

## Compartmentalization in Science and Society

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*The following is a draft section from the introduction chapter of my dissertation proposal, which addresses the the problem of isolation in science and society which results from linear thinking.*

The strength in reductionism is in isolating important information from unimportant information. A correlation which accounts for partial variance implies that an unspoken variable or variables account for the remaining variance. This haystack of unaccounted-for variance is reduced through *controlled* experiment to discover the one variable which accounts for a one-to-one correlation. The needle is *isolated* from the haystack, and so on. Isolation, then, is an effect of reductionism, of linear thinking. As illustrated in the above section, one weakness of pervasive isolation is poor coordination between isolated entities, whether it is in the sciences, government agencies, or the body and mind system.

Researching the self-organization of social movements, Fuchs (2006) writes that “searching for singular laws of the emergence of movements is an expression of one-dimensional, linear, and deterministic thinking” (p. 101). Instead, many interdependent factors from multiple levels must be combined to understand the overall social climate leading up to the movement. As described above, a fragmented approach to the holistic concept of “population health” in the US (Kapp, Simones, DeBiasi, & Kravet, 2016) and management of the NHS in the UK have failed to achieve stated outcomes as a result of poor coordination between both internal systems with internal systems and internal systems with external systems. It is now common clinical knowledge that social isolation increases risk of suicide for those with suicidal ideation (Kaori, Ando, Shimodera, Yamasaki, & Usami, 2017). Bowen found in his research on the family as an emotional unit that degree of emotional cutoff from family is one of the most reliable markers of poor differentiation of self, as it reduces the resources available to cope with crisis through emotional inflexibility in the individual (Bowen, 1978). Jung described psychopathology as the result of denying consciousness to a part of the psyche through repression. This isolated, or split-off, libidinal energy would then naturally beg to be conscious through imagination, dreams, Freudian slips, and physical or mental symptoms. For Jung, the psyche naturally compensates for imbalances caused from split-of energy, and he describes the life of the psyche as a constant tension of opposing forces, e.g. conscious/unconscious, anima/animus, introversion/extroversion (Ajaya, 2007). One pole of the opposition will naturally increase or decrease in compensatory response to the other pole in order to maintain balance around the center of gravity created by the Self.

Specialization in science began in the early Enlightenment when certain regions of the world were found to possess special advantages for certain experiments. For example, experiments with heat were easy to come by in most populated areas, but it was not yet possible to produce colder

temperatures needed for experiments that required them. After increased European interest in the Aurora Borealis (Northern Lights) during the 1710's and 1720's when a surge in solar activity made them visible in southern areas, it became apparent that northern countries had a special advantage not afforded in southern climates. A debate about the very idea of scientific specialization ensued, oscillating between the old idea of science as the learning of existing knowledge by the few as and the new idea of the accumulation of new knowledge by the specialized many. Experimentalists and observers of nature began collecting data from particular areas (literally and figuratively) of expertise and reporting back to State organizations who would aggregate and discuss the findings. These organizations, such as the *Royal Society* in Britain and *Académie des Sciences* in France, began aggregating and publishing the work in journals, which also gave opportunity to amateurs to become known in the field (Pihlaja, 2012).

Astronomy was the first field to collectively organize scientific observation from many places around the globe. This ideal of cooperation was integral to the original idea of specialization, and drew life from the value in diversity in the sciences, not only from geographical specialties but from the sheer size of data produced through collaborative effort (Pihlaja, 2012). The French *Académie of Sciences*, precursor to the National Institute of the Sciences, has written in their *Historie*:

. . . not only because the spirits need to enrich each other's views, but because the different Countries have different conveniences and different benefits for the sciences. The Nature reveals itself in varying ways for the various inhabitants of the World; she provides ones with objects for deliberation which others do not have, and announces herself sometimes more or less, depending on the region. (Académie des Sciences, 1733: 8-9, as cited in Pihlaja, 2012)

