Mary Parker Follett: Prophet of Chaos and Complexity

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Abstract

The writings of Mary Parker Follett can inform the current debate regarding whether or not concepts from the field of nonlinear dynamics should be incorporated into the social sciences. The paper argues that Follett's writings serve as an ideological bridge between these two camps, and also reflect a rich understanding of nonlinear dynamics in social phenomena. The paper concludes with a discussion of the implications that Follett's writings hold for social scientists today in the area of research methodology.

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Over the past decade there has been a significant increase in the number of scholars who have begun to study organizations using concepts from the physical and natural sciences, in particular from the field of nonlinear dynamics (see, for examples: Arthur, 1990; Elliot & Kiel 1996a; Hayles, 1991; Holland, 1995; Parker & Stacey, 1994; Wheatley, 1992). These social scientists are currently wrestling with two issues: 1) how to conceptualize and apply ideas from nonlinear dynamics to the study of organizations; and 2) how to justify the metaphorical and analogical utilization of nonlinear dynamics concepts in the study of social phenomena.

Because the writings of Mary Parker Follett reveal a rich understanding of the theoretical application of nonlinear dynamics concepts to human organizations and provide an articulate argument for their use in social scientific research, it is our contention that she can aid these scholars in their two-fold quest.

This paper first introduces the reader to elemental characteristics of nonlinear dynamical systems, and then summarizes the foundational principles of Mary Parker Follett's thought on social processes. As this latter task is undertaken, conceptual commonalities that exist between Follett's thought and the principles inherent in nonlinear dynamics are delineated. The paper concludes with a discussion of the implications of Follett's writings on the field of management.

<u>Nonlinear Dynamics: An Introduction</u>

Nonlinear dynamics is the study of "the temporal evolution of nonlinear systems (Elliot & Kiel, 1996b, p.1)." The assumptions this field holds regarding the nature of the relationships between variables within systems differs from those commonly held by most social scientists. Social scientists tend to view complex social systems as being composed of variables that manifest linearity in their relationships (Mendenhall &

Macomber, 1997), an assumption that derives from the ideas of LaPlace, Descartes, and Newton (Dooley, 1997). The assumption of linearity in systemic relationships has led to the study of natural and social systems from reductionistic, deterministic, and equilibrium-oriented perspectives (Capra, 1996; Dooley, 1997; Wheatley, 1992). Accordingly, management theories that were created in the 19th and 20th centuries have essentially been based on these same principles (Dooley, 1997; Hayles, 1991; Wheatley, 1992).

For this reason, most social scientists currently work from the assumption that "linearized" mathematical and statistical techniques are appropriate methods to analyze human phenomena; however, research over the past three decades across various scientific disciplines in the physical and biological sciences has shown clearly that many systems in nature are *not* inherently linear (Arthur, 1990; Bak & Chen, 1991; Capra, 1996; Dooley, 1997; Elliot & Kiel, 1996a; Gleick, 1987; Goerner, 1994; Hayles, 1991; Holland, 1995; Lorenz, 1993; Prigogine & Stengers, 1984; Waldrop, 1994). Rather, "nonlinear phenomena dominate much more of the inanimate world than we thought, and they are an essential aspect of the network patterns of living systems (Capra, 1996, p. 123)."

These nonlinear systems often exhibit unexpected, unpredictable, random-looking behavior in spite of being governed by deterministic relationships. Such systems exhibit "chaos" or "complexity." Edward Lorenz, the seminal researcher on chaotic systems in meteorology, suggests that chaos refers to great irregularity over time while complexity refers to irregularity in space (Lorenz, 1993). Others use the term "complex adaptive systems" to refer to the type of phenomena encountered in nonlinear chaotic and/or complex systems (Capra, 1996; Holland, 1995; Waldrop, 1994). The use of these terms in studying nonlinear systems has emerged out of the broader field of nonlinear dynamics; we shall thus refer to the broader field of "nonlinear dynamics" in this paper when discussing the concepts of chaos, complexity, and complex adaptive systems since any distinction between these terms are at best fuzzy.

