

Considering Causality

The clear bead at the center changes everything.

—Rumi¹

Assumptions about causality are basic to the choices we make. Whether we are brushing our teeth or casting a vote, they impinge on our expectations and actions. Yet theories about the interrelationship of cause and effect rarely claim our attention outside the classroom or the philosopher's study. They seem too abstract to be relevant to the concrete situations in which we find ourselves, where our attention focuses on more pressing questions—like why and how something is to be done.

Stepping back, however, we recognize that the very questions of why and how are the substance of causal theories, which spring from the primordial human desire to understand why things are as they are and how they change. Just as these theories vary, so can a problem be approached in different ways. Once we shift the focal length of our thought to include these underlying assumptions, new possibilities emerge—both in the way we understand our world and in the way we respond to it. Then, like “the clear bead at the center” of which Rumi spoke, these possibilities “change everything.”

Like the Air We Breathe

Presuppositions about cause and effect are as invisible and pervasive as the air we breathe. They are implicit in every world view, at work in every enterprise.

In science they influence the selection of empirical data and the tests to which the data are put. In medicine they inform the

diagnoses of disorders and prescriptions for their cure. They imbue the goals of religious belief systems and the practices they enjoin. They shape a culture's perceptions of power as well as the means by which it is attained and exerted.

In our personal lives assumptions about cause and effect are no less telling. They provide the very ground for our sense of coherence—that is, the ways we find the world intelligible and the ways we posit our relationship to it. Do we see events as random, discontinuous, and beyond our control? Or do we see effective relationships that give leverage to our actions? These are essentially questions of causality and they shape our attitudes and behaviors. They are basic to our notions of responsibility and our attributions of blame and guilt. They color our encounters with conflict, guide our efforts to find solutions. Causal assumptions even affect the relative reality we ascribe to ourselves and our world. For the relationship we see between the mental and material realms of experience can lead us to ignore one or the other as a significant determinative factor.

In eras when a world view goes unchallenged, given notions about causality are taken for granted. Considered self-evident they are no less operative for being tacitly assumed, whether by voodoo priest, Zen monk, or IBM executive. These assumptions constitute a *paradigm*, to use the term widely adopted from the work of Thomas S. Kuhn, philosopher of science.² As a mindset about how things happen, a paradigm represents the mental context within which problems are perceived and endeavors mounted. These endeavors tend to justify the assumptions on which they are based until problems—queries and data which do not fit the paradigm—accrue to dramatize the inadequacy of the paradigm's assumptions. In periods of radical change, dissonance arises between previous assumptions and present experience; the paradigm is brought into question—and into consciousness.

This is happening. Words like *synergy*, *feedback*, *causal loops*, *symbiosis* have become current and useful. They suggest that events affect each other in a back-and-forth manner, creating circuits and networks of contingency where causes and effects interact reciprocally. They express a paradigm which challenges the assumptions about causation that have dominated Western culture for over two millennia.

What this new paradigm challenges is not the notion of causality itself, that events modify each other in objective and intelligi-

ble ways, but rather the manner in which causality has been perceived. It challenges the idea that causal action flows in one direction only, from cause to effect, from producer to produced, like a series of billiard balls or falling dominoes. To understand the momentous nature of this development that is taking place in our time, let us look at what it replaces: the linear unidirectional paradigm.

The Linear Unidirectional Causal Paradigm

As the words suggest, we refer here to a one-way flow of influence from the cause *A* to the effect *B*.

$$A \rightarrow B$$

The direction of causal efficacy is from the producer to the produced, from the action of the agent or actor to its results in the acted-upon. This causal model implies that there is no new behavior in the effect *B* which cannot be traced back to its cause *A*. Another way of putting this is that there is no less information in *A* than in *B*. A corollary of this assumption, operative in scientific research, is that distinctive features in the effect *B* must correspond to similar features in the cause *A*. Hence it is assumed that similar causes yield similar effects, and that different effects derive from different causes.

