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A POST-CRITICAL SCIENCE OF ADMINISTRATION:
TOWARD A SOCIETY OF EXPLORERS

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at the

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We hereby approve this dissertation for

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DEDICATION

I dedicate this dissertation to my families:

- To my wife, Cheryl, who patiently and sometimes not-so-patiently endured my long effort.
- To my birth mother and father who always remained interested and willing to listen to my discoveries.
- To my mother-in-law and especially my late father-in-law who understood little of my purpose or thinking, but supported me unconditionally, as a son.
- To my children who sometimes wondered why I continued such a long pursuit with little promise of reward.
- To my grandchildren (and all children) who always bring me so much joy.
- To my local church family which sought to give me space while suffering from the neglect of my full presence.
- To my siblings and siblings-in-law who probably understand me better than I do myself - and yet have continued to support me nonetheless.
- To my missionary family which always assumes more of me than I deserve.
- To my global church family which always accepts me as a brother.

Even if I had never completed this work, my families would have accepted me, encouraged me, supported me, and brought me joy. I am blessed to belong and to be called by so great a throng of witnesses.

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Academically, I owe much of my success for completion of this dissertation to Michael Spicer who gave me confidence by inviting me to write a dissertation under his tutelage and who, as my committee chair, then pushed me to complete it, spending many, many hours correcting and critiquing and editing my work in a process of apprenticeship that made real many of the concepts I was attempting to bring to light.

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Many other professors at Cleveland State University contributed to my development as a scholar, among them Camilla Stivers, Sylvester Murray, Jennifer Alexander, Robert Simons, Joel Elvery, William Bowen, and Robert Gleeson, and I received further encouragement from the associations, particularly the Public Administration Theory Network and the Polanyi Society, of which I have become a part. Special acknowledgement must be made to The Institute of Applied Phenomenology in Science and Technology for financial support provided through a Ralph P. Hummel Scholarship in 2013. Without the expressions of confidence from all of these and many more, I would not have been able to bring this work to completion.

A POST-CRITICAL SCIENCE OF ADMINISTRATION:
TOWARD A SOCIETY OF EXPLORERS

CRAIG M. WICKSTROM

ABSTRACT

What is meant by "science" and whether it is an appropriate model for public administration has been a subject of debate since Woodrow Wilson called for a science of administration in 1887. This dissertation introduces another voice into that debate, the voice of a world-renowned physical chemist named Michael Polanyi.

Polanyi's sharp criticism of positivism reinforces the arguments of those questioning the legitimacy of an administrative science, but instead of rejecting it, he constructed an alternative definition of science that recognizes the indeterminacy of reality, the personal nature of knowledge, and the centrality of "the logic of tacit knowing." Because all knowledge is tacit or rooted in tacit knowing, we can know more than we can tell, and tacit knowing becomes evident in the dynamic order of polycentric entities and in their reliance on tradition and the person, constrained by community, and morally responsible for discovery and practice.

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CHAPTER I

INTRODUCTION

But apart from this contemporary mood, the ideas of economists and political philosophers, both when they are right and when they are wrong, are more powerful than is commonly understood. Indeed the world is ruled by little else. Practical men, who believe themselves to be quite exempt from any intellectual influences, are usually the slaves of some defunct economist. Madmen in authority, who hear voices in the air, are distilling their frenzy from some academic scribbler of a few years back. (Keynes, 2008, p. 383)

He taught me, among other things, that science begins when a body of phenomena is available which shows some coherence and regularities, that science consists in assimilating these regularities and in creating concepts which permit expressing these regularities in a natural way. He also taught me that it is this method of science rather than the concepts themselves (such as energy) which should be applied to other fields of learning. (Wigner, 1963)

“Science” has been an important theme in American public administration since the latter first began to define itself at the end of the 19th Century. As early as 1887, Woodrow Wilson wrote that,

Seeing every day new things which the state ought to do, the next thing is to see clearly how it ought to do them. This is why there should be a

science of administration which shall seek to straighten the paths of government, to make its business less unbusinesslike, to strengthen and purify its organization, and to crown its duties with dutifulness. (Wilson, 1887, p. 201, italics added)

Wilson and his immediate successors advocated a “science of administration” that was rational, objective, and universal. Esteeming it themselves, they recognized that the growing public appreciation for science at the end of the 19th and beginning of the 20th centuries made a scientific orientation imperative for the adoption of administrative reform. Wilson’s seminal article reflected an attitude about government that began to be evident after the Civil War, that gained legitimacy in the Progressive Movement at the turn of the century, and that was expressed in civil service reform, in the growth of city planning and bureaus of municipal research, in the establishment of “settlement houses” to improve the lot of the poor, and in the application of “scientific” principles to management and administration. At the heart of this attitude, expressed in calls for societal change, was a confidence in science and the scientific method.

In response to this push for an administrative science, public administrationists developed a philosophy that manifested itself in a growing literature, in schools for training administrators, and in successful reform at the local, state, and national level. It was characterized by the separation of decision from execution (the politics/administration dichotomy), by the development of principles of administration based on scientific study, by the centrality of economy and efficiency as the goals of administrative practice, and by the potential for using the impersonal, mechanistic methods of the natural sciences to study and guide administrative behavior. However, by the end of World War II, following a period of heightened opportunities for implementation of a scientific administration, a new group of scholars began to seriously

question the premisses upon which this orthodox conception of public administration was based. One expression of this unease over public administration orthodoxy was evident in Dwight Waldo's 1948 call for promotion of democracy at the expense of science. An alternative reaction was a call for the adoption of a *more* scientific attitude toward administration. The framework that Herbert Simon (1945/1957) outlined in *Administrative Behavior* became the centerpiece for this approach. Both groups criticized orthodoxy, but it soon became apparent that their greater challenge was not public administration orthodoxy, but each other.

Those public administrationists, like Waldo, who emphasized democracy, also encouraged conversation with other social sciences and exploration of alternative philosophies that might or might not give science a privileged place. Simon's alternative, based on logical positivist philosophy, was a rational, empirical science of administration that separated fact from value and focused administrative research on the factual components which, it was claimed, could alone be examined "scientifically" and measured for success or failure by efficiency. These two approaches took public administrationists down two paths that, if not wholly incommensurable, were clearly at odds with one another.

The first public expression of the philosophical differences of these approaches came during the well-known Simon/Waldo Debate (Waldo, 1952a; Simon 1952; Waldo, 1952b), but that clash of titans was not the last to occur. In the years since that first published debate, those who, in the tradition of Waldo, sought to promote democracy in public administration by exploring alternative philosophies have regularly criticized the logical positivist foundations and other assumptions of the empirical tradition (Spicer,

2010; Miller and Fox, 2007; Luton, 2007; Adams and Balfour, 1998; White and Adams, 1994; Argyris, 1973; Storing, 1962). Initially, those emphasizing a rational, empirical approach to the study of public administration appeared to hold the high ground, riding the behaviorist wave through the 1950s and 1960s, confident in their methodology and focusing attention on philosophical issues only when attacked. However the New Public Administration movement that emerged from the 1968 Minnowbrook Conference showed that the influence of the rational empiricists was waning. Subsequent growth in alternative approaches based on postmodern philosophy, gender studies, and phenomenology, among others, gradually forced rational empiricists to abandon their defensive posture and to seek ways to acknowledge alternative philosophies without abandoning their empiricism (Lynn, Heinrich, and Hill, 2001; Gill and Meier, 2000; Dubnick, 1999). What is clear of the history of “science” in public administration is that the agreement in public administration academia evident during the orthodox period seems to have been lost. On the one hand are those who question the possibility of a science of administration, on philosophical as well as practical grounds. On the other hand are those whose faith in science remains unwavering and who continue to call for *more* science rather than less.

It is the purpose of this work to add another voice to this debate. This voice will not seek to remove science from public administration, nor even to undermine its influence. Instead, it will seek to redefine science in a way that opens it to the influence of alternative philosophies and makes it more compatible with democracy. The voice that this dissertation will interject into the debate about science is the voice of a world-renowned physical chemist who recognized the fallacy of a strictly instrumental science

and abandoned his practice of pure science to understand and defend it philosophically. This is the voice of Michael Polanyi who was called to a philosophical defense of science by its misuse under totalitarianism at about the same time that American public administration also began questioning the role of science. Confronted, in the Soviet Union, by a strong philosophical argument for centralization of science, he was forced to ask,

What philosophy of science had we in the West to pit against this? How was its general acceptance among us to be accounted for? Was this acceptance justified? On what grounds? (Polanyi, 1946/1964, p. 9)

"Marxism" he confessed, "has challenged me to answer these questions" (Polanyi, p. 9).

It is doubtful that Polanyi's writings had much effect on Soviet policy, but his search for a response to the misuse of science resulted in a philosophy of science that is comprehensive in a way that few can claim. Diamond cutters agree that no two diamonds are identical. The study of an individual diamond can reveal its unique identity, made up of its physical and chemical properties as well as its comprehensive purpose as part of a necklace or an industrial cutter. However, it takes a more comprehensive view to see beyond the particularity of a diamond to its role as a generalized representation, and therefore a member, of all diamonds or all crystals or all solid compounds. That is precisely what Polanyi accomplished. He set out to develop a philosophy of *science* that could defend science against totalitarian demands for its subservience to the state, but as he studied science his viewpoint broadened to include politics, economics, sociology, theology, and philosophy. In the end, he recognized that science is not unique, nor is it a pattern on which society should be modeled. Instead, it is but one instance among many, including art, law, and economics, in which certain organizational principles are evident

and which depend on a common epistemological foundation.

Science, Polanyi claimed, is but one example of personal commitment to “the logic of self-compulsion with universal intent” (Polanyi, 1958/1962, p. 396). Like art, law, a market economy, and other arenas, science can not be centrally managed through a hierarchy, but depends on “coordination by mutual adjustment of independent initiatives” (Polanyi, 1962, p. 54). Scientific principles are enforced by a community through tradition, and science is learned as a skill by apprenticeship to a master. Through a process of tacit knowing, it discovers an independent reality pregnant with possibility and rejects objective knowledge that is detached and impersonal.

Polanyi’s journey of discovery in the defense of science led him to recognize the Cartesian demand for radical skepticism and impersonal objectivity as illogical and the foundation that, combined with utopian passion, resulted in totalitarianism and the political turmoil experienced throughout Europe during the 20th century. His post-critical philosophy of personal knowledge and tacit knowing undermines the possibility of impersonal, objective knowledge and the Cartesian need for philosophical doubt. Consequently, it also undermines the logical positivist foundation and the rational, empiricist definition of science that have been at the root of so much debate in public administration. However, it redefines science rather than rejecting it, and does so in a manner that allows it to more easily embrace alternative philosophies, frameworks of inquiry, and methodologies. Polanyi’s post-critical philosophy of personal knowledge and tacit knowing not only establishes a more robust foundation for a *science of administration*, it also hints at the possibility of mitigating some of the differences in public administration that can be traced to this misunderstanding of the nature of science.

A History of “Science” in Public Administration

This dissertation is a philosophical study, a “history of ideas” in the tradition of Dwight Waldo, who argued for the importance of historical perspective and an appraisal of “the theoretical content” of a literature, for facts are dependent on and related to “the thought of a particular time and place” (Waldo, 1948, p. xxiii). It is impossible to turn a history of ideas into an impersonal, objective method because “No human cognitive effort can claim transcendence for its own point of view” (Gill, 2010, p. 24). Indeed, Michael Spicer has noted, “there is no Archimedean point from which we can look down upon public administration, freed of our moral and political presuppositions” (2008, p. 59). The desire for such a detached objectivity leads us to over-dependence on precise method and a misunderstanding of the role of theory. As Sheldon Wolin (1969) has suggested, because a theorist, and particularly an epic theorist, focuses on “problems-in-the-world” rather than on “problems-in-a-theory”, a theory becomes a tool for understanding and potentially changing the world, rather than a simple summary of a set of “facts”. Only theories that actively engage the world as it exists are capable of effecting the deeper understanding for which it calls.

This dissertation, then, is a history of ideas with administrative science as its subject matter. It does not attempt to trace the full history of science over time, nor does it take a snapshot of all conceptions of science at a particular time. Instead it attempts to look at science in public administration through the philosophy of Michael Polanyi. By looking at what Polanyi has said and written and practiced and by comparing it to what public administrators have said and written and practiced, we gain insight into our discipline and are better able to appraise it. Such an examination of the history of

administrative science as an idea also helps us to avoid, as Spicer noted, “the recycling of old ideas that have been tried in the past and found wanting” (2008, p. 52) and the embrace of “political values that are incoherent with, or even contradict those which we ourselves hold to be dear and true” (p. 60). Finally, a study of the philosophy of Michael Polanyi, applied to public administration, leads to new ways of approaching public administration and of engaging the world.

As children we are taught that part of the Copernican revolution was to oust man from the center of the universe, forcing us to see ourselves with detached objectivity from the perspective of time and space. But, as Polanyi argued,

As human beings, we must inevitably see the universe from a centre lying within ourselves and speak about it in terms of a human language shaped by the exigencies of human intercourse. Any attempt rigorously to eliminate our human perspective from our picture of the world must lead to absurdity.” (Polanyi, 1958/1962, p. 3)

When we claim that the Copernican theory is more objective than the Ptolemaic system that it replaced, we do claim universal significance for our choice, but the objectivity that we claim is not detached and impersonal. Rather, “We abandon the cruder anthropocentrism of our senses - but only in favor of a more ambitious anthropocentrism of our reason” (Polanyi, pp. 4-5). In either case, whether we commit ourselves to Copernican or Ptolemaic theory, it is our personal involvement that determines the objectivity of an explanation of physical phenomena and it is its beauty and elegance that determine the validity or legitimacy of a scientific theory.

Polanyi’s answer to the impersonal objectivity of popular conceptions of science was the personal commitment by the scientist to a reality that is intimated in the particulars of the empirical world, but always independent of them and therefore never

absolutely predictable. Such a commitment is a responsible acceptance of a calling, not only to accept my physical environment, but also the intellectual and cultural situation that acts as a background to all of my existence. The scientist can never be sure of the implications of the reality to which he commits himself, but she is nevertheless responsible to make that commitment. “Objectivism” Polanyi wrote, “seeks to relieve us from all responsibility for the holding of our beliefs. That is why it can be logically expanded to systems of thought in which the responsibility of the human person is eliminated from the life and society of man” (Polanyi, 1958/1962, p. 323). He rejected such an irresponsible reaction. His reliance on himself, both to search for and proclaim a defense of science, and to attack the objectivity and radical skepticism of enlightenment science, led Polanyi ever deeper in an examination of how and why a scientist comes to discover the world. In the end, Polanyi acknowledged the indeterminacy of reality by declaring his search “to achieve a frame of mind in which I may hold firmly to what I believe to be true, even though I know that it might conceivably be false” (p. 214). Called to responsibility, he acknowledged the tenuous nature of truth and yet embraced it wholeheartedly as part of his calling. Even the most “impersonal” facts - say the number of occupied residences on a particular street - are true only in the sense that someone has judged them to be true. Personal knowledge shows that the positivist assumptions, upon which a rational, empirical science is also based, are mistaken at best.

For personal knowledge to survive, however, it must be grounded in a society that can be trusted to uphold the values so passionately affirmed by the person. In Polanyi’s words, “Articulate systems which foster and satisfy an intellectual passion can survive only with the support of a society which respects the values affirmed by these passions”

(Polanyi, 1958/1962, p. 203). Communication, learning, pure conviviality (both cultivation of good fellowship and participation in joint activities), the organization of society, the upholding of morality, custom, and law within a culture, and the administration of both individual and civic culture, are all founded on a personal knowledge in which a person commits himself to a reality that is claimed with universal intent. Such a claim is possible only in the context of a tradition enforced by community, whether a small group, a formal organization, or a larger society or culture. Personal knowledge is rooted in community and the tradition and values that it upholds - even as tradition and values are likewise dependent on individual, personal commitment.

While recognition of the personal nature of knowledge is an effective criticism of enlightenment assumptions, alone it contributes little to the improvement of administrative practices or outcomes. It must be coupled with a structure that enables it to be put into practice. It is such a structure that is arguably Polanyi's greatest contribution. This structure of the knowing process builds on the conception of directionality in consciousness widely accepted since the work of Franz Brentano and passed down through Phenomenology and Gestalt Psychology. However, it emphasizes the background of subsidiary particulars missing in Brentano's work, adds the Gestalt concept of a comprehensive entity, and incorporates the centrality of the person. Finally, it builds these into a structure that illuminates and educates, that enables and creates. This structure, Polanyi named "the logic of tacit knowing".

Grounded in Polanyi's philosophy, in tacit knowing and personal knowledge, it is the central thesis of this dissertation that a science of administration is a legitimate goal for public administration if, and only if, the prevalent conception of a detached,

impersonal and instrumental, rational and empirical science is replaced by one that recognizes the personal nature and tacit structure of all knowing and its dependence on tradition, dynamic order, and responsibility to a community.

Chapter Overview

In light of these goals, Chapter II will thrust the reader directly into a discussion of Polanyi's central philosophical concept: the logic of tacit knowing. Within that framework, both epistemological concepts such as awareness, indwelling, belief, and heuristics, as well as ontological manifestations of tacit knowing, such as indeterminacy, dual control and layers of reality, will be examined. Chapter III will turn to the examination of his sociological and political discussions of tradition and community, dynamic order and public liberty, moral inversion and the free society. These latter concepts are foundational to the maintenance of an epistemological and ontological framework that argues for personal knowledge and the intimate involvement of the subject in a process of tacit knowing.

Once the reader has had an opportunity to absorb the concepts central to Polanyi's philosophy, public administration, itself, will be addressed. Chapter IV presents the dominant, positivist understanding of a science of public administration through the writings of several public administration scholars, beginning with Herbert Simon. Central to this vision of a science of administration is the separation of facts from values, the reliance on formal methods and precise data, and the acceptance of a single understanding of knowledge and the models and methods used to represent it. Underlying such a vision, as evident in the writings and language of public administration scholars, is a tacit acceptance of a deterministic reality. However, Chapter IV also

reveals a paradox of positivism: its proponents often do not practice what they espouse in theory, and Polanyi's post-critical epistemology, that depends on personal knowledge and the logic of tacit knowing, undermines this theoretical approach and its assumptions while presenting an alternative understanding of science that uncovers the possibility of scientific discovery free from reliance on a deterministic reality and a positivist approach to knowledge. In Chapter IV the potential for a redefinition of science in public administration becomes evident in the philosophy of Michael Polanyi.

Whereas Chapter IV begins with public administration scholarship as it exists today and shows how Polanyi's ideas reveal a solution to the paradox of positivism, Chapter V begins with Polanyi's prescription for a free society and shows how tradition, dynamic order, and public liberty have been revealed in public administration literature. It shows how a Polanyian understanding of tradition is revealed in the work of John Rohr, and Michael Spicer; how a Polanyian understanding of dynamic or spontaneous order is revealed in civil association, in incrementalism, and in networking; and how the concept of public liberty is reflected in the idea of administrative conservatorship. In so doing, Chapter V suggests that Polanyi's philosophy has already joined the public administration conversation in the United States. This implies that public administration, itself, is dependent on a self-modifying tradition, is spontaneously ordered, and may function responsibly on behalf of a community. In other words, a redefined science of administration, based on personal knowledge and tacit knowing, may be accepted more readily than at first intimated. According to Polanyi, science is a dynamically ordered system that has been granted public liberty. It follows that a science of public administration is one too and it must therefore responsibly accept the freedom it has been

given to act on behalf of a free society.

In Chapter VI, I conclude my argument by drawing additional attention to *the person* in Polanyi's writing, drawing on the writing of Thomas Pfau and Murray Jardine who, like Polanyi, understand the person as more than an isolated individual. I point to several examples in the public administration literature that demonstrate an awareness of the person in context, the person called to responsibility. Such examples become part of a conversation with Polanyi who argued for a postcritical science anchored in the logic of tacit knowing, the dynamic relationship of individual and community, and the central role of personal involvement in knowing and being and doing.

Finally, I have included, as a postscript, a summary presentation of the argument advanced in this dissertation. While short on detail, this postscript emphasizes the possibility of a postcritical science of administration anchored in an indeterminate rather than a fixed reality, known tacitly rather than explicitly. Such an administrative science helps to justify research based on personal encounter and intuitive insight, emphasizes the dynamic nature of both individuals and the communities of which they are part, and calls attention to the central role of self-modifying tradition in the maintenance of social, economic, and political systems. At the heart of a postcritical science of administration is the logic of tacit knowing - to which I now turn.

CHAPTER II

TACIT KNOWING AND THE LEGITIMACY OF RELYING ON AN INDETERMINATE REALITY

A problem, a clue, a hunch, a discovery -- they all contain an element that is personal; the whole heuristic process is personal, yet its significance is not subjective, for it consists in anticipating some part of the truth yet to be discovered, which when discovered will point beyond itself to reality. To meet this situation, I have coined the term Personal Knowledge. (Polanyi, 1964a, p. 24)

*All knowledge falls into one of these two classes:
it is either tacit or rooted in tacit knowledge.
(Polanyi, 1967b/1969, p. 195)*

Richard Gelwick (1977) appropriately argued that “a Society of Explorers” encompasses the importance of Michael Polanyi’s philosophy. That phrase, taken from Polanyi’s *The Tacit Dimension*, includes both “the intense effort of the individual pioneer” and “the social roots and ties that surround the seemingly individual triumph” (Gelwick, 1977, p. xi). This duality, this tension of personal discovery and a community claiming universality, was evident both in Polanyi’s philosophy and in his life. Anchored

by many years of practice in science, and completely confident in its goodness, Polanyi was appalled by its abuse in the Soviet Union of Stalin and, to a lesser extent, in Hitler's Germany. Finding no robust philosophical foundation that allowed Western philosophy to defend what he tacitly understood and affirmed from his own experience, he set out on a voyage of philosophical discovery to explicitly state what he already tacitly knew. His voyage of discovery resulted in a unique understanding of the process of knowing, and at the end of that journey he made a claim with universal intent that all knowledge is personal and is structured in a particular manner that he called "the logic of tacit knowing". Importantly, Polanyi's arguments for personal knowledge and tacit knowing were always set in the context of a tradition and a community, and he was acutely conscious that his personal efforts were both enabled and constrained by a polycentric society that was dynamically ordered. Indeed, it is the tension between personal discovery and a community claiming universality that drives the knowing process.

The importance of tacit knowing becomes evident in watching an accomplished pianist. Here, it becomes clear that there is more to piano-playing than simply knowing how to hit the keys or to read musical notation. Indeed, the mechanism known as a piano is designed in such a way that there is a finite set of sounds that may emerge from it - yet an accomplished pianist is able to draw out infinite possibilities. In searching for those possibilities, it is not unusual to observe the pianist playing with eyes shut, reaching into the heart of the piano to express more than simple mechanical noise. This is the essence of a skill: the master of a skill cannot specify what s/he is doing, yet s/he clearly knows more than s/he can tell. Moreover, the knowing is not simply a past accomplishment, for the playing of a piano is not fixed statically forever, but depends on the interpretation of

each pianist. Others have acknowledged that we *do* know more than we can tell, but Michael Polanyi claimed that "one *can* know more than one can tell" (Polanyi, 1966/2009, p. 8, italics added), for he understood that tacit knowing is a process rather than a fact. We know by intimate acquaintance with the object of our knowing¹, by interiorizing or dwelling in a background of clues on which we rely to point to our true focus.

Throughout his journey of philosophical discovery, Polanyi used the example of science to show *how* we know and discover and what that also implies about *what* we know. As quoted in the introduction, he was convinced that any attempt to eliminate the person from the process of knowing, to honestly view reality impersonally and mechanistically, "must lead to absurdity" (Polanyi, 1958/1962, p. 3). Even if we could define all relationships mathematically, there would be an infinite number of ways to represent each element of a relationship to another; "Never yet has a definite rule been laid down by which any particular mathematical function can be recognized ... as the one which expresses a natural law" (Polanyi, 1946/1964, p. 21). Science is always dependent on the judgment of a person within the context of a community. This is an issue central to public administration, for public administration is normative; it is concerned with possibilities and values, and to eliminate our human perspective would lead to absurdity

The Structure of Tacit Knowing

To better grasp the importance of tacit knowing to public administration, consider the following hypothetical example. When a parent enters a government office loudly swearing and complaining and demanding service for a handicapped child, the first task

¹ The idea of "knowing by acquaintance" as a description of tacit knowing has been argued by Dale Cannon (2002-2003).

of a public servant must be an epistemic one - to understand the problem and to recognize possible solutions. That epistemic act, that act of knowing, is a skillful act that possesses a characteristic pattern. It is an act that is structured in a manner that, Polanyi argued, characterizes all acts of knowing, a pattern that he called, “the *structure of tacit knowing*” (Polanyi, 1967b/1969, p. 181).

Tacit knowing consists of a triad that Polanyi likened to “the triad of Peirce” (1967b/1969, p. 181). It consists of subsidiary particulars, focal wholes, and a subject or person who integrates *from* the particulars *to* the whole. As Polanyi put it,

the triad of tacit knowing consists in subsidiary things (B) bearing on a focus (C) by virtue of an integration performed by a person (A); we may say also that in tacit knowing we attend *from* one or more subsidiaries *to* a focus on which the subsidiaries are brought to bear. (Polanyi, p. 182).

When a social worker sits down with an irate parent, she attends *from* the words and body language of the parent, *from* information located in case files, *from* past training and experience, and *from* her own bodily response - *to* an understanding of a specific problem or *to* a solution to that problem. She *integrates* the surface details with any instruction and bodily response into a comprehensive whole that is the manifestation of her effort, the ends toward which she applies available means. Through integration she relies on the subsidiary particulars in their bearing on her focus. The triad of tacit knowing teaches us, then, that a public administrator attends *from* the subsidiary *to* the focal *by integrating* the subsidiary particulars into a focal whole.

In *The Study of Man*, Polanyi stated that there are two kinds of human knowledge: “What is usually described as knowledge, as set out in written words or maps, or mathematical formulae, is only one kind of knowledge; while unformulated knowledge, such as we have of something we are in the act of doing, is another form of knowledge”

(1959a, p. 12). The first kind of knowledge he called explicit knowledge and the second, tacit knowledge. This distinction has become widely accepted and integral to efforts focused on the understanding of knowledge creation and management (Kakabadse, Kouzmin, and Kakabadse, 2001; Nonaka, 1994; Schon, 1983). What is less readily acknowledged is that Polanyi also described *two different kinds of awareness*. When the social worker is focusing her attention on understanding an agitated client she can not simultaneously be focally aware of her own bodily reactions or of the application of lessons learned through training or experience. While the client is violently expressing himself, the administrator's attention must be focused on him. She remains aware of her body and of past lessons, but in a *subsidiary* manner.

Polanyi almost always described subsidiary awareness through an example. Of the recognition of a physiognomy, he wrote "We are attending *from* the features *to* the face"; of the performance of a skill such as piano playing, he wrote "We are attending *from* these elementary movements *to* the achievement of their joint purpose" (Polanyi, 1966/2009, p. 10); and of the skillful use of a hammer, he wrote that "I have a *subsidiary awareness* of the feeling in the palm of my hand which is merged into my *focal awareness* of my driving in the nail" (Polanyi, 1958/1962, p. 55). The social worker's training and personal knowledge is not lost in the process of tacit knowing, but it is known in a different manner than it would be if she were to focus on that training or knowledge. She sees *through* the subsidiary or attends *from* the subsidiary *to* the focus. Not only are there two types of knowledge, but there are also two kinds of awareness. Recognizing this distinction between distinctions is critical to a clear understanding of

tacit knowing².

According to Polanyi, the art of diagnostics, the testing of objects, the practice of skills, the skillful use of tools, the use of words and signs, and the act of perception all involve the integration of subsidiary particulars into a focal whole. Explicit knowledge we know by focusing our attention on it, but we can only know the subsidiary elements of tacit knowledge “by relying on our awareness of them for attending to something else that comprises them” (Polanyi, 1961, p. 241). It is our reliance on awareness of the subsidiary elements, for attending to a comprehensive whole of which they are a part, which leads to our appreciation of them. It is our reliance on the proximal particulars that leads to our understanding of the distal whole.

Tacit Knowing as Indwelling

For a deeper understanding of tacit knowing, it is helpful to consider the use of a tool, such as use of a probe to explore an unseen location. A probe demonstrates all three elements of tacit knowing: *the subject attends from the subsidiary arm and hand and probe to focus on the comprehensive object* being explored. However, in the skillful use of a tool, we also recognize that subsidiary awareness of particulars involves an interiorization; we *indwell* a probe, *relying on it* and making it an extension of our body. In a sense, a tool becomes part of our body; "our awareness of its impact on our hand is transformed into a sense of its point touching the objects we are exploring" (Polanyi, 1966/2009, p. 12). We are focally aware of the objects at the tip of the probe but we are *subsidiarily* aware of our touch on the handle of the probe: we know the probe *by relying on it* for attending to the object at its end, but in so doing, *we dwell in* the probe in a

² The phrase “distinction between distinctions” is a variation of the phrase “distinction between two distinctions” used by Richard Moodey, a sociologist at Gannon University (personal communication, August 14, 2014).

manner similar to the way we dwell in our own bodies.

Interiorization is clearly evident in the processes of perception. In touch, we are focused on the outside world but subsidiarily aware of muscles and bones and skin and joints. In hearing, we are aware of a multitude of sounds and may focus on one or several by becoming subsidiarily aware of others. Hearing aid wearers are particularly sensitive to the distracting effect that focal awareness of multiple sounds can have on effective listening. In the world of vision, when we look at something, we mechanically perform a set of actions and compile a set of subsidiary particulars, but the looking itself may be meaningless - as when we stare blankly at an object. However, when we *see* something, it takes on meaning because we *integrate* the subsidiary particulars by looking *through* our eyes and brain *to* the object that has become our focus. Our body takes on a subsidiary role as we attend *from* it *to* the object of our focal attention. In fact, Polanyi wrote, "All conscious transactions we have with the world involve our subsidiary use of our body" (Polanyi, 1968/1997, p. 318).

Polanyi distinguished the indwelling of tacit knowing from the indwelling or empathy of Wilhelm Dilthey and Theodor Lipps. The latter led them to assert that empathy "sharply distinguished the humanities from the natural sciences" (Polanyi, 1966/2009, p. 17). In contrast, the indwelling of tacit knowing is more precisely defined and therefore more broadly applicable. For Polanyi, tacit knowing "is an indwelling which mentally extends the knower, enlarges his existence and raises his sense of rational being" (1964a, p. 25); such an indwelling applies to humanities and natural sciences alike. When we rely on subsidiary particulars by integrating them in our focus on a comprehensive whole, we indwell them. When we know our own bodies, we do so by

living in them, and just as we live in our bodies, so we dwell in the subsidiary particulars of a focal whole when we rely on them. *Indwelling*, then, is the process by which certain things become known subsidiarily *as they bear on* the whole that is our focus, and *tacit knowing* is the process by which we indwell or interiorize subsidiary particulars *by relying on* them.

When we rely on our body to keep us balanced on a bicycle, we are dwelling in our bodies, but we also rely on the bicycle wheels to turn smoothly, the pedals to provide power, and the handles to adjust balance or direction. In that subsidiary reliance on them, we interiorize them. Likewise, when a social worker relies on her perception of the client, on her training, or on her previous experience, she is dwelling in those subsidiary elements for attending to the message that the client is trying to express, just as she is dwelling in her own body to hear and see and respond. Through indwelling or interiorization, those elements have become an extension of her body just as the bicycle becomes an extension of its rider or the piano becomes an extension of the pianist. Importantly, it is not only the social worker who is employing the logic of tacit knowing in her encounter with a client. The client, himself, must attempt to express his frustrations, and may do so through sophisticated speech or by thrusting the blame and responsibility on others. However, the social worker instinctively knows that she must pay attention to more than the words being shouted. She must tacitly draw on all of the elements mentioned above to read the external manifestations of the client's mind as expressed through his speech and actions, and must interiorize those external manifestations by dwelling in them while focused on their meaning. The client and social worker are approaching a common problem from two directions, and Polanyi

suggested that they are communicating through use of two sets of tacit knowing triads.

The client's attempt to describe his problem is an instance of "sense-giving" and Polanyi likened it to a practical skill. The client attempts to integrate spoken word and bodily action; he attempts to fuse his words and actions into a comprehensive whole that is their meaning. He already has a tacit understanding of that meaning and must attempt to make it explicit by internalizing external clues to integrate them into a meaningful focus. In the case of sense-giving, "we may feel what we want to say, yet must grope desperately for words to say it" (Polanyi, 1967b/1969, p. 187). The client must skillfully thrust his imagination forward to seek an acceptable expression of that understanding.

The social worker's attempt to interpret the client's description, on the other hand, is an instance of "sense-reading". Where the client begins with an understanding of the meaning and gropes for words to express it, the social worker hears the words and gropes for the meaning that integrates them into a comprehensive whole. The *sense-giver* must rely on tacit knowledge to make it explicit. The *sense-reader* must rely "on informal judgment" (Polanyi, 1967b/1969, p. 188) to integrate explicit knowledge into a tacit whole, indwelling it by relying on subsidiary particulars for an understanding that is deeper or broader than the explicit words enunciated by the client. The words that are spoken are clues that must be indwelt by the sense reader, who makes sense jointly of the words and the experience that they describe, but the goal is an understanding of the comprehensive entity known tacitly to the sense giver. No formula could bring about the understanding that this tacit process occasions; "No explicit procedure can produce this integration" (Polanyi, p. 191).

Three Aspects of Tacit Knowing and Objectivization

The discussion of subsidiary awareness, comprehensive entities, and a subject who integrates particulars into a focus, who attends *from* the former *to* the latter through a process of indwelling, brings to light three important aspects of tacit knowing. The from-to relationship, of the subsidiary to the focal, Polanyi called the *functional aspect* of tacit knowing. We are aware of the subsidiary particulars, but only “in the act of focusing our attention on something else, away from them” (Polanyi and Prosch, 1975, p. 34). The *function* of the subsidiary particulars is their bearing on the focal whole. As a result, we are *subsidiarily aware* of the particulars of which it is composed by being *focally aware* of the whole; the social worker is aware of the subsidiary particulars that inform her decisions, but only as they manifest themselves in decision-making.

The joint *meaning* of the subsidiary elements of a tacit integration, apparent in the focal whole, is the *semantic aspect* of tacit knowing. “The subsidiaries of from-to knowing bear on a focal target, and whatever a thing bears on may be called its meaning” (Polanyi and Prosch, 1975, p. 35). What the client “means”, as he forcefully expresses himself, becomes apparent only when his words and body language are integrated with the knowledge and bodily response of the social worker. When we simply stare blankly at a sunset while focused elsewhere, neither it nor the particular colors on display, nor the silhouettes of trees or people. have meaning, but when we allow it to become our focus, those elements of which we are subsidiarily aware also take on new meaning. When focused on a physiognomy, we might say “that a characteristic physiognomy is the meaning of its features” (Polanyi, 1966/2009, p. 12), and of symbols, tools, machines, probes, optical instruments, and so on, Polanyi wrote that their meaning “lies in their

purpose; they are not tools, machines, etc., when observed as objects in themselves, but only when viewed subsidiarily by focusing attention on their purpose” (Polanyi, 1959a, pp. 30-31). The meaning given subsidiary particulars by their integration into a comprehensive whole may be seen as a surplus meaning beyond their meaning recognized focally or explicitly. If, instead of focusing on the purpose or meaning of a tool or a face or a process or a concept, we turn our attention to the components of which it is composed, its surplus meaning is lost. The *semantic aspect* of tacit knowing, then, is *the joint meaning* that it brings to the subsidiary particulars of a comprehensive entity.