Three fundamental characterics of nonlinear dynamical systems (nonlinearity, sensitive dependence on initial conditions, and self-organization) will be discussed next, and how these ideas link with Mary Parker Follett's work will then be delineated.

Nonlinearity As noted previously, scientists have traditionally viewed the natural world as being composed of linear, cause-and-effect relationships. Mathematical tools have proven to be efficacious when analyzing linear systems, and even in systems where the mathematically defined laws are not linear, their derivatives are, so linear differential equations have been used to model relationships. However, these latter mathematical methods have inherent limitations. For example, the calculus, Newton's tremendous invention, describes motion and the effects of gravity with uncanny accuracy, *if* it is applied to a closed, two-celestial-body system. If a third body is added to the problem, the efficacy of the tool breaks down because the third body simply adds too much complexity for the equations of motion to work effectively (Mendenhall & Macomber, 1997).

In nonlinear dynamical systems relationships between variables are actually *interrelationships*-- variable x does not have one, and only one effect on variable y-- variable x and y have mutual influences upon each other and upon a myriad of other coexisting variables as well. Thus, in nonlinear dynamical systems, the distinction between independent and dependent variables breaks down into an interdependence *between* variables, also known as "mutual causality." The mutually causal web of interrelationships between variables in nonlinear dynamical systems act as feedback loops where behavior is fed back into the systemic relationships which created it, thus modifying the relationships among the variables that produced the behavior. In nonlinear systems causality can only be understood by analyzing the complexity of interconnections among all the variables in a system (Lichtenstein, Mendenhall, & Macomber, 1997). Meiss (1995) notes that

> in algebra, we define linearity in terms of functions which have the property $f(x+y) = f(x)+f(y)$ and $f(ax) = af(x)$. Nonlinear is defined as the negation of linear. This means that the result f may be out of proportion to the input x or y. The result may be more than linear, as when a diode begins to pass current; or less than linear, as when finite resources limit Malthusian population growth. Thus the fundamental simplifying tools of linear analysis are no longer available (Meiss, 1995, p. 1)

The inherent nonlinearity of organizational life is perhaps best reflected in peoples' careers. Not all self-initiated efforts to enhance one's career pay off at the same levels of efficacy; in fact, most people can often point out to seemingly random, "insignficant-at-the-time," or unforseen external inputs or influences that rendered a positive or negative career impact that was out of proportion to the nature of the input or influence itself. Also, one's career is often inextricably tied to others' career successes and failures. A CEO resigning or a project that failed in another department, though not tied to an individual directly, often still influence that person's career or ability to do quality work, either through the diminuation of available resources to do the job or perhaps by being caught in a wave of downsizing. Individual careers are not independent of other people; peoples' careers are interdependent with system-wide behavior and the behavior of others in their company. This state of affairs leads to the next principle of nonlinear dynamics, "sensitive dependence on initial conditions."

Sensitive Dependence on Initial Conditions   Research studies have shown that systems that exhibit nonlinearity are also highly sensitive to small deviations at the starting point of the system, or at other intervals throughout the system's existence.   That is, a small difference at the beginning of a series of values is soon magnified into major differences between evolving systems.   (Capra, 1996; Elliot & Kiel, 1996a; Goerner, 1994; Lorenz, 1993; Ward, 1995). This principle was discovered accidently by Edward Lorenz during his efforts to develop a weather prediction model.

