with comprehension. For Polanyi:

Indwelling is most vivid in man's use of language. Human intelligence lives only by grasping the meaning and mastering the use of language. Little indeed of our minds lives in our natural body; our person comes into existence when our lips shape words and our eyes read print.⁶⁵

It is in this grasping the meaning of language and in mastering its use that the process of indwelling in our articulate frameworks becomes palpable. Viewed focally in itself the word is as meaningless as the unintegrated data of sense or the uncomprehended particulars of a comprehen-

spent by students of chemistry, biology and medicine in their practical courses shows how greatly these sciences rely on the transmission of skills and connoisseurship from master to apprentice. It offers an impressive demonstration of the extent to which the art of knowing has remained unspecifiable at the very heart of science. (Ibid., p. 55.)

⁶⁵"The Scientific Revolution," op. cit., p. 296.

sive entity. It is by virtue of the conception, the articulate counterpart of the perceptual whole or the integrated comprehensive entity, that the word is made meaningful and it is upon the conception that awareness in language is directed.

The process of indwelling in articulation which seeks either to render apposite the relation of word and concept in the act of endowing the word with meaning, or that which seeks to render apposite the relation of word and concept in the act of comprehending the meaning of the word, varies as one speaks or writes or as one listens or reads.⁶⁶ The former Polanyi has called "conceptual subsumption," the latter "conceptual exemplification." Both are illustrations of man's powers of indwelling in the form of an interiorization and

⁶⁶The distinction between word and concept which is central to tacit knowing in articulation distinguishes such knowing from that as given in linguistic philosophy where it is vague if it exists at all. For Polanyi we shape our conceptions in a manner similar to that in which we make clear the things we see.

In both cases we pick out clues which seem to suggest a context in which they make sense as its subsidiary particulars. This may resolve the paradox that we intellectually owe so much to articulation, even though the focus of all articulation is conceptual, with language playing only a subsidiary part of this focus. For since the conceptions conveyed by speech, when speech is properly understood, make us aware both of the way our speech refers to certain things and of the way these things are constituted in themselves, we can never learn to speak except by learning to know what is meant by speech. So that even while our thoughts are of things and not of language, we are aware of language in all our thinking (so far as our thinking surpasses that of the animals) and can neither have these thoughts without language, nor understand language without understanding the things to which we attend in such thoughts. (P.K., op.cit., p. 101.)

projection within the framework of articulation where words are integrated with their conceptual meanings either in the sense of being made to bear upon that conception or recognized as instances of it. Both are unspecifiable either in terms of a reduction to either of their separate components or in terms of a formal procedure of derivation, in terms of any "rules of language." Both conceptual subsumption and conceptual exemplification constitute the answer of tacit knowing to the problem of universals, how a general term can be made to comprehend a multitude of instances which fall under it, instances which differ in every particular. Our conception of "man," as Polanyi points out, is formed by subsuming particular instances of man upon which we rely tacitly in the act of making them bear upon their conceptual focus.

It arises by the tacit integration of countless experiences with different human beings: with men and women, with black, white and yellow people, with people of all ages, people long dead and with countless others who too have reached us only by reports of them. All these encounters are included in forming the conception of man; they are all used subsidiarily with a bearing on the conception of man, which is what we denote by the word 'man.'⁶⁷

Correspondingly, as the instances of a general term are integrated as a pointer to the conception which comprehends those instances, a general term, in the act of conceptual exemplification, may be relied upon as a pointer to its instances. "When reading about meadows, churchbells and village

⁶⁷"Sense-Giving and Sense-Reading," in Philosophy, op. cit., p. 310.

folk," Polanyi remarks in respect to relying subsidiarily on the concepts involved,

. . . we can readily think of possible examples of them. In a description composed of a number of general terms these will mutually restrict the range of their possible instances, and this is what a description conveys to the reader.⁶⁸

As with language we pass from a meaning consisting in an object to one consisting in a conception, so the projective

⁶⁸Ibid., p. 311. Polanyi's reference to the mutual restriction of general terms relative to the range of their possible instances is grounded in his theory of "intensions." Having dismissed language games, linguistic rules and the appeal to "open texture" of terms to account for the relation of words and their meaning as pseudosubstitutions, he writes that:

I suggest that we should be more frank in facing our situation and acknowledge our faculties for recognizing real entities, the designations of which form a rational vocabulary. I believe that a classification made according to rational criteria should form groups of things which we may expect to have an indefinite number of properties in common, and that accordingly the terms designating such classes will have an intension-referring to an indefinite range of uncovenanted common properties shared by the members of that class. The ampler the intensions of a key feature, the more rational should be as a rule the identification of things in its terms and the more truly should such classifications reveal the nature of the classified objects; while classifications made according to terms having no intension should be rejected as purely artificial, unreal, nonsensical; unless they are designed purely for convenience as, e.g., an alphabetic register of words. (P.K., op. cit., pp. 114-115.)

Polanyi identifies three strata of such intensions, passing from the readily specifiable properties of a class of things, through a second stratum consisting of "the known but not readily specifiable properties which these things share," (ibid., p. 115) such as "justice," to the third, that "formed by the indeterminate range of anticipations expressed by designating something." (Ibid., p. 116) The third and deepest strata consists of those things "which only future discoveries may reveal—confirming thereby the rightness of the conception conveyed by our term." (Ibid.)

feature of indwelling in articulation becomes more pronounced than that found in perception, skilful performance, or the recognition of comprehensive entities. Whether meaning is established in the form of a conception attended to focally by an act of integration in which we dwell subsidiarily in the word to which it points, or whether it is established by indwelling in the conception by way of comprehending the instances which it governs, a projective effort or striving to make sense is frequently involved since the conception to be conveyed or grasped may lack clear specification. It is in the innovative use of language that the heuristic powers of tacit integration prefigured at the lower levels of conscious activity gain in intensity. "We can speak as we do," Polanyi maintains in reference to this projective feature of indwelling in articulation,

. . . because we feel that many thousands of words are available for our novel purposes, and we can trust the powers of our imagination, bent on this purpose, to evoke from these available resources the implementation of our purpose, just as our intention to raise our arm evokes the coordination of nerves and muscles in the accomplishment of this intention.⁶⁹

⁶⁹"Reconstruction," in Meaning, op. cit., p. 58 (italics his). Polanyi has elsewhere pointed to the heuristic powers of tacit integration involved in routine physical activities such as raising one's arm. In "The Creative Imagination," (M. Grene, ed., Towards a Unity of Knowledge, Psychological Issues, Vol. VI, No. 2, Monograph 21 [New York: International Universities Press, Inc., 1969]) he writes that:

When I intend to lift my arm, this intention is an act of my imagination. In this case imagining is not visual but muscular. An athlete keyed up for a high jump is engaged in an act of muscular imagination. But even in the effortless lifting of an arm, we can recognize a conscious intention, an act of the imagination, distinct from its

This intensification of the projective feature of indwelling in the act of articulation, particularly in the production of novel utterance, works to increase the coefficient of unspecifiability in its performance, together with the characteristics of commitment and self-accreditation. Indeed, in the confident use of language, commitment and self-accreditation become themselves the fundamental features of that unspecifiability, being resistant to reduction in the form of an objectivist analysis of usage or to a procedural reversibility in the form of rules in terms of which the validity of such confident assertion may be tested. In the act of articulation the tacit coefficient is itself an affirmation of confidence in the rightness of that act, certifying the appositeness of the word and the reality of the conception it is meant to denote. Any attempt to objectivize this tacit coefficient, to render it impersonal by an analysis of usage from which criteria of meaning are to be impartially derived is, as Polanyi points out, self-contradictory.

muscular execution. For we never decree this muscular performance in itself, since we have no direct control over it. The delicately coordinated feat of muscular contractions can be made to take place only spontaneous, as a sequel to our imaginative act. . . . We may say that we have a focal awareness of lifting our arm, and that this focal act is implemented by the integration of muscular particulars. (p. 62, italics his.)

