Fred Emery: Creator of timeless work from a timeless land

Merrelyn Emery
Adjunct Professor
Concordia University
Department of Applied Human Sciences
121 Summerville Crescent
Florey, ACT 2615
Australia
Email: memery9@outlook.com

February 2016

Abstract

This chapter documents the evolution of an approach to social science based on material universals or reality, open systems theory (OST). OST diverges from approaches based on abstract universals. The chapter traces the development of its key concepts and attempts to convey some feeling for the man responsible for most of its development. It attempts to convey not only Fred's intellectual brilliance but also hints at his complex mixture of free spirit, respecter of life, self-determination and participative democracy, 'workaholic', idealist, scientist, academic, heretic and generous, dry witted colleague as much, if not more, at home on the factory floor than in the ivory tower. His origins as a working class kid from the bush meant Fred learnt from the world around him while also quickly seizing the opportunities inherent in formal education. These origins go a long way to explain his determination to create a social science that actually works in both theory and practice. Such a task demanded much rethinking starting with the first key building block of the new conceptual framework, the revolutionary concept of an extended social field. It proceeded on multiple fronts, an operational definition of people, his discovery of the genotypical organizational design principles, the gradual exposition of the set of ideals and maladaptions, the perceptual basis of ecological learning, the design and continual improvement of methods based on the new framework of ideas. Because ordinary people could use those ideas to move the world towards a more adaptive and desirable future, they spread around the world. Throughout his life a diverse group of people cohered around Fred and OST. They have continued the work of practicing with, and further developing, it. New elements of theory have further enriched OST while increasing the reliability of methods. Loopholes have been closed and internal consistencies resolved while the world continues to furnish us with a rich array of new opportunities for such developments.

Key words: contextualism, design principles, ecological learning, open systems theory, Participative Design Workshop, Search Conference,

Fred Emery (1925–97) was one of those rare people, a polymath, who left school as the top student at 14 and at 67 was awarded a Doctorate of Science, an extremely rare distinction. His contributions range over science and social science including economics (Crombie, 1986). He originally chose psychology, but no discipline could confine him (Singh, 1986). When asked what he did or what social science meant, he invariably answered "anything with people in it." That phrase covers everything from environmental pollution (F. Emery, 1964) to alcohol (too many references to mention) to economics (F. Emery, 1978a; F. Emery, 1993a, pp. 188–195) to epistemology (F. Emery, 1980a), back to scientific logic (F. Emery & M. Emery, 1997) and creativity (F. Emery, 1999).

The work continues. Fred inspired many, including me. This chapter cannot do justice to the range or richness of Fred's work or contemporary open systems theory (OST).

Influences and Motivations –learning from reality

Like everybody, Fred was a product of his time and his culture. Born in Narrogin, Western Australia, second son of a shearer and drover, Fred, like all bush kids ran free, learning from his surroundings.

Later, on the coast, Fred became a surfer. He constantly redesigned his boards, striving for perfection. That is the story of his life. And to a far greater extent than for most people, Fred's work was his life. His collected works list over 750 unpublished papers on top of his published books and articles.

After leaving school, he gained matriculation through night classes, started as an office boy in the Department of Mines and organized a cheese factory to improve working conditions. Again, this is a major theme in Fred's life: a belief in the equality and dignity of all people, with an unquenchable desire to see that belief brought to reality. He analyzed democracy and Aboriginal oppression at twenty-one (F. Emery, 1946), worked on minorities (Katz & F. Emery, 1951) and rural communities (Oeser & F. Emery, 1954).

Fred was raised Catholic but rejected that belief system early as he later rejected others. His money was on science. He was critical of much of the work he saw around him as it deviated from logic, scientific method and/or denied common human experience.

Prepared by tough bush pragmatism and a curious mind, Fred was propelled towards contextualism, not mechanism (Pepper, 1942), systems not reductionism. Fred chose to view life through an open rather than a closed systems lens because real species in real environments change each other. He rejected as nonsense the idea that you can understand anything one variable at a time.

He did not, however, reject analysis any more than did Angyal (1941a), but *did* create a systemic statistical method (below).

He knew he had a special gift, which conferred additional responsibility upon him. To acquit that responsibility, he worked uncompromisingly, striving for the right answers that derived from realism (Mead, 1932)—material rather than abstract universals (Feibleman, 1946)—that stream of thought throughout history he and Eric Trist dubbed the 'Thin Red Line' (M. Emery, 2000a).

Fred's work followed the Thin Red Line as it was highly conceptual but also practical, thoroughly tested in reality. It had to 'work', to fulfil what he saw as the unique responsibility of the social sciences, the "mutual enrichment of social science and the important practical

affairs of people" (F. Emery, 1977, p. 199). His lasting achievements confirm the benefits of that mutuality.