> After initially writing the computer program he decided to make it easier for the primitive machine to calculate the outcome predictions . . . He reprogrammed the computer algorithim to round up by one or two decimal places over each iteration. However, he was surprised to find that within only a few iterations the outcome predictions were wildly divergent from the original model that didn't round up as much. The long term impact was that any correlation between the two tests was impossible, since every decimal place was crucially important to the outcomes of the whole model. (Lichtenstein et al., 1997, p. 5)

This extreme sensitivity to initial conditions became known as the *butterfly effect*, after the idea that the creation of airflow from the flapping of a butterfly's wings in Hawaii might be a key influencing factor in a storm system building up that ultimately causes severe weather somewhere else on the globe (Lorenz, 1993). Outcomes are thus not proportional to the additive influence of inputs in a system (Cutright, 1997), and small inputs into a system can--but not necessarily will--amplify over time throughout the system (Cutright, 1997). Parker and Stacey (1994) note that:

> Nonlinear . . . systems are highly sensitive to initial conditions, which means that some tiny error to a number of decimal places, some

> imperceptible `noise' in the system, can escalate into major qualitative changes in the behaviour of that system. In such systems we cannot safely assume that small errors are unimportant. Errors are not distributed in the way statistical theory assumes; instead, variances are infinite so that standard estimation techniques break down. The range of effects to which a single cause can lead may well be huge. In fact, links between cause and effect disappear in the complexity of interactions. In consequence, the long-term future of the system is inherently unpredictable (p. 13).

In organizations we often find that seemingly insignificant behaviors can have sometimes catastrophic, long-term, and unintended organization-wide effects.

> We can see the butterfly effect in situations such as the tragic federal Alcohol, Tobacco, and Firearms agency raid on the Branch Davidian complex in Waco, Texas, early in 1993. The "butterfly"--the tipoff of the Davidians prior to the raid--led to a series of unexpected events that nearly resulted in the dissolution of the ATF as a separate federal agency (Kiel, 1994, p. 7).

As nonlinear systems evolve over time, they continually reproduce fresh "initial conditions." Because the system always creates new initial conditions as it adapts and grows, sensitivity to initial conditions is a principle that is a constant throughout the system's existence (Lichtenstein et al., 1997; Mendenhall, Macomber, Gregersen, & Cutright, in press).

<u>Self-Organization</u>

The variables that make up a nonlinear system possess unique characteristics of capability. Capra (1996) contends that nonlinear systems are

> networks of production processes, in which the function of each component is to participate in the production or transformation of other components in the network. In this way the the entire network continually 'makes itself.' It is produced by its components and in turn produces those components (Capra, 1996, p. 98).

Such systems are sometimes referred to as "complex adaptive systems," and are characterized as being able to "adapt, change, evolve, and reconstruct themselves in response to external and internal environmental inputs (Mendenhall & Macomber, 1997, p. 48)." Holland (1995) notes that complex adaptive systems are constituted of "adaptive agents" that in response to external and intra-system inputs adapt, form, and change their system strategy.

These agents can act singly or combine with other agents to form ever complex hierarchical layers of organization within the system as a whole. For example, two of the authors of this paper act individually as management professors. With other management professors we form a department, which becomes an agent in and of itself. This department, combined with other departments, forms a college, which in turn becomes a separate agent within the system. This college agent merges with other college agents that help form the larger system itself: the university. All agents are thus formed by the aggregation of smaller agent hierarchies; "behavior depends on the interactions of the component agents in the network. The aggregate agents may again be aggregated to add new hierarchical levels (Holland, 1995, p. 6)."

As the myriad of "agent sub-systems" within a complex adaptive system interact in nonlinear ways, the overall system, though seemingly stable, is in truth in constant flux. Thus, such systems exhibit "self-organizing" behavior; that is, "they shift, adapt, learn, and change in order to survive. They do so through this almost infinite array of mutual agent interactions within the system, and between systems (Mendenhall & Macomber, 1997, 49)."

In summary, "through their interactions with the environment living organisms continually maintain and renew themselves, using energy and resources from the environment for that purpose. Moreover, the continual self-making also includes the ability to form new structures and new patterns of behavior (Capra, 1996, p. 168)." This ability of complex systems to recreate order and pattern is called *self -organization* .

Mary Parker Follett's Nonlinear Dynamics

Mary Parker Follett "saw" these principles and their operation in social systems, but did not articulate them in the terminology we have introduced here because she wrote 35 years before the emergence of nonlinear dynamics as a field of research. However, one familar with both the literature of nonlinear dynamics and Follett's writings can clearly see that she comprehended social processes from nonlinear systemic principles.