The third aspect of tacit knowing that has become clear is the *phenomenal aspect* or *transformation* which “embodies the *ontological claim* of tacit knowing” (Polanyi, 1964/1969, p. 141)³. A tacit integration is irreversible: the “fusion” of the subsidiaries into the focal, “*brings about a quality* not present in the appearance of the subsidiaries” (Polanyi, 1965/1969, p. 212); the integration of subsidiary particulars into a comprehensive whole creates something new that is not a simple addition of the clues. A social worker’s training or a set of rules can not anticipate the particular circumstances of the particular client sitting in that particular chair on that particular day. That a freak thunderstorm left the client soaking wet or that someone accidentally cut the client off as he was turning into the office parking lot, can no more be anticipated by a set of general prescriptions than can the presence of an electron be absolutely established by the rules of physical chemistry. It is only from the *integration* of those particular circumstances, together with a myriad set of other conscious and unconscious subsidiary elements, that new knowledge or new decisions emerge. Such knowledge or such decisions are

³ Polanyi's listing of these aspects varies from publication to publication. I have chosen to describe the functional, semantic, and phenomenal aspects as elements of the structure of tacit knowing, and to discuss his ontological theory of a stratified reality as a separate but related concept.

comprehensive wholes that are unlike any simple addition of subsidiary elements. They are new phenomena.

It is helpful to consider what happens to all three aspects when the process of tacit knowing is reversed. When a social worker integrates all of the subsidiary clues upon which she must rely to understand a client or to decide how to address the concerns of that client, she does not look *at* those clues, but looks *through* them to the understanding or decision upon which they bear. Consequently, she may be unaware of all of the subsidiary particulars that have gone into her understanding or decision, and if she were to attempt to turn her focus away from the comprehensive whole to the subsidiary particulars, she may find that they are ineffable, that “they are *largely submerged, unspecifiable*” (Polanyi, 1965/1969, p. 213). Therefore, to reverse an integration “is not to retrace our steps, but to efface them. ... All the effects of the integration are cancelled”, and the comprehensive entity is reduced “*to its relatively meaningless fragments*” (Polanyi, p. 213). The undoing of a tacit integration unravels all three of its aspects. When the from-to functional relationship of subsidiary to focal is undone, the phenomenal transformation is also destroyed and the surplus meaning of the subsidiary particulars evaporates.

Just as interiorizing knowledge or action facilitates our ability to tacitly look through or rely on that knowledge or action, externalizing or objectivizing it switches our attention “to something of which we had hitherto been subsidiarily aware” and turns that thing “into a mere external object, devoid of functional meaning” (Polanyi, 1968/1997, p. 319). Externalized objects continue to have semantic content as focal entities, but when objectivized, they lose the surplus meaning of their subsidiary participation in the

comprehensive entity upon which they bear. Objectivizing destroys all three aspects of a tacit integration. When we use a hammer, we interiorize it by pouring ourselves into it, but if we externalize it to focus our attention on our grip or how our arm is cocked, we destroy its surplus meaning, its phenomenal transformation, and its from-to function, and we may well pay with a smashed thumb. As Polanyi put it, when we rely on a tool, a set of standards, a theory, or a skill, “these things cannot be deliberately handled in themselves or critically examined as external objects” (Polanyi, 1954/1974, p. 90). When we rely on something uncritically, even for the critical examination of something else, we internalize or dwell in it, pouring ourselves into it to make it a part of our body.

The explicit knowledge that we have of an object on which we focus is anchored in the interiorization of a multitude of subsidiary particulars. Therefore, by externalizing our knowledge through deductive or inductive inference, or by making it explicit, we facilitate its precise specification and its broad distribution, but we sacrifice our knowledge of the subsidiary particulars that allow us to integrate it as a comprehensive whole. Just as a photograph leaves us with a more permanent record that is merely two dimensional, so an explicit representation of the art of piano playing will leave us a set of notes or a mechanical sound with little meaning. “All explicit forms of reasoning,” wrote Polanyi, “are impotent in themselves; they can operate only as the intellectual tools of man’s tacit powers reaching toward the hidden meaning of things” (Polanyi, 1961, p. 243).

Tacit Knowing and the Discovery of a Hidden Reality

In his book, *The Tacit Dimension* (1966/2009), Polanyi wrote that, “I shall reconsider human knowledge by starting from the fact that *we can know more than we*

can tell” (1966/2009, p. 4). The functional, phenomenal, and semantic aspects of tacit integration shed light on this sentence. Because we look *through* the subsidiary particulars *to* the focal whole, they can appear *functionally* invisible to us. Because there is *a phenomenal transformation* of the particulars into the whole, the particulars are no longer seen in the same light. Because tacit integration creates *a joint meaning* of the subsidiary particulars, they can *semantically* be understood only in terms of the focal whole that is their meaning. No techniques creating explicit representations of our tacit knowledge can eliminate the fact that our ability to interact with that explicit representation “displays a knowledge that we cannot tell” (Polanyi, p. 5). There is always a gap that must be spanned between the background of which we are subsidiarily aware and the comprehensive entity on which we focus. That indeterminacy must be bridged by means of tacit integration.

The gap between what we tacitly sense and what we explicitly know is an indisputable characteristic of our relationship to the world. Yet, as Esther Lightcap Meek, explained, “[w]hen the knower moves in his or her struggle from dissociated particulars to integrated coherent pattern, what once looked like empty spaces gets reinterpreted as hiddenness” (Meek, 2003, p. 120). In the context of tacit knowing, fixed, passive, and uninteresting *facts* become meaningful *clues* to unsuspected future possibilities. The gap between what the client means and what he says creates a tension that engages him in groping for a more precise expression. For what he means, while indefinite, is not unknowable; it is merely hidden and therefore a problem worth solving. Likewise, the gap between what the client says and what the case worker understands may be bridged by relying on subsidiary clues to resolve an unspecified message worth

pursuing. Understood tacitly, the gap between what is and what we understand becomes an essential part of our knowing; the indeterminate reality becomes a hidden reality that *calls us to responsible discovery* and determinate but meaningless facts become indeterminate but meaningful clues to the resolution of problems worth pursuing. Knowing more than we can tell recognizes the hiddenness of reality, the indeterminate nature of our knowledge, and the calling that connects the two.

As Polanyi explained the logic of tacit knowing, we can know more than we can tell because we know by integrating a set of indeterminate particulars, of which we are only subsidiarily aware, into a comprehensive whole on which our attention is focused. Not only are the clues that we integrate into a comprehensive whole “not fully specifiable”, but neither is the process of integration “fully definable”, nor are “the future manifestations of the reality indicated by this coherence” (Polanyi, 1966, p. 88) exhaustible. That the subsidiary particulars that we integrate into a comprehensive whole can not be fully specified and that the process of integration that makes tacit knowing possible can not be fully defined, has been made clear in the description of tacit knowing. That the reality indicated by tacit integration is made manifest by inexhaustible possibilities has received less attention, but is apparent if we consider that “human knowledge is but an intimation of reality, and we can never quite tell what reality will do next” (Polanyi, 1964/1997, p. 339). Positivist objectivity recognizes reality as explicit and observes it in a detached, impersonal manner. Tacit knowing depends on the personal involvement of the knower to affirm the independence of reality by accepting that “[i]t is external to us, it is objective, and ... its future manifestations can never be completely under our intellectual control” (Polanyi, p. 339).

In “Logic and Psychology” (1968), Polanyi further developed the uncertainties of a tacit integration. Beginning with the indeterminacy of the hidden reality revealed by tacit knowing, he pointed out that what we accept today as fact must be reinterpreted tomorrow as new data, new insights, and new interpretations come to light. Turning to the indeterminate character of the coherence, the integration upon which we rely to recognize truth, he argued that we commit ourselves to the validity of that integration while recognizing that it may be mistaken; the clues do not absolutely determine the coherence of our conclusions so we must judge between possible alternatives. Next taking up the indeterminate nature of the very clues which we integrate, he pointed out that we may be missing clues or our perception of them may be mistaken or distorted. However, the indeterminacy of subsidiary clues may be divided into two elements: the difficulty of identifying or tracing them and the fact that we are aware of them only by looking *through* them to the focus of our attention. Indeed, we can not logically know them determinately, for a determinate knowledge of them makes them our focus and undermines their participation in the integrated whole that gives them meaning. Having expanded his three indeterminacies of knowledge to four, Polanyi added a fifth. Every time a person integrates subsidiary particulars into a focal whole, she makes existential choices that modify the very grounds of her judgment and leave open the possibility of a different integrated whole based on reformulated grounds of knowledge. Our understanding of the world, then, is indeterminate in at least five ways: (1) how one person understands reality today leaves open the possibility of another understanding tomorrow; (2) the process of knowing always involves judgment that may be mistaken; (3) the clues that we integrate to an understanding may not be fully known; (4) when we

integrate clues we are only aware of them subsidiarily as they bear on our understanding; and (5) our very act of knowing reality involves choices which modify the grounds that we use to know.

As noted above, it is significant that Polanyi wrote that we *can* know more than we can tell. If he had merely written that we *do* know more than we can tell, he would have left open the possibility of an explicit reduction of tacit knowledge. However, "this capacity of ours to know more than we can tell" (Polanyi, 1961/1969, p. 133) is rooted in our ability to know the unexpected; reduction of tacit knowledge to a formalized system is logically fallacious, for tacit knowing is a process and the subsidiary particulars of a tacit integration can not be exhaustively specified. "Formalisation" he acknowledged, "can be extended to hitherto unformalised semantic operations, but only if the resulting formal system can in its turn rely on yet unformalised semantic operations" (Polanyi, 1952, p. 313). Explicit reduction of tacit knowledge remains dependent on tacit integration. Moreover, since formal, explicit knowledge is necessarily grounded in the integration of subsidiary particulars into a comprehensive whole, such knowledge can never function without a person. Because people are free to choose, involvement of a person opens up the possibilities inherent in indeterminate future action. Polanyi's concern was not with knowledge that is static and impersonal, but with the process by which we come to know - a process that leaves open future possibilities. That we *can* know more than we can tell leaves indeterminate *the possibilities* of our knowing, by recognizing their hiddenness.

The Dynamics of Tacit Knowing

In *Science, Faith, and Society* (1946/1964), Polanyi likened scientific discovery to

a person waking to the sound of a burglar next door. Ears sensitized by the lack of visibility, the person immediately begins to speculate about possibilities in a darkened world that is unknown and undefined. Empirical clues are needed to stimulate intuition, but verification of a scientific theory depends, not on detached induction, but ultimately on “mental powers”, on what Polanyi eventually identified as imaginative tacit integration. This groping toward a focal whole, that is intuitively sensed but never fully specified, also occurs when the social worker confronts her client. She can not predict precisely what has caused the client to be upset, nor why he has chosen the agency to resolve the problems he is facing. Yet, drawing on a background of tacit knowledge, she often has a good idea of what is at stake - she intuitively senses the shape of undefined possibilities, always recognizing that surprise is possible and even to be anticipated. Having accepted her intuitive suspicions, she gropes toward a full understanding of reality, ever mindful that her final conclusions, reliant as they are on sometimes unspecifiable tacit knowledge of an indeterminate reality, may be mistaken, and even when true, remain open to change and to an indeterminacy of their own.

The gap between the particulars of a tacit integration, known subsidiarily, and the comprehensive whole of which we are focally aware, creates tension. That tension, of potentially unspecifiable clues pointing to possibilities, is a heuristic tension in two senses. On the one hand, once the gap between what is known and what is intimated has been leaped and the tension released, there is no return; once a discovery has been made, it can not be "un-discovered". On the other hand, a heuristic tension is open to future possibilities. For example, as George Polya (1945/1985) also taught, the openness of heuristic learning, as opposed to routine learning, draws the student into additional study

and insight. Likewise, while systematic problem solving is "a wholly deliberate act" (Polanyi, 1958/1962, p. 126), its openness calls the problem solver to additional inquiry through a process involving both active and passive stages. Drawing on the work of Henri Poincaré, Polanyi wrote that problem solving begins with a preparation period in which a logical gap is recognized. Preparation is followed by incubation in which the logical gap is explored, often unconsciously. Then comes illumination - the crossing of the logical gap. Finally there is a period of verification in which a more permanent bridge is constructed. Both preparation and verification are active while incubation and illumination appear to be more passive. At both active and passive stages there is a subject, for a logical gap is recognized as a problem "only if it puzzles and worries somebody," and the resolution of tension, the crossing of that logical gap, is recognized as a discovery "only if it relieves somebody from the burden of a problem" (Polanyi, 1958/1962, p. 122).

Driving this process is the heuristic power of "the belief that there exists a hidden solution which we may be able to find" (Polanyi, 1958/1962, pp. 126-127). With the recognition of a problem comes the passion of the explorer who senses the possibilities of subsidiary particulars pointing to a focal whole that is yet to be revealed. With the recognition of a solution or discovery comes the enthusiasm of the explorer who recognizes a comprehensive whole and becomes subsidiarily aware of all of the clues which point to it. "A problem" wrote Polanyi, "is an intellectual desire ... and like every desire it postulates the existence of something that can satisfy it" (p. 127). Obsession is "the mainspring of all inventive power" (p. 127), and its focus must be the unknown; it must be preoccupied by the unspecifiable. This is the heuristic power of a logical gap

which calls the explorer to action: a hidden reality, revealed in its indeterminacy, sets up a heuristic tension that incites our passion and calls us to the discovery of possibilities: "a heuristic striving evokes its own consummation" (p. 127). "We have here" wrote Polanyi, "the paradigm of all progress in science: discoveries are made by pursuing unsuspected possibilities suggested by existing knowledge" (1967a/1969, p. 79).

There are two elements that enter into heuristic problem solving. It is *intuition* that spontaneously suggests an idea which calls the explorer to discovery. Next, *imagination* casts or thrusts forward to seek confirmation of the idea. This casting forward may occur again and again as the passionate subject responsibly seeks to discover a solution. Finally, *intuition* takes over again when the imagination pauses from its frantic activity, spontaneously integrating old and new subsidiary elements in a flash of insight that reveals a solution. "All three parts of a scientific inquiry are set in motion by two mental powers" wrote Polanyi and Prosch:

They receive their guidance from integrative powers, while they are propelled, and also supplied with suitable material, by thrusts of the imagination. The integrative powers are largely spontaneous; to mark this, we may give them the name of 'intuition.' All the labor and anguish involved in the creative process go into the thrusts of the imagination; intuition is effortless" (Polanyi and Prosch, 1975, p. 96).

At the inception of scientific inquiry, at the stage of "strategic intuition", intuition is central while imagination functions solely in "keeping intuition alert to the sensing of a problem" (Polanyi and Prosch, 1975, p. 96). At this stage, we intuitively sense the possibilities of an indeterminate reality and we integrate existing knowledge to a comprehensive whole. Sensing the potential of the comprehensive entity that we have intuitively identified, we next "thrust the focus of our attention ahead of the subsidiary ... by the powers of our imagination" (Polanyi, 1968/1997, p. 326). In fact, "[i]t is only the

imagination that can direct our attention to a target that is as yet unsupported by subsidiaries” (Polanyi, 1968, p. 40). Polanyi and Prosch called this second stage of scientific inquiry, “questing intuition”. Polanyi and Prosch finally described a “concluding intuition”, in which a quest “is often brought to a close after a quiet interval ... by a sudden illumination which offers a solution for the problem” (Polanyi and Prosch, 1975, p. 96). This is an instant recognition of the whole, including both subsidiary and focal, that is most often associated with the term, “gestalt”.

The heuristic tension evident in the interplay of intuition and imagination may be found in every tacit integration of subsidiary clues into a comprehensive whole. Consequently, this dynamic process contributes a mechanism to the logic of tacit knowing by which discovery, the acquisition of a skill, and other heuristic acts of knowing take place. Importantly,

This dynamism endows tacit knowing with creativity. It lends us the power of acquiring a skill, and, by the same token, enables us to invent a machine; indeed, to perform any possible creative action. (Polanyi, 1968/1997, p. 326)

Together, intuition and imagination open up space for novelty. Set in the logical structure of tacit knowing, their dynamic action orients the discoverer toward the hidden future manifestation of a comprehensive entity. Guided by anticipation of a deepening coherence and by the potential of a reality that is hidden yet accessible, the scientist or artist or public administrator commits herself to passionately and responsibly integrate both a dynamic intuition and a straining imagination in the pursuit of knowledge or inspiration or a satisfied public. “Intuition” wrote Polanyi, “informs the imagination which, in turn, releases the powers of the intuition” (1966, p. 91). Intuitively, the knower recognizes the unspecifiability of a reality that remains possible but masked or disguised,

yet a sense of approaching this reality results in passionate expectancy that is translated into imaginative effort. Tacit knowing, therefore, allows us to anticipate a hidden reality that is intimated in the subsidiary knowledge on which we depend; it calls us to unmask the disguised and discover what is concealed.

At the end of an imaginative struggle inspired by an intuitive glimpse of possibilities, the subject returns to a relatively calm interlude, and he does so “with a new vision of coherence and reality” (Polanyi, 1966, p. 92). However, a new vision, a new set of standards of coherence can never be known absolutely, for all aspects of tacit knowing - the clues, the integrative process, the future manifestations of reality, and both intuition and imagination - are indeterminate. New standards of coherence do not come into existence through the action of explicit command, but through the covert action of practice. As we apply the logic of tacit knowing through an intuitive / imaginative struggle, we interiorize both the struggle and its results, tacitly abiding by any new values and conforming to any new standards. It is in this manner that the results become authoritative and by which new values and new standards emerge. By indwelling them through tacit application, we come to rely on them and conform our actions to them. New values, wrote Polanyi, “enter subsidiarily, embodied in creative action” (p. 92). Moreover, because these interiorized values are known subsidiarily, “[t]he actual grounds of a value, and its very meaning, will ever lie hidden in the commitment which originally bore witness to that value” (Polanyi, p. 92).

We see, then, that just as discovery takes place by the dynamic integration of subsidiary particulars into a comprehensive whole, so also do standards and values come into being through a successive alternation of intuition and imagination within the logic

of tacit knowing. Furthermore, noted Polanyi, “[w]hat the imagination achieves in the mind, the process of growth performs spontaneously in the child, and evolution performs likewise in the rise of higher forms of life” (1968/1997, p. 327). In each of these instances can be seen a mechanism that facilitates the tacit integration of subsidiary particulars into a comprehensive entity that is the meaning of, while being phenomenally unspecifiable in terms of, yet nevertheless dependent on, those particulars. In an imaginative process, in a process of growth, or in evolution, “a transition may take place gradually by a steady intensification of a higher principle from initial rudimentary traces, up to the stage where it fully takes control over the lower level from which it has emerged” (p. 327). From the subsidiary particulars of a lower ontological level, *emerges* a comprehensive entity that integrates those particulars into a comprehensive whole. The word, “emergence” suggests that the particulars determine, even cause, the comprehensive whole, but the interaction of intuition and imagination show that it is the alternation of intuitive insight with thrusting imagination that facilitates the emergence of new understanding through new discovery. Neither focal nor subsidiary awareness of a comprehensive entity take absolute precedence in the dynamics of tacit knowing.

Emergence and the Creative Tension of a Stratified Reality

That the dynamics of tacit knowing open up the possibility of emergence, suggests that the structure of tacit knowing has an *ontological aspect* that is related to but goes beyond its phenomenal transformation. The comprehensive entities that we know by attending to them from subsidiary particulars, on which they rely, are themselves structured hierarchically, are empowered by a heuristic openness to possibilities, and call humanity to responsible judgment and action. Indeed, that "all understanding is achieved

by indwelling" (Polanyi, 1962/1969, p. 160), itself points to an ontological significance, for indwelling involves our bodies which are real. Knowing, itself, is somatic, for "[o]ur body is the ultimate instrument of all our external knowledge, whether intellectual or practical" (Polanyi, 1966/2009, p. 15). Moreover, the from-to structure of tacit knowing is reflected in the hierarchical structure of comprehensive entities.

A machine, for example is a comprehensive entity that emerges from chemical and physical elements, and is subject to the chemical and physical laws which govern those elements, but which is formed by conditioning them through application of engineering principles unaccountable by the lower level principles. No detailed examination of chemical and physical laws can reveal the engineering principles that form lower level elements into a higher level machine. Just as a comprehensive whole is known focally, as a whole, while its particulars are known subsidiarily, so a comprehensive entity is governed by its upper level principles, as a whole, while its lower level elements, and therefore the entity as well, are governed by the lower level principles or laws that define them. Polanyi referred to this as *the principle of dual control*; a comprehensive entity is subject to both the principles that govern its lower level elements and the upper level principles that control and condition those lower level principles left open at the margins (1967b/1997, 1968/1969). The emergence of a comprehensive entity, then, is made possible by lower level entities "*under the control of operational principles that constitute (or determine) [their] boundaries*" (Polanyi, 1967b/1997, p. 289).

To understand the practical implications of higher level principles controlling lower level possibilities, one need only consider that a computer, for example, is made of

many hardware components that are each defined by a set of operational principles but which may be assembled together in a number of ways to yield desktops, laptops, tablets, or phones. However, once assembled into a comprehensive unit, by application of a set of engineering principles, a new set of rules govern the functionality of that assemblage. It is still subject to the rules or principles governing its storage unit, its screen, its input and output interfaces, its central processing unit and so forth, for those elements remain foundational to its functionality. Yet, the computer as a whole is also subject to the engineering principles that constrain its components to allow the emergence of the comprehensive entity that we recognize. It is subject to dual control. Polanyi also used a chess strategy as an example of a higher-level entity defined by the strategy while also subject to the principles defining the possible moves of the individual pieces. Likewise, DNA is dependent on the properties of the four nitrogen bases that are so critical to its function, but it is also subject to principles which limit the possible combinations of the four bases and thereby store the information that is so critical to life. Indeed, if DNA could be defined in a Laplacean, reduced fashion - in terms of the principles governing physics and chemistry - it would carry no information. It is the indeterminately possible combination of the four bases that gives their *particular* arrangement an informational content.

What becomes evident in these examples is that "any general principle ... must leave indeterminate a certain range of circumstances in which it can apply, and any particular application of such a principle requires that these circumstances be fixed by some agency not under the control of that principle" (Polanyi, 1965, p. 14). Polanyi referred to these "indeterminate circumstances" as "*boundary conditions*" (p. 14) and

argued that it is these boundary conditions that are shaped by higher level principles. Both the function of machines and "the machine-like functions of living beings," he wrote, "are determined by structural and operational principles which control the boundary conditions left open by physics and chemistry" (p. 14). A processor or storage unit or user interface are systems that are defined by principles that necessarily leave their possible applications undefined. It is these possibilities that may be controlled by a separate set of principles defined by some independent agency.

This process of control of lower levels by higher level principles is not limited to two levels. In certain circumstances, the possibilities left undefined *by higher-level principles* may themselves be controlled by other yet higher principles that condition them without undermining either their influence on lower-level principles or the indeterminate possibilities of the very lowest elements. Thus, the higher entities which are subject to *dual control* become subject to yet higher levels of control which are, themselves, subject to dual control. Each level of operational principles is subject to the higher-level principles that create, condition, and control them while also remaining dependent on the principles governing the lower level elements of which they are composed (Polanyi, 1965, 1968/1969, 1968/1997). Speech is a clear example of a multi-level entity in which phonemes become meaningful when combined into words, words when combined into phrases, phrases into sentences, and sentences into stories. Likewise, computer components can be broken down into more basic components and eventually into chemical elements even as computers, themselves, are given meaning through integration by higher level operating systems or software applications or grid computing systems.

In all of these examples a gap between what is known of reality and what is intimated but hidden, is evident. The components of a computer, the rules governing movement of the chess pieces, and the A, T, G, and C bases upon which DNA is based, are all elements of the comprehensive higher level entities that a separate set of principles create. The upper-level principles that constrain the components, pieces, and bases become tools to reveal an indeterminate aspect of a hidden reality. Given such a prevalence of uncertainty, simplification by reduction of higher level entities to lower level principles might seem attractive. Freeing higher level entities from the control of higher principles, however, does not simply result in a reduced set of principles. Rather, it eliminates the boundaries that define the higher level and destroys the entity, itself. “Smash up a machine, utter words at random, or make chess moves without a purpose, and the corresponding higher principles ... will all vanish, and the comprehensive entity which they controlled will cease to exist” (Polanyi, 1968/1997, p. 322). It is true that the lower-level principles will remain in operation, but the higher entity that was to be reduced only in terms of definition and control will also be reduced in fact - it will no longer exist. This, Polanyi suggested, “presents us with an ontological counterpart of the *logical disintegration* caused by switching our attention from the centre of a comprehensive entity to its particulars” (p. 322). Higher, comprehensive entities rely both on the principles governing the elements of which they are composed and on higher principles that apply only to themselves. They can not be reduced to control by lower level principles; they exhibit the logic of tacit knowing at an ontological level.

One of the most important offerings of a social worker is her ability to cobble together a unique solution to a specific problem from a set of general solutions devised

for broad application. Such general solutions leave open the possibility of applying higher level principles that limit and define the elements of a particular situation for a particular purpose. When a social worker turns from attempting to understand her client to the devising of a solution, she turns from an epistemological task to an ontological one. At an epistemological level we have seen that she integrates subsidiary particulars into a comprehensive whole that is a new understanding. When she turns to the creation of a solution, her efforts follow a similar pattern. What Polanyi has shown is that it is not just the creative process, but even the solution, itself, that is characterized by a from-to structure. The solution depends on the principles governing its components, but it is defined by higher level principles that bring those components together in a particular way to give them meaning. It is her engineering of such a higher level entity that makes the social worker effective in her work.

The ability of upper-level principles to define or contain sets up a creative tension that is central to meaning. Just as the subsidiary elements of knowledge become known and meaningful in light of the comprehensive focus to which they point, so the lower level elements of a multi-level entity are given meaning by the upper-level principles that constrain them and form them into a higher level entity. Chess pieces and the rules that define their possible movements are meaningful in the context of a strategy. A random set of pen strokes takes on meaning when formed into letters, letters are given meaning when formed into words, words are meaningful when constrained by grammar to form sentences, and sentences make sense when limited by concepts and ideas. Likewise, the advice or assistance given by a social worker is meaningful in the context of a client's needs, paving materials become a road when constrained by a particular location, and

force exerted by a police officer has proper purpose when applied within the limits of the law. The constraint of possibilities left open by lower-level entities provides a meaningful ontological counterpart to the integration of subsidiary particulars into a comprehensive whole. This ontological theory of a stratified reality shows how the tension between indeterminate possibilities and constraint empowers creativity.

The Fiduciary Foundations of Knowledge

Central to the logic of tacit knowing are the concepts of “belief” and “faith”. As early as 1936, Polanyi wrote that “the mere fact that there is no absolute security for the validity of what we consider exact natural laws should lead to the conclusion that these laws are only valuable in combination with the element of uncertainty in them, which is compensated by the supreme sanction of validity, which is faith” (Polanyi, 1936/1992, p. 35). It is the indeterminate possibilities inherent in both reality and our knowledge that gives them power; faith that we can know more than we can tell gives us confidence that indeterminacy is not randomness, but hiddenness calling us to discovery. “Verification,” therefore, “rests ultimately on mental powers which go beyond the application of any definite rules” (Polanyi, 1946/1964, p. 29), and “must be taken in the light of our own personal judgement of the evidence” (p. 30). Empirical evidence remains an important source of clues about reality, but the integration of such evidence into the body of scientific knowledge depends on faith in the standards, the methods, and the doctrine and premisses of scientific tradition.

Over and over Polanyi referred back to the Copernican revolution, finding in it both signs of coming modernism and clues to a post-critical approach to discovery. What he showed was that Copernicus’ claim was not to a better understanding of the

relationship of heavenly bodies (he was happy just to match the descriptive and predictive ability of the Ptolemaic system), nor to a more accurate representation of empirical data (according to Polanyi, even Copernicus must have realized how inaccurate some of his calculations were), but to a glimpse of a real but hidden system that exhibited both orderliness and heuristic power. Yet his claim to the cohesiveness and reality of his system meant little to those unwilling to accept it, for they simply dismissed it as “a novel computing device” (Polanyi, 1967a/1997, p. 226). What Copernicus meant by real was a system that he could rely on and that he could count on others to accept. He declared his theory with universal intent, and his followers, like Kepler and Galileo, and through them Newton, and on to Einstein, “testified to their belief that the Copernican system was real, *by relying on it* as a guide to discovery” (Polanyi, p. 236, italics added). Confident in its truth, they had *faith in* his system, even as they recognized its faults as problems to be solved through further investigation and discovery. Their dependence on Copernicus’ theory proved their belief in the hidden reality that was intimated therein.

It is easy to focus on Copernicus’ explicit description of a heliocentric system. However, “To rely on a theory for understanding nature is to interiorize it. For we are attending from the theory to things seen in its light” (Polanyi, 1966/2009, p. 17). By interiorizing the Copernican system, by dwelling in it to rely on it, Kepler and Galileo, and those who followed, realized the joint meaning of that system and of their own observations and conceptions. Their confidence in his system, together with an appreciation of its elegance, called them, even compelled them to new discoveries. Kepler and Galileo made claims to reality themselves, and Newton was able to prove *his* confidence in *their* claims *by relying on them*, just as they had relied on the claims of

Copernicus. The story of Copernicus, then, illustrates that the importance of a discovery, and its claim to reveal an aspect of reality, is not due to its certainty or even its accuracy. Rather, it is due to its ability to “manifest its truth ever again by new surprises” (Polanyi, 1967a/1997, p. 244).

In the Copernican story we find evidence of two key concepts. Orderliness, for Polanyi, is evidence of the intimate involvement of a person. Computer systems rely extensively on circuits that are limited to two options (they may be on or off) and on communication revealed in two voltage levels (high and low). Yet, when combined into a matrix or strung together in a series, such binary options may reveal substantial information. The key, Polanyi pointed out, is the orderliness of such circuits or communication *set against a random background*. The importance of this contrast between background and foreground is particularly evident in the “wiping” of a mass storage device. To clear a magnetic disk of all information one need only align all of its individual magnets; a background that is perfectly ordered contains no meaningful content. On the other hand, orderliness in the context of randomness points to the involvement of a person and becomes evidence of information - the expression of personal knowledge. It is human beings, wrote Polanyi, who have “the power to establish real patterns in nature” (Polanyi, 1958/1962, p. 37). Note that an orderly pattern need not be a pattern forced upon nature, as occurs in computer systems or in a written document or a government agency. Even a “naturally occurring” pattern reveals personal knowledge, for it is a person who recognizes such a pattern by integrating the observed elements of nature into an orderly structure that may also be recognized by others.

Heuristic power is the second key concept evident in Polanyi’s telling of this

story. In his use of the idea of a heuristic, Polanyi drew on the work of his fellow Hungarian, George Polya, who used this idea in two related ways. On the one hand, heuristics can be thought of as “methods and rules of discovery and invention” (Polya, 1945/1985, p. 112). Such methods and rules are often devised as short cuts or rules of thumb to facilitate solutions to a problem, particularly in mathematics or computer science. A heuristic need not produce an exact or final answer so long as it moves problem solving in the right direction. It is this openness that is central to the second way that Polya applied the term in his writing: “Heuristic reasoning is reasoning not regarded as final and strict but as provisional and plausible only, whose purpose is to discover the solution of the present problem” (Polya, p. 113). The heuristic power of the Copernican system was not its contribution of an absolute system that provided strict results, but of a provisional system of indeterminate possibilities that was recognized by its orderliness as a fitting rule of thumb or plausible method worth exploring and that led others to demonstrate faith in its legitimacy by relying on it for their own work.

Indeed, wrote Polanyi, given the role that faith in or reliance on the judgments of others plays in the search for scientific knowledge, the pursuit of such knowledge demonstrates “an instance of the process described epigrammatically by the Christian Church Fathers in the words: *fides quaerens intellectum*, faith in search of understanding” (1946/1964, p. 45). Such knowledge is a gift “for which we must strive under the guidance of antecedent belief” (Polanyi, 1958/1962, p. 266). By recognizing the fiduciary foundation of all knowledge, Polanyi argued, we are free to openly confess our true beliefs rather than allow them to be held unconsciously and thus susceptible to corruption. Such a fiduciary framework is manifest in tacit knowing, in a passion for

truth, in tradition, and in community.

The Fiduciary Call to Responsibility

Faith in or reliance on another (whether or not animate) is one side of a fiduciary program; it is evident when we dare to trust in another. On the other side is the effort to be trust-worthy; in the context of an orderly system that is heuristically powerful, faith not only persuades a person to rely on another, but it also becomes a calling to responsible commitment. Because personal knowledge is not made but discovered,

it claims to establish contact with reality beyond the clues on which it relies. It commits us, passionately and far beyond our comprehension, to a vision of reality. Of this responsibility we cannot divest ourselves by setting up objective criteria of verifiability - or falsifiability, or testability, or what you will. For we live in it as in the garment of our own skin.” (Polanyi, 1958/1962, p. 64)

The struggle to reveal a hidden meaning is a responsible struggle, a *responsibility* that we “live in” or dwell in. It is a task and a duty that we accept when we passionately commit ourselves to it, and no impersonal set of rules can detach it from our personal involvement or eliminate our struggle to remain responsible. Our search is passionate because we sense the potential of what is concealed and long to know its fullness. It is responsible because it can succeed or fail and we are called to do our utmost to bring about success. By relying on Copernicus’ heliocentric theory, Galileo and Kepler *committed* themselves to it and ardently and responsibly accepted the consequences of their commitment. They dedicated themselves to the discovery of a reality that was uncertain and unforeseeable but which *called* them to its passionate pursuit.

This hidden reality is not wholly foreign to us because our background knowledge already points subsidiarily to its possibility. However, because it does not originate fully formed within us, we are forced to humbly acknowledge that, even though we submit to

its claim on our energies, we may not succeed in our quest. This is not an objective reality, impersonally observed in a detached manner and known dispassionately and absolutely as “fact”. Nor is it a subjective reality, created by the god-like capacity of a mind that is independent of any contact with the external world. Instead,

A passionate search for the correct solution of a task leaves no arbitrary choice open to the seeker. He will have to guess, but he must make the utmost effort to guess right. The sense of a pre-existent task makes the shaping of knowledge a responsible act, free from subjective predilections. And it endows, by the same token, the results of such acts with a claim to universal validity. For when you believe that your discovery reveals a hidden reality, you will expect it to be recognized equally by others. To accept personal knowledge as valid is to accept such claims as justified, even though admitting the limitations imposed by the particular opportunity which enables the human mind to exercise its personal powers. This opportunity is then regarded as the person’s calling - the calling which determines his responsibilities” (Polanyi, 1959a, p. 36).

A calling to responsibility will neither abdicate its intimate relationship to all knowledge, nor permit a subjective abandonment of the universal intent of the discovery of an independent reality. It is an opportunity - an opportunity to be responsible.

Whereas modernity, and positivism in particular, have "made us regard human beliefs as arbitrary personal manifestations" (Polanyi, 1949/1974, p. 57), Polanyi argued that "the holding of a belief is a commitment" (p. 59), and such a commitment implies purposefulness. However, he also pointed out, "[t]o say that an action is purposeful is to admit that it may miscarry" (p. 58). Specifically, he explained, "[s]uch a belief may turn out to be true or false," but "[t]he affirmation of a belief can only be said to be either *sincere* or *insincere*" (p. 59). Because of the indeterminacy of knowledge and because the possibility of being right assumes its opposite, commitment to a belief can never be fully justified - for it may turn out to be mistaken or "*rash*". However, "when a belief is

both sincerely and responsibly held - that is, in conscientious awareness of its own conceivable fallibility - there is present a form of affirmation which cannot be criticized on any grounds whatsoever” (pp. 59-60).