Any philosophy that sets up strictness of meaning as its ideal is self-contradictory. For if the active participation of the philosopher in meaning what he says is regarded by it as a defect which precludes the achievement of objective validity, it must reject itself by these standards.⁷⁰

The alternative to self-contradiction in the course of analyses of usage by which accreditation is purportedly withdrawn from one's own utterance in the interests of objectivity is not a refined clarity in the view of the concepts thereby uncovered but rather meaninglessness. The risks involved in the act of articulation are unavoidable.

⁷⁰P.K., op. cit., pp. 252-253. Any attempt to set up such strict criteria of meaning as, for example, that found in the analysis of usage, simply smuggles into such criteria its own tacit coefficient by which it accredits to itself the aptness of the usage employed in the analysis. "Phrases like 'it is commonly agreed,' or 'it will hardly be doubted,'" Polanyi observes,

. . . are literally statements about what people are supposed to believe or not expected to doubt, yet they are commonly understood as declaring the certainty of the beliefs in question. Or take words like 'science' and 'scientist.' A neutral analysis of science as a system of beliefs should always use the word 'science' and 'scientist' in quotation marks, in the way the Soviet Academy refers to bourgeois 'science' and bourgeois 'scientists.' The confident use of any expressions including the word 'science,' or its derivatives like 'scientific method,' 'scientific observation,' 'natural law,' etc., conveys the writer's beliefs in a certain body of allegations, in the rightness of a certain procedure for arriving at such allegations and of confirming them, without his ever having taken the responsibility for affirming this belief. The use of the scientific idiom by writers on scientific method establishes in fact from the start a tacit understanding between them and their readers on the trustworthiness of the method which they are setting out to analyse. ("The Stability of Beliefs," The British Journal for the Philosophy of Science, Vol. III, No. 11 [November, 1951], p. 231.)

We may place a word in quotation marks, while using language confidently through the rest of the sentence. But the questioning of each word in turn would never question all at the same time. Accordingly, it would never reveal a comprehensive error which underlies our entire descriptive idiom. We can, of course write down a text and withdraw our confidence from all of its words simultaneously, by putting each descriptive word between quotation marks. But then none of the words would mean anything and the whole text would be meaningless. The hazards of confidence inherent in attaching a meaning at least to some set of descriptive terms are ineradicable.⁷¹

If the process of indwelling in articulation cannot be reduced to the outcomes of an objective analysis of usage so that the concept upon which it bears may be clarified without tacit remainder, any similar attempt at clarification by appeal to reversible rules of language in accordance with

⁷¹ P.K., op. cit., p. 251 (*italics his*). Similar hazards, Polanyi maintains, attach to assertions of fact.

Unless an assertion of fact is accompanied by some heuristic or persuasive feeling, it is a mere form of words saying nothing. Any attempt to eliminate this personal coefficient, by laying down precise rules for making or testing assertions of fact, is condemned to futility from the start. For we can derive rules of observation and verification only from examples of *factual* statements that we have accepted as true before we knew these rules; and in the end the application of our rules will necessarily fall back once more on *factual* observations, the acceptance of which is an act of personal judgement, unguided by any explicit rules. And besides, the application of such rules must rely all the time on the guidance of our own personal judgement. This argument formally confirms the participation of the speaker in any sincere statement of fact. (*Ibid.*, p. 254, *italics his*.)

which one may proceed from word to concept and back meets with little more success. The reason for this is that there are no such rules. The relation of word and concept is comprehensible, Polanyi points out,

. . . only if we use language as it exists to direct our attention to its subject matter and not the other way around, selecting instances of relevant cases to direct our attention to the use of language. 'Grammar' is precisely the total of linguistic rules which can be observed by using a language without attending to the things referred to.⁷²

To indwell in articulation, then, is to fulfil the characteristics of both the process of tacit knowing and its contact with reality here understood as that conception to which language points. It is an interiorization of the word attended to subsidiarily in relation to the concept which is the focal target of that word. The process is unspecifiable, being irreducible to an analysis of its terms and irreversible in the sense that it is inexplicable by formal rule, yet it incorporates the characteristics of commitment to self-set standards of rightness peculiar to all acts of tacit knowing, standards in terms of which the conception on which it bears is accredited as an aspect of reality. Such accreditation, of course, is the accreditation of the truth of the affirmation, and such, for Polanyi, is the only way in which one can speak of the truth.

The only sense in which I can speak of the facts of the matter is to make up my

⁷²Ibid., p. 114 (*italics his*).

own mind about them. In doing so I may rely on an existing consensus, as a clue to the truth, or else may dissent from it, for my own reasons. In either case my answer will be made with universal intent, saying what I believe to be the truth, and what the consensus ought therefore to be. This is the only sense in which I can speak of the truth, and though I am the only person who can speak of it in this sense, this is what I mean by the truth.⁷³

Indwelling in Inference: Deductive Inference. The view that one may remove the occasion for the exercise of personal judgement by means of a formalization of such judgement in terms of an appeal to the acceptance of rules for manipulating symbols which are taken to stand for a reality

⁷³ Ibid., p. 316. For Polanyi this is being neither solipsistic nor relativistic.

This position is not solipsistic, since it is based on a belief in external reality and implies the existence of other persons who can likewise approach the same reality. Nor is it relativistic. This is already apparent from the previous paragraph, but may be stated in more formal terms as follows. The concept of commitment postulates that there is no difference, except in emphasis, between saying 'I believe p' or '"p" is true.' Both utterances emphatically put into words that I am confidently asserting p, as a fact. This is something I am doing in uttering the words in question, and is quite different from my reporting that I have done this in the past, or that somebody else has either done this or is doing it now. If I report 'I believed p,' or 'X believes p,' I am not committing myself in respect to p and hence no utterance linking 'p' to 'true' corresponds to these reports; they issue in no assertion of the sentence p as true, be it in relation to my own past or to other people's beliefs. There remains therefore only one truth to speak about. (Ibid.)

subsisting in independence of that acquired by the process of indwelling overlooks the fact that such a logical reality and the symbolic manipulations which constitute it

. . . denote not a state of affairs, but the transformation of one conception of a state of affairs into another conception of it that is implied in the first. They evoke the conceptual transformation which they symbolize in the same way as a descriptive term like 'cat' evokes the conception for which it stands. The tacit component of a formalized process of reasoning is broadly analogous to that of a denotation. It conveys both our understanding of the formal manipulations, and our acceptance of them as right.⁷⁴

The realization of what a formalization of reasoning is, that is, that it consists of the replacement of the terms of language with symbolic notation together with the acceptance of what these symbols stand for and the rules of operation by which they may be manipulated, leads to the further realization that the operation of that formal system demands an exercise of personal judgement comparable to that employed in articulation. In the way that a definition as the formalization of meaning in articulation cannot be complete in the sense that the definiens cannot be understood by anyone who is not conversant with the definiendum, so "the meaning of a formalism lies in our subsidiary awareness of it within a conceptual focus sustained in terms of this formalism, and is necessarily absent therefore in operations carried out on symbols seen quite impersonally, as objects."⁷⁵ To dwell in

⁷⁴ Ibid., p. 118.

⁷⁵ Ibid., p. 119.

a formalism is to interiorize it in the sense of relying upon it in relation to the purpose it is intended to serve, in a manner similar to that in which the blind man relies on his cane to identify that with which it comes into contact.⁷⁶

Correspondingly, as such objects constitute the projective focus of the one relying on the cane, so the projective characteristic of indwelling in a formal system lies in a focal awareness of the purpose that system is intended to achieve, a purpose formulated in terms of a formal proof. Yet, as Polanyi points out,

A formal proof proves nothing until it induces the tacit conviction that it is binding. Thus the alternation between the intuitive and the formal depends on tacit affirmations both at the beginning and at the end of each chain of formal reasoning.⁷⁷

Whether or not a formal proof will be conceived of as binding is, of course, not itself the outcome of an antecedent

⁷⁶The instrumental quality of formal systems and their dependence upon the human mind is emphasized by Polanyi also in the context of the debate as to whether machines can think.