Mary Parker Follett on Nonlinearity

The foundational assumption that undergirds Follett's model of social systems is that of interdependence between subject and object. She decried the tendency of social researchers to divide subject from object (independent variable from dependent variable) in their search for knowledge, as well as the tendency to avoid the careful examination of data and to rely on subjectivity alone in making sense out of social phenomena. To her, "the subjective idealists have overemphasized the subject, and the realists, the object (Follett, 1951 p. 54); the fields of history, economics, political science, law, art, and psychology all missed the point, Follett contended, by seeing "reality either in subject or in object," for we cannot "run fast enough from one to the other to keep ourselves within the region of truth (Follett, 1951 p. 54)." Thus, for

Follett, one cannot freeze an action, operationalize it, measure it, and calculate it's relationship to an independent variable. Such an attempt would be like trying to take a slice out of a river, and after measuring it, generalizing from it what the river is like.

Follett's basic assumption was that "in the behavior-process, subject and object are equally important and that reality is in the relating of these, is in the endless evolving of these relatings (Follett, 1951 p.55) ." For Follett, the reality of organizational behavior is in the interaction <u>between</u> subject and object (independent variable and dependent variable), in the activity <u>between</u> them; she viewed the relationship between subject and object (independent variable and dependent variable), to be reciprocal and interdependent in nature, each being a function of the other (Follett, 1951 p. 54-56).

Given the assumption that organizational life is made up not of linear relationships between subject and object (independent variable and dependent variable), but of the nonlinear, reciprocal, mutually causal, and interweaving influences <u>between</u> subject and object, Follett concluded that social scientists must focus their analytical efforts to the study of these reciprocal influence processes. She termed the reciprocal influence between subject and object as, "circular response," and contended that it "formed a basic truth of all the social sciences (Follett, 1951 p. 63)." Circular response and systemic nonlinearity both are terms that describe the same phenomenon.

Follett described the law of circular response in a variety of ways, and the richness of her writing is often reflected in her use of case examples to illustrate the pervasiveness of this principle in social organizations. She summarized the principle as follows:

> The most fundamental thought about all this is that reaction is always reaction to a relating . . . I never react to you but to you-plus-me; or to be more accurate, it is I-plus-you reacting to you-plus-me . . . that is, in the very process of meeting, by the very process of meeting, we both become something different. It begins even before we meet, in the anticipation of meeting. . . It is I plus the-interweaving-between-you-and-me meeting you plus the-interweaving-between-you-and-me, etc., etc. If we were doing it mathematically we should work it out to the nth power. (Follett, 1951 p. 62-63)

Follett amplified the above quotation by noting that if the behavior process could be formulated mathematically, it would need to be done via the use of differential equations or by sets of differential equations (Follett, 1951 p. 63); in this, she accurately anticipated the problems associated in measuring behavior in nonlinear systems (Capra, 1996; Holland, 1995; Mendenhall et al., in press).

> Simple response, if there was such a thing, would be like simple interest-- if there was such a thing. There is no such thing as simple interest in the organic world; the law of organic growth is the law of compound interest. Organic growth is by geometrical progression. This is the law of social relations. (Follett, 1951 p. 64)

<u>Mary Parker Follett on Sensistive Dependence on Initial Conditions</u>

Due to the inherent nonlinearity in interactions in complex adaptive systems, every participant in such systems can influence the system profoundly. Because of "sensitive dependence on initial conditions" we learn that relatively small inputs into a complex adaptive system by an individual can produce, over time, profound amplifier effects throughout the system, which collectively produce what Follett called, a new "common ground" in the system. This process occurs daily in all social systems, but it is so natural that we have trouble seeing it. Follett saw this basic principle inherent in nonlinear dynamics clearly:

> I contribute to society my mite, and then society contains not just that much more nourishment, but as much more as the loaves and fishes which fed the multitude outnumbered the original seven and two . . . my contribution by means of all the cross-currents of life always has so much more than itself to offer. When I withhold my contribution, therefore, I am withholding far more than my personal share. When I fail some one or some cause, I have not failed just that person, just that cause, but the whole world is thereby crippled. This thought gives an added solemnity to the sense of personal responsibility. (Follett, 1920 p. 66-67)

Sensitive dependence on initial conditions does not mean that only individual inputs create amplifier effects within a larger system; groups' or sub-systems' concerted inputs can also cause tremendous amplifier effects throughout the larger system in which they reside. Follett eloquently described the nature of these kinds of amplifier effects when she wrote:

> The increased strength which comes to me when I work with others is not a numerical thing, is not because I feel that ten of us have ten times the strength of one. It is because all together we have struck out a new power in the universe. Ten of us have ten, or a hundred, or a thousand times the strength of one--or rather you cannot measure it mathematically at all. (Follett, 1920 p.42-43)

<u>Mary Parker Follett and Self-Organization</u>

Follett held that the law of circular response holds true across hierarchical levels of systems within social systems, and in fact contributed to the very existence of more sophisticated systems. She illustrates the complexity of interweaving and intercreating across systems levels within social systems with the following example:

> Think of the boy going to school. He is not responding to school merely, but also to his own response to school. That is, the going to school may so stimulate him that he works much better than at home with his mother; his activity is a function of the activity that is set up between him and school. And the school too is affected by the activity-between; through either his or his parents' demand upon it, it may improve its methods. And so the interweaving goes on: the more the school alters the boy, the more chance is there of the boy altering the school. (Follett, 1951 p. 64)

Behavior, then, is the manifestation of innumerable complex interactions between an individual agent and his/her environment in any moment in time. These interweavings of agents continually "integrate" and create new behaviors. Thus, according to Follett, behavior "emerges" out of this maelstrom of simultaneous "intra and extra organic stimulation" because the behavioral function is continuously being modified by itself (Follett, 1951, p. 66; 73). This view profoundly influenced her definition of the construct of "behavior:"

> Thinking (willing, purposing) is specific relating of the interdependent variables, individual and situation, each thereby creating itself anew, relating themselves anew, and thus giving us the evolving situation. (Follett, 1951 p. 89)

She noted that this definition "is pregnant and important for the social sciences because it makes us think of our problems in terms of process and not of 'pictures.' The self-sustaining process . . . is the fundamental law of human activity." (Follett, 1951 p. 90.)

This self-sustaining process creates what Holland refers to as "complex adaptive systems"--systems that continually adapt, change, evolve, and reconstruct themselves from on-going interaction amongst variables within the system and between systems (Holland, 1995; Waldrop, 1994). Complex adaptive systems are made up of multiple sub-systems, which in turn are constituted by multiple sub-systems, yet all are interdependent for their existence on each other, forever recreating themselves both individually and collectively, in a simultaneous fashion. Follett observed that

> The interpenetrating of psychic forces creates at the same time individuals and society. . . therefore the individual is not a unit but a centre of forces (both centripetal and centrifugal), and consequently society is not a collection of units but a complex of radiating and converging, crossing and recrossing energies . . . (Follett, 1920 p. 75)

Another key principle that makes the creation of complex adaptive systems possible Follett termed, "difference." She contended that difference is the most essential feature of life; and that it is the merging of differences in nature that brings about new creation, and that the new creations then merge with other differing creations to produce, in turn, new creations. In each new creation there is new unity, new similarity, new commonality. She explains this process as follows:

> The common at any moment . . . has come from heredity, biological influences, suggestion and imitation, and the previous workings of the law of interpenetration. All the accumulated effect of these is seen in our habits of thinking, our modes of living. But we cannot rest in the common. The surge of life sweeps through the given similarity, the