By the same logic causal chains arise, as *B* acts on *C*, and *C* in turn effects *D* and so on.

$$A \rightarrow B \rightarrow C \rightarrow D \rightarrow \dots$$

The chains carry the causal impulse or efficacy onward in a series of effects, like a chain of command. By these chains of cause and effect, both explanations and predictions are made. Explanations are contrived by tracing the chain backward, to find out what started it all. Predictions are formulated by extrapolating it forward. The operative assumption is that from a complete knowledge of the present (hypothetical as that may be), the past and future can be inferred.

The unidirectional causal flow is also called "linear." In physics and mathematics the term *linear* denotes a uniform progression which, when its formula is graphed, yields a straight line. Put in informational terms, we can say that, in linear causality, inputs de-

termine outputs in proportion to the information the inputs carry. An example is a simple machine like a typewriter whose printout is determined by which keys are struck—a one to one effect, in contrast to a computer whose printout is codetermined by its memory stores. As reflected in its popular usage, the term *linear* carries connotations of *predictable* and *mechanistic*.

One-Way Causality in the West

The linear paradigm owes its centrality in Western thought to the Greeks, and particularly to the fact that it was Parmenides and not Heraclitus whose views took hold of subsequent major thinkers.

The view of reality offered by Heraclitus was dynamic: He saw reality as an ever-changing river where *panta rhei*, "everything flows," all is in process, arising and passing and yielding novelty. In contrast to such an unsettling vision, Parmenides of Elea, influenced perhaps by the earlier views of Anaximander who saw the world in terms of substance and not process, declared that all was permanence, a fullness of Being so complete and eternal that change itself comes into question—and is, indeed, denied. "If anything changes, something which was not comes to be; since not-being is nonexistent, change is impossible."³ *Ex nihilo nihil fit*, he said, "nothing comes from nothing," or, put another way, all that is must pre-exist in its cause.

The import is clear: What is really real does not change.

Plato subscribed to this equation of reality with changelessness and set it in terms that deeply influenced the history of Western thought. Reluctant to deny the experience of change, he subsumed it into permanence, positing eternal and immutable Ideal Forms from which the world of change is merely derivative. Possessed of an absolute, ultimate reality, these Ideas are unaffected by changing phenomena, whose shapes are but pale and imperfect copies of them. Whatever the degree of reality subsequently accorded to the world of change, unidirectional causality is grounded here, in the assumption that the effect pre-exists in the cause.

The principles of causation developed by Aristotle bore the Parmenidean imprint as well. Giving more attention to the empirical world of experience, Aristotle accorded reality to change. Things are as we see them, changing. Yet he still assumed that stability or permanence was primary and that, therefore, change must be accounted for as derivative from that stability—as caused by some ex-

ternal agent. Everything that moves must be moved by something else, for matter itself is passive and inert.

Aristotle's delineation of the forms of causation profoundly shaped categories of subsequent Western thought. He posited four determinants of phenomena:

- the material cause (the stuff of which a thing is made, say, the clay of a pot),
- the formal cause (the form a thing takes, the shape of the pot),
- the efficient cause (acting externally upon it, as potter to clay), and
- the final cause (the thing's purpose, or the goal the potter had in mind).

Of these four causes, only the efficient cause moves. The first two, material and formal, are motionless and incapable of change, and the fourth acts only by attraction, without itself moving. If change occurs, it must be pushed into existence (by the efficient cause) or pulled into being (by the final cause). On both their parts the action is unilateral and unidirectional. Given this unidirectionality Aristotle was, by his own logic, drawn into the postulation of an Unmoved Mover, as a final cause of phenomena. Sometimes, to explain how things become, he thought there must be a plurality of Unmoved Movers; sometimes he concluded there was only one—and in that way he saw God. This was a God whose unidirectionality of influence is so thorough and uncompromised that he is subject to no external action. This God cannot respond to lesser beings or even have a thought outside the divine self.⁴