But the spirit of synthesis did not grow with the spirit of analysis. Nowhere is this plainer to see than in the explosion of the field of professional physics following World War II. The number of article abstracts in *Physical Review*, an internationally published British journal founded in 1898 which aggregated abstracts from many scientific journals, grew from 4090 abstracts in 1948, to 7500 abstracts in 1949, over 10,000 in 1954, and 84,000 in 1971 before stabilizing. The prominent American journal *Physics Review* had to constantly update its index of subjects to keep up with the increased level of specialization throughout the 1950's. "By 1955, major fields like nuclear physics, separated into six subcategories, had been added to the list. Ten years later, nuclear physics had been carved up into thirty-five distinct subcategories, and solid-state physics into thirty-eight" (Kaiser, 2012, p. 296). Unfortunately, the unprecedented explosion and specialization did not come with a complimentary degree of coordination. Samuel Goudsmit, the editor of the *Physical Review*, explained the increased isolation of specialists in 1966,

the journal "is no longer similar to the neighborhood grocery store where old customers get personal attention." Instead it had become "more like a supermarket where the manager is

hidden in an office on the top floor. As a result, lots of things are just done by routine rather than by human judgment. (Kaiser, 2012)

In *Consilience*, E. O. Wilson (1999) writes of the compartmentalization of the sciences as an artifact of scholarship and not of nature. Our current social structure is simply not prepared to handle problems which require communication across disciplines, such as environmental policy, ethics, biology, and social science, as the disciplines are not united in a common language or set of principles through which to base a collaborative effort. Wilson writes, “Each has its own practitioners, language, modes of analysis, and standards of validation. . . There has never been a better time for collaboration between scientists and philosophers, especially where they meet in the borderlands between biology, the social sciences, and the humanities.” Wilson argues that “We are approaching a new age of synthesis, when the testing of consilience is the greatest of all intellectual challenges” (pp. 22-25), and that this change will only occur when a shift is made toward the early enlightenment ideal of the synthesis knowledge:

Win or lose, true reform will aim at the consilience of science with the social sciences and humanities in scholarship and teaching. *Every college student should be able to answer the following question: What is the relation between science and the humanities, and how is it important for human welfare?* [italics added] Every public intellectual and political leader should be able to answer that question as well. Already half the legislation coming before the United States Congress contains important scientific and technological components. Most of the issues that vex humanity daily—ethnic conflict, arms escalation, overpopulation, abortion, environment, endemic poverty, to cite several most persistently before us—cannot be solved without integrating knowledge from the natural sciences with that of the social sciences and humanities. Only fluency across the boundaries will provide a clear view of the world as it really is, not as seen through the lens of ideologies and religious dogmas or commanded by myopic response to immediate need. Yet the vast majority of our political leaders are trained exclusively in the social sciences and humanities, and have little or no knowledge of the natural sciences. The same is true of the public intellectuals, the columnists, the media interrogators, and think-tank gurus. The best of their analyses are careful and responsible, and sometimes correct, but the substantive base of their wisdom is fragmented and lopsided. (1999, pp. 26-27)

In his writing on systems philosophy, Erwin Laszlo (1971) argued for the return of philosophy to the most important problems of the day, in that philosophy has lost its grounding in substantive questions about nature and the sciences through increased specialization of science: “Lest philosophers analyze themselves out of philosophy, a return must be effected to synthesis. . . . Synthesis can mean the conjoining various sets of non-philosophically researched data, to furnish new avenues toward the constructive discussion of substantive philosophical issues” (p. 55). Frodeman (2013) writes “The institutional status of philosophy—e.g., its functioning as a discipline—was the great blind spot of twentieth (and now twenty-first) century philosophy. This is part of what has led philosophy, potentially the most relevant of subjects, to become a synonym for

irrelevance” (p. 1918). It is uncoordinated specialization which detracts from the meaning-making which can occur through synthesis, both at the level of science and the level of the human soul. Laszlo suggests that reductionism is the new nihilism. People need to feel as though they have a purpose, as though their existence plays some role in the big picture. Laszlo (1971) writes,

In earlier epochs they were guided by synthetic modes of thought which rested in part on faith and imagination; but the great myths of former ages and the religions of our immediate heritage have lost their cogency to millions. According to “ideologues,” they are capable of being replaced by action-oriented ideologies, like Nazism and Communism, which present a total world-view with explicit directives for action. (p. 112)

Laszlo argues that the obsession with analysis and subsequent loss of meaning partially accounts for the surging popularity of “Eastern sacred texts, astrology, reincarnation, states of consciousness, and the like” (p. 112). Thus, science, the humanities, and spirituality are intimate bedfellows through the common “demand to ‘see things whole’” (Laszlo, 1971, p. 112). “All this requires the resuscitation of a mode of rational and systematic thinking which has fallen into disrepute through overinsistence on detailed investigation and specialization” (Laszlo, 1971, p. 113).