As a fiduciary act, such commitment to a belief is an act of tacit knowing. The integration of subsidiary particulars in terms of a comprehensive whole on which they bear is a commitment to that whole. It is a belief in the whole’s comprehensiveness despite the uncertainty - in spite of the unspecifiability - of the subsidiary elements which make it possible. Empirically, someone learning to ride a bicycle must rely on a host of clues known only subsidiarily. She must have faith that half-understood momentum and a body's ability to balance itself will enable effective forward movement. More generally, belief in the reality of a comprehensive entity is a personal commitment, and reliance on subsidiary particulars, by looking through them or attending from them to a comprehensive whole, is an act of faith. Therefore, the certainty of a reality claimed with universal intent is a dynamic certainty and subject to modification. An explicit focus on the subsidiary particulars of tacit knowing will dissolve the tacit integration that brings into being the comprehensive entity to which a person makes a commitment; “the present moment’s belief can be rejected or modified by the next moment’s reflection” (Polanyi, 1949/1974, p. 60). Commitment and reflection, therefore, are incommensurable: while we reflect on our beliefs, we must relinquish our commitment to them; while we commit ourselves to them, we ignore reflection on them.

Integration of subsidiary particulars into a comprehensive whole, then, is “an act of hope”. It is a commitment to a hidden reality which is “expressed in the universal intent of personal knowledge” (Polanyi, 1958/1962, p. 65). Polanyi set out “to bring back

the idea of reality and place it at the centre of a theory of scientific enquiry” (1967a/1997, p. 225). However, “The resurrected idea of reality ... will turn out to be known only vaguely, with an unlimited range of unspecifiable expectations attached to it” (p. 226). Therefore, when we rely on such an indeterminate reality, we do so by faith, and when we respond to its call to responsibly seek out and discover further aspects of that reality and hold them with universal intent, we do so by faith. These are the two sides of a fiduciary program driven by hope, by the tacit intimations of unspecified and even unsuspected future manifestations of reality.

Beauty, Passion, and Legitimacy in Tacit Knowing

The responsible acceptance of a call based on intimations of a hidden reality acknowledges the heuristic power of a logical gap. Such heuristic power was evident in Copernicus’ affirmation of his heliocentric system in the face of great opposition, but it was more clearly defined in Kepler’s reliance on Copernicus’ system to develop his own equations that at once affirmed the heliocentric system while disproving Copernicus’ particular version. And, of course, Newton’s imagination would have been hampered without Kepler’s refinement of Copernicus’ system as a foundation. However, we need not reach out to ancient stories of astronomical discoveries to recognize the heuristic powers of a trusted system. A social worker confronted with an irate client might simply dismiss him as “a jerk” and refuse to listen for other possibilities. Alternatively, she might choose to pay attention to subtle hints that point in other directions and suggest other possibilities. The former response closes the door to future discoveries. The latter leaves the door open, lending it heuristic power.

Openness to the heuristic power of a theory, an interpretation, or an action forces

us to acknowledge "a beauty that exhilarates and a profundity that entrances us" (Polanyi, 1958/1962, p. 15). The ability to develop a theory, to devise an interpretation, or to imagine an action that has heuristic power brings a sense of beauty to a situation because it points to future possibilities that remain, themselves, indeterminate. Such a skill adds orderliness to a theory, interpretation, or action, imprinting it with the responsible action of a person. Against a background of heuristic randomness, any particular combination of the four bases in DNA becomes meaningful. Likewise, the potential randomness of electrical signals turns an orderly combination of signals into information, and the unspecifiable range of possible strategies available to a social worker makes a particular combination into a comprehensive plan. The beauty of a theory or idea or action - the cohesiveness of a comprehensive entity that gives it meaning - is recognized by its orderliness in the context of its heuristic power.

In Polanyi's writing, beauty and passion are closely associated, for intellectual beauty is "a beauty which establishes a new contact with external reality" (Polanyi, 1958/1962, p. 148). Because reality is characterized by an indefinite range of unexpected manifestations, it can only be discovered by leaping a logical gap. That heuristic process, when combined with orderliness, gives the explorer a glimpse of reality that elicits a passionate appraisal of its beauty. Through imagination, heuristic power thrusts the explorer forward in the search for reality, while orderliness, through intuition, constrains it to give it meaning. The anticipatory powers of an entity or system or idea call to the scientist who sees in them the beauty of a cohesive system pointing to an aspect of a hidden reality. This is what persuaded Copernicus that he was looking in the right direction and that he could rely on his conclusions: "Everything is now bound together,

he claim[ed], and this is a sign that the system is real” (Polanyi, 1967a/1997, p. 234).

Polanyi found the passion of recognizing beauty in a discovery especially evident in the writing of Kepler. Kepler recognized that he might be wrong, but he was so enthralled by the beauty of the discoveries he was making that, “He even went so far as to write down the tune of each planet in musical notation” (Polanyi, 1958/1962, p. 7). To Kepler, “astronomic discovery was ecstatic communion” (p. 7), but it would not be unusual for a social worker to also feel a sense of elation at uncovering the root of a client’s ongoing problems, or at devising a particularly elegant solution to a thorny situation. As Kepler showed, the beauty of a cohesive discovery inspires a passionate commitment to the reality intimated in such a revelation. It compels the knower to a responsible reliance on the indeterminate possibilities of such a truth. Consequently, science, wrote Polanyi, “exists only to the extent to which there lives a passion for its beauty, a beauty believed to be universal and eternal” (1958/1962, p. 267).

The beauty of a tacit integration is evident in the passion with which it is upheld. Because such an integration may be right, it may also be wrong, but its orderliness and its heuristic power to point us toward further unexpected manifestations of an indeterminate nature excite us and draw us toward a set of possibilities that yet lie beyond our reach. The beauty of a tacit integration thus legitimizes it; beauty gives us the confidence necessary to commit ourselves to the passionate search for yet more comprehensive entities that point us still further in the pursuit of the real. Facts, ideas, theories, institutions, relationships - all become clues to an indeterminate reality, pointers that act as signs along the way, indications that we are on the right path and that our destination is approaching. The heuristic power of those clues calls us forward to passionately search

out further evidence, but their orderliness simultaneously reveals to us, and validates for us, the particulars, the background that anchors *them*. Legitimacy and validity, then, are not the leftovers of certainty, but the passionate commitment that results from the recognition of a beautiful integration of subsidiary clues into a comprehensive whole that leaves the future open and undetermined.

A public servant endeavoring to interpret the exclamations of a client or a scientist attempting to understand a problem both seek to make sense of something that is hidden yet accessible, something that is real yet indeterminate. Both recognize that their discoveries, their interpretations, their understanding may be wrong, and both recognize that any progress they make is only the beginning of an ongoing process of discovery, interpretation, and understanding. Because they live in an indeterminate world, they intuitively sense that the product of their efforts must be indeterminate as well, yet when insight strikes them, they have confidence in the results of their achievement and embrace those results, dependent not on their certainty but on their potential to manifest themselves unexpectedly in the future. The case worker's confidence in the legitimacy of her interpretation, or in the validity of the historical records of a particular client, or in the authority of the rules and procedures upon which she relies, is not based on their absolute character but on their integration into a comprehensive whole that is bound together in such a way that it points to a possible reality that is orderly and heuristically powerful. It is the beauty of her interpretation of a client, of her solution to his problem - or of the scientist's understanding of a problem - that validates it and gives it legitimacy and authority. It is the beauty of a discovery that convinces the discoverer that it is not in error and gives the knower confidence in its rightness.

CHAPTER III

COMMUNITY, TRADITION, AND DYNAMIC ORDER IN A FREE SOCIETY

We have now, in the instance of scientific inquiry, seen how a kind of moral association of persons, through the exercise of mutual authority, welds tradition and freedom together in a pursuit of the truth and how actions of persons in this association are rendered responsibly universal in intent by a common belief in the existence of a reality, further and further aspects of which may be uncovered by these persons through their own originative actions. (Polanyi and Prosch, 1975, p. 196)

Science is governed by common beliefs, by values and practices transmitted to succeeding generations. Each new independent member of the scientific community adheres to this tradition, assuming at the same time the responsibility shared by all members for re-interpreting the tradition and, possibly, revolutionizing its teachings. (Polanyi, 1967a/1969, p. 85)

A free society, wrote Polanyi and Harry Prosch, "is not simply an "open" one, a society in which anything goes" (1975, p. 196). Specifically, "[i]t cannot be a free society by being open on matters such as these, that is, by being neutral with respect to truth and falsehood, justice and injustice, honesty and fraud" (p. 197). "This is a very serious mistake" they asserted, for a wholly open society "would be a wholly vacuous

one - one which could never actually exist, since it could never have any reason for existing" (p. 184). Instead, "a free society *rests upon a traditional framework*" (p. 184), upon public liberties that, as shown in the example of science, enable moral associations constrained and directed *by tradition to freedom for* responsible relationship with an indeterminate reality. Such a society is one "in which men, being engaged in various activities whose ends are considered worthy of respect, are allowed the freedom to pursue these ends" (p. 196). Polanyi was an unrelenting defender of liberty and liberalism, but he came to understand liberty and liberalism in a manner that linked them closely to his conception of knowledge as personal and reality as indeterminate.

The concept of public liberty is at the center of Polanyi's understanding of a free society. Public liberties are granted for a purpose (the achievement of meaning through responsible relationship) but they are also constrained by structure and mechanism. They are fostered by dynamically ordered systems that weld together tradition and freedom for responsible action on behalf of a community and of society as a whole. Such entities are provided structure and guidance by the mutual adjustment of individual initiatives, by mutual authority and overlapping neighborhoods of knowledge and action, by self-modifying tradition, and by a hierarchy of "influentials." Those who embrace public liberty are free to act responsibly with universal intent, yet they are at the same time bound by tradition and hierarchy and the mutual authority of a community.

Given this emphasis on public liberty, Chapter III will show that tradition and community provide a background and creative control that allow organizations to emerge from individual initiative; that the dynamic tension evident in tacit knowing is also reflected in the spontaneous order of social groups; and that the call to a responsible

search for beauty through discovery is inherent in the public liberty granted to institutions that comprise a free society. The picture of a free society that emerges will be described primarily in terms of dynamic or spontaneous order and the tradition and community on which such order depends, but tacit knowing remains foundational to any attempt to understand Polanyi's political philosophy. The organization of such a society by the mutual adjustment of individual initiatives will not be presented as a perfect order, but as one that is necessary in light of our indeterminate, fallible nature as human beings, and in light of the personal nature and tacit roots of our knowledge. Chapter III, therefore, will examine Polanyi's understanding of community, of tradition, and of spontaneous order, before focusing on three important functions of systems granted public liberty that demonstrate how tacit knowing and an unspecifiable stratified reality come together to reinforce responsibility in a free society.

Community

As discussed in the previous chapter, Polanyi showed that the heuristic tension of a hidden reality, of a logical gap between what is known and what might be, incites passion in the explorer. However, without a community that may recognize and affirm the promise of a discovery and the values expressed in heuristic passion, discovery becomes wasted effort, for once a discovery has been made, it must be shared; “[i]n order to be satisfied, our intellectual passions must find response” (Polanyi, 1958/1962, p. 150). In seeking affirmation by another, a new logical gap appears, this time between the discoverer and those who have yet to fully grasp his vision. The discoverer "has committed himself to a new vision of reality, he has separated himself from others who still think on the old lines" (p. 150), and the tension resulting from that rift can not be

resolved through formal rules of language and logic because the two parties now speak incommensurate languages. Any one system supporting such a vision "is relatively stable, for it can account for most of the evidence which it accepts as well established" (Polanyi, p. 151), yet such a framework "is correspondingly segregated from any knowledge or alleged knowledge rooted in different conceptions of experience" (p. 151). Having embraced a new vision, the speaker faces a logical gap that, spurred on by the prospect of response, calls him to cross it "by converting everybody to his way of seeing things" (p. 150). This passion for affirmation by another is a *persuasive passion* that can only be satisfied through endorsement by a representative of the community, and it depends, like intellectual passion, on the logic of tacit knowing.

Polanyi used the term "conviviality" to describe the central relationship between individuals in community and defined it as the "interpersonal coincidence of tacit judgments" (Polanyi, 1958/1962, p. 205). In the awareness of such a coincidence, community comes into being. Polanyi was confident that such community is possible because its members share a common core of tacit knowledge, and "even though people may conceivably misunderstand any particular words addressed to them, they can, as a rule, convey information to each other reliably enough by speech" (Polanyi, p. 205). Because speech, itself, is dependent on tacit knowing, the articulate systems of a community or a society are made possible by shared tacit knowledge, and that shared knowledge makes conviviality the defining characteristic of a community.

Because tacit knowledge cannot be known explicitly, it may be shared only by indwelling another's speech and action; because there are no fixed rules defining intercourse between individuals, true communication depends on the passionate leaping

of a logical gap. Acceptance of communication is therefore "a heuristic process, a self-modifying act, and to this extent a conversion" (Polanyi, 1958/1962, p. 151). Moreover, each person must maintain a humble openness to the other, and communication must be approached responsibly: in speaking I have a responsibility to the listener; in listening I have a responsibility to the speaker. Furthermore, while the indeterminacy of all knowledge leaves open the possibility that our claims may be mistaken, a responsible integration of subsidiary particulars into a comprehensive whole assumes that others will also recognize that entity and affirm the discovery so made. Anchored as it is in tacit knowing, conviviality must forever be sensitive to the possibilities inherent in the other, even as it relies on an intuitive sense of the indeterminate future manifestations evident in a contact with another who is therefore real.

In a fixed, explicit world, a work crew discussion of a problem looks like inefficient work practices, but if the centrality of tacit knowing is recognized, then such a discussion may be seen as an attempt to reach beyond the fixed to the tacit knowledge that allows it to be utilized. In such a gathering both a discovery gap and a communication gap are being simultaneously bridged to arrive at a single comprehensive whole, at a discovery shared by a community. "I cannot speak," Polanyi wrote, "without implying a reference to a consensus" (1958/1962, p. 209). In fact, "[s]uch granting of one's personal allegiance is - like an act of heuristic conjecture - a passionate pouring of oneself into untried forms of existence" (p. 208). Each person of the work crew depends on tacit knowing for both discovery and communication, and when the discovery is accepted by the crew as a whole the end result is conviviality and community.

Tradition

Intellectual passion, then, may only be fully satisfied through and by a community. However, not any community will suffice, for “[a]rticulate systems which foster and satisfy an intellectual passion, can survive only with the support of a society which respects the values affirmed by these passions” (Polanyi, 1958/1962, p. 203). A community which supports discovery must share the values of the explorer, and a community which supports the persuasive passion of communication must share common meanings. As Polanyi pointed out, “[s]ince the advancement and dissemination of knowledge ... forms part of cultural life, the tacit coefficients by which these articulate systems are understood and accredited ... are also coefficients of a cultural life shared by a community” (Polanyi, p. 203). To use science as an example, the premisses of shared meanings “cannot be explicitly formulated, and can be found authentically manifested only in the *practice* of science, as maintained by the *tradition* of science” (Polanyi, 1946/1964, p. 85, italics added), for “this tacit sharing of knowing underlies every single act of articulate communication” (Polanyi, 1958/1962, p. 203). Since “practical wisdom is more truly embodied in action” (p. 54) and personal knowledge, such as the methods and practice of science, “can be passed on only by example from master to apprentice” (p. 53), “[a] society which wants to preserve a fund of personal knowledge must submit to tradition” (Polanyi, p. 53).

Tradition is not simply a set of rules and procedures handed down from some absolute authority. Rather, the premisses of a tradition “are transmitted to us from the past, but they are our own interpretations of the past, at which we have arrived within the context of our own immediate problems” (Polanyi, 1958/1962, p. 160). Such a tradition

is therefore never fixed and absolute, but is constantly in flux as each member of the community interprets it and contributes to its maintenance as well as its ongoing development. As an example, scientific opinion "represents only a temporary and imperfect embodiment of the traditional standards of science" (Polanyi, 1946/1964, p. 53). Tradition, as enforced by a community, is the tacit background conditioning the possibilities of discovery, of communication, and of action, but that very community, and the individuals of which it is comprised, personalize tradition and prevent it from ever becoming a set of fixed rules and absolute principles. The indeterminate possibilities evident in tradition are limited by a community, not to restrict them, but to affirm them and give them meaning.

To the tacit nature of tradition and its potential for self-modification must be added its dependence on fiduciary responsibility. This feature may already be seen in the need for submission which is not the blind submission of a bureaucrat enforced by fixed procedures but a responsible reliance on the authority of tradition, on its heuristic power and its orderliness. Acceptance of tradition may be likened to the embrace of tacit knowledge, which may only be grasped by "the person pouring himself into" (Polanyi, 1959a, p. 62) or indwelling its particulars. This act of submission to tradition recognizes that "each person can know directly very little of truth" (p. 68), but "even so, a valid choice can be made" (p. 62), for submission to tradition is the acceptance of the personal nature of knowledge and is therefore a responsible act. Tacit assent of traditional values is "elevated to the seat of responsible judgment" (Polanyi, 1958/1962, p. 312), and a responsible decision is reached "in the knowledge that we have overruled by it conceivable alternatives, for reasons that are not fully specifiable" (p. 312). Tradition

cannot be accepted explicitly and impersonally; it can only be accepted through responsible action, by first submitting to and relying on its authority.

Consider the personal and traditional foundation of scientific "facts" and the premisses on which they depend. Conceptually, a premiss "is logically anterior to that of which it is the premiss" (Polanyi, 1958/1962, p. 161). But, we can only know a scientific premiss once it has been *applied*, for a premiss in flux can only be seen tacitly, as it bears on a comprehensive entity that relies on it. More specifically, "The logical premisses of factuality are not known to us or believed by us *before* we start establishing facts, but are recognized on the contrary *by reflecting on the way we establish facts*" (Polanyi, p. 162). We define facts as those items that seem to us to be factual, but our understanding of "factual" is determined *prior to* our *definition* of facts. Again, "we believe in certain explicit presuppositions of factuality only because we have discovered that they are implied in our belief in the existence of facts" (Polanyi, p. 162). Accordingly, we know the premisses of a tradition subsidiarily as we rely on them for an awareness of the object of our focus, on which they bear.

Tradition, then, as necessary as it is to both discovery and communication, can never be defined absolutely, for it is known tacitly and responsibly, through practice. It is constantly being changed by the community that, or individual who, submits to it. This creative renewal always implies an appeal "from a tradition as it *is* to a tradition as it *ought to be*" (Polanyi, 1946/1964, p. 56). Contrary to common misconceptions, tradition is a living thing, not a static set of rules and habits. Each appeal to its authority not only defers to, but also modifies that authority in subtle but significant ways. This tension between what is established as, and the change that comes from responsible use of, a

tradition and its premisses, may be seen in the way science comes to understand the world by choosing a problem worth pursuing, in the way in which authority is apportioned, and in the way a tradition is passed down from one generation to the next through apprenticeship. However, to properly understand problem solving, authority, and apprenticeship, it is necessary to first develop a better understanding of dynamic order.

Dynamic Order

When Polanyi set out to argue against the central government control of science so evident in Soviet rejection of "science pursued for its own sake" (Polanyi, 1946/1964, p. 8), what he immediately recognized as a key to the survival of science, as he understood and had experienced it, was freedom for scientists to determine their own path of study. He found this freedom in dynamic or spontaneous order set in the context of tradition and community, and he described its central operation as *the mutual adjustment of individual initiatives*⁴.

Drawing on an appreciation for the free market, on his studies of fluids and crystal formation, and on the writings of Gestalt Psychology, Polanyi showed that spontaneous order is achieved by giving free rein to the elements of a system, rather than by limiting freedom as might occur in a rigid structure. For example, a fluid poured into a vessel with a complex shape, if left to act freely, will dynamically fill all nooks and crannies and come to rest at a common level: "[t]he water in a jug settles down, filling the hollow of the vessel perfectly, in even density, up to the level of a horizontal plane forming its free surface" (Polanyi, 1941, p. 431). Likewise, diverse molecules dissolved

⁴ Struan Jacobs (1999) has argued that Polanyi's use of the term "spontaneous order" changed somewhat between 1941 and 1948, resulting in a distinction between spontaneous and dynamic order, but for the purposes of this dissertation, the terms are synonymous. In later writing, Polanyi tended to eschew both terms and wrote most often of mutual adjustment.

together and allowed to act freely, will naturally sort themselves into separate crystals. Or in economics, a market economy spontaneously orders itself through the action of individuals mutually coordinating their efforts while guided by an “invisible hand”.

Polanyi suggested that dynamic order also applies to the handling of men in corporations or in a discipline like science. Like the participants in a market economy, scientists, acting individually but in competition with each other, select their own problems for investigation and seek to make use of traditional standards and methods to discover solutions to the problems they have chosen. Each scientific claim adjusts itself to all previously established ones, with scientists calibrating their efforts using both competition, like a consumer or producer, and consultation, like a judge (Polanyi, 1941, p. 437). Importantly, each individual within a spontaneously ordered organization need only maintain direct working relationships with two or three colleagues and more indirect connections with up to a dozen others. Polanyi called this "the Principle of Overlapping Neighborhoods", where "Every mature scientist knows an important part of science at first hand" even as "other scientists, cultivating adjoining fields ... see a similar fragment of science, parts of which overlap with the area well known to the first scientist" (Polanyi, 1964b, p. 9). In such a system, each individual trusts the judgment of her fellows by relying on them and thereby extending her realm of knowledge well beyond her capacity to personally make contact with reality.

In small organizations, a bureaucratic hierarchy can be relatively effective, but in large entities, this becomes impossible without the mutual adjustment inherent in spontaneous or dynamic forms of order. Rather than attempting to calculate an optimally sized span of control, Polanyi went to the root of the problem, arguing that centralized

control is simply not effective in the comprehensive, polycentric entities prevalent in our modern, complex world. Indeed, "A polycentric task can be socially managed only by a system of mutual adjustments" (Polanyi, 1951/1998, p. 226). To organize a very large number of units, specific assignments will not suffice; only spontaneous mutual adjustment of individual initiatives will be effective.

Mathematically, Polanyi demonstrated that, while the hierarchy necessitated by centralized control is severely limited in its ability to respond to, much less control, a large number of nodes, a system of spontaneous order is virtually unlimited in the number of individuals that can be accommodated (Polanyi, 1951/1998, pp.141-149). Critically, centralized order is characterized only by vertical interactions and managed by a single individual, while dynamic order is controlled through mutual adjustment of each node to all of the others. Even using robots without subjective feelings and desires, he argued, the problem of centrally determining the satisfaction of the robot customers of a large enterprise, in a polycentric economy, evaluating an indefinite number of goods, "would be an entirely insoluble problem" (Polanyi, 1948/1997, p. 149). The only solution is to establish a measure of exchange and allow the robot customers to each resolve its own satisfaction problem in correlation with similar resolutions by its neighbors; "the true scientific handling of an economic system of many centres does not consist in taking into account jointly all the elements of the problem, but in disregarding their vast majority at each move" (Polanyi, 1951/1998, p. 225). From a strictly mathematical perspective, as designers of super computers have found, dynamic order (through parallel processing) is the only effective way to manage large complex machines, just as it is the only credible way to order complex molecules, organisms, or

organizations.

Empirically, Polanyi used the Soviet economy to show that, a centralized shell of 5-year plans and top level administrators gives the appearance of a command based order but, at the level where production actually takes place, government has to rely on the mutual adjustment of individual initiatives. Any comprehensive plan is, in reality, "but a meaningless summary of an aggregate of plans, dressed up as a single plan" (Polanyi, 1951/1998, p. 165) and claiming "economic powers that are only imaginary" (p. 169). In fact, Polanyi argued, in this respect the "rigorous free-traders" such as L. von Mises, F. H. Knight, and F. A. Hayek (in *The Road to Serfdom*) were mistaken in admitting the possibility of a centrally managed economy, albeit at the price of freedom (Polanyi, 1951/1998, 1957/1997, 1962/1997). In real life, involving real circumstances, a complex economy can only be ordered spontaneously. Moreover, dynamic order is not limited to economics. To Polanyi, the necessity of spontaneous order was evident in comprehensive tasks as simple as completion of a jigsaw puzzle, as challenging as the implementation of a chess strategy, or as indeterminate as science. Any attempt to structure the completion of a puzzle by a team of puzzlers, to hierarchically divide up responsibility for multiple games of chess, or to centrally direct scientific research, would bring progress to a halt. In practice, such tasks are managed dynamically, for only the mutual adjustment of individual initiatives can effectively take into account the specific context of a strategic decision or a complex, comprehensive entity.

Philosophically, Polanyi's argument in favor of spontaneous order may be linked to the logic of tacit knowing in multiple ways. Firstly, tacit knowing is a dynamic process, rather than a static object, and the intuitive recognition of a discovery may be

understood as "a spontaneous coalescence of the elements which must combine to its achievement" (Polanyi, 1946/1964, p. 33), a process "of spontaneous mental reorganization uncontrolled by conscious effort" (p. 34). The Gestalt process by which tacit knowing integrates subsidiary and focal elements, itself occurs spontaneously. Secondly, if all knowledge is personal and dependent on a process of tacit knowing, then a truly centralized, fixed organization of the elements of a comprehensive entity is impossible in practice, for such a structure must depend on explicit knowledge that is certain and absolute. Because explicit knowledge, isolated from the tacit knowing that gives it meaning, is impossible, "a decentralized and free procedure of mutual adjustment through self-coordination achieves the greatest total progress possible" (Polanyi and Prosch, 1975, p. 190). Thirdly, like tacit knowing, spontaneous order allows for the indeterminacy of reality and is therefore more flexible than centrally managed order in terms of size of the entity being ordered, in terms of types of knowledge that it may take into account, in terms of complexity of organization or function, and in its ability to motivate organization members. In the theoretical world of a perfectly coordinated corporate body, only the person at the top of the pyramid acts independently and sees broadly; "All others must obey first, and act only within the limits of, the changing directives issued daily by their superiors" (Polanyi, 1941, p. 434). In a complex entity, the consequences of limiting the full ability of organizational members, and of ignoring the tacit root of all knowledge, are "large-scale maladjustments" (p. 434).

Spontaneous order is, like tradition, characterized by a tension between the dynamic changes enacted by individual initiative and the standards and knowledge that constrain the system as a whole. On the one hand we find that the mutual adjustment of

individual initiatives is empowered by the heuristic talent and passion of individuals acting freely. In a community of scientists, for example, it is the freedom to choose a problem that takes center stage; in a market economy it is the freedom to buy or sell according to individual dictates that is of overriding importance; and in a court of law the freedom of the judge to decide a case according to personal knowledge is paramount. On the other hand, the freedom evident in individual initiative is also constrained. In science, it is the community enforcing a tradition, reinforced by values and skills appropriated through a process of apprenticeship, which act as boundaries to define new meaning. In a market economy, it is primarily scarcity, set in a traditional structure of individual property rights enforced by law, which constrains individual choice. In a court, tradition, evident in previous judgments, predominates, creating a framework within which individual decision becomes more than the whim of a rogue judge. This heuristic freedom, in tension with orderliness, will be clearly evident in the following discussions of problem solving, the distribution of authority, and apprenticeship.

Problem Solving in a Dynamic Order

The practice of dynamically ordered systems like science, Common Law, or a market economy; the search for knowledge by a scientist, the decision by a judge, the weighing of values by buyers and sellers; may all be seen as instances of problem solving. In all three examples, there are choices to be made and one may recognize "a first stage of perplexity followed by a second stage of doing and perceiving which dispels this perplexity" (Polanyi, 1958/1962, p. 120). Such "a readiness ... to make sense of [our] own situation" (p. 120), involves the recognition of a problem followed by effort to find its solution. The result of such a search is "a purposive tension from which no fully

awake animal is free" (p. 120), a tension that is resolved by the tacit integration of subsidiary particulars into a comprehensive whole. In a dynamically ordered discipline like science (or Common Law or a market economy), the individual scientist (or judge or buyer/seller) is driven by such a purposive tension, called to identify and understand problems and to resolve them heuristically, always recognizing that such a resolution is not only irreversible, and thereby impossible to describe explicitly, but simply shifts the heuristic tension forward by suggesting new possibilities. The "readiness" of the scientist or judge or buyer/seller is in tension, not only with the situation, but also with a tradition as enforced by a community.

According to Polanyi, the scientific tradition, for example, teaches the scientist to weigh creativity, plausibility, and scientific value in the search for a problem worth solving. The value of a scientific problem depends on its profundity or systematic relevance, on its intrinsic interest, and on its validity (its certainty, accuracy, or exactitude). These three characteristics work together to attract the scientist to problems promising results of scientific value. Validity, profundity, and intrinsic interest are not enough, however, to identify the merit of a scientific proposition; a scientific problem and its solution must also be plausible and original (Polanyi, 1946/1964, pp. 16, 49; 1962, pp. 57-58). If a problem and solution are too unusual or if similar problems have regularly been rejected, the implausible will be ignored by the scientist as beyond reach. At the same time, a problem that is both plausible and scientifically valuable may yet be a waste of time if it contributes nothing unique to the body of scientific knowledge. Thus, a problem or its solution must also be original, and the measure of originality is surprise - the unexpectedness of the contribution. The tension, between the heuristic power of

originality and the orderliness of plausibility and scientific value, results in a science that “is constantly revolutionized and perfected by its pioneers, while remaining firmly rooted in its tradition” (Polanyi, 1946/1964, p. 56).

The choice of a problem, then, is rooted in tradition, but such a weighing of plausibility and scientific value against originality, of "unsuspected possibilities suggested by existing knowledge" (Polanyi, 1967a/1969, p. 79), also intimates an "inexhaustible profundity" (p. 79) impossible to an impersonal, mechanistic science that recognizes only certain knowledge of a fixed reality and a determinate future. Problem solving that recognizes the uncertainty of an indeterminate future, on the other hand, heuristically opens itself to unlimited possibilities and inexhaustible profundity because it perceives "*an aspect of reality*, and aspects of reality are clues to yet boundless undisclosed and perhaps as yet unthinkable experiences" (Polanyi, 1967a/1969, p. 79). "Indeed," Polanyi and Prosch argued, "the process by which this unknown thing will be brought to light will be acknowledged as a discovery precisely because it could not have been achieved by persistent application of explicit rules to given facts" (Polanyi and Prosch, p. 193).

Anchored in tradition, scientific problems are living things. Each appeal by a scientist to plausibility and scientific value not only lives in tension with originality, but modifies the very grounds upon which it relies. The scientist senses the potential of a problem, recognizes the existence of a logical gap that must be crossed, and becomes passionate about the possibilities realized therein. However, "the investigator takes a decision fraught with risks" (Polanyi, 1958/1962, p. 124), and must choose a problem that is "neither too hard nor too easy" (Polanyi, 1962, p. 56). The contingency of such a

decision makes the application of fixed, explicit rules impossible. Only the tacit integration of subsidiary particulars by a person - by the individual scientist - can make the weighing of plausibility and scientific value against originality feasible, for "[t]he freedom of scientists to make truly original contributions has thus been shown to rest on various traditional beliefs enforced by the community of scientists as a whole" (Polanyi and Prosch, 1975, p. 190). Only the responsible submission to a tradition authorizes the independent initiative of the individual in a dynamically ordered system like science or Common Law or a market economy.

Mutual Authority in a Dynamic Order

Problem solving, then, is a dynamic process that may only take place within a discipline that is organized spontaneously, for each individual must choose for herself a problem of the right difficulty and then responsibly attempt to solve it in a manner conducive with the tradition to which she has committed herself and on which she relies. The individual is therefore subject to the authority of the community that upholds that tradition. This relationship between problem solving and the authority of the community comes into full view when comparing the selection of a scientific problem and that community's support of the scientific tradition. Because scientific problem solving lives in a tension between heuristic possibilities and an orderliness that gives them meaning,

The professional standards of science must impose a framework of discipline and at the same time encourage rebellion against it. ... Thus, the authority of scientific opinion enforces the teachings of science in general, for the very purpose of fostering their subversion in particular points. (Polanyi, 1962, pp. 58-59)

Just as the scientist must weigh plausibility and scientific value against originality in choosing a problem worth pursuing, so the tradition of science, expressed as authority,

insists on conformity while inviting revolution; it remains conservative while opening itself to new sources of knowledge.

In a dynamically ordered entity, each individual is accredited and, together, a community of individuals expresses the authority of the organization by laying down general presuppositions that leave it “subject to control by [its] own body of opinion” (Polanyi, 1946/1964, p. 57)⁵. Such general rules leave open possibilities at the margin that require discretionary personal judgment. Therefore, reliance on authority is personal, and just as personal knowledge depends on the acceptance of a calling to responsibility, so too does authority rely on responsible commitment to a tradition expressed by a community. The authority of a dynamically ordered entity like science lives in a tension between submission to the tradition that calls it into being, and creative renewal through exercise of the general presuppositions that are its expression. "The tradition of science," wrote Polanyi, "can be made use of by scientists only if they place themselves at its service" (p. 54). As he pointed out, marginal changes by individual participants are not only useful in accomplishing specific goals, but may also serve normatively to modify the general rules that make specific application of those rules possible. Such creative renewal assumes that individual community members are capable of making contact with reality and therefore implies “an appeal from a tradition as it *is* to a tradition as it *ought to be*” (Polanyi, p. 56). .

Authority, then, depends on tacit knowing, for our knowledge or actions become authoritative only when someone demonstrates their trust in them by relying on them:

The learner, like the discoverer, must believe before he can know. But while the problem-solver's foreknowledge expresses confidence in

⁵ Michael Oakeshott (1962/1991, p. 454) described "non-instrumental rules" similar to Polanyi's description of general presuppositions.

himself, the intimations followed by the learner are based predominantly on his confidence in others; *and this is an acceptance of authority.* (Polanyi, 1958/1962, p. 208, italics added)

Authority, therefore, links the problem-solver's intellectual passion with the learner's (and speaker's) persuasive passion. It gives legitimacy to the knowledge or actions of individual members of a community by acknowledging their contribution to the tradition that gives them meaning. Authority is faith in a claim that is made with universal intent; it is personal knowledge that is asserted in the context of tradition. Thus, "when the premisses of science are held in common by the scientific community each must subscribe to them by an act of devotion ... they are not merely indicative, but also normative" (Polanyi, 1946/1964, p. 54).

In a dynamic order, made up of many individuals acting independently but responsibly, authority becomes a corporate entity; it becomes a *mutual authority* of the whole community in which "each scientist is both subject to criticism by others and is encouraged by their appreciation" (Polanyi, 1967a/1969, p. 85). Each scientist can know and therefore authorize only a restricted field of scientific knowledge, "but their restricted fields form chains of overlapping neighbourhoods extending over the entire range of sciences" (Polanyi, p. 85). The general principles laid down by a mutual authority empower the members of a community to act freely and creatively. Just as the tacit root of authority suggests a purposive tension to validate and justify individual action within a specific situation, so the traditional root of mutual authority legitimizes the tradition as a whole by enabling the emergence of the creative work of individual scientists.

It is important to note that the mutual authority of a spontaneous order is not democratic in an ideal sense. Polanyi acknowledged that there is a hierarchy to the

structure of authority in the community of scientists. Indeed, he noted that it is the "influentials" (Polanyi, 1941, p. 441) who control appointments to research opportunities, referee papers submitted to journals, and control the review and consequently the success of textbooks. They qualify scientific opinion expressed in popular literature and newspapers through public expressions of approval or disapproval, they regulate the teaching of science in schools by the same mechanism, and they manage the distribution of material resources and personal effort. In fact, since "the whole outlook of man on the universe is conditioned by an implicit recognition of the authority of scientific opinion" (Polanyi, 1962, p. 60), the "influentials" are granted uncommon authority. However, the authority evident in the discipline of science remains a distributed authority and the hierarchy of influentials remains a dynamic hierarchy, for not even an influential knows one part in a million of the body of scientific knowledge. Thus the hierarchy of influentials remains dependent on and subject to the mutual authority of the full scientific community; they are called to act responsibly on behalf of the community as a whole.

Apprenticeship in a Dynamic Order

The tension between heuristic possibilities and the orderliness that gives them meaning, that is evident in tacit knowing, in the process of discovery, in communication, in problem solving, and in mutual authority, is also evident in the process by which a tradition is handed down from one generation to the next and by which membership in a community comes to be. In a scientific community membership is not inherited but earned, and it involves three steps. The first step to community membership is to learn the language and conventions of the community, much as an immigrant must learn the language and conventions of a newly adopted country. The second step to earning a

voice and a vote is to learn to recognize the community's "uncertainties and its eternally provisional nature," while gaining "a glimpse of the dormant implications which may yet emerge from the established doctrine" (Polanyi, 1946/1964, p. 43). It is not enough to be able to translate explicit meanings of individual words or to memorize rules or rituals. Someone intent on becoming a member of such a community must learn the informal, implied meanings of its rules and rituals, must begin to learn its methodology and experience it in practice, and must be "impelled to imitate" (p. 44) its expert guides.