In the third century C.E., Hellenistic philosopher Plotinus took one-way causality and cast it in imagery that strongly stamped subsequent thought. In seeking to understand the One toward which his soul and intellect yearned, this Neoplatonic mystic borrowed the image of the sun, which he saw shedding its effulgence without being affected in return. Plotinus viewed creation as a kind of "overflow of the One," and all things as emanations of this "eternally perfect, unmoved," and sun-like One.⁵ As being radiates out from the One, like light from a light bulb, its power naturally and gradually lessens with distance, and entities become progressively multiple and impure, less conscious, less real, and less valuable. In this manner "what is eternally perfect produces something inferior to itself," without its own power and radiance being in any way

lessened.⁶ The Neoplatonic postulation of one single, unaffected source of being, along with its persuasive imagery of light, entered Christian theology through Augustine and others, and firmly anchored one-way causality in the Western mind.

A millenium later the monumental work of Thomas Aquinas carried forward the one-way notion of causality and in explicitly Christian terms. Thomas used the logical necessity of the Unmoved Mover as a proof of God's existence; continuing to assume a one-way causal flow, he argued that God was necessary to avoid the only other and untenable alternative, infinite regress. In this fashion the Hebrew God who interacted with his Chosen People, scolding and making covenants with them, as well as the God of the New Testament, who entered the world to suffer in human flesh, took on the Greek mantle of static perfection. From this fusion derives God's awesome features of omnipotence, immutability, and impassibility—for by logical necessity, God is incapable of being affected by his creation. Though considered to be all-powerful, he is yet unable to change and is above all emotion or response.

Mary and the saints filled the gap between divine aloofness and human need. They were moved by the prayers of the faithful and interceded on their behalf. But when the Protestant reformers evicted these mediators, their followers were left with an absolute Unmoved Mover. His omnipotence and omniscience made the doctrine of predestination reasonable and even believable.

To be aloof from the actions of others and unaffected by them became a sign of one's moral strength.

Who, moving others are themselves as stone
Unmoved, cold and to temptation slow:
They rightly do inherit heaven's graces
And husband nature's riches from expense.

(Shakespeare, Sonnet 2)

Descartes' rationalism did not mitigate this one-way causality. In the radically dualistic move that separated mind from matter into two discontinuous realms, he accorded all efficacy to his idea of God, "infinite, eternal, immutable, independent, all-powerful, and by which I myself and everything else, if anything else does exist, have been created."⁷ God's unilateral power extends to the very concepts the thinker can make about him; that is, as Descartes ex-

plained, he can derive the idea of himself from the idea of God, but not the idea of God from the idea of himself. Therefore, he concluded, the source of the idea of God must be God himself. By virtue of the Cartesian separation of mind from matter, the aloofness of this God now becomes emulated and mirrored in the aloofness of the human mind from the phenomenal world. Categorically distinct from this world of contingency and matter, mind can now imagine itself acting upon the world in a similarly impassive and unidirectional fashion.

The rise of modern science incorporated the unidirectional causal model, although Unmoved Movers and Ideal Forms, as well as Aristotle's formal and final causes, were rejected as both unnecessary and unempirical. Only material and efficient causes remained appropriate to scientific inquiry—and both, in their different ways, were assumed to have a one-way relation to the conditions they produced. Explanations were sought by reducing phenomena to their basic components, to building blocks that could be uncovered by dissection and analysis. Changes in their condition were assumed to derive from an efficient cause or external agent impinging upon them. With Newton's law of inertia, movement no longer appeared to be a secondary characteristic, less real than stability, but the notion persisted that an external force was needed to explain changes in velocity and direction.