A formalized deductive system is an instrument which requires for its logical completion a mind using the instrument in a manner not fully determined by the instrument; while the mind of the person using the instrument requires no such logical completion. A person can carry out computations with the aid of a machine (or formal system) or without it, but a computing machine cannot be said to operate except within a tripartite system. ("The Hypothesis of Cybernetics," The British Journal for the Philosophy of Science, Vol. II [February, 1952], p. 314, italics his.)

⁷⁷"Problem-Solving," The British Journal for the Philosophy of Science, Vol. VIII, No. 30 (August, 1957), p. 102.

chain of formal reasoning but rather the outcome of a tacit conviction grounded upon standards of personal assessment. Unlike the formal system which they support, such standards derive from the initial conception of the state of affairs of which the formal system is a secondary transformation. That initial conception cannot be reduced to a paraphrase of its cognitive content which one meets in such systems nor, since it is the product of a prior and more generalized subsidiary awareness which works to endorse the acceptance of a formal proof as binding, is it reversible like that formal proof with its own premises.

Indwelling in Inference: Inductive Inference. The consideration of the structure of tacit knowing has revealed that inductive inference as viewed by objectivist theory as the paradigm of knowing in its scientific embodiment leaves open explanatory lacunae which are inexplicable in terms of that theory. Where the view is that science proceeds by establishing a hypothesis which is then subjected to experimental testing aimed at either verifying or falsifying the functional relationships between observed data, all guided by the ideal of a strict detachment, it has been seen that such observation destroys rather than engenders meaning. Objectivist theory is silent as to the point one stops "observing" and begins interpreting, as it is in respect to the basis upon which some observations are selected as instances which belong together while others are rejected as irrelevant. As in perception where one cannot focally attend to an object

independently of relying upon the subliminal and marginal clues by virtue of which it acquires coherence, so one cannot observe the data of science in independence of a background theory in terms of which they are comprehensible.⁷⁸ Indeed, in scientific discovery such data cease to be the objects of focal awareness, becoming rather subsidiary to that upon which they bear.⁷⁹ There is no impersonal activity of observation any more than there are autonomous facts. Similarly, the attempt at a formalization of inductive inference by way of the hypothetical-deductive method leaves open the question of

⁷⁸Even if it were granted that there exist no observations apart from background theory, the relationship between such theory and the observations made in its light is not deductive. Polanyi illustrates the relation between observation and theory by reference to the exact science of astronomy.

Astronomers can merely compute from one set of numbers, which they identify with the position of a particular planet at a particular time, another set of numbers, which will represent its position at a future moment of time. But no formula can foretell the actual readings on our instruments. These readings will rarely, if ever, coincide with the predicted numbers as computed from Newton's laws, and there is no rule—and can be no rule—on which we can rely for deciding whether the discrepancies between theory and observation should be shrugged aside as observational errors or be recognized, on the contrary, as actual deviations from the theory. The assessment in each case is a personal judgement. ("Personal Knowledge," in Meaning, op. cit., p. 30, italics his.)

⁷⁹"We may say," Polanyi points out, "that a scientific discovery reduces our focal awareness of observations into a subsidiary awareness of them, by shifting our attention from them to their theoretical coherence." ("The Logic of Tacit Inference," op. cit., p. 3.)

the genesis of the hypothesis in the light of which the data are to be observed and tested, the nature of the deduction in terms of which an empirical generalization may be established as valid, and, in the event that it cannot be so established, the formal procedure by which it may be falsified. All explicit forms of reasoning then, for Polanyi, "whether deductive or inductive, are impotent in themselves; they can operate only as the intellectual tools of man's tacit powers reaching towards the hidden meaning of things."⁸⁰ How, then, do such tacit powers function in science? How does one come to indwell in reality so that one might grasp the as-yet uncomprehended coherence in the nature of things? In the theory of personal knowledge it is the process of scientific discovery which is paradigmatic for all understanding and learning as it most vividly illustrates the struggle from a state of incomprehension to one of knowing the meaning of a reality hidden from, yet accessible to, the integrating powers of the mind. Such discovery was not the product of the formalized procedures of deductive or inductive inference but rather of the unformalized procedures of tacit inference.

Tacit Inference in Scientific Discovery. "The progress of science," Polanyi maintains,

. . . falls into three main periods. The first is the sighting of a problem and the decision to pursue it; the second, the quest for a solution and the drawing of a

⁸⁰"Faith and Reason," op. cit., p. 243 (*italics his*).

conclusion: the third, the holding of the conclusion to be an established fact.⁸¹

A problem for Polanyi is not the sort of thing set to students but one the solution of which is unknown. Further, it is not a hypothesis, such being rather the explicit conjectures offered by way of the solution of the problem.⁸² A problem, of course, is not a problem unless it is recognized as being a problem. A problem in chess is not a problem to a chimpanzee. The sighting of a problem in the theory of personal knowledge consists in the exercise of a skill pre-figured in a natural sensibility by which hidden patterns are discerned, a skill manifested in scientific discovery as inuitive foreknowledge.

I have spoken of our powers to perceive a coherence bearing on reality, with its hidden future manifestations. But there exists a more intensely pointed knowledge of a hidden coherence: the kind of foreknowledge we call a problem. And we know that the scientist produces problems, has hunches, and, elated by these

⁸¹"Genius in Science," op.cit., p. 11. In "Problem-Solving," (op. cit.) Polanyi employs Poincaré's terminology of "Preparation," "Illumination," and "Verification."

⁸²"Is a problem a hypothesis?" Polanyi asks.

It is something much vaguer. Besides, supposing the knowing of a problem were replaced by the setting up of a hypothesis, such a hypothesis would have to be either one formulated at random or so chosen that it has a fair initial chance to be true. If the former, its chances of proving true would be negligible; if the latter, we are left with the question how it is arrived at. (The Unaccountable Element in Science," Philosophy, op. cit., p. 13.)

anticipations, pursues the quest that should fulfill these anticipations. The quest is guided throughout by feelings of a deepening coherence and these feelings have a fair chance of proving right. We may recognize here the powers of a dynamic intuition.⁸³

Such foreknowledge of a problem, evoked by intimations of a hidden coherence in reality, is one aspect of the dynamic intuition, the "unaccountable element in science." It is, however, nothing more than an intensification of those principles found to guide acts of perception, the performance of skilled feats, the production of novel sentences, and the recognition or elucidation of comprehensive entities. For all consciousness in the theory of personal knowledge is vectorial, serving to guide all purposive human activity in all its manifestations.

In the quest for a solution to the problem revealed to it by relying subsidiarily on the accepted framework of science, a framework which provides the general clues to discovery as perceptual experience does to sight, the quality of intuition becomes less anticipatory and more strategic. In the context of the pursuit, Polanyi distinguishes such strategic intuition from the more broadly heuristic imagination. Where the imagination is deliberate and active, the intuition is rather "a spontaneous process of integration."

⁸³"The Creative Imagination," op. cit., p. 60. In "Sense-Giving and Sense-Reading" (op. cit.) Polanyi refers to such foreknowledge as an "anticipatory intuition," a faculty which surpasses the recognition of unexplained regularities, deviations from such regularities, or conflicting principles which "can merely offer a possible occasion for discovery: they do not tell us how to make a discovery." (p. 321.)

It is intuition that senses the presence of hidden resources for solving a problem and that launches the imagination in its pursuit. It is also intuition that forms our surmises in the course of this pursuit and eventually selects from the material mobilized by the imagination the relevant pieces of evidence and integrates them into the solution of the problem.⁸⁴

Where the anticipatory intuition might be seen as roaming and speculative in nature, the strategic intuition on the scent of discovery becomes more focussed on an as yet empty but intimated target, harnessing the imaginative "casting the mind forward" by way of "clues of feasibility" which it furnishes to the imagination. The process continues until the pieces of evidence are integrated spontaneously into the solution with the act of discovery. Here the strategic intuition gives way to the creative intuition.