Having developed both an explicit and a tacit understanding, the third step to membership in the community is the achievement of independence. Polanyi argued that such independence is usually achieved "only through close personal association with the intimate views and practice of a distinguished master" (1946.1964, p. 43). As he described it,

In the great schools of research are fostered the most vital premisses of scientific discovery. A master's daily labours will reveal these to the intelligent student and impart to him also some of the master's personal intuitions by which his work is guided. The way he chooses problems, selects a technique, reacts to new clues and to unforeseen difficulties, discusses other scientists' work, and keeps speculating all the time about a hundred possibilities which are never to materialize, may transmit a reflection at least of his essential vision" (Polanyi, pp. 43-44).

Neither memorized rules and rituals nor tacit knowledge of the potential of science are enough. An apprentice scientist must learn to live *independently* as a scientist before being granted authoritative freedom.

What becomes clear in Polanyi's writing is that knowing and discovery, communication and judgment all become meaningful in the midst of a tension between conservative impulses and disruptive ones. Boundaries are defined, only to be re-imagined by application of new principles; gaps are recognized, only to be creatively

hurdled. Comprehensive entities are recognized and authoritative judgments are made in the context of particulars recognized only subsidiarily. The process of apprenticeship into a community and a tradition is conservative, demanding long hours of training in the presence of a master. That training results in a faith in, a reliance on the premisses of the tradition as held by the community, but its goal is independence of the individual to transcend the constraints that make independence possible. The end result is a community of individuals who are committed to the tradition and thus bound together into a comprehensive entity, yet dynamically ordered by the mutual adjustment of individual initiatives and disciplined by the mutual authority of the community as a whole.

When the mutual adjustment of individual initiatives is coupled with discipline under the mutual authority of each member, the individual who has completed his apprenticeship is authorized and granted freedom to act responsibly for the benefit of community and society by choosing his own problems and by seeking their solution. However, "science can exist and continue to exist only because its premisses can be embodied in a tradition which can be held in common by a community" (Polanyi, 1946/1964, p. 56). Indeed, "[t]his is true also of all complex creative activities which are carried on beyond the lifetime of individuals" (p. 56). A participant in a dynamic order such as science voluntarily chooses to accept and support the tradition that governs the community that is so ordered. That tradition, together with the individual's personal background and experience, as well as the traditions embodied in a larger culture or other entities of which she is a part, culminates in a calling to responsibility that she can accept or reject. It is acceptance of that calling, the commitment to rely on a community and its

tradition, that binds the individual to the community and gives its members confidence that *they* may also rely on *her* to act in accordance with the tradition that supports it. A dynamic order without responsibility will soon unravel just as a contaminated liquid may crystallize before it can spontaneously order itself, thereby allowing outside forces to take control. A system, lacking corporate command to constrain it from the outside, must rely on responsible self-control to do so from within.

Public Liberty and a Free Society

Apprenticeship, then, brings together community, tradition, and dynamic order in such a way that the result is a call to responsible action. This is a calling to what Polanyi called public liberty. The freedom granted to one who has accepted such a call is not personal freedom “in which a man’s obligations are defined, and not to be varied at a master’s pleasure” (Polanyi, 1941, p. 430). Rather, public liberty is freedom of the individual to act “with a responsible purpose” (p. 438). It is a “privilege combined with duties” (p. 438). Public liberty is neither negative liberty (freedom from “being interfered with by others”) nor positive liberty (freedom of the individual “to be his own master”) as defined by Isaiah Berlin (1969/1971, pp. 123, 131)⁶. On the contrary, it “is not for the sake of the individual at all, but for the benefit of the community in which dynamic systems of order are to be maintained” (Polanyi, 1941, p. 438). Public liberty emphasizes responsibility, tradition, and community; private liberty emphasizes individual freedom and spontaneous order. Both public and private liberty deserve protection, “but it is damaging to the first that it should be demanded and its justification sought - as often happens - on the grounds of the second” (Polanyi, 1951/1998, p. 195). Indeed, the need

⁶ Note that Berlin's full discussion of liberty recognized more than its private sense, but his definitions emphasize the importance of the private benefits to freedom.

to defend public liberties, against a totalitarianism that may favor personal freedom, was the impetus for Polanyi's recognition of the broad application and essential nature of spontaneous order.

In contrast to a totalitarian regime that will always eschew public liberties, Polanyi wrote that “[a] free society is characterized by the range of public liberties through which individualism performs a social function, and not by the scope of socially ineffective personal liberties” (Polanyi, 1951/1998, p. 194). For example, science, being a dynamically ordered system that fosters the practice of public liberty, is granted the freedom to choose its own problems and discipline its own members. However, its freedom is granted for the benefit of society as a whole and conditioned on its submission to the liberal tradition that gave it birth, just as the freedom of individual scientists is granted for the benefit of science as a whole, so long as they accept the traditional premisses of science handed down to them through the process of apprenticeship. In addition to science, Polanyi frequently used the economy and Common Law as examples of dynamic orders that foster public liberties, each characterized by its own unique set of premises or traditions. To these he added a wide variety of dynamically ordered systems found “in the intellectual and moral heritage of man” (Polanyi, 1941, pp. 436), including “[t]he social legacies of language, writing, literature and of the various arts, pictorial and musical; of practical crafts, including medicine, agriculture, manufacture and the technique of communications; of sets of conventional units and measures, and of customs of intercourse; of religious, social and political thought” (p. 438). As Polanyi saw it, “all these are systems of dynamic order” which, like science, are characterized by “direct individual adjustment” and by “a public mental heritage” that is handed down “from

generation to generation" and "accessible to all" (p. 438). Furthermore, each of them can "safeguard the complete independence" of its legacy "[o]nly by securing popular respect for its own authority" (Polanyi, 1962, p. 61). The pursuit, by these different systems of dynamic order, of the "moral support of society," "financial resources," and "recruits" turns each of them into "rivals," and "[s]ociety divides its attention, its funds and its recruits between them" (Polanyi, 1941, p. 446). The motives of society as a whole for supporting various systems of dynamic order may vary, but "once [society] has decided to lend its support to such a system, its intentions can be seen to be all transformed into an allegiance to the ideals by which the system itself is guided" (p. 446).

Dynamic orders, then, as well as the public liberties they serve to protect, are constrained by their reliance on and commitment to a tradition comprised of standards and practices, principles and habits. This is also true more broadly of a free society which "must exist within the context of a tradition that provides a framework within which members of the society may make free contributions to the tasks involved in the society" (Polanyi and Prosch, 1975, p. 202). If a free society is, indeed, a traditional society, it is important to consider "what premisses will guide conscience" (Polanyi, 1946/1964, p. 67) within such a society. Polanyi identified a commitment to truth as foundational, for "[o]nly in the supposition that most people are disposed towards truth essentially as you are yourself is there any sense of opening yourself up to them" (p. 70). Given such a commitment, Polanyi suggested that "a practical art which embodies" the premisses of a free society; a "tradition by which this art is transmitted;" and "institutions in which it finds shelter and expression" are essential. In a free society, he identified "the art of free discussion" (including "fairness" and "tolerance"), a "tradition of civic

liberties" (evident in public opinion), and "the institutions of democracy" (including legislatures, courts, churches, the press and other forms of communication, local government, and a variety of independent organizations) as the key elements of the traditional foundation for a free society. Faith in the truthfulness of others, then, is embodied in free, that is fair and tolerant, discussion, supported by a public committed to such values and implemented through a host of civic institutions. Of course, "[e]ach generation has the problem of sorting out the few great innovators from a multitude of cranks and frauds" for the survival of a free society ultimately depends on "the outcome of individual decisions made in as much faith and insight as may be everyone's share" (Polanyi, p. 72).

"Thus," wrote Polanyi, "to accord validity to science - or to any other of the great domains of the mind - is to express a faith which can be upheld only within a community" (1946/1964, p. 73). Moreover, by facilitating the exercise of public liberty, these domains "constitute the intellectual and moral order of society" (Polanyi, 1941, p. 445), for they cultivate ideals that are widely acknowledged as real and living, and are approved by society for continued nurture of human and material values. "This hope of progress through the pursuit of various forms and aspects of truth ... by a number of autonomous circles," wrote Polanyi, "is the essential idea of a Liberal Society" (p. 448). Furthermore, the mutual adjustment of systems fostering public liberty within such a Liberal Society, and society's reliance on and commitment to a set of traditional premisses allay Joseph Agassi's (1981) concern that the authority granted to science is dangerous because of the great influence such a small number may exercise. The public liberty enjoyed by science is a freedom to act responsibly *on behalf of society*, but it is a

freedom that is limited by its particular scope, for the system within which it is expressed is subject to traditional values and set in a context of other systems also exercising their own liberty on behalf of society. As noted at the beginning of this chapter, a plurality of dynamic systems practicing public liberty is not simply an "open" society. Instead, it is a society that is founded on the conception of human beings seeking to serve the truth while also dependent on a set of traditional premisses which may be adapted by that service to point to freedom (Polanyi, 1959a, p. 82). A free society is one in which each system fostering public liberty is constrained by its neighbors and together they are constrained by a set of traditions - by values and morals and limits to freedom.

A Liberal Society, therefore, can not completely recreate itself each generation, as Thomas Paine advocated. Instead, it must always look to tradition, for it is tradition, implemented by the granting of public liberty to individual institutions, which gives meaning and purpose to the indeterminate possibilities, to the inexhaustible profundity of free individual initiative. Such liberty must be understood tacitly with traditional practice giving meaning to the theoretical possibilities of freedom. As Polanyi put it, dynamic orders practicing public liberty find protection "not in the explicit content of their constitutional rules, but in the tacit practice of interpreting these rules" (Polanyi, 1955/1997, p. 203) for, "[j]ust as a person cannot be obliged in general, so also he cannot be free in general, but only in respect to definite grounds of conscience" (Polanyi, 1946/1964, p. 65). It is in the traditional *practice* of freedom that liberty resides, not in its promotion or declaration.⁷

A free society lives in the tension of individual possibilities straining against tradition as revealed in practice. Specific institutions, granted freedom on behalf of

⁷ Richard Allen argues this point extensively in *Beyond Liberalism* (1998).

society, pull it in various directions, constrained only by their responsibility to a tradition they have embraced. "[T]he whole purpose of society lies in enabling its members to pursue their transcendent obligations" (Polanyi, 1946/1964, p. 83), yet their actions are only meaningful in the context of the society as a whole, and are ever subject to the mutual authority of each other. In a spontaneously ordered society, authority is not based on certain, absolute rules, but on the faith others have in the individual authority of each person or institution, and in the collective authority of the whole order. Such faith is validated by an indwelling of another's speech and action, an indwelling based on tacit integration that emerges from a tension between a tradition that is recognized subsidiarily in its bearing on individual initiative, or between that individual initiative and the community that focuses it and gives it meaning. Because reliance is a fiduciary affirmation that may be mistaken, rather than an absolute statement that requires no personal intervention, it leaves society in tension between what is and what might be, between potential success and possible failure.

Moral Inversion in a Free Society

The possibility that a free society may fail was a central concern of Polanyi's, and he argued that its potential is evident in the very attributes that make such a society effective. Thus, he suggested that the fusion of two key trends was central both to the growth of thought in European society that found expression in Enlightenment values, and to its potential breakdown. On the one hand there was an embrace of free thought anchored in "anti-authoritarianism and philosophic doubt" (Polanyi, 1951/1998, p. 117). At the same time, there was also "a fervent religious revival, accompanied by a schism of the Christian churches" (p. 116) that left a Utopian longing for a better society and the

elevation to dominance of "the deliberate contriving of unlimited social improvement" (Polanyi, 1960/1969, p. 8).

According to Polanyi, the tension between a radical skepticism that rejects all moral authority and a utopian striving for moral perfection is potentially unstable. If a traditional reliance on moral responsibility remains in place, the tension will be manageable and will lead to an unbridled creativity. Alternatively, moral principles may be masked for a time in objectivist terminology by "pretending that ethical principles [can] actually be scientifically demonstrated" (Polanyi, 1951/1998, p. 121). For example, Locke did just this "by asserting that good and evil could be identified with pleasure and pain, and suggesting that all ideals of good behaviour are merely maxims of prudence" (p. 121). "Camouflaged as long-term selfishness," Polanyi noted, "the traditional ideals of man are protected from destruction by scepticism" and it is in this manner that "the Anglo-American tradition of liberty" (p. 121) has been preserved. Polanyi also pointed to the "distinctly religious character" of Anglo-American liberalism, and to "the establishment of democratic institutions at a time when religious beliefs were still strong" (p. 122) in these countries, as keys to its survival in the face of this tension between skepticism and a longing for perfection.

However, Polanyi argued, "it is dangerous to rely on it that men will continue indefinitely to pursue their moral ideals within a system of thought which denies reality to them" (1958/1962, p. 234). Such an "objectivist masquerade" is only feasible so long as moral convictions "remain comparatively peaceable" (p. 234), so long as traditional morality remains in effect. When, as took place in Continental Europe in the 20th Century, "a *real* substitution of human appetites and human passions for reason and the

ideals of man" comes into being, utopian moral passions are left hanging without a home (Polanyi, 1951/1998, p. 126). In such an environment, "[t]he public, taught by the sociologist to distrust its traditional morality, is grateful to receive it back from him in a scientifically branded wrapping" (Polanyi, 1958/1962, p. 234) and a great "upsurge in moral demands ... must seek a more forcible expression" (pp. 234-235). Lacking a tradition of public liberty that emphasizes responsibility to a community, this more forcible expression of moral passion is injected by a philosophy of radical skepticism "into a utilitarian framework" and "turns into a fanatical force of a machinery of violence" (p. 235). This is *moral inversion*: "man masked as a beast turns into a Minotaur" (p. 235).

When an individual or a society forsakes reliance on traditional morality and abandons responsibility for conserving and refining it, morality becomes meaningless in its own right, a tool to be manipulated in the service of power. Rather than conditioning the actions of individuals or societies, morality is conditioned, itself. When human appetites and passions replace reason and values *in practice*, morality is inverted and the end result is nihilism on the part of individuals and totalitarianism on the part of societies. "The morally inverted person has not merely performed a philosophic substitution of moral aims by material purposes, but is acting with the whole force of his homeless moral passions within a purely materialistic framework of purposes" (Polanyi, 1951/1998, p. 131). The horrors of the 20th Century "were not the outcome of any weakening of morality by scepticism," but were powered by "a rising tide of moral passions compelled by scepticism to accept merciless violence as the only effective mode of political action" (Polanyi, 1959b, p. 63). Such moral inversion compels a person to give effect "to his

immanent morality by his *manifest* immorality" (p. 63), and the only solution is the reclaiming of the fiduciary foundations of liberalism by once again relying on the self-modifying tradition of morality that gives us hope for a future in which we, ourselves, may play a part.

Key to the avoidance of moral inversion is an understanding, then, that a free society is dependent on moral ideals anchored in tradition and on responsible commitment to beliefs held in common. Communities, having submitted to and therefore being dedicated to such a tradition, may be confidently granted public liberty so that individuals may freely and dynamically act on their own initiative while adjusting their thoughts and actions to those of their neighbors. Together, the members of such a community form a network of mutually adjusting individual initiatives and discipline under mutual authority, anchored in a tradition that encourages responsibility rather than anarchy. So long as society recognizes "that truth, justice, and morality have an intrinsic reality" (Polanyi, 1966/1969, p. 36), such a partnership is safe from descent into full moral inversion. Yet, if our values are separated from their tacit roots, we cannot simply adopt a new philosophy; a simple *changing* of spectacles is not enough and our only recourse is "a *smashing* of spectacles" (p. 36):

For this is the fact. The recognition granted in a free society to the independent growth of science, art and morality, involves a dedication of society to the fostering of a specific tradition of thought, transmitted and cultivated by a particular group of authoritative specialists, perpetuating themselves by co-option. To uphold the independence of thought implemented by such a society is to subscribe to a kind of orthodoxy which, though it specifies no fixed articles of faith, is virtually unassailable within the limits imposed on the process of innovation by the cultural leadership of a free society (Polanyi, 1958/1962, pp. 244-245).

The lessons of indeterminacy taught by the logic of tacit knowing can be seen once again.

We are called not only to individually “keep holding beliefs that can conceivably be doubted,” but we must also pledge allegiance to "a manifestly imperfect society, based on the acknowledgment that our duty lies in the service of ideals which we cannot possibly achieve” (Polanyi, p. 245).

CHAPTER IV

LIKE CLOWNS IMITATING PUPPETS: FACTS AND CLUES IN PUBLIC ADMINISTRATION

Natural science deals with facts borrowed largely from common experience. ... On the other hand, the assumption of persistent features in nature is certainly not a sufficient premiss for the establishment of natural science. It gives us grounds for referring to facts and for thinking of the universe as an aggregate of facts. But factuality is not science. Only a comparatively few peculiar facts are scientific facts, while the enormous rest are without scientific interest. (Polanyi, 1958/1962, p. 161)

Modern science disclaims any intention of understanding the hidden nature of things; its philosophy condemns any such endeavour as vague, misleading and altogether unscientific. (Polanyi, 1959a, p. 20)

Like clowns imitating puppets, we pretend to be pulled by strings, so as to conform with a mechanistic conception of man. It is part of this pattern that we dare not confess that we hold the scientific beliefs which we actually hold, for fear of the empiricist policeman behind us. (Polanyi, 1950, p. 31)

As suggested in the introduction to this dissertation, a "science" of administration has been a central goal for American public administration since it first began to define

itself through civil service reform, through progressive movement attempts to fashion more effective and equitable administrative bodies, and through the writings of political scientists and public administrators like Wilson, Goodnow, Willoughby, and on to White, Gulick, Urwick, and many others. Yet there was an uneasiness about the relationship between science and administration that found expression in a bifurcation of public administration scholarship following World War II. On the one hand were those who argued that the ambiguities evident in early "scientific" administration were due to a lack of logical discipline. Best represented by Herbert Simon's writings in *Administrative Behavior*, this camp claimed that additional discipline was needed in public administration, with a clear separation of facts and values allowing administrators to study their field of facts in an impartial, detached manner, using the mechanistic models so useful in understanding the physical world around us. To quote Simon,

A valid approach to the study of administration requires that *all* the relevant diagnostic criteria be identified; that each administrative situation be analyzed in terms of the entire set of criteria; and that research be instituted to determine how weights can be assigned to the several criteria when they are, as they usually will be, mutually incompatible. (1945/1957, p. 36)

On the other hand were those, well represented by Dwight Waldo's critique of administrative science in *The Administrative State*, who emphasized the values underlying the work of public administrators in the United States, values that included the democratic embrace of individual participants and an openness to alternative ways of thinking about the world. As Waldo put it,

Students of administration, following a line of precedent which begins in the modern period with Hobbes, have simply been willing to accept the verdict of science - or more accurately, popular conceptions of the verdict of science - as to the nature of reality. It is appropriate to inquire whether these concepts of reality are consistent among themselves, whether they

are valid within their proper realm, and whether, if valid, they have been extended beyond the bounds of their validity. (Dwight Waldo, 1948, p. 21)

The first group has emphasized a positivist, while the second has emphasized a normative, approach to public administration. The first group has sought to describe the world in objective terms, stressing the certain nature of reality and modeling their efforts on the work of physicists and chemists who allegedly study their subject matter impersonally and without bias. "'Correctness' as applied to factual propositions" wrote Simon, "means objective, empirical truth. If two persons give different answers to a factual problem, both cannot be right" (1945/1957, p. 53). The second group has described the world subjectively, recognizing the centrality of personal values and judgment and the power of ideas and words to shape our understanding of reality. "Administrative study" wrote Waldo, "is concerned primarily with *human beings*, a type of being characterized by *thinking* and *valuing*" (1948, p. 181), and "despite occasional claims that public administration is a science with principles of universal validity, American public administration has evolved political theories unmistakably related to *unique* economic, social, governmental, and ideological facts" (1948, p. 3, italics added).

As we have seen in the previous two chapters, Michael Polanyi argued that knowledge is neither objective nor subjective, but personal and characterized by a reliance on tacit knowing. Personal knowledge eschews the belief that we can know an indeterminate world in absolute terms, but it nevertheless claims that reality *does* exist and that we are empowered and obligated to seek the truth and proclaim what we discover with universal intent. The search for truth, that we call science, *is* possible because the real is true, but the evidence of reality comes from its unexpected future manifestations and its indeterminate possibilities rather than from its fixed and absolute

nature. Science is a worthy pursuit, but its central attribute is discovery, not method. As a scientist, himself, Polanyi affirmed its claim to discover reality, but he also recognized that its ability to do so depended on an uncritical acceptance of beliefs and traditions that give meaning to its efforts. He recognized that it was the embrace of both a program of radical doubt (that rejected the claims of first principles defined by a tradition) and a passion for utopia (inherited from a system of beliefs and traditions) that led to a mistaken belief in an impersonal, detached reality knowable by impersonal, detached methods of inquiry.

In the previous two chapters I focused my attention on Polanyi's construction of a philosophy based on an indeterminate reality, on the tacit knowing of personal knowledge, and on a dynamic social order anchored in responsible public liberty and tradition enforced by a community. While his critique of modernism and of a positivist science is powerful on its own, it is in the light of his constructive claims, with their focus on discovery, that the shortcomings of a positivist approach to science can most clearly be seen. Acceptance of Polanyi's constructive argument for personal knowledge of an indeterminate reality effectively forswears allegiance to the positivist understanding of knowing that underlies much of scientific inquiry.

In this chapter, I will show how a Polanyian understanding of the dynamics of reality, forever in tension between what is and what might be, weakens any argument for a deterministic public administration and will show how his insistence on the indeterminacy of reality and of the process of tacit knowing leads public administration beyond a simple admission of fallibility. I will also show how his claim that all knowledge is personal and discovered by a process of tacit knowing undermines a

positivist administrative science while giving it new life as a search for knowledge of a real world that is independent of, yet potentially known by, the administrator or administrative scholar. While developing these two themes, I will demonstrate that administrative discovery and problem solving is already characterized, to a large extent, by the logic of tacit knowing. These arguments are not totally new to public administration scholarship, but Polanyi's understanding of scientific discovery, his emphasis on the personal nature of knowledge, its tacit, from-to structure, its fiduciary foundations, and its dynamic character, all set in a world that can only be known indeterminately, can free public administration from its need to claim objectivity in an absolute, impersonal manner, without forcing it to also abandon the potential contributions of scientific study.

Objective, Empirical Knowledge in Administration

By the time Woodrow Wilson turned to the German example for a public administration that was scientific and bureaucratic, the United States had already embraced science for its technical benefits, so the foundation was already laid. The science of administration that was to be developed would be built on “a foundation of *practice*” (Ricucci, 2006, p. 57) and would prove its utility and ensure public trust and support through its links to technology. Wilson captured this sentiment when he wrote that, “as it is the office of the constitutional reformer to create conditions of trustfulness, so it is the office of the administrative organizer to fit administration with conditions of clear-cut responsibility which shall insure trustworthiness” (Wilson, 1887, p. 213).

"Administration is ordinarily discussed as the art of 'getting things done'" wrote Herbert Simon, in acknowledgement of this pragmatism (1945/1957, p. 1). However, he

turned his attention away from "processes and methods for insuring incisive action" to "the choice that prefaces all action" (p. 1). "The task of 'deciding'" he wrote, "pervades the entire administrative organization quite as much as does the task of 'doing' - indeed, it is integrally tied up with the latter" (p. 1). "The task of decision involves three steps:" he added, "(1) the listing of all the alternative strategies; (2) the determination of all the consequences that follow upon each of these strategies; (3) the comparative evaluation of these sets of consequences" (p. 67). However, since "[i]t is obviously impossible for the individual to know *all* his alternatives or *all* their consequences" (p. 67), it must also be "impossible for the behavior of a single, isolated individual to reach any high degree of rationality" (p. 79). Nonetheless, Simon emphasized, *in an organizational context*, a "higher degree of integration and rationality can ... be achieved, because the environment of choice itself can be chosen and deliberately modified" (Simon, p. 79). For Simon, rational decision making was the goal, but because perfect knowledge is impossible, it is only within an organizational context that human fallibility can be minimized and rational decision making realized. He believed that what he termed the "stimuli," that initiate and determine the decisions of individuals working in organizations, could be controlled by managers "so as to serve broader ends, and a sequence of individual decisions ... integrated into a well-conceived plan" (p. 109).

To gain control of the decision making process, Simon first turned his attention to the problem of knowing. Building on the work of logical positivists, he argued that it is possible to break down the administrative decision process into those elements that are based on values or ethics, and those that are based on facts. "In so far as decisions lead toward the selection of final goals," he wrote, "they will be called 'value judgments'; so

far as they involve the implementation of such goals they will be called ‘factual judgments’” (Simon, 1945/1957, pp. 4-5). Factual judgments or statements - the realm of administrators charged with implementing political decisions - are empirical statements and may be tested for truth or falsehood. Value statements, on the other hand, possess “an imperative quality - they select one future state of affairs in preference to another and direct behavior toward the chosen alternative” (Simon, p. 46). Value statements are therefore essential for setting direction and context for decisions, but it is factual statements that detail the achievement of goals and thereby allow one to predict and control outcomes.

For, Simon, “an administrative science, just like any other science” should only be “concerned with factual statements” and he saw “no place for ethical assertions in the body of a science” (1945/1957, p. 253). Indeed, he argued, only factual statements could have “any relevance to science” (p. 253), because, while “factual propositions may be tested to determine whether they are *true* or *false* ... there is no way in which the correctness of ethical propositions can be empirically or rationally tested” (pp. 45-46). While “a factual statement ... is validated by its agreement with the facts,” a value judgment is “validated” simply by “human fiat” (p. 56).

Consistent with this positivist perspective, Simon argued for the development of “a practical science of administration,” consisting of “propositions as to how men would behave if they wished their activity to result in the greatest attainment of administrative objectives with scarce means” (1945/1957, p. 253). In his view, “the central concern” of such a science was to be “the rationality of decisions - that is their appropriateness for the accomplishment of specified goals” (p. 240). In other words, Simon sought to develop a

value-free theory of administration that would be useful to practice because, while exclusively concerned with the facts of administration, it would nevertheless enable an almost mechanical evaluation of administrative actions and institutions in instrumental terms. It followed, for Simon, that “an administrative decision ... is correct if it selects appropriate means to reach designated ends” (p. 61) and “‘efficiency’ - the attainment of maximum values with limited means - must be a guiding criterion in administrative decision” (p. 65). Viewed in this way, administrative decisions should ideally be determined in an instrumental and impersonal fashion through the application of clearly delineated rules of method.

Furthermore, Simon argued, under the authority of reason, in the descriptive activity of science, “we are free to study subsystems - to abstract out a part of the whole reality in order to achieve a more thorough understanding of that part” (Simon, 1973, p. 353). Indeed, he wrote, just as the "normative activity of engineering design rests on the descriptive theories of physics", so also we must depend on a "corresponding foundation of descriptive knowledge about human and social behavior" (p. 351). By separating factual judgments from value judgments, a clear descriptive knowledge of human and social behavior, upon which to build and control an administrative state, becomes possible.

Simon's continuing influence is evident in the choice of his "The Proverbs of Administration" as the first classic essay reviewed for the 75th anniversary of *Public Administration Review*. Kenneth Meier began his review by affirming Simon's argument that "[t]o be useful, to be relevant, means that prescriptions of public administration must have empirical validity, that they must be supported by strong scientific evidence" (2015,

p. 15). However, he critically observed that "[w]e are a long way from knowing precisely how various actions of public administrators affect the efficiency or effectiveness of programs" (p. 21). Neither has theoretical development "kept pace with the empirical work," and as a result, public administration "looks to other fields and other disciplines for its basic theories" (Meier, p. 21). Meier concluded by recommending a focus on "improving the skill set of scholars in public administration; improving the review process of our journals; making the research process, particularly data generation, more efficient; engaging in a serious effort to develop theory; and seeking to generalize our research findings" (p. 20).

This final emphasis on formal method, efficiency, and generalizability reflects Meier's concern for application of research to practice, but it also suggests the prominence of arguments for precise knowledge developed through empirical research. In 2000 he and Laurence J. O'Toole, Jr. did their own examination of proverbs, this time of those used in *The New Public Management*. Using "*evidence-based public management*" (2000, p. 4), they argued that the field needed to reconsider conventional wisdom by using an approach that begins with "a precise set of theoretical predictions contained in a formal model ... itself a generalization" (Meier and O'Toole, p. 18). This model, they argued, could be (like a machine) "then disaggregated into smaller parts that can be studied systematically ... using elaborate statistical controls ... and arrive at conclusions that are true" (p. 18). As Simon had insisted on a formal method that separates fact from value to strip out ethical content, so Meier and O'Toole have contended that the truth of such conclusions is directly connected to the use of "accepted techniques of social science research" (Meier and O'Toole, p. 18). This blending of

formal method with empirical research may also be seen in a methodological manifesto issued by Meier in partnership with Jeff Gill, a manifesto that called for standardized data as well as "more rigorous mathematical, statistical, and formal theoretic applications to questions in public administration" (Gill and Meier, 2000, p. 193). Standardized sources of independent data, paired with standardized methodology, make the separation of facts from values feasible and the application of rigorous, formal, theoretic approaches possible.

Laurence E. Lynn, Carolyn J. Heinrich, and Carolyn J. Hill, have expressed a similar attention to formal methods in arguing that "[t]he most useful research ... derives empirically testable propositions from a clearly developed theoretical framework or explicitly posed set of questions that reflect a logic of governance" (2001, p. 177). Claiming that "'theory' constitutes *explanation* ... based on concepts or principles independent of what is observed or explained" (Lynn, Heinrich, and Hill, p. 80), they have suggested that "theory-based models" therefore play "an indispensable role in securing understanding of the social phenomena of interest" (p. 81). Consequently, an "abstract parameterization of a logic of governance provides a framing device" for studying a "policy environment that is more complex than any research design can accommodate" (p. 81), and the end result is a reduced-form model (p. 81) of governance that can be easily manipulated and used to predict and control otherwise indeterminate processes. The knowledge necessary for effective practice is to be obtained through a formal process involving the application of theoretical models to empirical data wherein the former provide a framework for managing the complexity of the real world.

Objective, empirical knowledge, as espoused by Simon, Meier, et. al., may be discovered, then, through empirical research using formal methods and interpreted by formal, theoretical models that isolate facts from values. By employing this type of positivist approach to public management, detached, impersonal knowledge may be obtained and used to predict and control decision making within public organizations. Such a focus on a positivist interpretation of administrative decision and action does not eliminate consideration of morals and values, but it allegedly permits administrators to anchor their efforts in a value-free "scientific" world before also incorporating ethical questions.

Facts and Values in Administrative Science

Critics of science in administration have tended to focus their arguments around several epistemological themes. One of these is the relationship of facts and values that was so central to Simon's framework. For example, in contrast to Simon's de-emphasis of their importance for administration, Waldo affirmed the importance of values when he observed that "administration is generally suffused with questions of value" (1948, p. 182). Moreover, he argued that fact and value can never be fully separated because they are joined organically. "While it is possible in the study or laboratory to divide all reality into two neat pieces," he wrote, "reality as it is experienced in the process of living is a seamless web" (Waldo, 1955, p. 63). Moreover, any attempt to identify the ends of administration with the realm of values and the means with the realm of facts and efficiency, must take into account what Simon had also noted, that "the efficiency of any mean is relative to *particular* ends" (Waldo, p. 64). Therefore, the "value neutrality of means asserted by logical positivism is false" (p. 64); the administrative means of

accomplishing any end are always informed by values. Contrary to belief that the certainty of facts gives meaning to reality, Waldo recognized that limiting reason to the study of facts that are valueless "opens the door to action that is meaningless" (Waldo, p. 64) and forces the realm of values and meaning into the irrational. "The split between fact and value, 'is' and 'ought,'" he wrote, "makes for a split personality" (p. 62). On the one hand, the scientist can not help but carry "the baggage of moral beliefs he has received from the past" (Waldo, p. 62), for the assumptions of a positivist science are, themselves, values. On the other hand, in the world of facts, those values are uprooted and left floating without justification and without anchor.

This last consequence of a separation of facts from values is particularly evident in the language of positivism. To facilitate an examination of facts independent of values, Simon attempted to create "an entirely new language" that is "free of the defects of common sense" (Storing, 1962, p. 150). However, as Michael Spicer has argued, any attempt to create such a neutral language, by setting aside values, is problematic. Human beings, he made clear, "must always think, talk, write, and even act on the basis of a particular language or vocabulary" (2015, p. 189), and "[n]o matter how neutral we might try to be," our thinking "will reflect some set of ethical or political values" (Spicer, p. 189). Indeed, regarding the possibility of a neutral language devoid of values, "there is, frankly, little if any reason to believe in the possibility of any such language" (p. 189). Simon, Spicer pointed out, set out to "construct a vocabulary" that would allow description of "exactly how an administrative organization looks and exactly how it works" (Simon, 1945/1957, p. xlv), yet "the language [Simon] employed was anything but value-free" (Spicer, 2015, p. 192).

Theory and Formal Method in Administrative Science

A second epistemological theme emphasized by the critics of a positive science of administration, has been the consequences of formalizing method and of representing the world in terms of abstract, universal theory. This is the issue Waldo recognized when he wrote that "[w]hat is presented as an instrument of analysis becomes inevitably a program of action - with unfortunate results" (Waldo, 1955, p. 63). A certain reality lays the foundation for formal methods of research and precise theoretical representations of the world, but there are consequences to such an approach that may not be desired.

Among those who have criticized the possibility of a rigorous, formal method for knowledge making, Ralph P. Hummel has been particularly effective in identifying the unfortunate results that Waldo noted. "Scientific thinking" wrote Hummel, "grants no validity to subjective thinking" (Hummel, 1994, p. 210). Instead, "[i]t insists on objective thinking ... [i]t aims at *proving* the coherence of the world. ... it seeks *total certainty*" (p. 210). Science, according to Hummel, seeks to simplify and quantify: "[t]he humanly involved yields to the methodically correct and objectively detached" (Hummel, 2006, p. 74). "By looking at the world through the lenses of only a few factors at a time, science wins clarity and coherence in forming a picture of how things work according to its assumptions about the world" (Hummel, 1994, p. 204). Then, "keeping a precise and clear construction of reality in mind, and forcing reality to respond (or not) to it, and measuring the degree of congruence, the modern scientist [frees] himself of the complexity, confusion, and fuzziness of being fully immersed in reality" (1994, p. 206). In the end, human beings are seen as objects, their only value derived from the arbitrary construction of reality that abstract theory demands of us.

The problem with this process is that "playing with ... abstract pictures" becomes "a technical preoccupation" (Hummel, 1994, p. 204) that turns into a "trained arrogance" (p. 205) and a "detachment from the flow of life" (p. 205). As a result, the client in a bureaucracy becomes *an impersonal case* (Hummel, pp. 34-36), and administrative scientists criticize "how public managers acquire knowledge" and "condemn how public administration professors guide research, and how students write dissertations," while failing to consider the possibility "that public managers and teachers and students know what they are doing" (Hummel, 1991, p. 31). "In modern scientific thinking" wrote Hummel,

we purposefully compare what we find in nature to models we already have constructed of it. For more exact comparing we measure. Measurement enables us to create *formulas* determining how elements of the model relate to each other and how reality relates to the model (Hummel, 1994, p.210)

The world that is created by a positivist science is a "formula world" that assumes a certain reality that can be disassembled, measured, and described in an abstract, impersonal manner.