Newton's Third Law of Motion, stating that every action produces an equal and opposite reaction, might seem to challenge the unidirectional causal paradigm. But Newton's religious beliefs remained firmly anchored in one-way causality. The God he described is so unilaterally powerful that he need not obey the very laws he created, and so unmovable that he cannot respond to prayers.⁸

The logic of the one-way paradigm led to determinism, as Pierre Laplace, the French astronomer, demonstrated. For if everything is moved by something else, how could it act otherwise than it does? Novelty, as Parmenides had asserted, is precluded. If we could conceivably detect all the external forces at work, then we could predict the movements of every star and every atom, claimed Laplace.

In contrast to such a view and in a radically empiricist move, philosopher David Hume denied causal necessity altogether. Events have no necessary and objective connection, he said, beyond our observation of the way they succeed each other in time. To escape from the determinism implicit in the unilateral causal paradigm,

Hume and his followers had to reject the objective nature of causality itself and retreat from any claim to know the external world.

Even with the later advent of dialectical and process philosophies, unidirectional causal assumptions held sway. Hegel's dialectical progression of thesis, antithesis, and synthesis seemed to allow the new and unprecedented to arise. But what unfolds in this process is the rational principle or idea that is aloof from the random and inert material stuff of the world, and shapes it unilaterally. Alfred North Whitehead's process thought of a century later strove to give scope to creativity and the emergence of novelty. Yet he posited a Platonic realm of God and 'eternal objects' endowed with a one-way causal connection with the phenomenal world. As systems philosopher Ervin Laszlo pointed out, "Whitehead's eternal objects can ingress in actuality and thus qualify its course, but actuality does not affect them."⁹

Process theologian Charles Hartshorne, writing a generation later, made these operative assumptions about causality quite explicit. "We shall assume . . . that a 'cause' in the widest meaning of the term is always independent of its particular effect, while this is always dependent on its cause."¹⁰

Linear causal notions have shaped the scientific method in various and telling ways. An area of research is chosen and circumscribed so that causal chains can be hypothesized and detected. The variables are reduced to those that can be empirically tested and controlled. Seeking the root cause or "active ingredient," variables are artificially separated and tested one at a time, in disregard or ignorance of their action on each other. As he proceeds, the scientist makes the caveat of "all other things being equal," although that assumption is empirically unverified.

This methodology has yielded powerful results. They seemed, at least until recently, to have served the goals of analysis, predictability, and control. But, as the tools and inquiries of scientists expand, it is increasingly evident that the universe does not always conform to expectations. When events interact and patterns are superimposed on each other, they yield novel, unpredictable, nonlinear results. As Ian Stewart, a mathematician working in chaos theory, states: "Linearity is a trap. The behavior of linear equations—like that of choirboys—is far from typical. But if you decide that only linear equations are worth thinking about, self-censorship sets in. Your textbooks fill with triumphs of linear analysis, its failures buried so deep that the graves go unmarked and the existence of the graves goes unremarked."¹¹

One-Way Causality in Indian Thought

The notion that causal efficacy flows in one direction only is not exclusive to the West. We find it enshrined in the thought of ancient India as well, though its forms and the goals that it served are distinctive and indigenous. It arose as early as the Vedas, the earliest scriptures of the second and first millennia B.C.E.

In seeking to determine the *ṛta*, or order, underlying all phenomena, the postulation was made that change can be understood in terms of a potency inherent in these phenomena. It was termed *svadhā*, or own power,—that is, a power or property inherent in the cause to produce the effect. As such it stands in clear contrast to the Aristotelian, Thomist, and Newtonian notion that change requires an external agent. Yet, as in the West, this causation was seen as operating in a one-way fashion independent of other variables and unaltered by its own effects.