> common ground, and breaks it up into a thousand differences. This tumultuous, irresistible flow of life is our existence: the unity, the common, is but for an instant, it flows on to new differings which adjust themselves anew in fuller, more varied, richer synthesis. The moment when similarity achieves itself as a composite of working, seething forces, it throws out its myriad new differings. The torrent flows into a pool, works, ferments, and then rushes forth until all is again gathered into the new pool of its own unifying...Social progress is to be sure coadpating, but coadapting means always that the fresh unity becomes the pole of a fresh difference leading to again new unities which lead to broader and broader fields of activity. (Follett, 1920 p. 35)

As a result, the notion of complex systems being impelled to a state of equilibrium is a false notion, one based on Newtonian assumptions that do not hold for nonlinear systems. The process described above by Follett reflects what occurs in complex adaptive systems under “far from equilibrium” conditions. (Prigogine & Stengers, 1984) When internal dynamic resource flows intensify in a complex adaptive system, the product is unexpected regimes of order that emerge or “self-organize” over time (Lichtenstein et al., 1997).

In other words, due to manifold interactions within a system, and between the system and its complex environments, these interactions, over time, will produce a new regime of order; or, as Follett would term it, a new common ground, a new unity (nonlinear dynamicists would term it “self-organizing” (Holland, 1995). Thus, Follett, anticipating ideas now inherent in complexity theory, held that “the organism [be it a person, a group, or an organization] is the continuing activity of self-organizing, selfmaintaining (Follett, 1951 p. 58)," for "whenever we advance," she asserts, we "slip from the bondage of equilibrium (Follett, 1951 p. 53)."

This is how she viewed all life as being able to continue, change, adapt, and progress. For her, concepts inherent in chaos theory, complexity theory, and nonlinear dynamical systems are not metaphors that management might experiment with, but the essential principles that undergird social life. She concluded:

> There is no end to this process. A new being springs forth from every fresh contact. My nature opens and opens to thousands of new influences. I feel countless new births. Such is the glory of our common every-day life . . . The unifying of difference is the eternal process of life--the creative synthesis, the highest act of creation . . . (Follett, 1920, p. 37-38; 40)

Discussion

In the introduction, it was indicated that social scientists who try to apply nonlinear dynamics principles to the study of social processes currently face two major concerns: 1) the need to justify to their peers their metaphorical and analogical utilization of nonlinear dynamics concepts in the study of social phenomena, and 2) how to conceptualize and apply ideas from nonlinear dynamics to the study of organizations. Follett's writings directly address both of these concerns.

Borrowing concepts from the physical and natural sciences for use as metaphors or analogies for the study of organizations is troubling to many social scientists (Faber & Koppelaar, 1994; Gould, 1987; Hunter & Benson, 1997; Johnson & Burton, 1994), and as the popularity of utilizing concepts from the fields of nonlinear dynamics for the study of organizations has increased, they have raised warning voices against this trend. Cutright (1997) summarizes their essential arguments as follows:

> [they] hold that chaos theory is a mathematically articulated, natural-system specific set of principles, the application of which to social circumstances is both an unsupported, deductive overextension and a debasing of scientific language. These critics often cite scientists, including some founders of natural-system chaos, who have criticized, in general and specifically, social extensions. The critics also have at their critical disposal some very loose "applications" of chaos, applications which are sometimes little better than, "if we can't understand this situation's dynamics, then it must be chaos, so don't worry, it'll organize itself." (Cutright, 1997 p. 4)

These critics' arguments against nonlinear dynamics applications in social systems rests largely on their perception of a deductive overextension of nonlinear dynamics concepts to social phenomena, a condition which raises the spectre of earlier, inappropriate applications of scientific theory to the social realm. History is replete with overextensions of scientific ideas to society; for example, the ill-fated attempts to construct ideal models of government based on Newton's scientific ideas by his contemporary disciples (Cohen, 1994), and the misinterpretation and overextension of Darwin's writings on natural selection and organic evolution to the state and to society. "Social Darwinism" came to be used in large measure as a rationalization for classism, racism, and imperialism, a rationalization that became more destructive as it hardened from metaphor to analogy (Cohen, 1994; Cutright, 1997).