While the true scientist "escapes into discovery, where instinct and knowledge both rule, there are enough equations for the bureaucrats of science - technicians - to immerse themselves in the details of calculation" and in the end, "[s]cientists are reduced to technicians" (Hummel, 1994, p. 211). Disassociated from the whole that gives them meaning, the disaggregated parts (including individual human beings) are either accepted as examples of the formula or model or are classified as accidents or anomalies. Because the parts have been segregated from abstract theory and forced to respond to or comply with it, theory may stand independently and be applied in an impersonal and universal

manner. Because the mechanistic, mathematical, abstract representation becomes the new reality, the theoretical future may be predicted effortlessly, and because real particulars are forced to fit the theory, control seems elementary.

What becomes clear in Hummel's critique of a positivist science is that, to accept such a science one must accept the existence of two worlds: the abstract, theoretical world of science and the real world in which we live. These two worlds are incompatible and potentially incommensurable, and if both are to continue to exist, communication between the two will require translation, for they speak different languages. When a scientist "operationalizes" the real world to "freeze" it for measurement and calculation, she is translating "our fluid experience of life to become the clear and well-defined propositions or hypotheses demanded by formal science" (Hummel, 2008, p. 1015). When she attempts to apply her measurements, her abstract theory, her conclusions, to real life, "[w]hat is required is judgment" (p. 1016), and judgment is anchored in a sense of beauty that cannot be compelled, but only wooed. Its "dedication to numbers" brings "clarity and distinctness" to scientific data analysis, and those attributes are "made even more exact by precise measurement" (Hummel, p. 1018), but such a science exists in a parallel world.

Hummel suggested that a "hands-on" approach to knowledge may be a better way. From Martin Heidegger he appropriated the concept of being "already involved" (Hummel, 1994, p. 269), the rejection of "the tendency of modern Man to see himself as the center of the world" (p. 270), and the acknowledgement that "[t]he human being becomes itself only in the encounter with the world" (p. 271). From Edmund Husserl, he appropriated an understanding of measurement and numbers that suggests that "man can

again become the measure of all things," but only if we choose to "use judgment to put measurement back into its proper place, mindful that the numbers are never the full measure of the man (or woman or child)" (Hummel, 2006, p. 76). Most pointedly, from managers he learned to appreciate stories (Hummel, 1991), and from workers, he learned the importance of being "inside the work" (Hummel, 1983, p. 73). What he recommended was an alternative method of knowledge making based on an alternative model of reality.

Alternative Models, Methods, and Forms of Knowledge

If a theoretical world amenable to formal methods is found wanting, what is needed is an openness to alternatives. However, there has been a strong inclination among advocates of a positivist approach to administrative science to promote an ideal, or even a single best model, method, or form of knowledge. If other models, methods, and knowledges are recognized, as they often are, they tend to be recognized as substandard and deficient. "Actual behavior falls short ... of objective rationality" (1945/1957, p. 81), wrote Simon, for science "is concerned with the factual aspects of meaning, but not with the ethical" (Simon, p. 249). Waldo identified this tendency when he described how "faith in science and the efficacy of scientific method" (1948, p. 21) had so thoroughly permeated the literature of public administration that it readily accepted the need to also become rationally objective:

Science has its experts: so we must have "experts in government."
Science relies upon exact measurement: so let the data of administration be measured. Science is concerned only with facts: so let the "facts" be sovereign. Science makes use of experiments: so let the mode of administrative advance be experimental. (Waldo, 1948, p. 21)

In the United States, Waldo argued, "scientific" had become such an "honorific" word

that "even religion and ethics found it expedient to become scientific" (p. 20).

Consequently, a third epistemological theme repeatedly mentioned by the critics of a positivist approach to administrative science has been the need to recognize alternative methods of research, forms of knowledge, and models of administration. This theme is evident in Waldo's assertion that "*the nature of the subject matter must define the method*" (Waldo, 1948, p. 191); in his emphasis on "the integration of public administration with the other social sciences" (Waldo, 1955, p. 68); and in the need for "the application to administrative study of *all possible perspectives and metaphors*" (Waldo, p. 68). It is similarly evident in Ralph Hummel's argument that "public managers and teachers and students [may] know what they are doing" (1991, p. 31) when they are "not scientific enough" (p. 31), choose story telling as a method for knowledge acquisition and communication, and depend on "intuition," "judgment," and "flying by the seat of your pants" to "determine what is going on in their world" (Hummel, p. 32).

As Polanyi recognized, a positivist approach to science, and therefore to administrative science, is but a child of the Enlightenment; it is a particular model and a particular form of knowledge with a particular method. As a human creation, it is problematic to the extent that it becomes an unexamined set of beliefs that distort our understanding of reality and isolate us from important elements of our humanity. Consequently, some of the most effective criticisms of scientific administration have been examples of how real people in real situations respond. Polanyi understood the importance of such "real life" examples and interspersed his writings with such illustrations while also emphasizing the practical wisdom of tacit knowing and therefore, scientific discovery.

In the realm of public administration, one important demonstration of the importance of alternative forms of knowing and doing, and the dangerous consequences of ignoring alternative kinds of knowledge, is Mary Schmidt's account of the 1975 failure of the Teton River Dam. Contrary to safety investigators, Schmidt argued that the underlying cause of the disaster was not a lack of safety guidelines or engineering procedures or bureaucratic rules. Instead, the disaster was due to a failure to accept alternative types of knowledge, a failure that was rooted in a dominant model of science and reality, enforced by a science "that dismisses knowledge expressed as feelings," by an engineering "that scorns the knowledge of the uneducated laborers," and by a bureaucracy "that disaggregates such knowledge" (Schmidt, p. 527).

According to Schmidt, there were three types of knowledge that were ignored to meet production deadlines of dam construction: "a feel for the hole," "a feel for the whole," and "a kind of passive knowledge" (Schmidt, 1993, p. 527). What she called "a feel for the hole" was the "art of grouting" (p. 526) - the tacit knowledge of grouters who attempted "to stabilize the material under the foundation" of the dam (p. 526). They did this by pumping grout "into closely spaced holes," (p. 525) despite being unable to "directly observe conditions deep below the surface" (p. 526). To be effective at their work, therefore, required "continues attention to a host of subtle qualities" and the combination of "data from many senses" (p. 526). What Schmidt called "synthesis" of information and knowledge is the tacit integration of subsidiary particulars into a comprehensive whole, into a sense of the appropriate solution, into "a feel for the hole."

A second type of knowledge ignored in the decision to bring the dam online was what Schmidt called "a feel for the whole." This second kind of knowledge was not the

intimate knowledge of a single process in a focused location, but the acquisition by surface crews, over time, of "a more complete knowledge of the heterogeneous surface than anyone had before or would be able to ever have again" (Schmidt, 1993, p. 526). This was a "collective knowledge" that was "disaggregated by the formal organization and working conditions" and that "was ephemeral" and "would soon be forgotten" (p. 527). This general knowledge was potentially explicit, but it was held by multiple individuals and only the tacit integration of each individual's knowledge into a comprehensive whole could make use of it.

The third type of knowledge identified by Schmidt, but ignored by science, engineering, and bureaucracy, was "a kind of passive knowledge" that enabled workmen to tacitly sense that the decision to "stop their work" was problematic (Schmidt, 1993, p. 527). Indeed, they were "at first bewildered," but their immersion in the tacit grand narrative enforced by the institutions of science, engineering, and bureaucracy led them to try "to construct an explanation" that gave credit to their superiors even though, it turned out, such credit was undue (p. 527). Schmidt noted that this was a type of knowledge that was not recognized by an "engineering that scorns the knowledge of uneducated laborers" (p. 527). Polanyi might have pointed out that it is regularly ignored because there is a false assumption that knowledge is fixed and impersonal and thus the property of experts.

However, argued Schmidt, the explanation for this failure was not as simple as "the lowly status of these workers" (1993, p. 527). Rather, the disaster could be traced to the three institutions of science, engineering, and bureaucracy which "interact in complex ways" (p. 527) and, taken together, promote a system that claims to "know and represent

physical reality directly with general theories couched in abstract terms" (Schmidt, p. 527). According to Schmidt, one solution to the failure of such a hegemonic system would be the adoption of an alternative model of science and reality. Taking the work of Barbara McClintock (Keller, 1983) as a template, Schmidt proposed a framework for science and reality that "shifts the focus from an hierarchical model of a relatively simple static system to more interactive models of complex dynamic systems" in which nature becomes "an active partner in reciprocal relationships with an equally active observer," an observer who assumes "an attitude of humility, patience, and open attentiveness" (Schmidt, 1993, p. 528). Such an approach encourages "intimate knowledge" (p. 529) and, recognizing the complexity of many problems and projects, it relies on "social rationality" (p. 530). It recognizes knowledge of "specific phenomena," calls for "direct, bodily involvement in acquiring knowledge," demonstrates a need for "synthesis of data from several senses, from a feel for the hole ... or from several individuals," is qualitative, and demonstrates that "we know more than we can say" (p. 530)⁸. The alternative model of science and reality that Schmidt proposed would also open the way to an embrace of alternative types of knowledge such as "a feel for the hole," "a feel for the whole," and "a kind of passive knowledge". However, "the tacit, grand narrative of technical rationality" (White and Adams, 1994, p. 2) underlying science, engineering, and bureaucracy, is not easily displaced.

A Deterministic World of Administration

The image of "objective, empirical truth" (Simon, 1945/1957, p. 53) promoted by some public administration scholars and criticized by others, remains a dominant picture

⁸ Schmidt accredits Donald A Schön as the source of this variation on Polanyi's well known statement about tacit knowing.

in part because its basic elements have been internalized by Western societies as "an unexamined and tacit set of beliefs " (White and Adams, 1994, p. 3) that are dependent on a "scientific-analytic mind-set and technological progress" (p. 1), and reinforced by "powerful social forces of enculturation" (p. 11), evident in both practice and explicit education. As a result, this "scientific-analytic mind-set has to be almost 'unlearned' before other, alternative ways of knowing can be grasped" (p. 11). The call to treat facts and values organically, the call to adopt a "hands-on" approach to knowledge that emphasizes personal judgment and encounter with the world, and the call to embrace alternative models, methods, and forms of knowledge, has strong proponents but it is set against a positivist framework, a vision of knowing that is anchored in an understanding of reality that is tacitly assumed to be deterministically fixed and absolute.

It is beyond the scope of this dissertation to define determinism in absolute terms, if that were, indeed, possible. What may be helpful, however, is to consider Kant's distinction between individual action, that is characterized by free will and therefore indeterminate, and aggregate summaries of human action seen retrospectively "as if" determined by "some guiding thread" (Kant, 1784/1963, p. 1). Echoing Kant's argument, Polanyi and Prosch pointed out that "[t]here are two possible ways of viewing the progress made by the front line of scientific discoveries as it advances over a period of time" (1975, p. 192):

We may look back upon such progress as the growth of thought in the minds of gifted people along the determined or "caused" pathways of science. ... Yet, looking *forward*, before the event, the act of discovery appears personal and indeterminate. (pp. 192-193)

Looking forward to an indeterminate future, our focus turns to the individual, but looking backward we may choose to focus on aggregate data that, in retrospect, appears guided or

even controlled. Determinism, then, may be thought of as an attempt to turn such aggregate observations forward in time as prediction and control of societies or organizations or even individuals.

As the argument made by White and Adams suggests, affirmation of such a determinism occurs tacitly, often recognized only as it bears on research or decision making or action. For example, when Meier concluded that Simon's goals for public administration have not been realized and "[w]e are a long way from knowing precisely how various actions of public administrators affect the efficiency or effectiveness of programs" (Meier, 2015, p. 21), his use of the word, "precisely" was suggestive because it emphasized the importance of the explicit and the absolute. Polanyi argued that such an emphasis on precision was problematic even in the exact sciences, which seek "to establish complete intellectual control over experience in terms of *precise* rules which can be *formally* set out and *empirically* tested" (Polanyi, 1958/1962, p. 18, italics added). It is such an establishment of "complete intellectual control over experience", as modeled by the exact sciences, that Simon, Meier, et. al. have sought through "precise rules which can be formally set out and empirically tested" to yield explicit knowledge. However, such exactitude is only possible in a world where reality, itself, is fixed and mechanistic, and reliance on a certain reality may be seen as evidence of a deterministic understanding of the relationship between cause and effect and between means and ends.

A fixed, unchanging reality has important implications for public administration. It suggests that all aspects of our world may be measured, that an explicit description of reality is possible, and that clear causal chains may be discovered. In the extreme, this is the deterministic message that, in principle,

we can all be regarded as essentially objects subject to general causal laws and that our experiences and actions, as dependent variables, can be explained and predicted in terms of factors that are outside of our control. (Spicer, 2005, p. 258)

Ralph Hummel suggested that this objectification of human beings begins when lived experience is turned into a fixed entity that can be measured and controlled. This is followed by a second transformation of the real into the theoretical, of "a science of visible shapes and human concerns into a system of symbols and their relation" (Hummel, 2006, p. 68). Determinism expresses the belief that reality is absolute and unchanging and can therefore be observed and measured in a detached, impersonal manner. Because such a reality can be known absolutely and relied upon to "cause" actions and experiences in a mechanistic, predictable manner, it may also be modeled using abstract theoretical representations that are universal and generalizable.

While public administration scholars rarely embrace, and generally disavow determinism, their language and methodology often demonstrate the deterministic assumption of a fixed reality that leaves human beings, at least in principle, subject to causal laws. Lynn, Heinrich, and Hill, for example, proposed "a logic for the systematic, empirical study of governance and public management, utilizing quantitative and qualitative methods" (2001, p. vii). Given that *governance* "generally refers to the means for achieving direction, control, and coordination" (p. 6), they defined it as "regimes of laws, rules, judicial decisions, and administrative practices that constrain, prescribe, and enable the provision of publicly supported goods and services" (p. 7). The words that they used are telling: they sought "systematic, empirical study" utilizing "quantitative and qualitative methods" to achieve "direction, control, and coordination" through use of processes and procedures that "constrain, prescribe, and enable" provision of appropriate

goods and services. These are the words of those who believe in a rational system of administration that can treat human beings as objects of study, objects whose behavior may be explained, predicted, and controlled in a detached, impersonal manner.

Central to determinism is the assumption of causality and, wrote Lynn, Heinrich, and Hill: "The central theoretical problem in governance research is applying theories that impose a causal ordering or *a priori* structure on the logic that links context, governance, and consequences or outcomes" (2001, p. 17). This central theoretical problem is coupled to a central empirical problem - the gathering of data that enables investigators "to explore causal relationships" (p. 18). Making use of economic theory, Lynn, et. al. were able to develop "a rigorous deductive framework" (p. 20) that integrates concepts about and sharpens insight into management. Indeed, they argued, "[a]ny governance regime ... is the result of a dynamic process that can be summarized in terms of a core logic" (Lynn, et. al., p. 28) that "assumes rational behavior by social actors" (p. 33). The assumption, here, of an objective reality that can be known with certainty, suggests a deterministic understanding of human beings living in a deterministic world that may be described in objective terms, modeled on the work of physicists and chemists, and managed impersonally according to absolute rules. As Waldo observed,

The answer of positivism to the problem of the basis of decision is that "science," "facts," "measurement" answer questions of "What to do?" It asserts that what is objective can and should "determine," that the imperative of "the facts" should be substituted for chance and will. (1948, p. 80)

Against such a determinist view, however, Waldo argued that it is a "fundamental error" to believe that "if a science of cause and effect could be worked out, it would be possible

to tell what government should do and when the response should be made" (p. 182). In truth,

If mechanical cause and effect obtained in the realm of human affairs, no one would *need* to tell government what to do; what it does would be predetermined, fixed, and invariable. It is only because free will exists that it is necessary or possible "to tell what government should do and when the response should be made." (1948, p. 182)

Again, few students of public administration believe that *every* act or every decision is determined by external factors over which we have no control. However, assumptions, whether held explicitly or implicitly, have consequences. "Although most social scientists do not reflect much upon the philosophical implications of their approach to research," noted Michael Spicer, "in the adoption of the methodology of the natural sciences, social scientists implicitly assume what is an essentially deterministic view of human action" (2005, p. 258). According to Spicer, what is at stake in assuming a deterministic view, is "the very notion of human freedom" (p. 260), and the potential for encouraging individuals "to try and absolve themselves of responsibility for their action" (p. 262). However, even setting aside the philosophical and moral questions of freedom and responsibility, Spicer suggested that "it is far from clear that public administration practitioners themselves have been able to find very much guidance from the deterministic vocabulary of mainstream social science" (p. 264). Given the questionable value and potential danger of a deterministic administration, and despite its expression of "certain important human values in the discourse of public administration" (p. 267), Spicer concluded that "an excessive focus on deterministic social science would seem inappropriate for public administration" (Spicer, 2005, p. 267).

Personal Knowledge and the Paradox of Positivism

The alternative to belief in a deterministic world is to accept the indeterminacies of reality and its "independence and power for manifesting itself in yet unthought of ways in the future" (Polanyi, 1966/2009, p. 32). While the proponents of a positivist approach to public administration may protest that "[a]ny social scientist who is deterministic in the manner that Spicer depicts ... is likely delusional" (Meier, 2005, p. 652), their written words are influential and not only demonstrate deterministic assumptions, but suggest both its epistemological and ontological implications. As noted above, the tacit grand narrative of technical rationality, with its foundation in determinism, must be "unlearned" before an alternative way of understanding the world can be accepted. This is the problem that Polanyi faced when he turned his attention to a defense of science from totalitarianism. When he looked closely at the arguments of totalitarian regimes, he realized that there was no philosophical alternative in the West. Faced with a similar dilemma in public administration today, we can learn much from Polanyi.

In response to the positivist approach to science, one of Polanyi's early and more important observations was that scientists who profess a positivist approach do not in fact conduct scientific research in the way that they claim. Practicing scientists do not choose a problem based on explicit coupling of data and theory but already sense the solution to a problem before it is explicitly defined: "nothing is a problem or discovery in itself; it can be a problem only if it puzzles and worries somebody, and a discovery only if it relieves somebody from the burden of a problem" (Polanyi, 1958/1962, p. 122). Polanyi understood Plato's *Meno* dilemma that,

to search for the solution of a problem is an absurdity. For either you know what you are looking for, and then there is no problem; or you do

not know what you are looking for, and then you are not looking for anything and cannot expect to find anything. (Polanyi, 1946/1964, p. 14)

However, he also recognized that we are called to search out and discover the possibilities that we tacitly sense; "A potential discovery may be thought to attract the mind which will reveal it - inflaming the scientist with creative desire and imparting to him intimations that guide him from clue to clue and from surmise to surmise" (Polanyi, p. 14). Practicing scientists tacitly accept the uncertain nature of a problem or a discovery and seek to understand reality by integrating clues that are often unspecifiable or known only in focusing on the comprehensive whole on which they bear. They claim a positivist, detached neutrality, but it is their passion for the unknown that motivates them and resolves the paradox of the *Meno*. What concerned Polanyi was that those who know better have no philosophical argument to defend what they sense to be true. My argument is that the answer Polanyi identified for the natural sciences applies equally well to a science of public administration.

"It is widely assumed" wrote Polanyi, "that the pursuit of science represents a field of intellectual activities which does not require the acceptance of any doubtful beliefs" (1950, p. 27). Yet, he continued, experience suggests that "there are certain not indubitable beliefs involved in our acceptance of science" (p. 27). In practice, "[t]he scientist's decision depends on the strength of the beliefs in the light of which he interprets his observations, and we approve of this decision if we share these beliefs" (Polanyi, p. 30). What Polanyi recognized was that arguments like Simon's, that embrace a science that abrogates responsibility for discovering the truth by focusing solely on description or a summary of evidence, are part of a more general trend of "pseudo-substitution", in which we mask our true beliefs and values to avoid saying anything

metaphysical or to avoid claiming that truth is accessible. We are induced to "camouflage in utilitarian colors our transcendent faculties and obligations in order that they may pass muster before a skeptical philosophy" (p. 31). This is the central argument that Polanyi makes against a positivist science dependent on determinism. In reality we are complex human beings who freely and passionately seek out a hidden reality by employing a process of tacit knowing that affirms a knowledge that is personal. Yet, we don a positivist costume and pretend to be absolutely controlled by deterministic "laws" so that we might appear to be indifferent and neutral about the issues that matter most to us. We become like "clowns imitating puppets," pretending to be controlled deterministically so that our "mechanistic conception" of human beings may be proved true (Polanyi, p. 31).

As Polanyi showed, the freedom and creativity of reason, isolated from morality and from any obligation to rely on traditional values or to be responsible for action that validates a community and a tradition, is the freedom and creativity to be inconsequential. Simon argued that it is reason that is "the instrument through which Man sees the world and his own life, understands them, and invests them with meaning" (Simon, 1973, p. 353). Polanyi argued (1970b/1997, 1975) that it is the tacit integration of subsidiary particulars into a comprehensive entity, the framing of a picture, or the context of a metaphor, which gives them meaning, and such an integration or frame or context is only possible with the involvement of a person. The naturalistic outlook, "according to which events affecting human fate may be purely accidental" leaves such events "entirely meaningless" (Polanyi, 1950, p. 32). Simon argued, and Meier and others argue, for a parallel universe severed, temporarily for the purpose of analysis, from

moral obligation or responsibility. In such a universe, a fixed reality passively awaits description by the scientist. As Polanyi showed, such a world is of no interest because its meaning has been lost. Simon promoted an impersonal, detailed examination of subsidiary particulars; Polanyi demonstrated that, while the "detailing" of subsidiary particulars is possible - and often necessary - a truly detached, impersonal examination of data, at any level, is not only impossible, but also meaningless unless its tacit foundation is constantly acknowledged. Indeed, he wrote, "[s]cience can never be more than an affirmation of certain things we believe in" (Polanyi, 1950, p. 35), and ultimately,

our protests must rest on the affirmation that our own scientific beliefs are true. There is no way of divesting ourselves of the responsibility for holding these beliefs and for committing ourselves to their dissemination and defense. (p. 36)

An Indeterminate World of Public Administration

The paradox of positivism is that its advocates do not follow the principles that they profess, for there is no practical way to isolate science from moral beliefs and to examine the world neutrally and impersonally. While avowing the necessity of an objective world of indubitable data governed by categorical principles for the scientific study of administration, public administrationists admit that such a positivist world is an ideal that may only reveal for us "under what conditions" (Simon, 1945/1957, p. 250) a desired result may take place. To determine "whether we *ought*" (p. 250) to take a particular action or accept specific knowledge, we must turn to values and beliefs to discern our direction. As suggested above, Ralph Hummel argued that this rift between an abstract, theoretical, "formula world" of science and the real world in which we live requires translation. To obtain data for analysis, reality must be translated into measurable language, and to apply the results of those measurements, they must be

translated back into real world terms. In 2007, Larry S. Luton appropriately asked whether the translation efforts of public administration empiricists have been successful, and after examining a number of studies by empiricists, he concluded that, "[i]f there is an objective reality, they are not measuring it" (Luton, 2007, p. 542). Furthermore, he went beyond questioning the effectiveness of translation efforts to question the very existence of an objective reality, confessing that "it is unclear to me whether we can ever be certain about such a thing" (p. 528).

Luton's agnosticism about the existence of an "objective reality" caught the attention of Meier and O'Toole. For them, the need to believe in a certain reality was anchored in their understanding of the very practice of public administration research. As "a pragmatic, design science," they claimed, public administration "requires one to believe that there is an identifiable reality and that some aspects of that reality are capable of adjustment, change, and - indeed - manipulation" (2007, p. 793). In such a world, "facts" must be treated as fixed attributes of reality that provide a "way of judging" and a means "to make decisions ... in the face of uncertainty" (p. 794). After all,

If one doubts the existence of an objective reality, how does one teach public administration? ... More importantly ... if one is agnostic that an objective reality exists, how does one judge one's own actions? ... How does one judge not just the empirical referents ... but the moral ones? (Meier and O'Toole, pp. 793-794)?

For Meier and O'Toole, certain, objective reality is indispensable to address normative questions; a fixed, determinate reality is necessary to make sense of a world that directly confronts practitioners in ways that cannot be understood subjectively; and indubitable values and an absolute morality are essential to facilitate wisdom. In short, "the reason public administration has value is to make decisions ... in the face of uncertainty" (Meier

and O'Toole, p. 794), and "without a concept of objective reality, we have no way of judging whether, for instance, your perception of reality should be given more consideration than ours" (p. 794).

As a realist, Polanyi, too, eschewed the possibility of a subjective reality that can be created at will. However, instead of retreating to a frozen world that is deterministic and known in a mechanistic manner, he took a closer look at the meaning of reality, and discerned that reality, itself, must be redefined by focusing our attention on an element of the real that most of us take for granted. "We meet here with a new definition of reality" he wrote.

Real is that which is expected to reveal itself indeterminately in the future. Hence an explicit statement can bear on reality only by virtue of the tacit coefficient associated with it. This conception of reality and of the tacit knowing of reality underlies all my writing." (Polanyi, 1946/1964, p. 10)

To affirm the independence of "the other," we in the West have emphasized its explicit precision but in so doing we have neglected its possibilities for revelation, for application, for action in the future. What makes something real, recognized Polanyi, is not its absolute certainty but its unspecified, unexpected, even unsuspected possibilities.

This new definition of reality deals a heavy blow to a deterministic outlook on public administration and to a positivist approach to knowledge making. If being real means being indeterminately revealed in the future, it becomes impossible to precisely describe, much less measure, reality. That the described and measured is a recognizable pattern is not a function of the object's certainty but a personal judgment of the discoverer, for "the appraisal of order is an act of personal knowledge" (Polanyi, 1958/1962, p. 36). If reality "will yet show up in an indefinite number of unpredictable ways" (p. 311), we can never predict it with absolute assurance, nor can we confidently

attempt to control it. Whereas a fixed, deterministic reality is isolated from the person and becomes known only in a detached manner, an indeterminate reality demands the intimate involvement of the person, and we are faced with "the paradox of our self-reliance in seeking contact with a reality of which we believe that it will yet manifest itself in unexpected ways" (Polanyi, p. 117). If reality is pregnant with possibilities, then it can only be described, measured, modeled, predicted, and controlled tentatively, by means of personal judgment.

To demonstrate our reliance on personal judgment in making contact with reality, Polanyi pointed out that the location of the pebbles in the station garden of Abergele "is an objective fact as compared with the personal fact that the pebbles form a sentence in the English language" (Polanyi, 1958/1962, p. 36). When we perceive something, we integrate the subsidiary "objective" facts into a comprehensive whole that has "personal" meaning. As an alternative example, he described a digital message made up of "X"s and "O"s. Without personal recognition of a pattern, such a collection is merely a random set of characters. The translation of such "objective" data into meaningful information is a personal act of discovery that, as Hummel pointed out, must be "wooed" by drawing out what may be merely random as an aspect of a hidden reality that is knowable.

The heuristic gap, between an indeterminate, random reality and a hidden reality that can be identified and known, can only be bridged through a process of tacit knowing. Once recognized, the centrality of the person in perception, in conscious attention, or in skillful action seems clear, but Polanyi was not arguing for subjectivity as it is commonly understood. In the same breath that he rejected "any attempt to avoid the responsibility for shaping the beliefs which we accept as true", Polanyi also rejected "the existentialist

claim of choosing our beliefs from zero” (1958/1962, p. xix). A reality that may reveal itself indeterminately will support neither a detached objectivity nor an absolute subjectivity. Instead, it is *a person* who integrates the particulars of an indeterminate reality to reveal a comprehensive whole. The logic of tacit knowing teaches us that there *is* a reality that anyone can know but, because it is hidden, it can never be known mechanically or impersonally, nor created *ex-hihilo*. A determinism that attempts to turn a backward summary of aggregate data into forward looking prediction or control is doomed to failure, for it cannot account for the unspecifiable and indefinite.

Facts and Clues in Public Administration

Given Polanyi's understanding of a reality that reveals itself unexpectedly and indeterminately in the future and our reliance on the logic of tacit knowing to understand a knowledge that is personal, Simon's "framework for the analysis and description of administrative situations" (Simon, 1945/1957, p. 247) must be seen in a new light. First, his claim that "an administrative science, like any science, is concerned purely with factual statements" (Simon, p. 253) must be rejected as unjustified, for "[e]very factual statement embodies some measure of responsible judgment as the personal pole of the commitment in which it is affirmed" (Polanyi, 1958/1962, p. 312). Likewise, because every act of knowing involves a person responsibly integrating subsidiary particulars into a focal whole, Simon's assertions that "factual propositions cannot be derived from ethical ones ... nor can ethical propositions be compared directly with the facts" (1945/1957, p. 46), make little sense. Indeed, there is no need to separate the factual from the ethical parts of a statement - even if it were possible - for tacit knowing integrates them together in the knowing process. As Waldo insisted, "fact and value are

joined not merely mechanically, but organically" and the possibility of a true value neutrality of means is "false" (1955, pp. 63, 64). Indeed, the isolation of facts from values leads to action that is "meaningless, irrational" (p. 64).

Second, Simon's effort to set out a formal process of decision making not only overlooks the personal appraisal that makes recognition of pertinent information significant, but his decision making process, that begins by listing alternative strategies, can never be complete in an indeterminate world. Neither is determination of, nor the comparative evaluation of, all the consequences possible without personal assessment, an indwelling of the alternatives, and their integration with knowledge of the situation. That "our knowledge may include far more than we can tell" (Polanyi, 1961/1969, p. 133) affirms its hidden nature; not only does reality reveal itself unforeseeably, but our knowledge, itself, is unspecifiable and dependent on personal judgment. The weakness of Meier and O'Toole's (2000) argument in favor of precise predictions derived from a formal theoretical model, or of Gill and Meier's (2000) call for more rigorous methods, can now be seen clearly, for the precision of a prediction or a measurement or a description is dependent on the tacit affirmation and personal commitment of the one predicting or measuring or describing. Indeed, the precision of descriptive terms "can mean something real only if they are not strictly precise" (Polanyi, 1958/1962, p. 252).

Third, any attempt "to abstract out a part of the whole reality" (Simon, 1973, p. 353) must result in the destruction of the comprehensive entity on which the parts bear, for no attempt to "understand thoroughly how the system is constructed" (p. 353) can make up for the destruction of a whole that results from shifting one's focus to its parts. Indeed, separating facts from values not only leaves the "facts" meaningless, but it also

disassociates values from their material foundation. That a model of reality may be "disaggregated into smaller parts that can be studied systematically," even if the use of "elaborate statistical controls" is guaranteed (Meier and O'Toole, 2000, p. 18), must be questioned, for reducing reality to its parts impedes its functionality, undoes its phenomenal transformation into a comprehensive entity, and renders it meaningless. The tacit root of all knowledge teaches us that the best designed methods that fail to account for the indeterminacy of reality and the personal nature of our knowledge will inevitably focus all effort on studying problems that have no heuristic power and are therefore meaningless and of no real interest to humanity.

In a positivist world of fixed reality, disaggregated particulars are seen as facts that are complete in themselves and that may be treated independently of their context. Indeed, the words "disaggregated" and "disassembled" found in positivist publications, suggest a mechanistic understanding of knowledge and of "facts" that have no organic relationship to each other. In contrast, Polanyi wrote of "detailing" when it is necessary to turn one's focus from a comprehensive whole to its subsidiary particulars, a detailing that keeps the comprehensive entity in mind to avoid losing sight of the subsidiary status of particulars that point to a whole. Consequently, he often used the word "clue" rather than "fact". In the context of a comprehensive entity, its particulars are known subsidiarily as they bear on the focal whole. They are *clues* to the whole that must be integrated by a person using a dynamic process involving intuition and imagination - rather than *facts* that can be logically fitted together to create a whole. "Clues and tools are things used as such and not observed in themselves" (1958/1962, p. vii), wrote Polanyi. Facts become clues when they point to something outside of themselves, when

we skillfully rely on them to comprehend a focal whole. In an indeterminate world, the integration of indefinite clues results in a comprehensive entity that will manifest itself unspecifiably and unexpectedly in the future.

In their 2007 defense of certainty, Meier and O'Toole argued that it is necessary to assume an objective reality if one is to design a better administration, to teach public administration, and to judge value. From a Polanyian perspective, designing a better administration, like all activities involving the skillful application of knowledge, is anchored in tacit knowing. There is no fixed knowledge that can be applied to administrative design because reality, itself, is hidden and indeterminate. However, there are *clues* that can be discovered by focusing on a comprehensive whole. Indeed, knowledge acquired through tacit integration takes full advantage of all relevant clues, even those known only unconsciously, and effective teaching becomes an exercise in apprenticeship of tacit skills rather than the memorization of explicit facts. Finally, no fixed, impersonal knowledge can facilitate judgment, for judgment is a personal action that must rely on the logic of tacit knowing by integrating a plethora of clues that are often known only subsidiarily. Certain knowledge is not adequate for design, teaching, or judgment. What is needed is tacit knowing.

Scientific or bureaucratic thinking that simplifies "[b]y looking at the world through the lenses of only a few factors at a time" (Hummel, 1994, p. 204) must force reality to fit or not fit its preconceived framework. Consequently, by simplifying, scientific or bureaucratic thinkers are actually enforcing a particular, or strictly speaking, a personal understanding of the world, for "simplicity in science can be made equivalent to rationality only if 'simplicity' is used in a special sense known solely by scientists"

(Polanyi, 1958/1962, p. 16). Yet, scientific or bureaucratic thinkers hide their personal motives behind objective terminology. This practice of masking moral or essential qualities, of hiding expressions of personal values behind the allegedly neutral language of science or bureaucracy is an instance of what Polanyi called "pseudo-substitution". In pseudo-substitution, what is at stake is a refusal to accept our personal responsibility for what we know and what is lost is an awareness of values. "The positivist movement" wrote Polanyi, "is shown isolating science on the one hand from any extra-scientific first principles and on the other hand from reality, since neither of these is recognised" (Polanyi, 1967b/1997, p. 236). The alternative to formal, positivist models and methods is to recognize description and action and theoretical construction as tentative rather than absolute, as meaningful clues rather than cold, hollow facts.

Tacit Knowing as an Alternative Model for Administration

American public administration has long sought legitimacy through the practice of a "scientific" administration that is allegedly concerned with objective "facts" and the instrumental implementation of a purpose that is politically determined by others. Since such an administrative science implies a deterministic understanding of reality, and in the face of overwhelming evidence that the practice of administration does not, and even can not, follow deterministic rules, some public administration scholars, as we have seen, have sought to introduce alternative methods, models, and forms of knowledge into administrative study.

The alternative that Polanyi offered was the fiduciary embrace of and reliance on a background of tacit knowledge integrated through a process of tacit knowing into a comprehensive whole. Such knowledge is personal and becomes, itself, part of a

background from which a scientist attends to the choice of a problem, the observation of data, the discovery of a solution, or the communication of results. In recognizing the personal nature of knowledge and its reliance on the logic of tacit knowing, Polanyi pointed the way forward to a science characterized by discovery rather than method, by a responsible search for meaningful truth rather than the practice of meaningless technique. Rather than being isolated from the influence of traditional values and from influence on a fixed reality, such a science submits itself to tradition and responsibly addresses an indeterminate reality. It is conservative on the one hand and disruptive on the other, but it is always embedded in reality and humbly aware of its fallibility even as it passionately seeks to leap the logical gap that separates its intimations of reality's possibilities from reality's actual manifestations in the world.