Discovery is therefore made in two moves: one deliberate, the other spontaneous, the spontaneous move being evoked in ourselves by the action of our deliberate effort. The deliberate thrust is a focal act of the imagination, while the spontaneous response to it, which brings discovery, belongs to the same class as the spontaneous coordination of muscles responding to our intention to lift our arm, or the spontaneous coordination of visual clues in response to our looking at something. This spontaneous act of discovery deserves to be recognized as creative intuition.⁸⁵

⁸⁴"Reconstruction," in Meaning, op. cit., p. 60.

⁸⁵"The Creative Imagination," op. cit., pp. 65-66 (italics his). Discovery, like the more mundane problem-solving, is an irreversible heuristic act in the sense that one can never be puzzled again by the same difficulty. If it were reversible, one could trace the procedure backward to one's initial state of puzzlement. "Accordingly," Polanyi points out, since true discovery is not a strictly logical performance, "we may describe the obstacle to be overcome in solving a problem as a 'logical gap,' and speak of the width of the logical gap as the measure of the ingenuity required for solving the problem." ("Problem-Solving," op. cit., p. 93.)

The credit for the act of discovery is then twofold. On the one hand it is the imagination which "imposes on the intuition a feasible task," while, on the other, it is the intuition "which rises to this task and reveals the discovery that the quest was due to bring forth. Intuition informs the imagination, which, in its turn, releases the powers of the intuition."⁸⁶

With verification, or validation as Polanyi prefers to call it, the last of the three stages of the act of discovery is reached. Where the initial sighting of the problem was governed by the deliberate processes of the anticipatory intuition and where the act of discovery itself was identical to the spontaneous integration of creative intuition, the holding of that discovery to be an established fact rests on a final intuition.

When the quest has ended, imagination and intuition do not vanish from the scene. Our intuition recognizes the final result to be valid, and our imagination points to the inexhaustible future manifestations of it. We return to the quiescent state of mind from which the inquiry started, but return to it with a new vision of coherence and reality. Herein lies the final acceptance of this vision; any new standards of coherence implied in it have become our own standards, we are committed to them.⁸⁷

Scientific discovery then manifests the range of characteristics associated with tacit knowing, of which it is the exemplar. There is the dynamic interiorization and projection

⁸⁶ Ibid., p. 66 (*italics his*).

⁸⁷ Ibid.

of consciousness, relying on clues which are unspecifiable in that act while integrating them in an equally unspecifiable manner in a bearing on their focus, which, in the case of discovery, is also unspecifiable. Yet such a focus is taken to betoken a reality which the integrating powers of the mind recognize as autonomous, a reality to which it accedes as the impersonal standard by which its exercise is delimited.

Further, scientific discovery as with creative thought generally constitutes the upper reaches of the isomorphic relationship between the knower and the known. The questing imagination guided by the anticipatory powers of intuition jointly function as the operational principles of discovery and creative thought, which, although rooted in the boundary conditions of the conceptual framework within which the mind lives, attain a level of coherence inaccessible to that conceptual framework. In discovery and creative thought, in other words, the operational principles transcend their own boundary conditions, a transcendence which itself transcends the principle of dual or marginal control where the higher faculty always operates through the levels below it, levels which serve to circumscribe the exercise of that higher faculty even to the point of accounting for its failure. In a manner comparable to that of cosmological emergence whereby the intensification of the higher principle serves to bring forth new life forms, creative thought makes contact with a reality lying beyond the conditions through which that creative thought operates. This, for Polanyi, is the paradox of all truly creative activity.

If it be true that no higher level can be accounted for by the operations of a lower level, then no effort of ours can be truly creative in the sense of establishing a higher principle not intrinsic to our initial conditions. Yet this is what all great art, great thought, and great action must aim at. And this is how these efforts have, in fact, built up the heritage in which our minds grow up and live.⁸⁸

Knowing Life. We understand a machine like the grandfather clock by indwelling in its parts and the boundary conditions left open by the lower principles governing those parts while attending focally to the principles of design and purpose which comprehend those boundary conditions. The parts are specifiable in themselves for we can take the clock apart and examine the pieces, but such an examination does not explain how the clock works. As the operational principles of the clock are nothing more than the principles of engineering or technology comprising its comprehensive features, they in their turn are equally specifiable. In spite of the fact that both the principles regulating the functioning of the parts and those comprehending its structure are specifiable, the operation of the clock as a comprehensive entity can be understood only by a tacit act of integration in which the one is relied upon subsidiarily while attending focally to the other.

Such specifiability does not extend to the parts and wholes of living specimens. Although we indwell in the particulars of the specimen while integrating them into a

⁸⁸"Science and Man's Place in the Universe," op. cit., p. 75.

focal awareness of its typical appearance, we cannot exhaustively specify what these particulars are nor that by virtue of which they satisfy the standards of being true to their type. Living things function as autonomous centres of activity to which is attributed either success or failure on grounds which escape strict formulation. Healthy growth and typical shape mark the assessments of success of the operational principles at the vegetative level, but there are no formulae by which such assessments may be objectively applied, such formulae depending rather upon prior accreditation of standards of rightness gained by previous acts of indwelling in numerous examples of the sort to which we now focally attend.

As we ascend the scale, from comprehending the functions of machines through vegetative life to that of an understanding of animal behaviour, our indwelling deepens, being here a matter of integrating the particulars of such behaviour in their bearing upon a focal awareness of activity and purpose marked by an originality which is not accountable in terms of the principles regulative of lower life forms.⁸⁹

⁸⁹ Polanyi distinguishes personal knowledge of an animal's purposive activity from the sort of knowledge derived from a behaviouristic observation of that activity.

Behaviourists teach that in observing an animal we must refrain above all from trying to imagine what we would do if placed in the animal's position. I suggest, on the contrary, that nothing at all could be known about an animal that would be of the slightest interest to physiology, and still less to psychology, except by following the opposite maxim of identifying ourselves with a centre of action in the animal and criticizing its performance by standards set up for it by ourselves.
(P.K., op. cit., p. 364.)

As the principles of chemistry and physics were incapable of explaining the operations of a machine as well as that of vegetative functioning, so the overt manifestations of bodily movement comprehended by the principles of physiology are incapable of explaining purpose and originality inherent in intelligent animal life.

Similarly, we can know the mind of another human being only by relying on its overt workings which are viewed subsidiarily while attending directly to that rendering such workings coherent, that is, to the mind of that human being. As we do not observe the clues of perception in the act of integrating them into their joint image, as we do not observe the words of a text while comprehending that which the text denotes, so we do not observe the workings of the mind but rather read them as indicators to that upon which they bear. And, as the clues of perception are not to be equated with their joint image and as the words of a text are not identified with that upon which they bear, so such workings are not to be equated with the mind itself. Both are distinct entities.. While the mind relies on the continued operations of the body for it cannot exist apart from or independently of it, such operations derive their coherence from the mind. The lower-level bodily principles may explain the failure of the mind's operations but they

cannot account for their success.⁹⁰ The body-mind relation is that of a dualism, not an identity, but it is a dualism relative to the knowledge of that mind.

The theory of tacit knowing, while it also tells us that we do not know another mind by a process of inference, nevertheless retains the dualism of mind and body in this sense: it says that the body seen focally is one thing, while the body seen subsidiarily points to another thing: these two things are the body and the mind.⁹¹

To indwell in another's mind is therefore to indwell in a reality stratified according to the principle of dual control in which we attend from the lower while focally attending to the higher.⁹² In addition, the nature of the process of indwelling

⁹⁰Polanyi extends his criticism of behaviourism as it applies to comprehending animal behaviour to the comprehension of man's mind. The "impossibility of behaviourism" follows from the fact that

. . . we can identify tangible manifestations of mental processes only by first recognizing the mind at work in them; that in fact a rational pattern of behaviour must be comprehended as a whole, before we can set out to analyse it; and finally that if we did succeed, per impossibile, in keeping track of the elements of mental behaviour without reference to mind, these particulars, observed in themselves, would remain meaningless, and experiments conducted with these meaningless fragments would also be meaningless. ("Tacit Knowing: Its Bearing on Some Problems in Philosophy," in Grene, op. cit., p. 169.)