Proponents of using nonlinear dynamics concepts in the social sciences utilize a common argument to justify their position on this issue; they argue that

> the social sciences, historically, have emulated both the intellectual and methodological paradigms of the natural sciences. From the behavioral

> revolution, to applications such as cybernetics, to a predominant reliance on the certainty and stability of the Newtonian paradigm, the social sciences have followed the lead of the natural sciences. (Elliot & Kiel, 1996b, p. 1)

These scholars argue that they are simply following the tradition of social scientists before them, namely, basing their their research efforts on paradigms used by the physical and natural sciences.

We contend that Follett's writings construct a conceptual bridge between these two views; we argue that this dispute among modern social scientists is one that is based on false premises. It is our contention that Follett would likely hold that both parties views are valid to a point, but that they actually are not separate conceptual positions, but in fact are conceptually linked together.

Follett "saw" and "understood" principles of nonlinear dynamics in social systems seventy-years before social scientists began seriously to attempt to utilize nonlinear concepts in their work. Yet her observations and conceptions of organizations and social systems are highly consistent with principles inherent in nonlinear dynamics. Homology after homology can be drawn from Follett's principles to those of nonlinear dynamics; her writings are inductively supportive of the operation of nonlinear dynamics within the social world. Her theoretical writings claim for the principles of nonlinear dynamics not only legitimacy as metaphors or analogies for the study of organizations, but claim that these principles are the foundation upon which social organizations exist and by which they continue their existence.

Yet, Follett believed strongly in careful experimentation, data collection, data analysis, observation of phenomena, and the cataloging of knowledge gained from scientific endeavor. She wrote that "we need then those . . . who will try experiment after experiment and note results . . . the methods of physical science are observation and experiment; these should be the methods of the social sciences (Follett, 1951, xi-xii). She believed that nonlinear social phenomena could, and must, be measured and the subsequent data analyzed in order to increase our understanding of organizations.

Viewed from a perspective of her writings, logical positivism and nonlinear dynamics are not antithetical, but rather inseparable paradigms that should inform each other in the pursuit of a greater understanding of social phenomena. Thus, experiments should be undertaken, but in the context of an understanding of the nonlinearity that pervades social systems. While she clearly saw nonlinear dynamics at work in human and organizational systems, she also advocated the methods of experimentation and observation as a way of coping with nonlinear social phenomena. Experimentation must, in her view, approach the phenomenon under study from a stance of ascertaining

> a varying thing in relation to a varying thing, taking into account that these are affecting each other simultaneously. We must therefore in the social sciences develop methods for watching varying activities in their relatings to other varying activities. We cannot watch the strikers and *then* the mill-owners. We cannot watch France and *then* Germany. . . the activity between mill-owners and strikers is changing the activity of mill-owners, of strikers . . . France is not responding to Germany, but to the relation between France and Germany. . . The interweaving which is changing both factors and creating constantly new situations should be the study of the student of the social sciences. (Follett, 1951 p. 68-69)

One implication of her thinking, then, is the question of how "data" should be viewed by social scientists. For logical positivists, data from a logical, well-constructed research design esconced in the scientific method, constitute facts. To nonlinear dynamicists, such data is questionable in its validity simply because it was generated from a positivistic approach. Follett's view of data, or "facts" is that

> to view facts in relation to one another is of the utmost importance, and that fact finding and fact-presentation must take this very seriously into account. One might go further and say that the value of every fact depends on its position in the whole world-process, is bound up in its multitudinous relations. One might go further still and say that a fact out of relation is not a fact. . . Moreover, those who wish conclusions to be drawn always from precise measurements, forget that many of our problems defy the possibility of precise measurements. For instance, what is the minimum a girl can live on 'in health and decency?' --the phrase used in the Massachussets Minimum Wage Law. (Follett, 1951, p. 12)

Follett understood the necessity of measuring and evaluating data, but she also understood that data exist in broader, nonlinear contexts. Her view, then, of social science research has important implications for those who work in the field today.