Looking to the past, a science characterized by responsible discovery recognizes orderliness as evidence of personal involvement, but looking to the future, an uncertain and unspecifiable reality focuses our attention on "an indeterminate range of yet undreamed consequences" (Polanyi, 1957, p. 484). It is therefore commitment "that lends universal intent to a scientist's most original solitary thoughts" (p. 484); it is the involvement of the scientist that validates a scientific claim. In light of such an understanding of science Polanyi suggested that our approach should be to "try training ourselves to study human affairs by intense participation in human problems instead of by detachment from them" (p. 482)

The recent works of Nicholas C. Zingales offer good examples of public administration scholarship that reflects an understanding of the personal nature of knowledge and the responsible participation of the scholar. Anchored in the

phenomenological philosophies of Husserl, Heidegger, and Merleau-Ponty, his work may be seen, in terms of Polanyi's ideas, as a responsible search for understanding of an indeterminate reality, as an academic study that makes use of the logic of tacit knowing. In his examination of the decision making of environmental managers, for example, Zingale observed more than raw descriptive data, reviewing categories like "Experience/Behavior," "Opinion/Belief," "Feeling," and "Knowledge" while also considering management purpose and incorporating field observations that resulted from "looking and listening, observing and interviewing" (Zingale, 2007, pp. 56, 60, and 56). A similar sensitivity to the personal nature of knowledge may be seen in a 2016 study of San Francisco cable car operators by Zingale and Justin T. Piccorelli. In this latter study, the research team spent three days observing and interviewing cable car operators, maintenance personnel, and powerhouse operators while "paying particular attention to people, processes, procedures, and workplace practices conducive to emergent knowledge" and while "remaining open to indications of developing and applying situational expertise" (Zingale and Piccorelli, 2016, p. 351).

Both studies focused on a phenomenological approach to knowledge that "lets" rather than "makes" knowledge. Within such an approach, "facts" are supplemented by "attitudes and behaviors" and "what is already there" by "what is still possible" (Zingale, 2007, p. 50). In other words, facts become clues that must be integrated together to point to a comprehensive whole. For Zingale and Piccorelli, intentionality became the key to understanding, whether interpreted as "the ability to engage the consciousness in a meaningful way," (2016, p. 347), as "shared in the experience and already there when one is completely immersed and involved in a situation" (p. 348), or as hermeneutically

understood "skillful coping ... that comes from practicing, doing, learning and adjusting " (p. 349). Whatever the definition, intentionality suggests "the application of ... *know-how* to that which is lived" (p. 355), know-how that is described in a manner similar to tacit knowledge.

This relationship to tacit knowing is evident in the manner in which the participants in both studies relied on a background of tacit knowledge that was integrated to bear on a comprehensive entity that was their focus. For Zingale's environmental managers, "being an expert is not something that can be empirically measured, but is an innate and intuitive sense of knowing how and what to do and when to do it" (Zingale, 2007, p. 60). "Knowing that" is the knowledge of a novice, but an expert has "a felt sense or know-how that pre-determines the range of our decisions and actions" (p. 61). Similarly, Zingale and Piccorelli described grip operators "letting the cable 'speak to him or her'" or a repair technician being able to tell "'by looking at the grip itself which operators were on the car'" (2016, pp. 360, 353). Conceptually, "we bring our experiences forward to inhabit the moment in space and time; a moment at which I belong to, and which is always slightly anew due to the particulars of the space/time experience" (2016, p. 356). The various ways of describing the knowing process evident in these works share with the logic of tacit knowing the concepts of intentionality and of a background that bears on and is integrated into a foreground that is our focus. Both quoted studies down-played a detached, impersonal knowledge based on fixed facts. Instead, the researchers boldly committed themselves to what they had discovered, a commitment based on clues that they gathered through intimate participation and confidence that their work represented a legitimate contact with reality.

Neither Polanyi's epistemology nor his ontology can be "proved" in an absolute manner. Indeed, to do so would undermine his very purpose. If there *is* a hidden reality that may be known only indefinitely and contingently, and if all knowledge is tacit or rooted in tacit knowing (and therefore personal), then any claim to knowledge must, itself, be tentative even as it claims universality. "It would not be consistent with my own views" wrote Polanyi, to expect a skeptic "to abandon a complete system of beliefs on account of any particular series of difficulties" (Polanyi, 1958/1962, p. 315). Tacit knowing is "an active comprehension of the things known, an action that requires skill" (Polanyi, p. vii). Consequently, any attempt to describe it precisely must fail, for a skill depends on personal factors that must be learned through practice. Furthermore, "[p]ersonal knowledge is an intellectual commitment" (p. viii), and

To accept commitment as the framework within which we may believe something to be true, is to circumscribe the hazards of belief. It is to establish the conception of competence which authorizes a fiduciary choice ... The paradox of self-set standards is eliminated, for in a competent mental act the agent does not do as he pleases but compels himself forcibly to act as he believes he must. (Polanyi, p. 315)

Because of its radically contingent nature and its reliance on belief, tacit knowing is never general and universal and always runs the risk of being mistaken. It is possible only through humble commitment, held with universal intent. It is "the deliberate holding of unproven beliefs" (p. 268), and in the end we can only confess with Polanyi, himself, that "*in spite of the hazards involved, I am called upon to search for the truth and state my findings*" (p. 299).

CHAPTER V

PUBLIC ADMINISTRATION, TRADITION, AND DYNAMIC ORDER IN A FREE SOCIETY

We may conclude that when very large numbers are to be arranged carefully, this can be achieved only by the spontaneous mutual adjustment of the units; not by specific assignment of the several units to positions in a prearranged plan.
(Polanyi, 1941, p. 432)

But this should not prejudice us in favour of order by mutual adjustment, and against specifically planned order. ... The two alternative and opposite methods of achieving order - by limiting the freedom of the particles, or by giving full scope to their interactions - have their respective proper occasions. Unless one of these methods is preferred for its own sake ... it should in general be easy to decide which task can be accomplished by one and which by the other. They will combine in the way mutually exclusive functions combine, namely each fitting into the gap left open by the other. (Polanyi, 1951/1998, p. 192)

"it is not a taboo to return and fetch it when you forget"
(Seeman, 2010, p. 109)

In Chapter IV, I showed that acceptance of Polanyi's definition of reality as "that which is expected to reveal itself indeterminately in the future" (1946/1964, p. 10),

together with his assertion that all knowledge "is either tacit or rooted in tacit knowledge" (1967b/1969, p. 195), undermines the possibility of a determinate world and a strict positivist understanding of knowledge and discovery. Efforts to separate facts and values, it turns out, are unnecessary (for tacit knowing integrates the two) or fruitless (for truly isolated facts become meaningless and of no interest). Likewise, fixed, formal methods, seeking precise knowledge of empirical data, are seen to be nonsensical in the face of an indeterminate reality and personal knowledge. Furthermore, tacit knowing's recognition that faith in or reliance on a method or model or form of knowledge is the true measure of its legitimacy opens the door to a variety of alternatives that may be integrated or indwelt as tools for discovery and action.

In Chapter V I turn to Polanyi's understanding of communities, organizations, and society at large. Three concepts will be central to my examination: tradition, dynamic order, and public liberty. As outlined in Chapter III, Polanyi understood a free society to be made up of a collection of systems fostering public liberty, organized dynamically and subject to a tradition or a set of traditions. However, communities or organizations or institutions that exercise public liberty, are themselves organized internally in a dynamic or spontaneous fashion, also subject to tradition. Chapter V will show how signs of reliance on tradition and on spontaneous order reveal themselves in the public administration literature. Finally, it will consider the concept of public liberty and its implications for a dynamically ordered administrative state.

Tradition in the Public Administration Literature

The alternative that Polanyi offered, to a formal, hierarchical structure that promotes a planned order based on an imagined impersonal objectivity, is the fiduciary

embrace of and reliance on traditional values expressed and enforced by a community. For scientists, to use Polanyi's central example, such a tradition is part of a background from which they may attend to the choice of a problem, the discovery of a solution, or the communication of new insight. Science can not be isolated from the influence of traditional standards, for it relies on them subsidiarily as they bear on the problem or discovery or communication that is both the focus of the scientist and the comprehensive meaning of the tradition. Furthermore, because traditional values are known tacitly and responsibly through practice, they are always subject to modification or renewal. In other words, just as tacit knowing is both conservative and disruptive, so also is a science both anchored in tradition conventions and creative. Tradition is a set of lower level principles that define the conditions from which a traditional order may emerge by controlling the possibilities left open by the tradition, itself. However, the application of those upper level limits not only creates a new entity but also modifies the very tradition that makes it possible. A tradition that is known only in practice is necessarily contingent, for each participation in the tradition, by trusting it or relying on it, necessarily modifies it. It is, as noted above, "an appeal from a tradition as it is to a tradition as it ought to be" (Polanyi, 1946/1964, p. 56). Tradition, therefore, is always embedded in a community that depends on, enforces, and also refines it. The West African term "sankofa" comes to mind: returning to fetch what has been forgotten is not taboo, for tradition pushes forward into the future by looking back at and relying on the past (Seeman, 2010).

The link between a society or community anchored in tradition and personal knowledge can be seen in the parallel language Polanyi used to describe the two. Both are fiduciary concepts in which the participant or the knower relies on a background (of

traditional values or tacit knowledge) while accepting responsibility for a foreground or focus on which it bears. Both are conservative and disruptive, depending on the heuristic power of a logical gap, between what is and what might yet be, to incite passion for action or discovery in participant or knower. Both acknowledge the capacity of communities or individuals to fashion orderliness and both recognize that orderliness, when combined with heuristic power, produces beauty, which legitimizes. Both a community anchored in tradition and personal knowledge are unspecifiable, realized in practice, and ordered dynamically. Indeed, the two are inextricably linked. On the one hand, the knowledge contained in a tradition is personal knowledge that cannot be characterized explicitly and absolutely. On the other hand, the preservation and facilitation of personal knowledge depends on submission to a tradition. In effect, to the extent that our knowledge is unspecifiable, "we accept the verdict of our personal appraisal, be it at first hand by relying on our own judgment, or at second hand by submitting to the authority of a personal example as carrier of a tradition" (Polanyi, 1958/1962, p. 53). To know, we either rely on personal judgment facilitated by tacit knowing or on a tradition evident in a community.

In *To Run a Constitution* (1986), John A. Rohr used such an understanding of tradition in seeking to "legitimate the administrative state in terms of constitutional principle" (Rohr, 1986, p. ix) Against the argument that their "fears of governmental abuse" made the framers of the Constitution "implacable foes of the wide-ranging activities of modern government" (p. 7), he sought first to "*at least* neutralize" and even enlist them "in support of the modern administrative state" (p. 7). Secondly, he drew on the work of Hannah Arendt to explain and justify the Constitution as "the symbol of the

founding of the Republic" (Rohr, p. 7); the Constitution, as the founding document representing the founding as a whole, was and is authoritative, for "'foundings' are normative" (p. 7). According to Rohr, the "moral force of the founding period" (p. 8) makes it unfortunate that Woodrow Wilson, in particular, failed "to ground his theory of administration in American constitutional principle" and suggests that calls for "fundamental constitutional changes to accommodate administrative needs" are "unwise" (p. 9). However, it is not enough to "have our Constitution as the object of civil religion" (p. 9). "To legitimate the administrative state in constitutional terms," argued Rohr, "we must examine the Constitution rather than simply revere it" (p. 9).

Like Polanyi, Rohr recognized that, while tradition is anchored in the past, its primary function is to guide a community or society into the future. In light of its importance in augmenting the foundational status of the Constitution, Rohr strategically chose "to emphasize the constitutional tradition rather than the text of the Constitution" (1986, p. 172) as a source of administrative legitimacy. Rather than rely on *the words* of the framers, including those supporting arguments for and against specific aspects of the Constitution, he "found compelling the image of the Constitution as the conclusion of the great public argument of one hundred and fifty years of colonial experience and the premise of the great public argument of the next two centuries" (p. 173). This image "put the Constitution at the center of American political experience" and defined that experience, including the development of the administrative state, as an ongoing "civilized public argument" (p. 173). For Rohr, the constitutional tradition was a continuing, active process, not a static set of rules and procedures, and it was such a dynamic tradition that gave public administration legitimacy *as part of that tradition*.

Because the founding was in argument, it was only fitting that the development of American politics should be in argument as well. And because the administrative state is part of American politics ... it, too, should be part of the argument that is a projection in time of the act of founding. (Rohr, p. 180)

Rohr admitted that careful readers might "find my work defective", but he was more concerned that readers would conclude that "what I am doing is not worth doing at all" (1986, p. 178). In other words, to paraphrase Polanyi, he achieved a frame of mind in which he could hold firmly to what he believed to be true, even though he knew that it might conceivably be false. He made a claim to personal knowledge, and in the end he could boldly profess that "my argument is grounded in the *fact* that the founding period is normative for American politics" (1993, p. 246), for a rejection of that fact would force one to "enter the public argument on any topic with an insurmountable disadvantage" (p. 246). The tradition of the founding of the United States is a tradition that is both greater than and defined by the founding, itself, just as the founding is both greater than and defined by the Constitution. Within that context Rohr could humbly respond with confident universal intent.

Common Law, as Polanyi emphasized, is an important example of self-modifying tradition in a public administration context. "Common Law is founded on precedent," he wrote, and this practice "recognizes the principle of all traditionalism that practical wisdom is more truly embodied in action than expressed in rules of action" (Polanyi, 1958/1962, p. 54). Specifically, "precedent is constituted by *the decision* of a court, irrespective of its interpretation" (p. 54, italics added); it is practice that defines a tradition, rather than its theoretical definition or interpretation. Because the premisses of a traditional domain "are tacitly observed in the practice of [its] pursuits and in the

acceptance of their results as true" (p. 161), the practice of a tradition or of personal knowledge can not be transmitted from one generation to the next by memorizing fixed facts and reliable rules but must be handed down by a process of apprenticeship.

Precedent is established by the practice of judges, then, but at the same time it is that same precedent that judges consult in deciding a new case. Thus, we find judges relying on tradition (represented by precedent) even as they consciously or unconsciously bring about its change by their own practice. What becomes evident is that the body of judges functions as a dynamic order characterized by "a process of direct adjustments between succeeding judges" (Polanyi, 1941, p. 436), a process that takes place over space and time. As noted earlier, this mutual adjustment of individual judges is enabled by the mechanism of consultation, in contrast to the competition that empowers a market economy or the combination of consultation and competition that facilitates the operation of science. The practice of each of these domains is an art, guided by traditional values, principles, and rules, and we find that, while Common Law can never be "exercised according to its explicit rules," those same rules can be "of great assistance ... if observed subsidiarily within the context of its skilful performance" (Polanyi, 1958/1962, p. 162). It is the skill of its practitioners that makes possible the exercise of the law. However, *"the aim of a skilful performance is achieved by the observance of a set of rules which are not known as such to the person following them"* (p. 49). Common Law looks to traditional rules and traditional values that are useful to the extent that they are applied subsidiarily "within the framework of personal judgment" (p. 31). In other words, it relies on tacit knowing.

Michael Spicer has noted the importance of common law reasoning as a possible model for ethical reasoning in public administration. He has argued that "common-law reasoning in the exercise of administrative discretion" (Spicer, 1995, p. 90) is consistent with an "anti-rationalist" view, expressed by the American Founders, that stresses the limits of human reason and the importance of looking to past experience in determining action. In advancing his argument, he particularly noted Polanyi's explanation of Common Law's requirement that judges (as administrators) "draw upon the knowledge both explicit and implicit in past decision making, to interpret this in light of current social values and conditions, and then to contribute their own knowledge in the form of precedents for future decisions" (pp. 91-92).

The example of common-law reasoning was also noted by Spicer and Larry D. Terry (1996) in suggesting guidelines for the administrative interpretation of statutes. Responding to the 1984 Supreme Court decision, in *Chevron U.S.A. v. Natural Resources Defense Council*, that granted to "administrative agencies and public administrators ... greater discretionary authority and power in the realm of statutory interpretation" (Spicer and Terry, p. 39), they argued that "public administrators need guidance to enhance their effectiveness and overall performance in this area" (p. 40). First considering standard categories of statutory interpretation, they concluded that "textual, intentionalist, and public values approaches may provide valuable guidance in certain instances" (p. 45). However, as they saw it, each of these approaches exhibits deficiencies, and they concluded that "common-law reasoning can provide an additional valuable approach to statutory interpretation that is consistent with our constitutional heritage" (p. 45).

Importantly, common-law reasoning may be understood as "reasoning by example" (Spicer, 1995, p. 90; Spicer and Terry, 1996, p. 44) in which judges "try to find principles or rules from past cases that they can use to guide their own decisions" but are "not bound necessarily by the actual rules applied in past cases" (Spicer and Terry, p. 44). In the practice of reasoning by example, each judge has "some freedom to determine his or her own rule or rationale for that past decision and to use that rationale to support a decision in a current case" (p. 44). Spicer and Terry argue that the practice of this type of reasoning by administrators can, among other things, check "the arbitrary use of discretionary power by public administrators;" provide "greater predictability in administrative actions for citizens;" and enable administrators "to combine the knowledge and experience explicitly or implicitly contained in past decisions with their knowledge of current circumstances" (pp. 44-45). Moreover, as Spicer and Terry observed, "this approach to statutory interpretations is consistent with the perspective of the founders" (p. 45). It is therefore part of the constitutional tradition that Rohr had highlighted and that legitimizes the administrative state. It is part of a tradition that is greater than its own local arguments.

Planned Order in Public Administration

In addition to its clear illustration of the self-reforming character of a traditional order, the example of Common Law demonstrates the spontaneous order of elements free to adjust their actions to those of their neighbors without external constraint. This is the dynamic order described in Chapter III and it was an unstated assumption integral to Spicer and Terry's argument, for their concern was to provide guidance to *individual administrators* acting independently to interpret statutes in a comprehensive "New World

Order" (Spicer and Terry, 1996, p. 38). Such an assumption, however, places their argument in opposition to those who advocate a hierarchical, planned or corporate order, a "method of establishing order" as Polanyi put it, which "consists in limiting the freedom of things and men to stay or move about at their pleasure, by assigning to each a specific position in a prearranged plan" (1941, p. 431). It is helpful here to illuminate Polanyi's description of spontaneous order by comparing it to the argument for planned order outlined by Herbert Simon.

For Simon, the unreasonable requirement "that all the possible plans be worked out in full detail before any decision is reached" (Simon, 1945/1957, p. 99), and the impossibility of knowing all alternatives or all consequences for decision making, led him to accept that perfect rationality is unattainable with individual human beings. However, set in an organizational environment, such perfect rationality may be approached more closely, for "[i]ndividual choice takes place in an environment of 'givens' - premises that are accepted by the subject as bases for his choice" (Simon, p. 79), and if those "givens" or "premises" can be controlled by choosing and deliberately modifying the "environment of choice", rational decision making in the efficient pursuit of organizational ends or objectives becomes more possible. The purpose of administrative efforts, then, is "the construction of an efficient administrative organization" (Simon, p. 2), a planned order in which authority, work assignments, decisions, and structure are all effectively determined by the organization rather than the individual.

Whereas Simon recognized complexity as a fault to be overcome by shifting the decision making responsibility to the organization, Polanyi embraced complexity and

indeterminacy, not only as the key to understanding reality, but also as a central characteristic of efficient organizational structure and function. According to Polanyi, precision in planned order depends on full characterization of all possible responsibilities, and such a "programme" becomes overwhelming "as it would demand the formulation of an indefinite range of impossible tasks" (Polanyi, 1951/1998, p. 221). However, "by giving full scope" (p. 192) to the interactions of each individual, a spontaneous and dynamic order may be achieved.

Simon acknowledged the possibility of "self-coordination", but "[l]acking formal coordination," attainment of the "best" result is unlikely "unless the intentions of each member of the group can be communicated to the others" and in most situations such "self-coordination is infinitely less effective than a predetermined scheme of action that relieves each member of the group of the task of anticipating the behavior of the others as a basis for his own" (Simon, 1945/1957, p. 106). Indeed, according to Simon, "self-coordination" of corporate activity is only plausible for small groups, and the solution to complexity is a formal organization that is deliberately planned and controlled through a centralized, hierarchical structure. Through a planning process, an organization places its members "in a psychological environment that will adapt their decisions to the organization objectives, and will provide them with the information needed to make these decisions correctly" (Simon, p. 79). A planned order, then, one that initiates objective rationality and purposive behavior in personal decision making, is necessary for all but the smallest organizations.

For Polanyi just the opposite seemed self-evident. The complexity of a polycentric entity led him to reject the possibility of a planned order *except* for small

groups. Polycentric tasks that may be calculated exactly, as a planned order requires, are limited by the sheer number of calculations and exactness of information that are required to coordinate individual actions and interactions within larger groups (Polanyi, 1951/1998, p. 211). Computers are much faster and more powerful today than they were in Polanyi's time, but even the most powerful computer has limitations. The solution, then, is "to approach the matter in a piecemeal manner" (p. 221), by disregarding the vast majority of a set of independent calculations (p. 225), and by turning attention to "*one centre at a time while supposing the others to be fixed in relation to the rest, for that time*" (Polanyi, p. 213). Simon described a planning process that also involved particularization and an examination only of "the most 'plausible' alternatives" (1945/1957, p. 99), but rather than give each center a measure of autonomy, he relied on one central planner to judge the plausibility of an option and to evaluate it accordingly. Simon sought to restrain indeterminacy by centralizing the planning process and by circumscribing individual choice. Polanyi recognized the impossibility of that task and sought to embrace indeterminacy by welcoming individual initiative and delegating the planning process to a multitude of independent centers. Indeed, Polanyi concluded, "A polycentric task can be socially managed only by a system of mutual adjustments" (1951/1998, p. 226), a system in which individuals are free to act while adjusting their efforts to those of their neighbors, a system characterized by overlapping neighborhoods of responsibility and authority that bears evidence to the logic of tacit knowing in its integration of subsidiary particulars into a comprehensive whole.

For Simon the behavior of individuals, particularly "within administrative organizations" (Simon, 1945/1957, p. 4) is purposive, and this purposiveness brings about

"an integration in the pattern of behavior" and provides "a principal criterion in determining what things are to be done" (p. 4). Such behavior is purposive "in so far as it is guided by general goals or objectives; it is rational in so far as it selects alternatives which are conducive to the achievement of the previously selected goals" (Simon, p. 5). In contrast, Polanyi's identification of decision making with problem solving, and with tradition and responsibility, suggests that decision making is in reaction to "a purposive tension ... to make sense of [one's] situation" (Polanyi, 1958/1962, p. 120). Whereas purpose for Simon comes from outside the individual, by way of a planning process, and from outside the organization, by way of a central decision maker or decision making body, purpose for Polanyi emerges from an individual tension to make sense of the world. An animal's sense-making, as Polanyi described it, involves an effort "to retain control of itself and of its surroundings" (p. 120), but it must come to terms with the same effort on the part of its neighbors, leaving its effort tentative and uncertain. This is a heuristic tension, never fully resolved, that draws the discoverer or decision maker onward by pushing the tension forward to new problems and new choices. Through a planned order, purpose, and therefore meaning, are handed down from *outside the situation* by way of external stimuli, subject to explicit rules. In a spontaneous order, purpose and meaning emerge heuristically from *within the situation*, from the very essence of a responsible, conscious being, and they are therefore dependent on the personal and responsible application of the logic of tacit knowing. On the one hand we find an external purpose enforced by external stimuli within a planned order. On the other hand, we discover an internal purpose emerging through the responsible action of individuals within a dynamic order.

Given Simon's emphasis on a purpose handed down from outside the situation, it is natural that he would claim that "[t]he concept of purposiveness involves a notion of a hierarchy of decisions - each step downward in the hierarchy consisting in an implementation of the goals set forth in the step immediately above" (Simon, 1945/1957, p. 5). This hierarchy is critical to a planned order, for the purposes defined by a plan are distributed downward by particularizing upper level plans in the broad decisions of lower levels. In such an order, standards and guidelines and training function to limit participation to a prescribed set of actions handed down from the "higher ranks". As Polanyi noted, such a corporate or planned order limits "the freedom of things and men" (Polanyi, 1941, p. 431); it seeks to determine decision-making and therefore action.

In a spontaneous or dynamic order, on the other hand, tradition functions as a lower-level set of operational principles that are integrated by the free participation of individual agents. Writing of science, Polanyi argued that "[e]ach new independent member of the scientific community adheres to this tradition, assuming at the same time the responsibility shared by all members for re-interpreting the tradition and, possibly, revolutionizing its teachings" (1967a/1969, p. 85). The mutual adjustments necessary in a dynamic, traditional order "must be initiated by individual agents" (Polanyi, 1951/1998, p. 229); they must emerge from the bottom rather than being handed down from the top. Indeed, "a system that develops from the bottom up, through free interaction of its parts upon one another ... is the only social system that can meaningfully be called free" (Polanyi and Prosch, 1975, p. 204). The difference between planned and spontaneous orders is significant. In a planned order, authority flows downward through the hierarchy to limit the freedom of the lower levels; in a dynamic order, authority is a mutual

authority in which each member is free to act independently, subject only to general rules defined by tradition and enforced by community. Thus, in a planned order, purpose is not only handed down from outside the situation, but it is *determined* from above, and guidelines are assigned in the expectation of conformity. In a spontaneous order, on the other hand, purpose emerges from below, from the integration of an indeterminate set of particulars that are often known only in their bearing on the comprehensive entity toward which they point. Consequently, guidelines are never certain, for they point to possibilities rather than certainties and their embodiment in a real world "*makes them liable to failure*" (Polanyi, 1959a, p. 67), as well as to success.

The positivist tendency, to resort to a static formula or model to define and understand public administration, is also evident in Simon's preference for planned order. At the heart of the latter's argument was the assumption that legitimate choice must be rational. However, rational decisions can only be guaranteed in a formal organizational context that provides a framework in which "the stimuli of decision can themselves be controlled" (p. 109). Significantly, Simon discounted "older traditional institutions like the family" (p. 101), clearly asserting his preference for formal organizations which are "rapidly assuming a role of broader significance" (p. 102). Formal organization has advantages, he suggested, "for administrative organizations are usually constructed and modified with a deliberation and freedom from tradition which - though far from complete - gives them great adaptability to meet new needs with new arrangements" (Simon, p. 102). Therefore, it is through such administrative institutions, characterized by formal organization, indeed by a planned order, that "the achievement of human rationality" (p. 102) becomes possible.

Polanyi, on the other hand, understood that the premises and consequences of decisions and behavior can never be evaluated in a strictly detached and impersonal manner because they are always rooted in a process of tacit knowing and always point to a reality that is uncertain and even unspecifiable. Decision making, as an instance of problem solving, is a heuristic discovery dependent on the integration of subsidiary particulars into a focal whole. Indeed, the "irreversible character of discovery suggests that no solution of a problem can be accredited as a discovery if it is achieved by a procedure following definite rules" (Polanyi, 1958/1962, p. 123). Moreover, a discipline like science, which is ordered spontaneously through the mutual adjustment of individual initiatives, also relies on a community that shares its values and beliefs. Indeed, it never exists in isolation but "can exist only because its premisses can be embodied in a tradition which can be held in common by a community" (Polanyi, 1946/1964, p. 56). "This is true also of all complex creative activities which are carried on beyond the lifetime of individuals" wrote Polanyi (p. 56); it is as true about decision making in formal organizations subject to a planned order as it is about any setting. The grounding of science and all complex creative activities in a tradition "held in common by a community" is therefore a significant difference between Simon's planned order and Polanyi's dynamic order. Simon's preference for formal organization and decision making based on explicit knowledge follow directly from his tacit assumption of a determinate reality, while Polanyi's embrace of the traditional foundation of dynamic order emanates from his recognition of indeterminacy and the tacit root of all knowledge.

Spontaneous Order in the Public Administration Literature

The concept of "self-coordination of independent initiatives" (Polanyi, 1962, p. 55) is familiar to public administrators, although often by other names. Timothy R. Dahlstrom has made one of the more direct applications of spontaneous order by suggesting that Polanyi's "sociointellectual framework" is useful for understanding intellectual networks, for it "provides a broad platform from which to develop theory and practice" (Dahlstrom, 2013, p. 578). Recognizing that Polanyi's use of science is as a *model* of dynamic order, Dahlstrom freely interchanged the terms "scientist" and "intellectual" and "researcher" in his writing, "to broaden the conceptual landscape" while developing an image of intellectuals as "members of an organization that is closely knit intellectually ... but loosely knit socially" (p. 580). Intellectuals in general, like scientists in particular, enjoy an "intellectual liberty" that "consists of the right to choose one's own problem to study, to conduct research free from any outside control, and to teach one's subject in light of one's own opinions" (p. 581). Yet, while "a well-connected and well-informed network is necessary," it "stands in contrast to transaction-based or power-based networks" which "may not require any sense or development of a true community" (p. 581). In an intellectual network, then, the mutual adjustment of independent initiatives "leads to a joint result that is unpremeditated by any of those who bring it about" (p. 281). Indeed, its "emergent character dissuades planning and control" and "any attempt to organize this self-coordination under a central authority would eliminate independent initiatives and thus reduce their joint effectiveness and paralyze their cooperation" (p. 281).

Dahlstrom's application of spontaneous order is focused on and true to Polanyi's own definition. Vincent Ostrom, Charles M. Tiebout, and Robert Warren, on the other hand, described a variation of spontaneous order without reference to Polanyi at all. They introduced the term "polycentric" to connote "many centers of decision-making which are formally independent of each other" and contrasted "the ideal model" of a political system "with a single dominant center for making decisions" with a situation where "each unit of local government acts independently without regard for other public interests" (1961, p. 831). Ostrom and his wife, Elinor Ostrom, developed the idea of polycentricity extensively over the next several decades, but the latter, together with Michael D. McGinnis pointed out that polycentricity, as used by Polanyi, differed from that proposed by Ostrom, Tiebout, and Warren. Polanyi's notion of polycentricity, in their view, connoted "an automatic dynamic process that does not recognize the pivotal role of public entrepreneurs in making connections between units of a governance system or the critical importance of explicit coordination among distinct actors within that system" (McGinnis and Ostrom, 2011, p. 18). Polanyi used polycentricity to support his argument for a process of dynamic order while Ostrom, Tiebout, and Warren focused their attention on the centers of decision-making that they saw as fostering creative and entrepreneurial action. Importantly, their elaboration of polycentricity in metropolitan areas "presaged, by several decades, the recent explosion of interest in networked governance, in which public authorities contract with private firms and other public actors to produce specific public goods" (McGinnis and Ostrom, p. 18).

The Ostrom-based conception of polycentricity was widely used to describe the general complexity or messiness of metropolitan government in which authority and

control of governance, evident in decision making, are intentionally or spontaneously distributed among many independent centers. Such decentralization is the result of factors such as "entrepreneurial leadership; contracts for service delivery; deregulation;" and so on, factors that effectively synthesize many of the "components of New Public Management and related concepts" (McGinnis and Ostrom, 2011, p. 18). The Ostrom, Tiebout, and Warren understanding of polycentricity also influenced "the later development of a more general appreciation of the critical importance of networks in public administration" (McGinnis and Ostrom, 2011, p. 18). Indeed, Laurence J. O'Toole, Jr.'s definition of networks as "structures of interdependence involving multiple organizations or parts thereof, where one unit is not merely the formal subordinate of the others in some larger hierarchical arrangement" (2015, p. 361; 1997, p. 45) is strikingly similar to the Ostrom, Tiebout, and Warren definition. "The notion of network" wrote O'Toole, "excludes mere formal hierarchies and perfect markets, but it includes a very wide range of structures in between" (1997, p. 45). However, it is interesting to note that networking, as O'Toole described it, is arguably different from true spontaneous order, as envisaged by Polanyi. O' Toole seemed to recognize this difference when he observed that "network forms ... are not necessarily voluntary - that is, self-organizing - nor even necessarily cooperative" (O'Toole, 2015, p. 362). Nevertheless, consistent with Polanyi's ideas, network theorists question Simon's assumption "that complex tasks can usually be divided up into small, relatively independent components that can be treated separately while still contributing to the overall objective" (O'Toole, 1997, p. 46). Like Polanyi's, their work brings into question Simon's argument that organizational hierarchy somehow "can 'push back' the decision-making weaknesses experienced by individuals" (p. 45).

Public Administration as Dynamically Ordered Tradition

In this chapter, I have brought attention to public administration scholars who have embraced the concept of a self-modifying tradition and others who have consciously or unconsciously recognized the importance of spontaneous order. I turn now to two examples that seem to reflect a more developed understanding of a dynamically ordered system that is also anchored in tradition.

Michael Spicer's most extensive use of Polanyi's conception of spontaneous order is found in his argument for civil association. He has suggested that the understanding of the state "which undergirds much of public administration, is one of purposive association" (Spicer, 1997, p. 90), an understanding "in which individuals see themselves as bound together for the pursuit of a particular coherent set of common substantive ends" (p. 91). Within such an association, a formal set of specifically instrumental rules may develop, rules that "serve to elicit and to facilitate individual actions in pursuit of the common purposes of the state" (Spicer, 2001, p. 15). A purposive association or state, therefore, "would seem to resemble closely what Michael Polanyi has termed a 'corporate' or a 'planned' social order" (Spicer, p. 15). Such an association "is characteristically one that has been consciously designed, or at least consciously adapted, by some individual or group of individuals to attain a particular set of substantive purposes deemed to be desirable" (p. 15).

Simon's planned order, implemented through a hierarchical structure, is a clear example of purposive association. Indeed, Spicer has argued that the description of planned order that Simon espoused is characterized by "a distinctly teleocratic tone" (2001, p. 59). Such a purposive or teleocratic order depends on "a powerful

administrative apparatus" (p. 70), and such an apparatus can only be controlled by political power that is "sufficiently centralized" (p. 70). In addition, a purposive state requires "sufficient knowledge about the effects of its policies on the actions of its subjects so that it can identify what those policies should be" (Spicer, p. 71). However, "a vision of purposive association does not really describe the type of political association in which we live" (p. 71). On the contrary, argued Spicer, "for most of our history, our political practice has reflected a vision of the state as something more akin to a 'civil association'" (p. 71).

In contrast to a purposive association, a civil association "is a form of political association in which men and women see themselves as essentially free to seek their own interests and values but recognize certain rules of conduct that serve to limit their individual spheres of action" (Spicer, 1997, p. 96). By limiting individual spheres of action, these rules of conduct also "limit conflict between individuals and groups" (Spicer, 2001, p. 21). In a purposive association, "the activities of individuals in the state must be organized around the pursuit of a coherent set of substantive ends" (Spicer, p. 22), but in a civil association, "individual or group actions are seen as directed toward achieving their own particular substantive ends" (p. 22). If a purposive association may be understood as a "purpose-based order," a civil association "is more accurately defined as a rule-based order" (Spicer, p. 22). More directly, a civil association "can be seen here as akin to what Michael Polanyi, drawing on analogies from the physical sciences, has termed a system of 'spontaneous order'" (Spicer, p. 72).

In this brief characterization of civil association, a mutual adjustment of independent initiatives, so central to spontaneous order, is clearly evident. Moreover,

"much of the information or knowledge that men and women use in deciding on what actions they will undertake is inevitably dispersed" (Spicer, 2001, p. 84). As a result, a spontaneous ordering of individual effort also results in (to use Polanyi's terminology) a mutual or "General" rather than centralized or "Specific" authority. Within our political system, wrote Spicer, "[i]nstead of there being a single locus of power, power is fragmented. It is dispersed throughout our constitutional system" (p. 80). Polanyi wrote similarly about general and specific authority: "the former leaves the decisions for interpreting traditional rules in the hands of numerous independent individuals while the latter centralizes such decisions at headquarters" (Polanyi, 1946/1964, p. 59).

Importantly, general or mutual authority lays down "general presuppositions" while specific or centralized authority imposes "*conclusions*" (Polanyi, 1946/1964, p. 57). Spicer emphasized that a civil association is, indeed, dependent on rules, but these are not, to quote Michael Oakeshott, "instrumental rules whose desirability lies in their propensity to promote, or at least not to hinder, the pursuit of the purpose" (1991, p. 451). Instead, they are "noninstrumental rules of conduct" (Spicer, 2001, p. 71), the purpose of which "is not to secure the achievement of any particular set of substantive purposes" (p. 71). The dynamic freedom of individuals, mutually adjusting their effort to that of their neighbors, results in a distributed authority, a fragmented power based on traditional rules and general presuppositions rather than on instrumental rules that impose conclusions.