⁹¹"Reconstruction," in Meaning, op. cit., pp. 46-47.

⁹²Where reality varies inversely as to tangibility, Polanyi points out that:

The human mind in particular is real in this sense, and indeed more real than the lower centers of individuality. For an intelligent person's mind is expected to reveal itself over a far wider range of indeterminate manifestations than the lower centers which control his growth or appetitive action. ("Knowing and Being," in Grene, op. cit., pp. 135-136.)

in another's mind changes from the process of indwelling in lesser comprehensive entities, becoming less a matter of "connoisseurship" and more a matter of "conviviality." Connoisseurship attaches to the exercise of skilful knowing as the tacit base of the observation of inanimate entities. Conviviality attaches rather to the quality of indwelling in animate existence, rising from a relation of empathy with animal life in the course of the observation of its behaviour to that characterizing the comprehension of another's knowledge, another who stands on a plane equal with ourselves and in whose mind we see our own reflected. "For if we agree with that which the other person claims to know and with the grounds on which he relies for this knowledge," Polanyi maintains, "the critical examination of this knowledge will become a critical reflection of our own knowledge."⁹³

Such convivial indwelling Polanyi sees in terms of an ascending scale, progressively marked by greater commitment coupled with greater unspecifiability; terminating finally at the stage of "superior knowledge." Superior knowledge is constituted by the various matrices which provide the basis of conviviality exercised in the activity of innovative thought; that firmament of impersonal standards to which all

⁹³P.K., op. cit., p. 373. Relative to indwelling in another's thoughts, Polanyi points out that:

We read the acts of his mind in the same way as we are aware of our own mental efforts in pursuing our objectives. All observation of life and mind is convivial. ("Clues to an Understanding of Mind and Body," op. cit., p. 74.)

who are so engaged tacitly pledge their allegiance. These matrices are constituted, in their turn, by the funded achievements of the mind of man which provide ~~that~~ heritage in which our minds grow up and live, the cultural counterpart of a biological emergence effected by the intensification of the higher principle in organic life.

This superior knowledge will be taken to include, therefore, beside the systems of science and other factual truths, all that is coherently believed to be right and excellent by men within their culture. . . .

Thus we may regard, in the last analysis, the entire superior knowledge embodied in a modern highly articulate culture as the sum total of what its classics have uttered and its heroes and saints have done. If we belong to this culture then these are our great men: men to whose superiority we entrust ourselves, by trying to understand their works and follow their teachings and examples. Our adherence to the common beliefs and standards on which intellectual exchanges within a culture depend, appears then equivalent to our adherence to the same masters as fountains of authority. They are our intellectual ancestry: 'the famous men and fathers who begat us' in whose heritage we enter.⁹⁴

Polanyi's superior knowledge is not to be equated with a Popperian "third world" knowledge reified in independence of the mind of man but is to be conceived as that presupposed where, in the study of human thought, conviviality becomes mutual. In the same way in which one perceives objects by tacitly submitting to perceptual clues or as one performs a skilled feat by subsidiarily incorporating its premises, so man's ideals as they are incorporated in superior knowledge can be known only by freely following them. Again, it is the

⁹⁴ Ibid., pp. 375-376 (italics his):

ideals embodied in superior knowledge, that of the universality of truth and the forms of excellence, which preclude a relation of simple dependency upon the great men themselves. The theory of personal knowledge does not advocate a traditionalistic conformism.

The language of these ideals, anchored in the works and lives of our masters, grants to each one of us the right to uphold these ideals against any particular utterance of these same masters. For it is not to their person, but to what we understand to be their teaching, that we pledge ourselves.⁹⁵

The ideals embodied in superior knowledge, then, in one sense provide the tacit grounds upon which articulate and innovative thought proceeds in the context of convivial comprehension, ideals which are integrated in an act which, as with perception and skilful doing, "is irreversible and also a-critical, since we cannot judge the rightness of our standards in the sense in which we judge other things in the light of these standards."⁹⁶ However, where man's aim lies in revealing these ideals in their varying manifestations, the firmament of impersonal standards comes to stand as the distal pole in relation to which he is the proximal term. Unlike his observation of inanimate nature in which he occupies the higher plane or that of animate nature where indwelling is directed to autonomous centres of activity and originality, the structure of tacit knowing where it is directed towards these ideals finds man's focal attention

⁹⁵ Ibid., p. 377.

⁹⁶ Ibid., p. 378.

directed "on things higher than himself. He may be said to stand on the lower level of this commitment. Alternatively, we may describe him as forming the personal pole of a commitment of which the ideals of man form the universal pole."⁹⁷

Ultimately, personal knowledge is an epistemology of commitment, manifested in its triadic structure, through the various forms of conscious awareness from perception to that of creative thought, in its process of indwelling marked by the dynamics of heuristic integration and projection, and in the tacit accreditation of the reality of that which its exercise reveals. It is this irreducibly committed quality of all knowing which Polanyi sets over against the new dogma of objectivism, the assertion of the efficacy of detachment and disbelief. Such commitment, for Polanyi, has given rise to that "firmament of truth and greatness" which man has at one time himself created yet which provides the basis for the exercise of his responsible judgement with universal intent. The only alternative to such commitment is not some form of non-committal clarity but rather it is meaninglessness. For man, Polanyi maintains,

. . . is strong, noble and wonderful so long as he fears the voices of this firmament; but he dissolves their power over himself and his own powers gained through obeying them, if he turns his back and examines what he respects in a detached manner. The law is then no more than what the courts will decide, art but an emollient of nerves, morality but a convention, tradition but an inertia, God but a psychological necessity. Then man dominates a world in which he himself does not exist. For with his

⁹⁷ Ibid., p. 379.

obligations he has lost his voice and his hope, and has been left behind meaningless to himself.⁹⁸

Polanyi has been referred to as "the man of reconciliation."⁹⁹ The essence of such reconciliation as embodied in his second "post-critical philosophy" has been to redress the balance between belief and critical reason upset by the post-Cartesian reification of doubt as a heuristic principle. Such a reification, carried forward by a positivistic science and adopted by those seeking similar de-personalized and objective certainty in the studies of man, has served to divorce man from his experience, his belief from his critical powers, the product of knowing from the process by which it acquires coherence, the knower from the known. As a final question, it might be asked if there exist grounds for a possible reconciliation between Polanyi's personal knowledge and the presuppositions of philosophical analysis in education.

C. Grounds for Reconciliation?

While interesting, it would be idle to speculate regarding the response of the analytical philosophers in education considered to the principles of tacit knowing. No doubt, they would draw back from what they saw to be its "metaphysical" or "psychological" qualities. But since it has been seen that

⁹⁸Ibid., p. 380.

⁹⁹Raymond Aron, "Max Weber and Michael Polanyi," in Langford and Poteat, Intellect and Hope: Essays in the Thought of Michael Polanyi, op. cit., p. 363, and in E.P. Wigner, "Michael Polanyi: 23 March 1891 - 22 February 1976," Biographical Memoirs of the Fellows of the Royal Society (London: The Royal Society, 1977), p. 433.

they employ precisely these qualities in their analysis of the activity of clarification and of the nature of educational theory and learning, a more profitable approach might be that of a brief examination of their views in the hope of finding some grounds for the beginnings of reconciliation with those of Polanyi.

Of the three analysts considered, it is perhaps O'Connor who shows the least possibility of reconciliation with the principles of tacit knowing as embodied in its triadic structure and process of integrative indwelling in a hierarchically stratified reality resting upon the foundation of a-critical belief. While any accommodation, admittedly, will be achieved only at the expense of O'Connor's objectivist ideal of impersonal noetic criteria as embodied in the natural sciences, grounds might be discerned in his view of that which provided the departure point for Polanyi's theory of personal knowledge, that is, the nature of perception.