The answer to mapping and understanding nonlinear systems likely does not lie in the increased use of increasingly sophisticated computer models or statistical techniques, but rather in the use of these techniques *along with* research methods that are grounded in the context of the phenomenon under study, such as participant-observation or in-depth case studies. Such a view would require that social scientists operate from a more flexible repertoire of research methodologies, and that research methods be chosen based on level of analysis and the potential degree of nonlinearity of the system under study.

Harvey and Reed (1996) have conceptualized research methods into domains of modeling, and argued that higher levels of ontological complexity in systems require methods such as historical narratives and other qualitative methods in order to investigate such phenomena; lower levels of ontological complexity in social systems, conversely, may be more amenable to traditional quantitative techniques (Harvey & Reed, 1996). The key, then, is to avoid misapplication of method to the system under study. In general, qualitative methods will likely be more amenable, at least initially, to the study of nonlinear social phenomena; this is due to the fact that

> In order to understand chaos, it must be examined in its dynamic, unpredictable setting, as it occurs . . . Quantitative techniques, for the most part, presuppose a static snap-shot of the organization in the form of data. To capture the chaotic nature of a [complex adaptive] system, a massive amount of quantitative data is required, more than most researchers can afford to collect. On the other hand, interviews and observation can provide pertinent information for understanding the negotiated, changing nature of chaotic social systems. . . While qualitative studies might incur problems of intersubjectivity and low reliability, they can have the advantage of efficiently producing a large amount of valid data which is necessary to understand how a chaotic social system might behave (Gregersen & Sailer, 1993, pp. 797-798)

Also, understanding "facts" in their relation to their position and valence in the "whole world-process" will require that phenomena be increasingly studied via interdisciplinary research designs as well; Follett argued that

> the correlation of the results of entirely independent observation in different fields might be interesting . . . we might get an appreciation of

> the full import of certain conceptions in one field of study by a cognizance of their value in other fields, that the cross-fertilizations, so to speak, which are now going on in our thinking are worthy of recognition. (Follett, 1951, p. xvii)

Both experimentation and observation, using a variety of research techniques, from a variety of disciplines, that is undertaken with an understanding of the basic nonlinear laws of human social systems, will yield more significant knowledge than our discipline has currently amassed: that was the vision Mary Parker Follett had for social science research.

Additionally, it should be noted that Follett did not take the view that such research should be carried out solely for the academic goal of "understanding phenomena as they are." Follett's purpose in delinating nonlinear principles of human systems was not an end in itself; rather, it was done with the hope that through a deeper understanding of human interaction social scientists might be able to "make human interplay productive (Follett, 1951, p. xi)." She once noted that "brilliant empiricists have poked much pleasant fun at those who tell us of some vague should-be instead of what is. We want something more than either of these; we want to find out what *may* be, the possibilities now open to us. This we can discover only by experiment (Follett, 1951, p. xi-xii)."

Mary Parker Follet believed that experimentation and theoretical understanding should serve the purpose of assisting the moral and social progress of the human community. She stated in the introduction to her book, *"Creative Experience,"* that "the object of this book is to suggest that we seek a way by which desires may interweave, that we seek a method by which the full integrity of the individual shall be one with social progress, that we try to make our daily experience yield for us larger and ever larger spiritual values (Follett, 1951, p. xiv)." Thus, for Follett, social science research has a whole different goal than it might for many in academe-- for her, social science research should actively seek to transform the social community.

Peter Drucker's view of her work seems an apt way to conclude this paper:

> She saw the society of organizations and she saw management as its generic function and specific organ well before either really existed. She did not attempt to be a systematic philosopher. She would, I suspect, have considered it intellectual arrogance. She was something far more important. She was the prophet of management. Management and society in general should welcome her return. (Drucker, 1995 p. 8-9)

We add that not only was she the prophet of management, she foresaw the principles of nonlinear dynamics as well-- she was also the prophet of chaos and complexity.

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