Within a dynamically ordered civil association, then, the role of government "becomes largely that of elucidating, protecting, and enforcing rules of conduct" (Spicer, 2001, p. 72). In Polanyian terms, it acts as the community which becomes, or perhaps the hierarchy of "influentials" who become, "entrusted by the whole of society with the

cultivation of certain ideals, in which the rest of the people take part at various stages of interest" (Polanyi, 1941, p. 442). "We have here" wrote Polanyi, "a system of indirect representation, at each stage of which people less experienced and interested in a particular field confide in others, more intimately concerned with it" (p. 442). Indeed, the scientists who make up the dynamic order that was Polanyi's central example, "are speaking with one voice because they are informed by the same tradition," a tradition that "represents only a temporary and imperfect embodiment of the traditional standards" (Polanyi, 1946/1964, pp. 52, 53). Like science, a spontaneously ordered civil association is anchored in general rules of conduct, customary standards, and daily practices that together make up the tradition that forms and defines the association.

Furthermore, because the general rules of a tradition are "incapable of precise formulation," they "can be transmitted only by teaching the practice which embodies them" (Polanyi, 1946/1964, p. 58). In other words, traditional standards and presuppositions can only be known tacitly, through example and skillful application. Spicer suggested that it was from "historical practices" that "the idea of the state as a civil association began to take on a much clearer form" (Spicer, 2001, p. 77). Indeed, the concept of civil association emerges from "an ordinary or practical type of knowledge often based on experience and practice rather than on scientific analysis" (Spicer, p. 84). Unlike the strict instrumental rules so important to the enforcing of a centrally defined and implemented purpose through planned order, the standards and presuppositions of a tradition are never fixed statically in place, but are revealed only in their particular expression through the practice of those who submit themselves to that tradition. As a result, "[t]he social scientist who seeks to make predictions about the effects of public

policies on the interrelated actions of individuals in particular situations must do so in the absence of much, if not most, of the knowledge that those individuals themselves use in deciding their actions in those situations" (p. 85). In Polanyian terms, the conclusions of social scientists who depend on explicit knowledge and a positivist method that ignores the tacit knowledge of real people in real situations, will be limited at best.

Aligning himself with Rohr and other constitutionalists, Spicer suggested that the Constitution stands at the center of the tradition guiding American public administration:

The founders' Constitution, with its various devices for checking power, can be seen here, therefore, as providing agreed-on rules of association for individuals and groups as they seek to achieve their own interests or particularistic visions of the public good within the political process. (Spicer, 2001, p. 79)

The general "rules of association" set out in the Constitution "place boundaries on the conduct of individuals and groups within the process of policy formulation and implementation" (Spicer, p. 79). They limit the power of any particular individual or group, thereby reinforcing the general or mutual nature of authority. Indeed, because the Constitution "reflects so strongly a vision of civil association," it becomes difficult for anyone "to use public administration as an instrument by which they might consistently carry out a coherent set of substantive state ends" (Spicer, p. 83). The Constitution can be seen as providing "agreed-on rules of association" that describe a civil association that is "essentially the same one that has been handed down to us through the centuries as part of our own Anglo-American tradition of political practice" (Spicer, 2001, p. 77). The Constitution, itself, emerged from a tradition and is evidence of the dynamic nature of traditions, dependent as they are on the interpretation of those who subscribe to and commit themselves to its premises.

Spicer did not claim that civil association should replace all vestiges of purposive association. On the contrary, the vision of a purposive association has been "[o]ne of the most powerful visions of the state to shape Western political thought, discourse, and action since the Middle Ages" (Spicer, 2001, p. 14). To early public administration writers, "[s]uch a vision was especially appealing" and "it has continued to exert a powerful influence on the field of public administration" (Spicer, p. 125). However, both "a particular set of political and constitutional traditions," that we have inherited, and "the severe fragmentation of political culture" (Spicer, p. 89), that we are experiencing, make "the pursuit of such a teleocratic vision of governance and administration ... impractical" (p. 126), for they place constraints on our ability to realize an efficient planned order and an effective purposive state, and are also potentially dangerous for citizens who happen not to share the ends pursued by government. Both purposive and civil associations, then, have a place in the thought of public administration. As Polanyi made clear, "[t]he two alternative and opposite methods of achieving order - by limiting the freedom of the particles, or by giving full scope to their interactions - have their respective proper occasions" (1951/1998, p. 192). However, public administration *in practice* is largely characterized by civil association, by spontaneous order anchored in tradition.

It was the contrast between a *theoretical* "rational-comprehensive" model or method of administrative action and its *practice* that prompted Charles E. Lindblom to describe an alternative model that also largely reflects Polanyi's conception of spontaneous or dynamic order. Lindblom's "science of muddling through" (1959) or process of "disjointed incrementalism" (1979), with its dependence on "successive limited comparison" and the response of many individuals to marginal change, is an

example of administrative structure and practice anchored in the spontaneous ordering of independent initiatives through mutual adjustment. He argued that a "rational-comprehensive" model or method of administrative action is a heroic model that, for complex problems, "is of course impossible" because it "assumes intellectual capacities and sources of information that men simply do not possess" (Lindblom, 1959, p. 80). In practice, the public administrator disregards "most other social values as beyond his present interest," outlines and compares "those few policy alternatives that occurred to him" while relying heavily on past experience, and weighs values and "instruments for reaching values" together to achieve the best result given the current situation (Lindblom, pp. 79-80). Because practitioners of this approach "expect to achieve their goals only partially, they would expect to repeat endlessly the sequence just described" (p. 80).

In this brief overview, one may see clear evidence of traditional foundations - in the practitioner's reliance on past experience - and of spontaneous order - in the need to approach problems incrementally (what Polanyi referred to as successive approximation) through the action of individual practitioners. The process of "successive limited comparison" was anticipated by Simon (1945/1957) as "satisficing" and as "bounded rationality" (March and Simon, 1958), but he saw them more as an anomaly or a concession to fallibility. In contrast, by emphasizing that successive limited comparison is necessary because of the impossibility of achieving useful results through a rational-comprehensive approach, Lindblom argued that a model of decision making characterized by "*successive limited comparisons*" (1959, p. 81) "is not a failure of method for which administrators ought to apologize" (p. 87) but an alternative worth clarifying and formalizing.

Because the "science of muddling through" depends on a process of successive approximation that is never certain with regard to its outcomes, it emphasizes the indeterminate nature of reality and the very real possibility of "unanticipated consequences" (Lindblom, 1959, p. 86). When coupled with the limited nature of incremental decisions, what materializes is decision making that is distributed among many centers, in which "every important interest or value has its watchdog" (Lindblom, p. 85). As Polanyi made clear, each participant in a dynamic order addresses the needs of his or her small "neighborhood" and thereby, together with each other participant, addresses the needs of the whole. Because the fixed, formal methods of a rational comprehensive or "synoptic" method are unachievable, the administrator is forced to rely on a tradition of accumulated past experience, rather than on formal organization, experience that is dynamically changing in response to each use. Because the selection of "value goals and empirical analysis" (Lindblom, 1959, p. 81) are closely intertwined in a traditional setting revealed in practice, the acceptance of responsibility takes precedence over response to external stimuli established by a comprehensive plan. Each actor is responsible to unique stimuli based on individual characteristics and must employ a process of tacit knowing to account for relevant factors. Because each administrator is responsible for his or her own domain, "the only practicable test of a policy's correctness" (Lindblom, p. 84), the only real measure of organizational purpose, must emerge from agreement among administrators. Purpose, therefore, appears from within the organization rather than being dictated from without. Ultimately, decision by disjointed incrementalism is a bottom-up process that emerges from the mutual adjustment of independent initiatives rather than being enforced from the top down by a central plan.

As suggested in the previous paragraph, Lindblom's description of disjointed incrementalism and his advocacy of "strategies for skillful incompleteness" (Lindblom, 1979, p. 524) display the importance of tacit knowing. That "means and ends are not distinct" (Lindblom, 1959, p. 81) acknowledges that the tacit integration of means takes place whenever we decide how to deal with an issue or problem we face. In Lindblom's words, "the only practicable way to disclose one's relevant ... values even to oneself is to describe the policy one chooses to achieve them" (p. 82). In other words, because "evaluation and empirical analysis are intertwined," values and policies are chosen "at one and the same time" (p. 82) in a Gestalt-like process of integration. That incrementalism relies on tacit knowing is also supported by its dependence on traditional processes that are self-modifying and known tacitly through practice. The spontaneous ordering of multiple centers in a polycentric entity results in the mutual adjustment of individual choice and action through a process of tacit knowing.

In Lindblom's description of a "science of muddling through" one finds a clear example of dynamic order anchored in tradition, community, and the logic of tacit knowing. Because there are so many involved in administrative decision making, no individual knows enough to conceive of, much less implement a truly comprehensive plan, but within a society where "individuals are free to combine and pursue almost any possible common interest they might have" (Lindblom, 1959, p. 85), a dynamically ordered entity "often can assure a more comprehensive regard for the values of the whole society than any attempt at intellectual comprehension" (p. 85). Like other examples of dynamic order in public administration, Lindblom's description of incrementalism closely parallels Polanyi's descriptions of a dynamically ordered Common Law or science with

their reliance on the precedent evident in the legal or scientific tradition. It is not surprising, therefore, that reasoning by example, as described by Spicer in 1995 and by Spicer and Terry in 1996 may also be seen in the decision making process employed by disjointed incrementalism. As already noted the "science of muddling through" depends heavily on historical precedent for decision making and its focus on marginal change gives evidence to the reasoning by example so integral to a traditional domain.

The parallels between incrementalism and civil association are more complex, but the freedom of individual administrators to make incremental changes is plainly related to the freedom of individuals to make choices within a civil association. That both are clear examples of dynamic order makes that relationship evident. In Spicer's writing about civil association, one finds emphasis on the heuristic power of civil association, on the rules necessary to check its potential abuse, and on its reliance on tradition. In Lindblom's writing, on the other hand, there is greater emphasis on the orderliness of disjointed incrementalism as evidence of its practical value, on its origin in and support for personal choice, and on its self-modifying capacity. There is a difference in emphasis, but both Spicer and Lindblom recognized that the mutual adjustment of individual initiatives evident in dynamic order takes place in time (through incremental mutual adjustment to precedents that make up the tradition upon which it relies) as well as in space (through mutual adjustment to other individuals or groups). In its reliance on tradition as supported by community, spontaneous order is dynamic, both temporally and spatially.

Public Liberty and Public Administration

While Lindblom's clarification and formalization of a model of successive limited

comparisons showed that *the practice* of public administration discloses a proclivity for spontaneous over planned order, Spicer's elucidation of civil association and its application to the field of public administration also revealed *the traditional roots* of such a propensity. Importantly, while neither addressed tacit knowing explicitly, both emphasized the ongoing practice of public administration as the primary source of a normative, as well as a positive, understanding of public administration. However, in spontaneous order, the dynamic skill of individual initiative is seen in relief against a background of tradition enforced by a community. Both a civil association and the successive limited comparison method of decision making reveal a tension between a traditional structure of values, beliefs, and setting, and the dynamic possibilities that seek better solutions to administrative problems. The *tradition* of public administration described by John Rohr and Michael Spicer acts as a background which defines the conditions from which the *practice* of public administration emerges, thereby constraining and re-imagining this tradition in the process of engaging specific administrative problems and issues. Said differently, the *practice* of public administration reveals a *tradition* of public administration that demonstrates a strong preference for civil association, incrementalism, and therefore spontaneous order, even though "American public administration as a field reflects, in significant part, a vision of a purposive state" (Spicer, 2001, p. 31), and even though "the literatures of decision-making, policy formulation, planning, and public administration formalize the [rational-comprehensive] approach rather than the [successive limited comparisons approach]" (Lindblom, 1959, p. 80). In a dynamically ordered public administration, the action of each individual is as full of meaning as is the practice or structure of society as a whole.

This tension between the practice of public administration and the tradition that gives it context is clearly reflected in Polanyi's concept of public liberty. Within an institution or system exercising public liberty, reliance on or fidelity to a tradition reveals itself as a calling to responsibility, a fiduciary commitment which provides the conditions within which liberty may legitimately emerge through practice. Indeed, it is in the *traditional practice* of freedom that liberty resides, not in its promotion or declaration. As Polanyi emphasized, systems of dynamic order fostering public liberty find protection “not in the explicit content of their constitutional rules, but in the tacit practice of interpreting these rules” (1955/1997, p. 203). Writing of science, he pointed out that it “can exist and continue to exist only because its premisses can be embodied in a tradition which can be held in common by a community” (1946/1964, p. 56). Yet, it “is constantly revolutionized and perfected by its pioneers, while remaining firmly rooted in its tradition” (Polanyi, p. 56). Because public liberty exists for the benefit of the community, it must be anchored in that community's tradition and must accept the premisses of that tradition as experienced in practice. However, at the same time that tradition limits and defines potential action, individual liberty strains toward a reality that may undermine the very tradition that gives it meaning.

Anchored in tradition and called to responsible action, a public liberty is therefore a moral freedom, for it provides "traditional limits on our freedoms, that is, for our values and our morals" (Polanyi and Prosch, 1975, p. 183). More specifically, in the exercise of public liberty, self-centeredness gives way to consideration of the community as a whole, for public liberty is not private freedom, but acts freely and responsibly on behalf of a community. Indeed, as was demonstrated in Chapter III, it is the neglect of public

liberties that leads to moral inversion and totalitarianism. Within a totalitarian state, liberty "can mean only a private freedom to act unsocially, or at least irresponsibly" (Polanyi, 1941, p. 439); because totalitarianism "must reject the rival claims of individuals to act independently for the benefit of society" (p. 438), it can conceive of liberty only as an absolute and a-moral freedom that is unconstrained by responsibility. Even in a liberal society, if unschooled in the unspecifiable art of public liberty, a commitment to political freedom will fail. Thus, the results were disastrous when "the doctrines of political freedom spread from England in the eighteenth century to France and thence throughout the world, while the unspecifiable art of exercising public liberty, being communicable only by tradition, was not transmitted with it" (Polanyi, 1958/1962, p. 54). An a-moral liberty is a dangerous freedom, for, as we have seen, it leads to moral inversion.

Within a moral context, however, meaning emerges from freedom that is constrained, from dynamic order and from public liberty, from possibilities straining against and restricted by boundaries, from heuristic power restrained by orderliness. Objectivism, in rejecting contingency and freedom, controls and restricts itself into meaninglessness while subjectivism imagines possibility without restraint and finds that a world of absolute freedom is without substance or purpose. Public liberty, on the other hand, embraces freedom, but grants it only in the context of a tradition and a commitment to the community that embraces and enforces it. It is not a formal organization, defined by external rules and specific purpose, but is a tradition that has been embraced and internalized, an internally defined order that is enforced through practice by its elements, a moral order that calls its members to responsible action.

Within public administration, the concept which most closely parallels public liberty is the idea of "administrative conservatorship" as described by Larry D. Terry. Noting that at the end of the 20th Century, "the topic of *bureaucratic leadership* is conspicuously absent" from conversations about "more effective leadership" in the United States (1995, p. 2), Terry suggested that a combination of factors was at play. In particular, he pointed to "Americans' deeply rooted fear of bureaucracy, the myopia created by Progressive Era reforms and scientific management, and the unintended consequences of scholarly attempts to reconcile bureaucracy with democracy" (p. 3). Fear of governmental power led antibureaucratic forces to devise strategies such as "politicization of bureaucracy; constant reorganization; extensive use of deregulation and budget, program and personnel cuts ... the exclusion of career executives from policy discussions and formal processes; and expansion of the size of both executive and legislative staffs" (Terry, p. 5). The activities of Progressive reformers and scientific management led to advocacy of a "business enterprise model" of governance, placing a heavy emphasis on "the application of *scientific methods* as a means of achieving commercial efficiency;" promoting "the use of *experts* who possessed skills, knowledge, and technical training in the application of scientific methods;" and relying "on the concept of a *strong executive* who exerted control over the enterprise by centralizing the decision-making process" (Terry, pp. 8-9). All of these trends led to a disregard for and an undermining of leadership in bureaucracy.

At the same time, scholarly attempts "to reconcile bureaucracy with democracy" also "deflected attention from the importance of bureaucratic leadership" (Terry, 1995, p. 11). In attempts to resolve the tension between a focus on efficiency that is prevalent in

bureaucracy and the need for "responsiveness to the public will" that is central to democracy, one response was to separate the two in a "hierarchy" that clearly defines the "responsibilities of bureaucracy ... within the boundaries of the democratic system" (p. 11), thereby turning to a focus on "controlling bureaucracy" to the detriment of bureaucratic leadership. A second response was to cast administrative officials "in a passive role of referees in an arena in which interest group competition and bargaining occurs" and the administrator becomes "a blank slate" on which various interests are written (Terry, p. 15). In either case, responsible, independent initiative, evident in true leadership, is missing.

In contrast to the weak role of bureaucratic leadership encouraged by fear, myopia, and a misunderstanding of the relationship of bureaucracy to democracy, Terry suggested several conceptual pieces that support a "theory of bureaucratic leadership that provides career executives with a legitimate role in the system of democratic governance" (Terry, 1995, p. 16). Based on the constitutional work of Rohr, together with his own work in partnership with Spicer, as well as the work of Brian J. Cook (1992), Terry concluded that public bureaucracy is *legitimate* "in the American political system" (p. 23). More specifically, he argued that (1) public bureaucracies are compatible with constitutional principles; (2) public administrators have "a moral obligation" to preserve and sustain constitutional principles; (3) public administrators occupy "a subordinate yet autonomous role" that includes the checking of political power; (4) public bureaucracies "serve as a representative institution that participates in and ensures reasoned deliberations on public policy issues"; (5) the exercise of combined executive, legislative, and judicial powers by public administrators "in a subordinate capacity is consistent with

the framers' relaxed interpretation of the separation-of-powers doctrine"; and (6) public bureaucracies help in forming "the character of citizens by contributing to the ongoing process of making the American regime what it is" (Terry, pp. 23, 24). Consequently, Terry concluded, "the *primary function of bureaucratic leaders is to protect and maintain administrative institutions in a manner that promotes or is consistent with constitutional processes, values, and beliefs*" (p. 24).

Terry characterized this leadership role as "administrative conservatorship" (1995, p. 25; 1990, p. 396). Such leadership consists in "the willingness of *administrative elites*, out of traditional loyalty and moral principles, to preserve authority and distribution of power with regard to the propriety of an *institution's* existence, its functional niche, and its collective institutional goals" (Terry, 1995, p. 26). Drawing largely on the work of Philip Selznick, Terry distinguished formal organization from an institution which is "a creation of social needs and aspirations," that is "an adaptive, responsive, cooperative system that embodies cultural values," and that has the "cultural values and moral commitments of a society" implanted within it (Terry, p. 26). In Polanyian terminology, institutions may be recognized as forms of dynamic order that make possible the exercise of public liberty. An institution is granted a certain freedom by society to govern itself independently; in return, it agrees to act responsibly, "to act independently for the benefit of society" (Polanyi, 1941, p. 438). An institution, then, as opposed to a formal organization, may be seen as "a responsive, adaptive organism" (Selznick, 1957, p. 5), an entity or a process that is infused with value "beyond the technical requirements of the task at hand" (p. 17). Formal organizations "are technical instruments, designed as means to definite goals" (p. 21) wherein management becomes a

primary function. Institutions, on the other hand, are "products of interaction and adaptation" (p. 22) and demand a more active, dynamic leadership.

According to Terry, public administrators, as administrative conservators, are responsible for "preservation of *institutional integrity*" (1995, p. 26), for identifying and maintaining an institution's "distinctive competence" (p. 27). Moreover, Terry found that "elites are essential to the perpetuation and preservation of society because they are the bearers and conservators of cultural values" (p. 28), much as Polanyi recognized the critical nature of "influentials" in a dynamic order like science. Polanyi, of course, insisted on the responsibility of all members of a traditional community while Terry focused on the importance of leaders, but one may readily recognize multiple parallels between Terry's description of administrative conservatorship and Polanyi's description of the role of individuals within a dynamic order that exercises public liberty and relies on tradition as enforced by a community. Administrative conservatorship is a moral responsibility that is grounded in and "consistent with our constitutional tradition" (Terry, 1990, p. 396). It is reliant on the independent initiative of a cadre of responsible leaders who can only be formed as leaders through a process of apprenticeship, thereby submitting to a tradition while humbly accepting the responsibility for its reformation through practice.

As noted in Chapter III, Polanyi identified an art of free discussion that is fair and tolerant, a tradition of civic liberties that are evident in public opinion, and the institutions of democracy that include legislatures, courts, churches, the press and other forms of communication, local government, and a variety of independent organizations, as key features of a free society that is anchored in moral responsibility, dynamically ordered,

and dependent on a self-modifying tradition. What Chapter V has shown is that, in the United States, public administration is an integral element of such a society, dependent on a constitutional tradition, facilitated by spontaneous order, and responsible to protect and maintain that tradition, including the full range of institutions that make it possible. Both in practice and in scholarship, the traditional framework upon which public administration rests is a moral association, constrained and directed *by* tradition *to* freedom *for* responsible relationship with an indeterminate reality.

CHAPTER VI

A SOCIETY OF PERSONS CALLED TO RESPONSIBILITY

[E]ven the most distinguished minds can produce nothing truly relevant to human affairs if they restrict themselves by the kind of detachment which is currently supposed to be the mark of scientific integrity. ... I would suggest that we might begin to remedy this weakness by prohibiting the use of the term scientific in praise of a study of human society, for a trial period of, say, 10 years. And in the meantime we should try training ourselves to study human affairs by intense participation in human problems instead of by detachment from them. (Polanyi, 1957, p. 482)

It is the image of humanity immersed in potential thought that I find revealing for the problems of our day. It rids us of the absurdity of absolute self-determination, yet offers each of us the chance of creative originality, within the fragmentary area which circumscribes our calling. It provides us with the metaphysical grounds and the organizing principle of a Society of Explorers. (Polanyi, 1966/2009, p. 91)

In the previous two chapters, I have attempted to demonstrate how Michael Polanyi's philosophy, his epistemology and ontology, his understanding of how we know and what we know, is revealed in, and may be applied to, the study and practice of public administration. In Chapter IV, I focused my attention first on his assertion that all knowledge is tacit or rooted in tacit knowing (rather than being explicitly objective) and

therefore dependent on the person (rather than on a detached realm of impersonal facts). Then I examined his associated claim that reality is revealed in indeterminate possibilities rather than in determinate certainty. Like the first, this second assertion has wide ramifications, not the least of which is to give an ontological expression to the logic of tacit knowing and personal knowledge. A deterministic world leaves human beings chained to immutable rules and isolated from an unalterable reality in a world that has no meaning. Recognition of the unspecifiable future manifestations that characterize reality forces public administration scholars and practitioners to approach their disciplines with an open attitude that is sensitive to the contingent nature of administrative responsibilities, ever mindful that the normative can never be absolute. This suggests that an alternative definition of science may be appropriate.

To facilitate such a definition, I suggested three widely accepted principles of public administration that are undermined by acceptance of the centrality of the tacit and the personal. If we know by integrating subsidiary particulars to a focal whole, it becomes detrimental and even impossible to separate facts from values; any attempt to theoretically model public administration must take into account the tacit nature of our knowing process and the personal nature of our knowledge; and that we can know more than we can tell suggests that alternative forms of knowledge, models, and methods must be embraced by public administrators in their scholarship and in their practice. Importantly, while an understanding of tacit knowing undermines certain widely accepted assumptions and practices, it also suggests opportunities for a more personal approach to administration that recognizes that our understanding of administration emerges from a host of subsidiary particulars that reveal themselves in ways that are often unforeseeable

and even unspecifiable.

In Chapter V, I turned to the application of Polanyi's sociological arguments to public administration. I showed that the traditional foundation of public administration advocated by Rohr, Spicer, and other constitutionalists, is congruent with and supported by Polanyi's conception of the self-modifying tradition so necessary to a free society's long term survival. Such a tradition is not simply a set of fixed prescriptions handed down from the past, but is a dynamic process of self-definition by which its members submit to its authority and, through practice under that authority, subvert and transform it. A free society is also a dynamic one, ordered spontaneously by the mutual adjustment of independent initiatives. Hints of such an order are evident in networking literature and a more direct application may be seen in Dahlstrom's promotion of intellectual networks dependent on the mutual adjustment of independent initiatives. More explicitly, Spicer's defense of civil association as a central element of the American constitutional tradition and therefore of public administration in the United States calls both scholars and practitioners to protect the traditional framework that enables dynamic order in administration and in society. Likewise, Lindblom's description of a "science of muddling through" describes a spontaneously ordered tradition that highlights the dynamic nature of administrative practice and both its dependence on and support for tacit knowing.

At the end of Chapter V, I emphasized the moral roots of a dynamically ordered free society, which relies on a self-modifying tradition, by examining evidence of public liberty in the public administration literature. The link that I found was in the work of Larry Terry, and in his definition of administrative conservatism. Public

administrators are called to conserve a constitutional tradition of public administration - dynamically but also hierarchically - much as Polanyi described the practice of science. While subject to that moral responsibility, they are free to act independently on behalf of society as a whole, and the tension between freedom, spontaneously striving for meaning, and tradition, that constrains it, opens the door to creativity. What becomes evident is that the possibilities for applying Polanyi's sociological and philosophical insights to public administration are far greater than could be examined in this dissertation. Indeed, C. P. Goodman has argued that "Polanyi anticipated or directly influenced many of the innovations that have most excited philosophers in the second half of the Twentieth Century" (Goodman, 2008, p. 73), for "the theory of tacit knowing effects a shift in the way in which we understand the world, one that undermines some of the assumptions that have generated the modern world" (Goodman, p. 75). Admission that all knowledge is tacit or dependent on tacit knowing forces us to responsibly accept our personal involvement in the knowing process, even while conceding the indeterminacy of our knowledge and of reality itself. If our knowledge is both indefinite and personal, we may never claim an "absolute understanding" (p. 77) but are forced to humbly accept our humanity and, therefore, our dependence on a community of persons who join us in a convivial journey of exploration and discovery.

A Dynamic Person and Harmonious Particularity

"Personal knowledge is an intellectual commitment," wrote Polanyi, "and as such inherently hazardous" (1958/1962, p. viii). Therefore, "into every act of knowing there enters a passionate contribution of the person knowing what is being known" (p. viii). Importantly, "this [personal] coefficient is no mere imperfection but a vital component"

(p. viii) of this knowledge. Fully aware that her knowledge commitment may be mistaken, the person acts responsibly in reaction to a calling "to fulfil the universal obligations" (p. 323) which s/he has embraced. "Many writers have observed," wrote Polanyi and Prosch, "that, to some degree, we shape all knowledge by the way we know it" (1975, p. 194). "Stated in this bald way," they continued, "knowledge would appear to be subject to the whims of the observer" (p. 194). However, the knower is always controlled by his calling: "His acts are personal judgments exercised responsibly with a view to a reality with which he is seeking to establish contact" (p. 194).

Any conclusion, whether given as a surmise or claimed as a certainty, represents a commitment of the person who arrives at it. Whether or not it *is* the truth can be hazarded only by another, equally responsible commitment. There is no explicit or automatic way to avoid this necessity. (Polanyi and Prosch, p. 194)

A *person* claiming to know truth is not free in an absolute sense. She can discover or create or even act only within the context of "impersonal requirements" and in response to a calling to responsibility. In this sense, she is not simply an individual; a person exists in relationship, in community subject to tradition.

Thomas Pfau (2017) has attempted to describe this distinction between a person as individual and as relational entity by drawing attention to "the Trinitarian framework" embraced by the Christian church. The Trinity acts as "the archetype of the ideal, organic community wherein the identity of the persons comprising that unity is inseparable from their relations, even as it is neither transferentially projected upon nor mimetically derived from the other persons in that community" (Pfau, 2017, p. 14). In other words, Pfau was arguing that "the human person is the expression or manifestation of an all-encompassing order, rather than a subject capable of unilaterally fashioning an account of

its inner constitution and its relatedness to other human beings" (p. 14). In comparison, for the individual (or "self"), "no apparent normative dimension intrudes on the various rights claims and subjective preferences" which modern political philosophy "takes to be the very essence of human flourishing" (Pfau, pp. 14-15). The result is that "otherwise isolated and hermetic individuals" are furnished with "a strictly elective and opportunistic template of socialization" (p. 15). Compare this picture of a "society of individuals" to the "communion of human persons" (Pfau, p. 15) evident in Polanyi's writings. For Polanyi, a person can never exist in isolation from the community that gives him or her meaning. Nor can s/he be isolated from the tradition which calls him or her to act, to be, or to know. A tradition supported by a community, as Polanyi described, may be recognized in the "all-encompassing order" of which, wrote Pfau, "the human person is the expression or manifestation" (p. 14). Consequently, the "mystery of human personhood" expresses "an unfathomable reality in which all human beings or individuals already find themselves, *from* which their discursive and social practices necessarily proceed and *to* which, ideally, their reasoning ought to return them" (Pfau, p. 15).

Murray Jardine, working from the perspective of political philosophy, has also found a Trinitarian framework helpful to understand the deep implications of Polanyi's philosophy, anchored as it is in the concept of personal knowledge. Drawing on the work of Colin Gunton, Jardine recently (2013) argued that a Christian failure to truly embrace the plurality of the Trinity resulted in an emphasis on the "unity" of God and nature and set the stage for modernism's emphasis on instrumental human agency. To clarify this point, Gunton compared the vision of "the world in terms of unity" evident in the philosophy of Parmenides to the understanding of "the world in terms of plurality"

evident in the philosophy of Heraclitus (Jardine, 2013, p. 183). In the former, "the many are simply functions of the one" while in the latter, "the many are prior to the one" (p. 183). Importantly, Gunton was not arguing that the Heraclitian view is of "reality as pluralistic and therefore conflictual," but that "plurality can be harmonious" (p. 183), with the Trinitarian framework serving as a model. In such a framework, particularity is not subsumed by unity but is celebrated through relationship. "Politically, then," wrote Jardine, "a truly trinitarian (sic) theology would imply that humans attempt to work out and put in practice a truly relational approach to each other and the natural world" (p. 184). Such an approach would imply that, as Polanyi argued, "true freedom is possible only within the context of community" and "would result in a new understanding of the human relation to nature, one that could mean a new, noninstrumental type of technology" (Jardine, p. 184).

In addition to drawing on the Trinitarian framework of particularity within and enhanced by community, Jardine turned to the work of William Poteat. What he found helpful was Poteat's suggestion that "Western thought since the Middle Ages has been characterized by a kind of 'parallax' created by the incoherent mixture" of Hebrew and Greek models of reality (Jardine, 2013, p. 182). The Hebrew model of reality, "drawn primarily from oral/aural experience" (p. 181), was "the speech act, as conceived by an oral culture" (p. 182). In contrast, the Greek model of reality, "drawn primarily from visual experience" (p. 181), was "the rhythms of the natural world ... as conceived by a literate culture" (p. 182). When the two models were brought together in the Middle Ages, "the full development of the implications of the Hebraic worldview was thwarted by the use of Greek philosophical concepts" (Jardine, p. 182). More specifically, while

the oral/aural logic of the Hebraic picture of reality can "allow for the coexistence of necessity and contingency" because of "its basis in the dynamism of the speech act," (p. 182), the "visual logic developed by the Greek philosophers" concluded that "a necessary relation cannot coexist with contingency" because its concern is for "eternal relations between static entities" (p. 182). In other words, "the static, impersonal concepts of Greek metaphysics could not allow Western philosophy and theology to make sense of the dynamic, personal picture of reality actually at the core of Christianity" (p. 182). The explosion of new discovery at the end of the Middle Ages made Western culture more aware of the contingency of reality, but a visual understanding of static necessity left modernity "unable to conceptualize any necessary limits on that contingency" (p. 182), limits that, Polanyi recognized, are necessary to give such contingency meaning.

The "absolute contingency of a world created by arbitrary will" (Jardine, 2013, p. 182) is an apt description of the conditions leading to moral inversion as Polanyi described it - the result of a world of instrumentally oriented individuals that leads to nihilism. In contrast, an oral/aural world of persons, formed over time by traditional relationships over which they may or may not have sway, in which knowing and doing rely on indeterminate subsidiary particulars pointing to comprehensive entities that manifest their reality in unexpected ways, is *necessarily* contingent. For Polanyi, then, it is contingency rather than arbitrary certainty that is necessary, much as it is for a "speech act, as conceived by an oral culture" (Jardine, p. 182). Note that Jardine was not arguing for the elimination of a visual, literate culture. Yet, he did recommend the examination of "a literate culture more thoroughly informed by the Hebraic model" (p. 182). Indeed, he pointed to Poteat's argument that this is the project that Polanyi had begun, albeit

unconsciously: "to convey a sense of the world being ordered temporally, as it would be understood from an oral/aural paradigm, rather than being ordered atemporally, as it would be seen from a visual standpoint" (Jardine, p. 183).

Both a Trinitarian framework and an oral/aural model of reality draw attention to the dynamics of personhood and, Jardine emphasized, "particularity - or again, particularity that is harmonious - is a central theme in Polanyi's thought" (2013, p. 185). A dynamic personhood is evident in the logic of tacit knowing where "the triad of knower, context, and known could be seen as a harmonious particularity" (p. 185). By recognizing the relational nature of the person, apparent in harmonious particularity, the "inevitable reduction of object to subject or vice versa" (p. 185) may be avoided. Polanyi's understanding of reality as layered also demonstrates a particularity that is harmonious, for higher level entities are constrained but not defined by lower level entities; higher levels "are limited by but not reducible to lower levels" (p. 185). Finally, "a (tacit) Trinitarian approach" that shows harmony through particularity is clearly evident in Polanyi's descriptions of spontaneous order, public liberty, and a free society, where individual persons and institutions work harmoniously through "the system of overlapping competences," through "the creative tension between tradition and innovation," and through "the free actions of particular individuals" (Jardine, p. 185).

The Person in Public Administration

Polanyi's emphasis on the person and on personal knowledge, so evident in the logic of tacit knowing, prompts us to see the world in a new light. A person who is more than simply a "self" or individual, who is a whole expressing harmonious particularity, is a temporal being, forever submitting to tradition while simultaneously seeking to subvert

and modify it and to thereby discover new aspects of, and bring change to, reality. "Reliance on" and "commitment to" are two sides of a fiduciary program, a system of action that reveals its subsidiary particulars - its procedures, its standards, its assumptions - in their bearing on the action or perception or idea to which they point. Yet, such a program is a whole that is not simply directional, for it includes those subsidiaries as a "from" which bear on a "to" through the action of a person. Such a program turns an individual into a person, a single-dimensioned image into an ineffable three-dimensional reality expressing unspecifiable future possibilities.

Camilla Stivers' examination of the possibility of hope "in Dark Times" (2008b), throws light on the importance of a personal understanding in studying public administration. Writing in a personal style that she identified as "meditation" (p. 238), Stivers demonstrated particularity in public administration by focusing attention on a single culture (the Crow) and within that people, the speech and dream and actions of a single person (Plenty Coups). The particularity that she used in her writing, however, was not isolated particularity, but the harmonious particularity of the individual within the people and of the culture within a broader philosophical framework. In other words, both people and individual may be considered "person" as Pfau, Jardine, and indeed, Polanyi, make plain: person in community, subject to, advocate for, and in defiance of tradition. In stating that

When the buffalo went away the hearts of my people fell to the ground,
and they could not lift them up again. After this nothing happened. (Lear,
2006, p. 2, as quoted in Stivers, p. 230)

Plenty Coups, as a person himself, was recognizing the interrelatedness of his people, physical elements such as the buffalo, cultural elements like the hunt and warfare, and the

importance of meaning. A people who are isolated from their cultural, physical, and corporate relationships, become less than person, and thereby meaningless; for the Crow, "the way of life that gave meaning to the idea of counting coup is gone" (Stivers, p. 231).