In his theory of perception O'Connor postulates four elements—the objects of the material world, the data of sense, the "sensory field," and the "sensory world."¹⁰⁰ What O'Connor purports to show in his theory is "a causal account of perception which will avoid the subjectivist traps in which such theories have usually been entangled."¹⁰¹ An examination of his views, however, reveals that his understanding of the act of perception is less causal than intentional and that,

¹⁰⁰"The Status of Sense Data," op. cit.

¹⁰¹Ibid., p. 91.

as a consequence, it is just those "subjective traps" which bestow coherence upon such views. Accordingly, his theory of perception might well appeal to the principles of tacit knowing for its completion.

Of cardinal importance for O'Connor is the disjunction between the data of sense and the objects of the material world. As has been seen,¹⁰² the gradations in the shades of colour are not matched by comparable gradations of the sensory data with the result that "these features of our sensory experience are so different in nature from the objects of the material world that they cannot be identified with them."¹⁰³ These data of our sensory experience are, in their turn, parts or elements of the "sensory field" which, to the degree to which it is unconceptualized, remains as in the case of sight simply unco-ordinated patches of colour. It is, however, at the level of the "sensory world" where one ceases to simply sense and commences to perceive or to observe, for it is here that one clothes the sensory field with concepts by way of rendering it an item of coherent sensory experience. So clothed, the conceptualized sensory field becomes an "intentional object." "We could," O'Connor points out, R

. . . conveniently but loosely define intentional objects as those that we can be mistaken about. In other words, it is not sense data, the raw unconceptualized elements of our sensory fields, that are intentional objects. It is rather the objects of perception that are intentional. Raw sensory fields are ambiguous in that

¹⁰²See above, Chapter I, p. 48-49.

¹⁰³"The Status of Sense Data," op. cit., p. 82.

they may be clothed in a variety of conceptual apparel. But until they are structured in this way, the possibility of error does not arise. Thus it is not sense data but physical objects, real or putative, that are intentional. Moreover, the heavier the conceptual load with which we interpret our sense fields, the greater the risk of mistake and so, in a sense, the greater degree of intentionality.¹⁰⁴

It is difficult to see how this might be considered a causal account of perception. Indeed, it can be seen to cohere with Polanyi's view of perception in terms of both structure and process and in terms of the affirmation of that reality which is perceived. O'Connor himself affirms that "I can feed or photograph a lion only if it is there to be fed or photographed,"¹⁰⁵ but given the disjunction between the objects of the material world and his data of sense which cannot be identified with them, there is no reason why he should do so apart from such affirmation. Again, the view that physical and chemical forces operate in both the objects of the material world and within the perceiver himself and that such functions constitute the necessary conditions for the production of the visual field, present no difficulty to the principles of perception as given in the theory of tacit knowing. Such operations are to be seen in their capacity as the boundary conditions of perception which, while they might account for its failure, do not account for its success. Here the intentional activity of the perceiver provides the operational principles of perception by reference to which

¹⁰⁴ Ibid., p. 91.

¹⁰⁵ Ibid.

successful perception might be assessed. For O'Connor then, as for Polanyi, reality is seen to be given, it is affirmed to be present, but its shaping is that of the person.

In structural terms O'Connor's sense data and sensory field which such data jointly constitute stand as the subsidiary marginal and subliminal clues from which the perceiver attends while directing his focal or intentional attention on the objects of the material world, such clues, ordered coherently, being in themselves the concepts of his sensory world. So clothed, the objects of the material world are phenomenally different than when unclothed and, conversely, are that in terms of which the sensory field derives its semantic significance. It is by the act of indwelling in the visual field while simultaneously projecting his intentional awareness to the coherent entities which it embodies that O'Connor is committed to the rightness of his perceptual act, that the coherent entity thereby perceived is not reducible to its constituent components in the form of the unconceptualized visual field nor reversible by means of the formal steps of any explicit procedure. While the objects of the material world and the coherent entities of O'Connor's sensory world cannot be adjudicated by reference to any concepts of some further sensory world, the standards by which he affirms his perceptual act are impersonal in the sense that they claim to have established contact with a reality independent of himself.

In view of the grounds of reconciliation between O'Connor and Polanyi at the level of perception, there appears

to be no good reason why similar reconciliation might not be generalized to the realms of philosophical clarification, educational theory, and the nature of learning. In employing objectivist criteria drawn from his view of the methods and evidence as embodied in the natural sciences and from the settled rules of deduction, he might be said to have clothed them in inappropriate conceptual apparel. By bringing to bear his concept of intentionality to which he gave so prominent a place in his theory of perception, the grounds for accommodation with the principles of tacit knowing would be established.

The more broadly linguistic objectivism of R.S. Peters points, just on account of that breadth, to greater areas of affinity with the principles of tacit knowing than those retrieved from the theory of perception as embodied in the empirical objectivism of D.J. O'Connor. For example, Peters does not rule out processes of intuition since such words are often used in connection with the learning of principles. Again, and given a less linguistic cast, Peters' public modes of experience as constituted by those impersonal content and procedures enshrined in public traditions bears analogy to Polanyi's impersonal standards to which one gives allegiance on the grounds of their contact with an independent reality. Congruence might also be discerned between Peters' concept of initiation in which experienced persons turn the eye of the other outward to what is independent of persons and Polanyi's concept of "apprenticeship" where, in respect to such tradi-

tions independent of persons and in terms of "a previous act of affiliation, by which the novice accepts apprenticeship to a community which cultivates this lore, (he) appreciates its values and strives to act by its standards."¹⁰⁶ Still again, Peters' conceptual truths, points and connections which stand in tautological relation with the concepts they exemplify might, in Polanyian terms, be seen merely as Peters' affirmations of his tacit framework since such affirmations, rendered explicitly, assume tautological formulation. . But perhaps the most essential point of affinity of Peters with Polanyi, and that upon which grounds for reconciliation might most profitably be sought, is that, unlike O'Connor, he does not view man under a naturalistic conception in terms of which he might ultimately be reduced to the laws of physics and chemistry. It is upon the rejection of just such a naturalistic conception that Peters, for example, accepts Piaget's model of assimilation and accommodation as that by which the development of reason proceeds on the one hand, but on the other rejects the biological model of homeostasis or equilibrium upon which he maintains Piaget founded the model. For Peters, disequilibrium between one's "schemata" and the novel situation "can only be identified by reference to the content of the schemata whose activity they explain. . . . But nothing is added to our understanding of this disposition by introducing the model of restoring equilibrium at the mental level."

¹⁰⁶P.K., op. cit., p. 207 (italics his)..

In my view, we can go no further in explaining the development of rationality than the ascription to man of two basic and closely related dispositions to respond to his experience. There is, first, assimilation, the constructive, classifying aspect of thought, the tendency to impose a conceptual scheme of experience and to generalize on the basis of similarities. Allied with this is the disposition to accommodate or to modify the scheme and the generalizations in the light of recalcitrant experience and information.¹⁰⁷

The difficulty is, however, that Peters, in his turn, by postulating dispositions and tendencies to impose a conceptual scheme on experience and to modify one's schemata in the light of recalcitrant experience and information does not add to our understanding of the activity of the schemata they were advanced to explain. It is suggested here that they do not do so because Peters lacks Polanyi's concept of subsidiary-focal awareness which might serve to extend our understanding of such activity and, in fact, might do so in connection with that penultimate point attained by Peters in his search for the logically necessary conditions for the use of a word, that is, in connection with his view that concepts must be understood in terms of other concepts.