With the Upaniṣads and to an extent unparalleled in the West, the reality of change itself came into question. As with Parmenides, Plato, and the Neoplatonists, the equation was made between the real and the immutable: Ultimate reality does not change. Yet in India that equation was taken more seriously. For some schools of thought, the phenomenal world of change was *māyā*, illusion. For others it was partially real or, as with Sāṃkhyan philosophy, real enough but completely disjoined from the mind and its spiritual goals. But whatever the ontological status accorded to the things of this world, they were engendered or caused in a unidirectional fashion. In the Upaniṣads and Sāṃkhya, this causal relationship was termed *satkāryavāda*, the effect pre-existing in its cause. Whether these Indian views consider change to be real or illusory, they are essentially linear; potency and efficacy are presented as flowing in one direction and deriving ultimately from a source that is supraphenomenal.

In the intellectual ferment that characterized sixth century B.C.E. in India, these notions were debated. It came to appear to some that causality hinged on the existence of a supreme agent whose reality could not be experienced, and that it was deterministic, foreclosing the possibility of novelty. While some schools of thought defended determinism, others, such as the acausalists or accidentalists, challenged it, arguing the notion that all is random. In the next chapter, as I present the Buddhist teaching that challenged these views, these ancient Indian views of causality will be described in more detail. For now, suffice it to say that all parties to

this debate assumed that causality was either linear or nonexistent—all, that is, except the Buddhists. With the teachings of Gotama the Buddha a radically new view of causality emerged.

The Mutual Causal Paradigm in the West

Assumptions of linear unidirectional causality in the West were not without exception. Alternative views arose, mainly among mathematicians and mystics, but they did not constitute a challenge to the dominant view sufficient to modify it. The visions of reality put forth by, for example, Meister Eckhart or Nicholas of Cusa implied a causal process that was not linear but circular or reciprocal. The ecstatic perspective dissolved categorical distinctions between cause and effect, and occasioned circular and seemingly paradoxical statements: "The eye by which I see God is the eye by which God sees me." Such departures, however, were neither presented nor perceived at the time as a philosophic challenge to the mainstream causal view, nor was an alternative elaborated until the mid-twentieth century.

Earlier in our century the work of physicists revealed how the position of the observer (as Albert Einstein showed) and how the act of observation (as Werner Heisenberg demonstrated) alter the perception of cause and effect. The relativization of subject and object weakened the linear causal view, but it remained for general systems theory to challenge it outright and articulate a coherent alternative.

As a metadiscipline based on the observation of invariances in many fields, general systems theory developed with the recognition that one-way causal concepts, while adequate for two-variable problems, could not be usefully applied to multivariable complex systems. Whether in the orbital patterns of atoms with more than two electrons or the electrochemical patterns of a living organism maintaining its equilibrium, variables appeared as mutually conditioned and irreducible to a linear causal chain. In consequence the systems view focused not on substance but on process—process in which cause and effect could no longer be categorically isolated.

"This scheme of isolable units acting in one-way causality has proved to be insufficient," wrote Ludwig von Bertalanffy, the biologist and father of general systems theory. "In the last resort, we must think in terms of systems of elements in mutual interaction".¹² The development of cybernetics during World War II helped in this thinking.

The invention and design of self-guiding antiaircraft missiles offered a conceptual breakthrough—a way of imaging "systems of

elements in mutual interaction." The process called "feedback," by which the missiles could monitor and correct their trajectory, was found to be analogous to the biological system's capacity to maintain and organize itself in nature. It showed how orderly and purposeful patterns, be they molecules or mammals, could subsist and evolve without recourse to Unmoved Movers or final causes. Negative feedback could explain the operation of systems in equilibrium, maintaining themselves in homeostasis against the forces of entropy, while positive feedback clarified how systems could change, grow, and complexify. Both demonstrated how, through the exchange and processing of energy and information, systems function as integrated networks.