Hope, albeit a dark hope, came to the Crow in the midst of the collapse of the "pillars of their world" (Stivers, 2008b, p. 232) when they corporately acknowledged the enigmatic and indeterminate nature of the future, while holding on to their traditions in the midst of change. As Stivers put it,

Plenty Coups and the Crow people do not have faith in a better future. What they have is belief in the importance of paying attention to dreams. Therefore they are willing to risk everything to heed the advice they received from outside the limits of ordinary existence. (Stivers, p. 235)

While, in the dream of Plenty Coups, the Crow were given "a direction, but not a destination" (p. 234), such an uncertain and incomplete future could be accepted because they recognized that a person is more than an individual. In writing of Havel's description of a greengrocer's rebellion against the system, Stivers pointed out that "[t]he truth in him is a living truth, one that he creates and sustains in the process of acting" (p. 234). The same may be said of Plenty Coups and the Crow as a people: the living truth of the dream, and their future, would be created and sustained through action.

Hope is a temporal concept and is realized in the recognition that the identity of persons is linked to and dependent on - yet not derived from - their situation and tradition; it is "inseparable from their relations" (Pfau, 2017, p. 14). Or as Polanyi and Prosch put it, "we shape all knowledge by the way we know it" but "even in the shaping of his own anticipations, the knower is controlled by impersonal requirements" (1975, p. 194). The freedom of originality "lies in this perfect service" (p. 194) of responsibility to a background of tradition and situation that call us to judge and to act. Indeed, it is only

"by submitting to one's own sense of responsibility" (Polanyi, 1959a, p. 62) to a "hidden reality" that is "already there, ready to be discovered" (p. 35); it is only by making a responsible claim with universal intent in the context of "a pre-existent task" (p. 36) with "straining" clues "pointing towards the true solution" (p. 62); it is only as a person dependent on a self-modifying tradition, sensitive to the present situation, and cognizant of the possibilities of an indeterminate future; that "the correct solution" (p. 36) can be discovered, or "a valid choice can be made" (p. 62). The Crow recognized the dream of Plenty Coups, to use Polanyi's words, as an opportunity and a calling, a calling which determined their responsibilities.

Acceptance of the person as more than an isolated and independent individual leads naturally to a reliance on tradition, to trust in the mutual authority of a community of responsible individuals, to the acceptance of an indeterminate and hidden reality, and to the recognition of personal knowledge adhering to the logic of tacit knowing. That we attend subsidiarily from particulars to focus on a whole, suggests how particularity in a person may exist harmoniously even when its elements are in tension with each other. Indeed, it is the tension between the possibilities intimated in subsidiary particulars and the comprehensive whole on which they bear that gives them meaning. It is true that the particularities that make up a person, whether psychological, sociological, or theological, may indeed clash with each other. Yet, they remain a part of the whole so long as they continue to bear on it and remain meaningful as subsidiaries to the whole.

Formed by tension between possibility and constraint, a person becomes known in action, for reality revealed in indeterminate future manifestations is always forward-facing, always moving from what is to what may yet be. The calling "to live and die in

this body," that Polanyi described, involves "struggling to satisfy its desires, recording my impressions by aid of such sense organs as it is equipped with, and acting through the puny machinery of my brain, my nerves and my muscles" (Polanyi, 1958/1962, p. 323). It is a calling to action, and actions so described are integral to the formation and expression of a person. Furthermore, "[w]hile the first rise of living individuals overcame the meaninglessness of the universe by establishing in it centres of subjective interests, the rise of human thought in its turn overcame these subjective interests by its universal intent" (p. 389). Self-originating action moves a person forward; yet it remains incomplete, "for a self-centred life ending in death has little meaning" (p. 389). Human thought reaches beyond individual action by claiming universality; yet, "owing to the finitude of man's condition it too remains blatantly incomplete" (p. 389). Once again, we see the tension between possibilities - of a self-centered life or human thought with universal intent - straining against constraints - against finitude and death. In that tension, person becomes more than self or individual, for a person who is called to responsibility discovers meaning in responsible action.

The meaningful action of a responsible person may also be seen in the work of Nicholas Zingale. In his 2007 survey of environmental managers he arrived at general conclusions by surveying *persons* rather than isolated individuals. This distinction can be seen in both the types of questions asked and in the effort made "to stimulate the subjects to not only discuss what they know about their job, but to get a sense of how they know it" (Zingale, p. 60). A similar sensitivity to the person may be seen in Zingale's 2016 study with Piccorelli. In this latter study, the centrality of persons, in Pfau's or Jardine's sense, was particularly evident in the interconnectedness of the conductors, the grip

operators, the repair technicians, and the powerhouse workers. Zingale and Piccorelli specifically noted the manner in which "[t]he cable connects each employee to the others" (2016, p. 360) and thereby "sheds light on a link that has really always been there between individuals within any organization and their connectedness to society" (p. 361). Indeed, "[l]ike the cable car operators, public administrators are nested in a much larger environment, some of which they can control, most of which they cannot." (Zingale and Piccorelli, p. 362).

A person is not a passive puzzle piece to be manipulated at will, nor an instrumental cog in an organizational machine, but neither is s/he wholly independent, for "being ... is a way of understanding who we are by carefully observing our engagements with the world and letting these tell us about us" (Zingale, 2007, p. 48). The harmonious particularity so evident in a person acts as background that may be relied on or integrated to bear on a comprehensive entity that is our focus. However, such integration is never straightforward and simple. In public administration, Zingale and Piccorelli suggest, "public administrators play a significant role ... of not only creating the conditions for the intentionality arc of *know-how*, but also experiencing an understanding for *know-how* themselves" (2016, p. 364). Indeed, "developing *know-how* is highly individualistic yet shaped by the demands of a situation as influenced by society at large" (p. 364). Such knowledge is truly personal, yet it is not subjective, for it is anchored in the active formation of individual persons who are shaped by situation and tradition.

A second look at Mary Schmidt's examination of the failure of the Teton River Dam in light of this enhanced understanding of person and its relationship to situation and tradition, suggests that science, engineering, and bureaucracy, as Schmidt described

them, had become isolated in a positivist world, divorced from a self-modifying tradition and from person as harmonious particularity. In contrast, her call for acceptance of "alternative kinds of knowledge" of "specific phenomena" attained through "direct, bodily involvement" and "synthesis of data" from "several senses," "a feel for the hole," "several individuals," or "over time" (Schmidt, 1993, p. 530), was a call for an understanding of person, in Polanyi's full sense, and of institutions more dependent on a dynamic tradition as supported and enforced by community. Embrace of Schmidt's suggestions would result in more responsible action - in administrative conservatorship, to use Terry's terminology, which is rooted in the logic of tacit knowing.

A Redefined Science of Administration

As suggested in Chapter IV, the paradox of positivism is that those who defend determinism and detached, impersonal knowledge abandon such a philosophy in practice. Yet words and ideas have power, and as Polanyi made clear, the isolation of moral passions from their tacit, traditional meanings by masking them in neutral, scientific terminology is a temporary solution that leaves society unstable and predisposed to moral inversion. Consequently, Polanyi set out to define a post-critical philosophy of knowledge and reality that explains and justifies the manner in which we practice science or law or economics or art. In a post-critical world, a new definition of science is necessary, a science that is dependent on tradition and anchored in personal knowledge. As I have argued in this dissertation, the philosophical shift that Polanyi attempted was to move *away from* a critical philosophy that is anchored in the rejection or uprooting of "unproven" and "voluntary ... belief" (Polanyi, 1958/1962, p. 269) and that leaves only an absolute, empirical world of "real knowledge" discovered through a rigorous method

of absolute doubt. Such a philosophy of radical doubt leads to objectivism if reality is considered independent of the subject and therefore fixed and permanent. Alternatively, it may lead to subjectivism, if reality is understood to be radically contingent on the subject. Both extremes leave the subject without meaning for, as Polanyi recognized, meaning emerges from freedom that is constrained, from dynamic order and from public liberty, from heuristic power restrained by orderliness. Objectivism controls and restricts itself into meaninglessness while rejecting contingency and liberty. Subjectivism imagines possibility without restraint and finds that a world of absolute freedom is without substance or purpose.

Polanyi rejected both alternatives. To suggest that "science deals only with the factual aspect of things, while their value can be appreciated only by other modes of thought" is both "false in principle" and "impracticable" (1954/1974, p. 85). Indeed, such a belief "sets for science an ideal of objectivity which would discredit large and perfectly sound parts of science and ... if strictly applied, would invalidate all empirical science" (p. 85). At the same time, it also "deprives our valuations of the support which they may justifiably derive from their continuity with similar acts within science" (p. 85). Such an objectivism "seeks to relieve us from all responsibility for the holding of our beliefs. That is why it can be logically expanded to systems of thought in which the responsibility of the human person is eliminated from the life and society of man" (Polanyi, 1958/1962, p. 323). However, to reject objectivism without safe-guarding the limits it places on us, would acquire for us "a nihilistic freedom of action" (p. 324), an empty promise of liberty without meaning.

A shift from a critical philosophy, therefore, is not enough, a *shift from* requires a *shift to*. The other half of change is a destination, and it is this constructive side of Polanyi's philosophy that has attracted much of my attention⁹. Central to Polanyi's argument for a post-critical philosophy is an understanding of person as I have described in this concluding chapter, an understanding of person as harmonious particularity, as a story being written in time and space, or as a comprehensive entity dependent on but not defined by subsidiary particulars. It is "further expansion of our personal participation in the act of knowing" that may "bridge the gap between scientific method and the study and conduct of human affairs" (Polanyi, 1954/1974, p. 92). According to Polanyi, there *can* be a science of administration, for "[s]cience does not require that we study man and society in a detached manner" (p. 96). Therefore, "[w]e cast off the limitations of objectivism in order to fulfil our calling, which bids us to make up our minds about the whole range of matters with which man is properly concerned" (Polanyi, 1958/1962, p. 324).

Rather than relying on an impersonal, detached approach to science and administration, Polanyi argued that "the part played by personal knowledge in science suggests that the science of man should rely on greatly extended uses of personal knowledge" (1954/1974, p. 96). As he made clear, "even an exact science is seen to include an art, the art of establishing correspondence with the raw experience given to our senses" (p. 88). Answers to the questions that interest us, therefore, "must be given in terms of *personal knowledge*" for "Laplacean predictions would convey none of this

⁹ The importance of Polanyi's *constructive* philosophy was brought to my attention by questions posed by Phil Mullins at the 2014 annual meeting of the Polanyi Society and presented more formally in his introduction to a 2013 forum on Polanyi's political thought published in *Perspectives on Political Science*.

personal knowledge and would therefore ignore almost the entire range of existing knowledge" (Polanyi, p. 89). Indeed, a broader understanding of person and a recognition of the personal nature of our knowledge suggests that our comprehension of humanity "may consist in putting ourselves in the place of the persons we are studying and in trying to solve their problems as they see them or as we see them" (Polanyi, p. 96). "[W]e might begin" wrote Polanyi, "by prohibiting the use of the term *scientific* in praise of a study of human society, for a trial period of, say, 10 years. And in the meantime we should try training ourselves to study human affairs by intense participation in human problems instead of by detachment from them" (1957, p. 482).

Such an approach to the study of humanity "opens the door for our entry into human personality in its whole moral, religious, and artistic outlook, as the bearer of a historical consciousness, a political and legal responsibility" (Polanyi, 1954/1974, p. 96). As was explained in Chapter II, tacit knowing "operates by an expansion of our person into a subsidiary awareness of particulars that are merged into our focal awareness of a whole" (p. 94). In this sense, our capacity "for understanding another person's actions by entering into his situation and for judging his actions from his own point of view" is shown to involve "an act of uncritical assimilation of certain things which enables us critically to appreciate others" (p. 94). When we are called by our "historical situation and our acceptance of a certain role" to personally participate in a search for truth or in the acquisition of a skill or the completion of a task, we accept our situation and our role as "legitimate guides to our responsible participation in the problems presented by these situations" (p. 94). Because we are called to enter into and fulfill our calling, we respond personally, guided by purpose or passion. A science based on tacit knowing, then,

"restores us to an acceptance of our position as members of a human society" (pp. 94-95).

Indeed,

A system of ethics or a code of laws can no longer be regarded as unscientific in a derogatory sense because it predicts nothing that could be true or false, for science is seen to accredit us with the capacity for authentic appreciation of other values than the truth or falsity of a statement. As we know order from disorder, health from sickness, the ingenious from the trivial, we may distinguish with equal authority good from evil, charity from cruelty, justice from injustice. (Polanyi, p. 97)

Full acceptance of the person recognizes and embraces a calling to responsible action that is anchored in the capacity to recognize and appreciate more than simply truth or falsehood. Assumption of that responsibility is both a commitment to the future and an act of faith that trusts and relies on a comprehensive tradition that brings together heredity, culture, education, and individual goals in the harmonious particularity of personhood. In this confluence, of self-centered "inarticulate interpretations by a person" and "universalized processes" or "universal technical principles," we meet humanity's "momentous acts of responsible commitment, made by accepting his own starting-point in space and time, as the condition of his own calling" (Polanyi, 1958/1962, p. 323). "We cast off the limitations of objectivism in order to fulfil our calling," wrote Polanyi, "which bids us to make up our minds about the whole range of matters with which man is properly concerned" (p. 324). Having accepted our calling, "we claim that our participation is personal, not subjective" (p. 324). The background in which our story is set "lies beyond our responsibility," for it is beyond our control, yet it is "transformed by our sense of responsibility into part of our calling" (p. 324). Our faith in, our reliance on "the historically given," anchors us and sets the conditions for our subjective acts of personal choice. Our redemption from both objectivity and subjectivity, then, "is to lose

ourselves in the performance of an obligation which we accept, in spite of its appearing on reflection impossible of achievement" (p. 324). "We undertake the task of attaining the universal in spite of our admitted infirmity," insisted Polanyi, "because we hope to be visited by powers for which we cannot account in terms of our specifiable capabilities" (p. 324). We *can* know more than we can tell.

Thus, at the confluence of biology and philosophical self-accrediting, man stands rooted in his calling under a firmament of truth and greatness. Its teachings are the idiom of his thought: the voice by which he commands himself to satisfy his intellectual standards. Its commands harness his powers to the exercise of his responsibilities. It binds him to abiding purposes, and grants him power and freedom to defend them. And we can establish it now as a matter of logic that man has no other power than this. He 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 back and examines what he respects in a detached manner. Then law is 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 obligations he has lost his voice and his hope, and been left behind meaningless to himself. (Polanyi, 1958/1962, p. 380)

POSTSCRIPT

A POST-CRITICAL SCIENCE OF ADMINISTRATION: TOWARD A SOCIETY OF EXPLORERS

The purpose of this dissertation is simple: it seeks to answer a problem long at the heart of the American study of public administration. Specifically, it seeks to discover *how we can develop a science of administration*. The first widely recognized expression of this concern can be seen in Woodrow Wilson's 1887 "The Study of Administration" in which he wrote,

Seeing every day new things which the state ought to do, the next thing is to see clearly how it ought to do them. This is why there should be a *science of administration* which shall seek to straighten the paths of government, to make its business less unbusinesslike, to strengthen and purify its organization, and to crown its duties with dutifulness. (Wilson, 1887, p. 201, italics added)

Fifty years later, public administration in the United States came into its own in response to the Great Depression and World War II, but its orthodox approach was already beginning to be questioned. What had developed was a critique of orthodoxy that recognized a certain naiveté about a discipline that separated politics and decision from administration and execution; about a discipline that assumed that public administration could be studied in the same impersonal, objective manner as the physical sciences; about

a discipline that believed that a set of law-like "principles" of administration could be discovered and applied in a detached manner; and about a discipline that treated economy and efficiency as the central or even the sole goals of administration. However, the critique of public administration orthodoxy came from two different sets of philosophical assumptions, and the result has been a bifurcation of the field of public administration around *the possibility* of developing a science of administration.

One set of critics are those who continue to embrace a science of administration as an ideal worth pursuing. While recognizing the fallibility of human beings and the complexity of human relations, these scholars believe that objective, empirical knowledge is possible. Shortly after World War II, Herbert Simon captured this belief when he wrote that,

A valid approach to the study of administration requires that *all* the relevant diagnostic criteria be identified; that each administrative situation be analyzed in terms of the entire set of criteria; and that research be instituted to determine how weights can be assigned to the several criteria when they are, as they usually will be, mutually incompatible. (1945/1957, p. 36)

Importantly, this approach to administrative study assumes an "objective" reality that is fixed and certain and therefore discoverable. As did public administration orthodoxy, this system holds the physical sciences up as exemplars of how a science of administration may be defined, but it emphasizes the need for additional logical discipline through the use of formal methods and theoretical constructs to focus on facts.

A second set of critics have been those who see science, itself, as culpable. These critics emphasize the importance of understanding the values, like democracy and liberty, that underlie the work of public administrators, and promote an openness to alternative ways of thinking about the world. Dwight Waldo represented this second approach when

he wrote that,

Students of administration ... have simply been willing to accept the verdict of science - or more accurately, popular conceptions of the verdict of science - as to the nature of reality. It is appropriate to inquire whether these concepts of reality are consistent among themselves, whether they are valid within their proper realm, and whether, if valid, they have been extended beyond the bounds of their validity. (1948, p. 21)

This second set of critics have explored a broad range of methods and philosophies, but what ties them together is their suspicion of a science defined in positivist terms.

The purpose of this dissertation is to add another voice to the debate about science in administration. This voice will not seek to remove science from public administration nor even to undermine its influence. Instead, it will seek to redefine science in a way that embraces values and opens it to the influence of alternative philosophies and to the use of alternative methods and models. This voice is the voice of Michael Polanyi, a world-renowned physical chemist who became acutely aware of the fallacy of a positivist approach to science when he was confronted by its logical conclusion in the Soviet Union of Stalin. "What philosophy of science had we in the West to pit against this?" he asked (1946/1964, p. 9), for it was the very arguments used in the West to justify science that were being used under totalitarianism to destroy it. Beginning in the mid-1930s, Polanyi began criticizing central planning, totalitarianism, and a positivist approach to science through economic, social, and philosophical writings. With science always at the center of his thinking, he also began constructing an alternative philosophy of knowledge and reality.

Science, Polanyi claimed, is but one example of personal commitment to "the logic of self-compulsion with universal intent" (Polanyi, 1958/1962, p. 396). Like art, law, a market economy, and many other arenas, science can not be centrally managed

through a hierarchy, but depends on “coordination by mutual adjustment of independent initiatives” (Polanyi, 1962, p. 54). Scientific principles are enforced by a community through tradition, and science is learned as a skill by apprenticeship to a master. Through a process of tacit knowing, it discovers an independent reality pregnant with possibility and rejects objective knowledge that is detached and impersonal. In practice, science itself relies on the type of alternative philosophy that Polanyi sought to reveal, and to understand his critique of central planning, totalitarianism, and positivism, it is necessary to understand his philosophical argument.

Polanyi's central contribution to philosophy is the logic of tacit knowing. We know, wrote Polanyi, by integrating *subsidiary particulars* to a *focal whole*. This triad of context, person, and object of our awareness comprises *the structure of tacit knowing* (note that Walter Gulick (2012-2013) argues that there is sometimes a "via" that enters into tacit integration). It is widely accepted that we may identify *two types of knowledge*. The formal knowledge that is found in books, databases, and so on, is *explicit knowledge*. The informal knowledge that we have of something we are in the act of doing or discovering is *tacit knowledge*. To use explicit knowledge, we must know it tacitly. In fact, wrote Polanyi, all knowledge is either tacit or rooted in tacit knowledge.

Take, for example, piano playing. Anyone who has listened closely to an accomplished piano player knows that the personality of the pianist is evident in her playing. A piano is designed so that only one sound may emerge from hitting each key, yet a pianist passionately reaches into the depths of a piano to pull out an infinite wealth of music. This is tacit knowing at work. Knowing the keys of a scale and how to place one's fingers are bits of explicit knowledge memorized by a novice, but expert playing

requires the pianist to learn how those bits fit together into a comprehensive whole. The context, including explicit knowledge, must be integrated by a person into the object of our attention.

Not only are there two kinds of knowledge, but tacit knowing is also characterized by *two types of awareness*. The piano player is *focally aware* of the music he is playing but he is also *subsidiarily aware* of the keys and of his arms and fingers and even his breathing. Skills like bicycle riding or using a hammer are clear examples of tacit knowing and the two types of awareness integral to its logic. In fact, if the pianist turns his focus to his fingers or the keys, his playing may well hesitate and unravel, just as someone riding a bicycle may crash if she turns her focus from her destination to her feet on the pedals.

Perception also demonstrates tacit knowing - when we hear someone speak we are subsidiarily aware of a plethora of sounds around us, but our focus is on the speaker. Our minds integrate the sounds together into a comprehensive whole. In contrast, someone trying new hearing aids may find that all sounds have become focal and the cacophony may make true hearing difficult, if not impossible.

Tool usage helps to demonstrate another key aspect of tacit knowing - when we use a tool, it becomes an extension of our body. When I pick up a pen, it is my focus, but when I *use* it to write a sentence or to draw a picture or to adjust the time on the back of my clock, I turn my focus to the sentence or the picture or the time and I become aware of the pen subsidiarily, rather than focally. The sentence or picture or time, then, become *the meaning* of my use of the pen, and the pen, while essential to my knowing process, recedes into the background as part of the context. Polanyi argued that I *indwell* or

interiorize the pen when I use it skillfully - I make it an extension of my body. The same is true of perception: when we see something we focus on the sight, but we are subsidiarily aware of a host of other factors - of objects at the edge of our visual field, but also of the muscles controlling our eyes, the tilt of our head, and so on. In fact, Polanyi argued, all conscious transactions that we have with the world involve *the subsidiary use of our body*. Indeed, our body is primarily known subsidiarily, as it bears on the objects of our focus.

Before the logic of tacit knowing recedes into the background, it may be helpful to introduce some additional ways of understanding it. We may say that we *submit* to the subsidiary particulars of an integration when we *rely on* them by indwelling them, but we do so *responsibly*, for a purpose, for we *trust* that they bear on *a reality that can be known*, albeit *indeterminately*. This *reliance on* a context to *bear on* reality creates a *logical gap* that must be leapt, but once it is leapt, it is impossible to return - once we know something, we cannot un-know it. Furthermore, the *possibilities* of the background to point to reality infuse us with a *passion* that drives us onward. This is the *heuristic power* of tacit knowing - once we tacitly know something we cannot un-know it, and leaping a logical gap does not complete our task, but opens us to new possibilities and new discoveries.

The dynamics of tacit knowing involve *intuition* together with passionate use of *imagination*, but both intuition and imagination may be seen as *integration* of subsidiary particulars to a focal whole. In the former, that process occurs almost unconsciously; in the latter, it is more intentional. Yet central to both is the leaping of a logical gap through integration of a context to the object of our attention. When Polanyi wrote that "we can

know more than we can tell" (1966/2009, p. 4), his use of the phrase "We *can* know" rather than "We *do* know" emphasized that tacit knowing is a process. Had he written "We *do* know" he would have left open the possibility of making tacit knowledge explicit, but he recognized that knowing is not only a *dynamic process* but results in knowledge that is indefinite and sometimes unsuspected or even unspecifiable. "We meet here with a new definition of reality" wrote Polanyi.

Real is that which is expected to reveal itself indeterminately in the future. Hence an explicit statement can bear on reality only by virtue of the tacit coefficient associated with it. (Polanyi, 1946/1964, p. 10)

Like our knowledge of it, reality, itself, is indeterminate. Looking backward, the *orderliness* of a comprehensive entity reveals the involvement of a person, but looking forward, its indeterminate possibilities excite us with *a heuristic passion for discovery*.

Having recognized a relationship between an indeterminate reality and the logic of tacit knowing, it is a small step to recognize that the logic of tacit knowing becomes evident in the objects that we know, not just in our knowledge of them. Polanyi described *an ontological theory of a stratified reality* in which a lower level is characterized by principles which leave *possibilities* open at the margins. A menagerie of processors, memory, screens, buttons, and cases are each characterized by a set of principles, but each leaves open possibilities by which they may be used. It takes a higher level set of principles, not evident in the lower levels, to assemble the components into a phone or computer that gives them meaning as a comprehensive entity. The success of such an entity is determined by the success of higher level principles, but once formed, its failure is determined by the lower-level components and the principles which characterize them. In examining such a comprehensive entity, it becomes clear that a

stratified reality reflects the structure and logic of tacit knowing, and just as tacit *knowledge may emerge* from the integration of subsidiary particulars to a focal whole, so a *comprehensive entity may emerge* from the restraint of lower-level possibilities by higher-level principles.

Finally, it should be clear by now that *reduction* by turning our focus to the subsidiary particulars of a comprehensive entity does not simply shift our focus. Rather, it dissolves the integration that brings it into being. No longer do we know the context subsidiarily as it points to our original focus, for it has become our new focus and we are now depending on our subsidiary awareness of *its* context to give *it* meaning. Furthermore, to attempt to regain the comprehensive entity, we must reintegrate it, and the new integration must take into account new elements that make it into a new entity. I will always remember helping a friend reassemble his motorcycle transmission, only to find extra parts that belonged deep within. It still functioned but it was no longer the factory built transmission it had been.

With a fresh understanding of the logic of tacit knowing in hand, we may return to an examination of the bifurcation in American public administration scholarship that I identified in my introduction, around the possibility and legitimacy of developing a science of administration. Those who argue for a more robust administrative science tend to adopt what may be called the positivist model, a model which sees science primarily as a means for obtaining knowledge of the world through *empirical research* using *formal methods* that attempt to isolate *objective, impersonal facts* from subjective, personal values. Any data obtained through such methods is interpreted by *theoretical models* that may be used to establish *universal generalizations*. Tacitly assumed (but not necessarily

acknowledged) are a *fixed reality* and a *deterministic relationship of its components*. Certainty is necessary to give meaning to reality and to justify its independence from the person. To account for freedom of choice, absolute determinism is eschewed, but recurring attempts to define reality precisely, to measure it exactly, to describe it explicitly, and to predict and control it, suggest a deterministic mindset. To be true, indeterminacy is recognized, but it is dismissed as anomaly and is mitigated if at all possible. Given such an understanding of science, public administration scholars have focused their attention on impersonal facts that are separated from values; they have relied on formal theories, methods, and models, and they have privileged the positivist model and methods above all others.

Critics of a positivist model of administrative science have argued that fact and value cannot be separated for they are joined organically, that administrative means are always informed by values, that the study of valueless facts leads to meaningless action, and that separating fact from value forces administrative scientists to smuggle their own values into their work disguised as "scientific" terms. Critics have also argued that rigorous, formal method is problematic because it creates two worlds. On the one hand is a formula world that assumes a certain reality that can be disassembled, measured, and described in an abstract, impersonal manner, and that classifies reality either as examples of the formula or as accidents or anomalies. On the other hand is the real world in which we live and which is forced to respond to the formula world. Because of the difference between the two worlds, translation back and forth is necessary, and it is unclear that translation efforts are successful. Critics have suggested a number of alternatives to a positivist science, including "hands-on" approaches, story-telling, intuition, and judgment

that involves "intimate knowledge" and "social rationality." Such alternatives synthesize data from multiple sources and demonstrate that "we know more than we can say" (Schmidt, 1993, p. 530).

As Polanyi recognized also about physicists and chemists, those who claim to follow a positivist model of science, do not actually do so in practice. We pretend to follow strict rules, to be "pulled by strings" as if we are puppets. Yet, in practice, we know that we are making judgments and decisions, that we have freedom to choose, and that a potential discovery inflames us "with creative desire" and imparts "intimations that guide [us] from clue to clue and from surmise to surmise" (Polanyi, 1946/1964, p. 14). The problem, Polanyi recognized, is that we have no philosophy to justify and support our personal action. So long as we accept the positivist model of science as valid, our only alternative is to reject science completely by embracing non-scientific models and methods and forms of knowledge.

One of Polanyi's greatest contributions to the study of public administration, therefore, is to give us an alternative definition of science that is based on the logic of tacit knowing. If we know by indwelling, rather than by dominating, reality, then our central concern becomes *discovery*, rather than method. A science focused on discovery of what is hidden but knowable eschews both a subjective reality that is created at will, and an objective reality that is fixed and determinate. Instead, it embraces a reality which is expected to reveal itself unexpectedly in the future and which is anchored in personal encounter with the world. Such a *post-critical science* readily *submits to* and *relies on* the *tacit coefficients* associated with all knowledge, while *responsibly committing itself* to a reality that is *affirmed with universal intent*. The discovery of reality through personal

intuition and imagination recognizes that it can only be described, measured, modeled, predicted, and controlled tentatively, by means of personal judgment.

Therefore, *a post-critical science of administration* is interested in *personal clues* rather than impersonal facts, for *indeterminate facts* are only *meaningful* if they point to and are integrated by a person into a comprehensive whole. As Waldo noted, facts without values are meaningless but, set within the logic of tacit knowing, there is no need to separate facts from values. Transformed into clues, they become meaningful as subsidiary elements of a comprehensive whole. Likewise, a post-critical science of administration does not rely on formal methods and theory, for formal processes overlook the personal appraisal necessary to turn facts into clues. Indeed, any attempt to exhaustively list all alternatives cannot succeed in the face of an indeterminate world. Nor can it evaluate alternatives without judgment nor define descriptive terms without tacit knowing, for formal processes are, themselves, personal understandings of the world. Furthermore, because discovery is central to a post-critical science of administration, it readily embraces alternative methods and models and forms of knowledge. Indeed, even a positivist model of science becomes useful in the "detailing" of the context or background of a tacit integration.

A post-critical science of administration calls us to discover the world of administration through the logic of tacit knowing. Because of its *radically contingent* nature and its *reliance on belief*, tacit knowing is never general and universal and always runs the risk of being mistaken. It is possible only through humble commitment, held with universal intent. It is "the deliberate holding of unproven beliefs" (Polanyi, 1958/1962, p. 268).

In addition to re-defining science and how we know, the implications and influence of Polanyi's philosophy may be readily seen in several other arenas. *Community* is central to much of Polanyi's writing, and he defines *conviviality* as the "interpersonal coincidence of tacit judgments" (1958/1962, p. 151). That such conviviality makes communication possible is itself important, but it is community's role in supporting and enforcing *tradition* that I have highlighted. The premisses of a tradition "cannot be explicitly formulated," but may be "authentically manifested" only in practice (Polanyi, 1946/1964, p. 85). They are tacit, known only subsidiarily as they point to an object of attention. Therefore, "A society which wants to preserve a fund of personal knowledge must submit to tradition" (Polanyi, 1958/1962, p. 53). Such submission, however, is not blind, for the premisses of a tradition as "transmitted to us ... are our own interpretations of the past" (p. 160) and our reliance on them also modifies them. *Tradition*, as Polanyi characterized it, *is self-modifying*.

In public administration literature, such an understanding of tradition may be seen in the writing of John Rohr who argued that the Constitution did not emerge *ex nihilo*, but is part of a continuing, active process. It may be seen as "the conclusion of the great public argument of one hundred and fifty years of colonial experience and the premise of the great public argument of the next two centuries" (Rohr, 1986, p. 173). Michael Spicer also recognized the importance of a self-modifying tradition by emphasizing the importance of the common-law reasoning by which judges turn to past decisions as guides for their own judgments, with those fresh judgments then becoming part of the background on which they, and others, will rely for future decisions. Both Rohr and Spicer were effectively describing self-modifying tradition anchored in the logic of tacit

knowing.

In response to the abuse of science in the Soviet Union, Polanyi argued strongly in favor of the freedom of scientists to choose their own problems. He appropriated the term "dynamic order" from Gestalt Psychology to describe the giving of free rein to the elements of a system. In society, such dynamic or spontaneous order demonstrates "*self-co-ordination by mutual adjustment*" (Polanyi, 1967/1969, p. 84), by the freedom of individuals constrained by their interaction with each other, much as the possibilities of a lower level are constrained by the principles of a higher one. Indeed, Polanyi argued that "[a] polycentric task can be socially managed only by a system of mutual adjustments" (1951/1998, p. 226). Such a dynamic order not only reflects the logic of tacit knowing, but it also provides an environment that supports such a process of knowing and being by allowing for indeterminacy. In contrast, a formal, centralized organization must rely on fixed, explicit knowledge and assumes a certain and determinate reality.

Polanyi pointed specifically to science, a market economy, and Common Law as examples of dynamic order, but he also noted that other domains, like art, are spontaneously ordered. Within public administration literature, Timothy Dahlstrom has found dynamic order particularly relevant to "socio-intellectual" networks, and networking and polycentricity literatures resonate some of Polanyi's ideas. However, the two most extensive applications of Polanyi's concept of dynamic order have been Spicer's characterization of civil association and Charles Lindblom's "Science of Muddling Through".

According to Spicer, the understanding of the state "which undergirds much of public administration, is one of purposive association" (Spicer, 1997, p. 90), "in which

individuals see themselves ... bound together for the pursuit of a particular coherent set of common substantive ends" (p. 91). However, public administration in practice is largely characterized by *civil association* in which a set of rules of conduct limit "individual spheres of action" (p. 96) while individuals are otherwise given freedom to pursue their own ends. Lindblom's "science of muddling through" (1959), or "disjointed incrementalism" (1979), also picks up on the practical nature of dynamic order. He argued that a "rational-comprehensive" model of decision-making is effectively impossible and that, in practice, public administrators employ an incremental method that is clearly parallel to Polanyi's dynamic order. Importantly, both writers have not only described dynamically ordered systems, but have also acknowledged the importance of relying on a self-modifying tradition. Consequently, both have reflected the logic of tacit knowing in their writing.

Closely associated with dynamic order is Polanyi's concept of public liberty. Public liberty is not private freedom but is the freedom of individuals to act responsibly on behalf of a community. Many of the systems that he described as dynamic orders also foster public liberty. In science, for example, individual scientists are given freedom to choose their own problems, but their freedom is constrained by their submission to the scientific tradition. Through apprenticeship, they learn both explicit and tacit knowledge contained in that tradition, but it is only when they begin to *practice* science by voluntarily *submitting to* its premisses and standards, that they are granted freedom to act on their own. Their newfound freedom is not an individual freedom but a public one for which they have accepted responsibility, a freedom that leaves them also subject to the mutual authority of all other scientists.

Importantly, public liberty can be granted to a system as a whole. Science has been granted such freedom, just as it then grants freedom to individual scientists. The domain of Common Law and the "socio-intellectual networks" described by Dahlstrom have also been granted public liberty, and it is this granting of freedom - to act responsibly on behalf of society - that characterizes *a free society*. Larry Terry's characterization of administrative conservatorship may be seen in this light. The primary function of bureaucratic leaders, he wrote, "*is to protect and maintain administrative institutions in a manner that promotes or is consistent with constitutional processes, values, and beliefs*" (Terry, 1995, p. 24). Terry described bureaucratic institutions as dynamically ordered systems granted freedom *by society* to act independently, but responsibly, *for the benefit of society*. Like science, such institutions foster public liberty by then granting freedom to individual administrators to act responsibly on behalf of said institutions and therefore on behalf of society as a whole.

In light of his understanding of a post-critical science, Polanyi suggested that our approach should be to "try training ourselves to study human affairs by intense participation in human problems instead of by detachment from them" (Polanyi, 1957, p. 482). Such a focus on personal encounter with the world around us has always been evident in American public administration - as the early work of settlement houses and more recent work by community and neighborhood development organizations bear witness. In current public administration literature, I find the work of Nicholas Zingale particularly interesting for it demonstrates an understanding of the personal nature of knowledge and the responsible participation of the scholar. In Zingale's work, a person is not a passive puzzle piece to be manipulated at will, nor an instrumental cog in an

organizational machine, for "being ... is a way of understanding who we are by carefully observing our engagements with the world and letting these tell us about us" (Zingale, 2007, p. 48).

In a post-critical science of administration, then, the person becomes central. Yet such a person is not an isolated individual in the tradition of Hobbes, but a being set in community and demonstrating *harmonious particularity*. We are called to submit to the context in which we find ourselves; called "to lose ourselves in the performance of an obligation which we accept" (Polanyi, 1958/1962, p. 324). Such a responsible commitment is possible because our knowledge is personal rather than subjective or objective, and the knowing process, itself, is tacit. We *can* know more than we can tell.

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