To understand concepts in terms of other concepts was, for Peters, to understand that the use of words is a form of purposeful behaviour and that such behaviour has to be understood, in its turn, in terms of other, non-linguistic purposes that people have in their social life. To understand

¹⁰⁷"The Development of Reason," in R.S. Peters, Psychology and Ethical Development (London: Allen & Unwin, 1974), p. 143.

concepts in terms of other concepts is then to understand the purposes people have in using the words they do but, in spite of the fact that the word and the concept for Peters stand in mirror relation, such understanding cannot be achieved relative to those words themselves since, so viewed, they would simply be marks on paper. But Peters' postulation of the disposition and tendency to assimilate and accommodate, while it violates that lesson of the "revolution in philosophy" which rules out reference to those mysterious inner entities, gives no specification of the activity of the schemata by reference to which assimilation and accommodation might be explained. Taken here at Peters' level of language and the purposeful use of concepts, the tendency to assimilate or to impose a conceptual scheme on experience and to generalize on the basis of similarities might itself be assimilated to Polanyi's concept of conceptual subsumption, where the disposition to accommodate, to modify the scheme and the generalizations in the light of recalcitrant experience and information might be accommodated to his corollary concept of conceptual exemplification. The tendency to assimilate, in other words, can be extended and given specification by reference to the act of either relying subsidiarily on the particular instances of a concept as conveyed by language while attending focally to that concept upon which those instances are made to bear or, conversely, of relying subsidiarily upon the concept as given in language while attending focally to the instances which that concept subsumes. Accommodation, on the other hand, seen as the modification

of the scheme in the light of recalcitrant experience and information as opposed, to shared concepts, extends the process of conceptual exemplification to embrace the comprehension of a novel concept. Here accommodation may be itself accommodated to an intensified process of conceptual exemplification pre-figuring that of discovery in which the dynamics of subsidiary-focal awareness involve attending from available conceptual resources which are utilized by the powers of the integrative imagination to bear upon a focus which, temporarily, is empty yet, when attained, will serve to modify those resources. It is, then, by reference to Polanyi's concept of subsidiary-focal awareness that Peters can go further in explaining the development of rationality, that he can give greater specification to the state of disequilibrium between one's schemata and the novel situation and the activity of the content of that schemata in identifying such disequilibrium. It is also, perhaps, upon the basis of such a concept that reconciliation might best be sought.

Unlike O'Connor and Peters, a recent paper of Hirst's reveals that he is, in fact, in possession of Polanyi's concept of subsidiary-focal awareness.¹⁰⁸ In support of his view of the theory-practice relation, here set in the context of demonstrating the grounds of authority for those professionally involved in education, Hirst has invoked the structure of tacit knowing. The issue of reconciliation

¹⁰⁸"Professional Authority: Its Foundations and Limits," op. cit.

therefore shifts from the adaptation of those aspects of analytical thought amenable to the concept of subsidiary-focal awareness to an examination of Hirst's employment of it in the context of a philosophy resting upon the grounds of linguistic objectivism.

Briefly, the question of derivation of the grounds of professional authority arises in the face of what Hirst has discerned to be public doubts of professional competence. The issue, of course, dovetails neatly with the question Hirst has considered for some time, that is, the establishment of educational theory on grounds other than O'Connor's collection of pieces of psychology. The question here, however, is whether, in invoking Polanyi in support of his model of the theory-practice relation, Hirst has in fact harnessed the theory of tacit knowing to the presuppositions underlying that model and in terms of which it is inappropriate.

To defend against the charges directed at the competence of professionals, what must be shown, according to Hirst, are the grounds of professional authority and the grounds of professional authority can be shown only by demonstrating "A clear grasp of education principles and their dependence, in fact or in principle, on specialized knowledge, judgement and skill."¹⁰⁹ While, Hirst points out, "what the 'disciplined' study of education has achieved so far is fragmentary, very limited and disagreement even within the

¹⁰⁹Ibid., p. 177.

individual disciplines is widespread,"¹¹⁰ and, as such, do not bear comparison with the well-established findings of the formal disciplines in the natural sciences, the view that competent educational practice can be derived directly only from well-founded theoretical knowledge must be rejected since such activities cannot "be undertaken as a technology." It is, then, not the status of the disciplines themselves which is at issue for Hirst but rather the manner in which competent educational practice may be derived. Hirst maintains that such derivation is not direct in the case of such practice but rather that it is indirect and, moreover, that such can be demonstrated by reference to Polanyi's concept of subsidiary-focal awareness. He sees there to exist a subsidiary-focal relation between "educational commonsense" and competent educational practice on the one hand, and on the other a similar relation between the range of formal disciplines and such educational common sense. It is the latter relation which issues out into "discipline-refined commonsense" and this, he maintains, is "the proper base of educational professionalism."¹¹¹

In the course of explicating his model, Hirst makes reference to Oakeshott's "practical knowledge" in which practical problems are to be understood in terms of the "beliefs, attitudes, capacities for recognition, discernment and judgement that we acquire by living within the social

¹¹⁰ Ibid., p. 178.

¹¹¹ Ibid., p. 179.

circumstances of our society with its particular institutions, rules and traditions."

Polanyi's notion of our focal attention to a problem being determined by a subsidiary and tacit framework from which we understand and act makes much the same point. He helpfully goes on to suggest that, even if many, or perhaps all, of these tacit elements could be attended to focally in their turn (from some other tacit framework of some sort which must necessarily be there in the activity), we would not thereby grasp their character and significance as tacit elements in any particular concrete situation. The tacit, which is as significant in its way as the focal in making actions and activities what they are, is, in one sense, in principle unget-at-able. No understanding of educational activities in terms of formal disciplines can therefore ever provide an adequate basis for determining a body of professional practices.¹¹²

In support of his view of the necessarily indirect relation between the formal disciplines contributory to educational practice, Hirst here makes reference to one of the main corollaries of tacit knowing, the functional unspecifiability of the tacit or subsidiary component in the act of from-to awareness. Insofar as these components function as tacit elements in the structure of tacit knowing they are logically unspecifiable in the sense of being the objects of explicit or focal attention. By extension, insofar as they are rendered focally in the context of another tacit framework, they necessarily lose their tacit quality and function they had in the initial framework. It is because of such a framework, where the formal disciplines function in the role of subsidiary to

¹¹²Ibid., p. 178.

educational practice where such practice is viewed focally that one cannot, therefore, grasp their character and significance as such tacit elements. As a consequence, they cannot provide an adequate basis for determining educational practice, where "adequate" is to be taken as direct and explicit derivation. To solve the dilemma, for without some sort of theoretical guidance educational practice must needs be idiosyncratic, Hirst introduced the half-way house of "educational common sense."

Educational common sense, for Hirst, consists of "a world of traditions, roles, attitudes, beliefs and principles that has developed largely within that practical setting. It encapsulates a vast implicit understanding of what is going on and what education is all about."¹¹³ It is such educational common sense, rather than the formal contributory disciplines themselves which provides the subsidiary component from which attention is directed away to a focal awareness of educational activities. But, as it is then itself un-specifiable in that context, the question arises as to whether it is idiosyncratic. Here Hirst has himself reached the focal point of his model, for he has espied the manner in which educational practice is to make indirect contact with the formal contributory disciplines and thereby repel questions of professional competence. Educational common sense would, in fact, be idiosyncratic he maintains, "only if the tacit were of its nature wayward or unmodifiable and

¹¹³Ibid., p. 179.

human action incapable of critical assessment."¹¹⁴

But as with everyday common sense the professionals' version is constantly capable of refinement. Beliefs and attitudes about the world, human beings, their relationships and social institutions, that are sometimes explicit but frequently embedded within much tacit understanding, are capable of explicit examination in the disciplines. In this way the whole domain of common sense can be modified and given a progressively more defensible content in its purely cognitive aspects. In turn this can lead to modifications in attitudes, behaviour, principles, rules and skills that are practiced, at both the explicit and tacit levels. The significance of the disciplines for practice is however properly indirect. Their findings will promote intelligent practice only if they are incorporated coherently into the web of existing practice rather than allowed to dominate that practice in a manner that seeks to deny the existence of all the other significant elements both tacit and explicit.¹¹⁵

It is suggested here that Hirst's model of the derivation of competent educational practice has harnessed the theory of tacit knowing to his prior view of educational theory, a view which presupposes his conception of the function of the formal contributory disciplines, educational common sense which is identical to that theory, and competent educational practice and further, that he has allowed the presuppositions embodied in this view of educational theory to dominate in a manner that seeks to deny the existence of other significant elements, principal among which is the content of the theory of tacit knowing, while simultaneously borrowing its structure. Observations in support of this

¹¹⁴ Ibid., p. 178.