As systems scientists seek to express the import of these concepts and of the data emerging from their studies, terms like *cyclical causality*, *reciprocal* and *mutual causality*, and *interdetermination* are employed. To those systems theorists in the natural sciences, this causal view offers a convincing alternative to previous models of nature, either as a predetermined clockwork universe or as the blind, random play of chance. To those in the social sciences it demonstrates as well the error of behaviorism with its linear model of stimulus-response. It also permits social scientists to perceive and articulate the inadequacy of diagnosing social problems and mounting social programs in terms of isolated "causes," without regard for the mutual causation between, for example, schools, jobs, housing, and health. They see this mutual causal view as heralding an intellectual revolution and as central to a new cultural paradigm emerging in our time, one which, by that token, they describe as symbiotic, synergistic, pluralistic, mutualistic.¹³

While systems pioneer Anatol Rapoport offers the opinion that the ancient world lacked "the analytical tools" for such a process-oriented concept of causality,¹⁴ others such as Magoroh Maruyama recognize that mutual causality has been the world view of many "unscientific" cultures. Indeed, Maruyama suggests that such a view has characterized much of human thinking in other parts of the world and throughout history, and that it is time that the modern West, scuttling its outmoded linear views, caught up with the rest of the world.¹⁵

The Buddhist Vision of Mutual Causality

With the emergence of this causal view in the West, it is rewarding to examine how mutual causality is presented and understood in a major religious and philosophic tradition—that of Buddhism. Buddhist thought offers a uniquely relevant perspective.

Its vision of interdependence, presenting reality as a dynamic interaction of mutually conditioning events, posits no prime cause or unconditioned absolute to which occurrences can be traced in a linear fashion.

This causal vision, known as *paṭicca samuppāda*, or dependent co-arising, underlies the Buddhist perception of the human predicament and of the liberation that is possible. It constitutes the intellectual content of the Buddha's enlightenment—that part of his transforming, intuitive realization that can be expressed in conceptual terms. It represents that character of reality, that truth about the universe, to which Gotama awoke. It is, therefore, accorded paramount importance in scripture; its understanding considered requisite to release from suffering and basic to the moral and meditative practices which the Buddhist Path upholds. Upon occasion it was identified with the Dharma itself, the order of things, the saving truth. "Whoever sees *paṭicca samuppāda* sees the *dhamma*, whoever sees the *dhamma* sees *paṭicca samuppāda*".¹⁶ It is hard to find another faith or value system where a doctrine of causality holds so explicit and so central a position.

In this doctrine, reality appears as a dynamically interdependent process. All factors, mental and physical, subsist in a web of mutual causal interaction, with no element or essence held to be immutable or autonomous. Understanding this is important because, it is held, our suffering is caused by the interplay of these factors and particularly by the delusion, craving, and aversion that arise from our misapprehension of them. We fabricate our bondage by hypostatizing and clinging to what is by nature contingent and transient. The reifications we construct falsify experience, imprison us in egos of our own making, doom our lives to endless rounds of acquisition and anxiety. Being so caused, our suffering is not endemic; it is not inevitable. It can cease, the causal play reversed. This cessation is not effected by unity with or obedience to an immutable being aloof from space-time, nor by the power of any metaphysical substance or entity. Our hope hinges on no external agency, but derives rather from the causal order itself where self and act, project and perception are mutually determining. Hence liberation entails a vision of the dependently co-arising nature of all phenomena. This vision, which amounts to a reorganization of personality, is made possible by the cleansing of perception (through meditation) and by moral conduct.

The Buddha's teaching of causality presents a radical contrast with other views that were debated in his time in India. It departed

from previous causal notion as much as the general systems view of causality does from traditional Western thought. The Buddha cut through the debates about causation by focusing not on power but on process. In *paṭicca samuppāda* he presented causality not as a function of power inherent in an agent, but as a function of relationship—of the interaction of multiple factors where cause and effect cannot be categorically isolated or traced unidirectionally. No effect arises without cause, yet no effect is predetermined, for its causes are multiple and mutually affecting. Hence there can be novelty as well as order. Thus, Buddhist teachings presented a middle way between the positions of determinism and indeterminacy that had polarized the discussion of causality.