This dilemma was as alive in the 19<sup>th</sup> century as it is today, when Nietzsche (1886, as cited in Frodeman, 2013) wrote,

The dangers for a philosopher’s development are indeed so manifold today that one may doubt whether this fruit can still ripen at all. The scope and the tower-building of the sciences has grown to be enormous, and with this the probability that the philosopher grows weary while still learning or allows himself to be detained somewhere to become a ‘specialist’—so he never attains his proper level, the height for a comprehensive look, for looking around, for looking down. Or he attains it too late, when his best time and strength are spent—or impaired, coarsened, degenerated, so that his overall value judgment does not mean much anymore. It may be precisely the sensitivity of his intellectual conscience that leads him to delay somewhere along the way and to be late: he is afraid of the seduction to become a dilettante... (Nietzsche 1886, p. 134)

“The world has problems, but universities have departments” (Brewer, 1999, p. 328, as cited in Cronin, 2008). All propose the solution of philosophy’s return as a binding force in the application of science to human life. “Philosophers need to get out of the study, and into the field,” Frodeman writes, (2013, p. 1918), and begin to combine the fruits of analytical science for the good of human life. Wilson believes that the thinkers of the enlightenment “got it mostly right the first time” assuming a “unity of knowledge” (Wilson, 1999, p. kpp 20) as in Sir Francis Bacon utopian *Solomon’s House*, a loom weaving together the threads of knowledge contributed by

different scholars of different problems (Pihlaja, 2012).

That early Enlightenment ideal resulted in an explosion of curiosity about the natural world that became “the West’s greatest contribution to civilization” (Wilson, 1999, p. kpp 29). The result of an effected synthesis could be an evolutionary leap for science’s ability to handle the pressing problems of today. If reductionism implies *atomism*, then the above may appear a case for its opposite, *holism*. But holism in itself, which holds the entire problem in view providing the opportunity for properties of the whole not evident in the parts to emerge, is still a branch too far from the trunk (Bunge, 2003). Barring claims of omniscience from sages of the ancient past, no human possesses nor can make use of all there is to know of the natural world. And yet, progress in all forms can be well informed by the thoughtful coordination of diverse minds and abilities. Analysis and synthesis have their places, and yet some kind of integration is required. A way of thinking is needed that can simultaneously account for the part as well as the whole. This way of thinking must both move freely between synthesis of analysis, and possibly go beyond synthesis and analysis.

### References

- Ajaya, S. (2007). *Psychotherapy east and west: A unifying pardigm*. Honesdale, PA: Himalayan Institute of Yoga Science and Philosophy.
- Bowen, M. (1978). *Family therapy in clinical practice*. New York, NY: Jason Aronson.
- Bunge, M. (2003). General Systems and Holism. In G. Midgley (Ed.), *Systems Thinking* (pp. 103-109).
- Frodeman, R. (2013). Philosophy dedisciplined. *Synthese*, 190, 1917–1936.
- Fuchs, C. (2006, February). The Self-Organization of Social Movements. *Systemic Practice and Action Research*, 19(1), 101-137.
- Kaiser, D. (2012, June 05). Booms, Busts, and the World of Ideas: Enrollment Pressures and the Challenge of Specialization. *Osiris*, 27(1), 276-302.
- Kaori, E., Ando, S., Shimodera, S., Yamasaki, S., & Usami, S. (2017, April 27). Future directions in suicide research and prevention. *Journal of Adolescent Health*.
- Kapp, J. M., Simones, E. J., DeBiasi, A., & Kravet, S. J. (2016). A Conceptual Framework for a Systems Thinking Approach to US Population Health. *Systems Research and Behavioral Science*.
- Laszlo, E. (1971). Systems philosophy. In G. Midgley (Ed.), *Systems thinking* (pp. 110-118).

London, England: Sage Publications Ltd.

Pihlaja, P. M. (2012). Northern Laboratories of Nature and the Quest for Scientific Honour in Early Modern Sweden. *Acta Boreala: A Nordic Journal of Circumpolar Societies*, 29(2), 119-136.

Wilson, E. O. (1999). *Consilience: The Unity of Knowledge*. New York, NY: Alfred A. Knopf.