¹¹⁵ Ibid., p. 179.

contention can be made in respect to both that structure as he has employed it, and in respect to the substantive issue.

It is the "purely cognitive aspects" of educational common sense as distinguished from those relating to its more practical aspect that is to provide the focal object of explicit examination in the formal disciplines and that by which educational practice can be given a progressively more defensible content. Just what these aspects are is not clear since Hirst gives them no specification. In the sense that they are the findings of some prior refinement from the perspective of some previous explicit examination in the formal disciplines, Hirst is not clear as to the nature of the alteration of the tacit perspective employed in the current examination by way of yielding further refinement. In other words, if there has been a change in the conceptual framework in terms of which the formal disciplines provide the subsidiary component while focally attending to the cognitive aspects of educational common sense—Hirst must mean this since the theory of tacit knowing clearly maintains that nothing can be viewed focally from another focal perspective—he has not shown that further conceptual framework in terms of which the merits of the competing frameworks have been adjudicated in favour of that issuing into the more recent refinement. In the sense that such cognitive aspects of educational common sense are the findings of the formal disciplines as currently applied, the model is either incoherent or merely self-confirmatory since it presents the picture of the application of the formal disciplines held in

the subsidiary mode bearing upon a focal awareness of its own refinements, resulting, of course, in the loss of the possibility of corrigibility which is the purpose of the explicit examination in the first place. Still again, it is not clear how the explicit examination in the disciplines of the cognitive aspects of educational common sense, whether in the form of a subsequent refinement of a previous examination or in the form of a current examination without reference to any antecedent examination could, in principle, issue out into some novel refinement since, as we have been told, disagreement even within the individual disciplines themselves is widespread. Adjudication is therefore demanded, not only between the antecedent and subsequent explicit examination in the formal disciplines of those cognitive aspects of educational common sense, but equally between competing conceptual frameworks in the subsequent examination itself. But such adjudication demands, in its turn, throwing the formal disciplines themselves into the focal mode in terms of which, and by virtue of some prior tacit framework, they become the objects of explicit examination. However, in Hirst's model of discipline-refined educational common sense, there is no further tacit framework. One is then presented with the odd view that, in spite of the fact that there exists widespread disagreement within the individual disciplines themselves, this is the ultimate perspective from which the cognitive aspects of educational common sense are to be refined.

Further, Hirst's model of the explicit examination in the disciplines of those purely cognitive aspects of educational

common sense simultaneously acknowledges and overlooks the fact that the process of tacit knowing is functionally unspecifiable, that that which is known by such a process is not reducible to an analysis of that explicitly known in its terms. The cognitive aspects of educational common sense, in other words, are not reducible to an explicit examination in those disciplines of which such aspects are the refinements. Rather, where such cognitive aspects are viewed focally, they serve to bestow coherence upon the particulars of which they are the tacit integration, that is, they bestow coherence on the formal disciplines themselves. It is by virtue of the focal apprehension of the purely cognitive aspects of educational common sense that the formal disciplines, functioning subsidiarily in that apprehension, derive their coherence. This, of course, is but to re-state Polanyi's view that the comprehension of purposeful activity, here educational practice, must be in terms of that purpose and not in terms of the explicitly identifiable features, here the purely cognitive aspects of educational common sense, which that purpose subsumes. In spite of his acknowledgement that educational common sense as constituted by its traditions, beliefs and principles as viewed focally would thenceforth lose its tacit function for educational practice and be, in principle, unget-at-able, Hirst has reversed the proper structure of Polanyi's subsidiary focal awareness in an attempt to establish objective theoretical underpinning for educational principles on the basis of specialized knowledge, judgement and skill as embodied in the formal disciplines.

As one turns from Hirst's rationalistic dévolution to the grounds of the formal disciplines and its violation of the principle of functional unspecifiability to the ascent back to educational practice by way of "incorporating coherently" the focal findings of discipline-refined common sense back into educational common sense which is then to serve as the subsidiary pole for focally attending to such practice, one finds a parallel violation of the corollary of that principle, that of functional irreversibility. Where the one would reduce the outcomes of an act of tacit integration to an analysis of that known by virtue of such integration, so the other, by reference to some unacknowledged but supervening rules of procedure, would attempt to trace the act of integration itself from its overt manifestation to its implicit constituent components and back again to its overt manifestation. In serial order we see the same thing, here viewed subsidiarily, there viewed focally, all under the auspices of some further rule and all articulated, of course, without reference to purpose. So educational common sense, while viewed subsidiarily relative to educational practice, becomes the object of focal attention viewed relative to the formal disciplines and re-emerges, with its purely cognitive aspects suitably refined, to be incorporated coherently back into educational common sense where it then assumes its prior status as subsidiary to practice. But subsidiary and focal awareness, in the theory of tacit knowing, are not two degrees of awareness but rather two kinds, and these two kinds of awareness are logically incompatible.

As educational common sense would dissolve into meaningless particulars when viewed focally without reference to educational practice, which, of course, is itself meaningless without reference to purpose, so the findings of the explicit examination of the purely cognitive aspects of educational common sense are themselves meaningless particulars without reference to the world of traditions, beliefs and principles and the practice they support. They are irreversible relative to the manner in which they are viewed and there is no rule by which such irreversibility may be bridged. Yet, in the absence of purpose, it is to such a rule that their coherent incorporation into educational common sense appeals.

At the basis of Hirst's model, of course, is his own subsidiary framework from which he has attended focally to the derivation of the dependence of educational principles, in fact or in principle, on specialized knowledge, judgement and skill, that framework being an idealistic rationalism set in the context of linguistic objectivism. The formal disciplines, which are seen to provide the basis for those educational principles, are themselves constituted by their distinctive concepts, logical structures and truth criteria, all validated by reference to the classes of true propositions which they embody. It is from the a-critical acceptance of this framework of philosophical belief, that providing his theory of what is ultimately real and ultimately important in life, that Hirst implicitly maintained that such principles as incorporated in educational common sense might

themselves be resolved in terms of those concepts, structures and truth criteria so validated. But, where educational common sense is itself constituted by those traditions, beliefs and principles as embodied in the purposes guiding educational practice, it is such common sense which serves to validate the concepts, structures and truth criteria of the formal disciplines in whose terms they are articulated. In employing the structure of tacit knowing, in other words, Hirst denied to himself in his explicit examination of educational common sense in the disciplines just that which renders the structure meaningful, that is, the affirmation of and commitment to the purposes of educational practice without which such practice is unintelligible.

In reviewing the grounds of possible reconciliation between the analytical philosophers in education and the principles of tacit knowing as embodied in Polanyi's theory of personal knowledge, it has been seen that the burden of such reconciliation has fallen on the shoulders of the analysts. It has, however, been the contention here that the present study was in the nature of a test, not of Polanyi's principles themselves which were to have been taken in the form of a hypothesis guiding its application, but rather directed towards the unveiling of objectivist elements in the analytical activity of clarification and, by extension, the uncovering of such elements in their views of educational theory and the nature of learning. The results of that test have been unequivocally positive, both in the sense that such elements have been seen to exist and

in the sense that, in education as elsewhere, they are self-defeating.

The issue of the adequacy and application of the principles of tacit knowing as directly related to the problems of educational philosophy itself has been dealt with here only obliquely. Questions in respect to such adequacy and application, however, are not difficult to seek. In what way, for example, would such principles confirm, alter, or overthrow prevailing conceptions of the concept of education itself? Might a theory of curriculum derive justification from the principles embodied in tacit knowing? Must Polanyi be necessarily aligned with the traditionalists in opposition to the progressivists? What, exactly, is his role in the question of education-as-indoctrination as opposed to education-as-self-determination? Has the ideal of rational autonomy in education been in fact superseded? Each of these problems, to name but a few, are legitimate issues in educational philosophy and in terms of which the adequacy and application of the principles of tacit knowing may themselves be tested, but such issues transcend the bounds of the present study. However, in view of the outcomes of the present inquiry, it might fairly be claimed that the grounds for such future tests have been cleared for their administration at another time.

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