The centrality of this vision of causality to Buddhist thought and practice is not always obvious, because *paṭicca samuppāda* is not presented as a view that can be taught and learned in the conventional sense. Integral to the concept of dependent co-arising is the belief that the preconceptions and predispositions of the mind itself shape the reality it sees. This runs counter to commonsensical notions of a world “out there” distinct from and independent of the perceiving self. A genuine understanding of mutual causality involves a transcendence of conventional dichotomies between self and world, a transformation of the way experience is processed, which amounts to an overhauling of one’s most ingrained assumptions. *Paṭicca samuppāda* is not a theory to which one assents, so much as a truth one is invited to experience, an insight one is encouraged to win, by virtue of disciplined introspection and radical attentiveness to the arising and passing away of mental and physical phenomena. The character of the reality which can break through once false constructs, dichotomies, and attachments are dissolved, has been variously termed *nirvāna*, *emptiness*, *dharma-dhatu*, *Buddha nature*. It gives rise to bliss and compassion, for, revealing the illusory nature of ego, it brings release from ego’s strategies, cravings and fears. Although its experience has been described with differing metaphors and emphases, it involves, as did the Buddha’s own enlightenment, a profound intuitive perception of dependent co-arising.

The Reciprocal Hermeneutic of Buddhism and General Systems Theory

Much can be discovered about mutual causality and its implications when we use perspectives of both general systems theory

and early Buddhist teachings. In no other bodies of thought is such a view of causal process set forth so coherently and precisely. We can employ these two perspectives to illuminate the notion of mutual causality, each from a different angle, using different data. It is not my aim to compare systems theory and the Buddha Dharma. While their views of the nature of reality may often appear to converge and complement each other, they remain two different kinds of human enterprise.

Arising from the sciences as a cross-disciplinary tool, general systems theory represents a set of conceptualizations employed to increase understanding of natural events for purposes of explanation, prediction, and control. While these conceptualizations are increasingly appropriate to considerations of value and the human quest for meaning, the aim is hardly soteriological. The aim of the Buddha Dharma is. Like other religious systems, it presents a path of liberation. The world view it offers and the ethic it teaches provide a structure of transformation, whereby it is held that suffering can be transcended and consciousness opened to that which is of irreducible reality and value.

These two enterprises differ in method as well as purpose. Both claim to be empirical, basing their constructs on experiential evidence and relying on neither revelation nor a priori reasoning, but the kinds of data used are not the same. While general systems theory employs observations afforded by tangible scientific practices, Buddhist teachings draw from subjective experience and the intuitive insights which meditative practice can yield. Although the Buddha urged his followers to win these insights for themselves, to test them in the laboratories of their own consciousnesses, they represent data or observations that are not publicly testable because they can be known only introspectively. Respect for the intrinsic contrasts between these two bodies of thought is essential if we are to bring them together and examine their respective views of mutual causality.

Notes

1. Barks, *Open Secrets, Versions of Rumi*, Quatrain 511.
2. Kuhn, *Structure of Scientific Revolutions*.
3. Reese, *Dictionary of Philosophy and Religion*, p. 413.

4. Copleston, *History of Philosophy*, pp. 55–61.
5. Plotinus, *Ennead* 5.2.1. and 5.1.6.
6. Plotinus, *Ennead* 5.1.6.
7. Reese, *Dictionary of Philosophy and Religion*, p. 125.
8. Newton, *Opticks*, cited in Griffin, *Woman and Nature*, p. 235.
9. Laszlo, *Introduction to Systems Philosophy*, p. 104.
10. Hartshorne, *Philosophers Speak to God*, p. 502.
11. Stewart, *Does God Play Dice?* p. 83.
12. von Bertalanffy, *General Systems Theory*, p. 44.
13. Dubin, "Causality and Social Systems Analysis," pp. 107–113; Fuller, *Synergetics*; Maruyama, "Mutual Causality."
14. Rapoport, "A Philosophic View."
15. Maruyama, "Paradigmatology and its Application"
16. *Majjhima Nikāya*, I.191.