Fred was always generous with his time and intellectual contributions, with workers and academics alike and was greeted as a mate when he returned to democratized organizations. But not everybody loved him or his work. Far from it. Some were implacably opposed, within academia and without (Watkins, 1986; F. Emery, 1987).

Fred fought back, stayed optimistic and carried on (e.g. F. Emery, 1969).

Fred showed no false sentimentality and had no heroes. Kurt Lewin would have come closest (M. Emery, 1997a) but only his systems, not his human relations work (Trist, 1997; M. Emery, 2000b). Fred followed ideas and ideals. He appreciated excellent work wherever it was. He enjoyed two prolonged overlapping working relationships, with Eric Trist and Merrelyn Emery. Those relationships and many more temporary partnerships are reflected in his publications.

Key Contributions: setting the foundations for a reality based social science

Fred's primary contribution was undoubtedly the creative insight into and construction over time of a conceptual framework that accurately grounds human realities. It allows us to approach questions confidently because perusing every component of the open system (Figure 1) reduces the probability of an ambush by an unperused component. That framework is open systems 'theory' (OST), previously 'thinking'. Fred asked, not long before his death, whether it was sufficiently solid to qualify as a genuine theory. We decided it did.

OST did not developed in any linear fashion. It developed through a series of insightful leaps occasioned by work either theoretical or in the field, which sometimes necessitated revision. Then the work went forward again. Many leaps were circulated informally or published years later.

From organizational environment to extended social field of directive correlations

The first and most important building block in any framework is clarity about what sort of world we live in. To achieve that, Fred grappled with that part of the open system Bertalanffy (1950) left undefined - "those processes in the environment itself which are among the determining conditions of the exchanges (between system and environment)" (F. Emery & Trist, 1965, p. 54). He designed an exploration of it into the first Search Conference in 1959 (Trist & F. Emery, 1960), related it to the feeding of cats (F. Emery, 1960) and in 1961 wrote notes on "causal texture" (unpublished).

In 1963, he presented his thoughts to the Informal European Group, a small, diverse "invisible college" of social scientists following embryonic ideas. Later that year, F. Emery & Trist presented a paper conceptualizing "organizational environments" to the XVII International Psychology Congress, where it was met with "a total lack of reaction" (F. Emery, 1980b, p. 92). The final draft was F. Emery & Trist (1965).

They defined the environment as the "processes through which parts of the environment become related to each other, that is, its causal texture – the area of interdependencies that belong within the environment itself" (F. Emery & Trist, 1965, p. 54).

As conceptualization proceeded, Fred adopted Angyal's (1941b) exposition of a system as having one and only one construction principle which delineated system and field. He deepened our understanding of how to plan in the face of increasing relevant uncertainty with Sommerhoff's concept of 'directive correlation' (1950, 1969) and Lewin's concept of 'overlapping temporal gestalten (1936). Search Conferences showed the social environment was global (F. Emery, 1972, p. 38).

Figure 1 (Emery M, 1999, p. 8) below presents the most easily comprehended visual of the open system
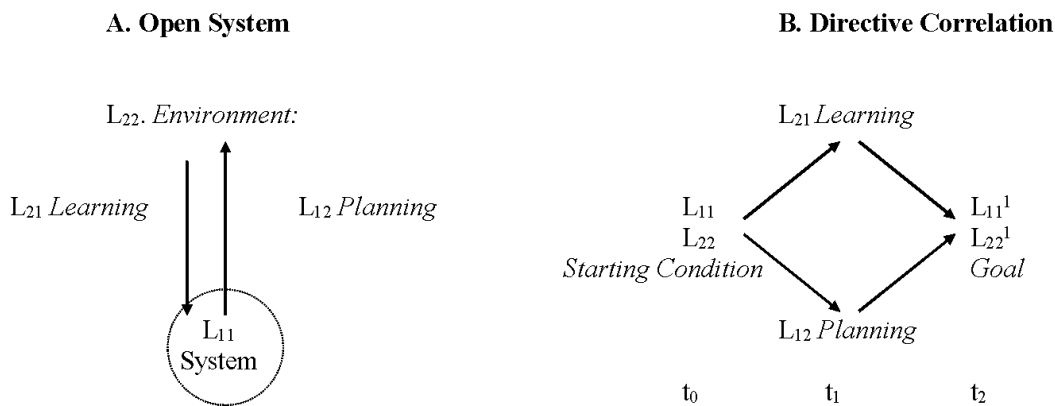

A. Open System   **B. Directive Correlation**

Figure 1. The Basic Models of Open System and Directive Correlation

In Figure 1A, L stands for laws that govern the components. A system (1) acts upon the environment (2) through planning (L_{12}). The environment acts upon the system and is known to us through learning (L_{21}). L_{11} and L_{22} express the intrinsic nature of the system and environment respectively.

Figure 1B shows the original condition of the system and environment at t_0, where both are making changes at t_1. These result in a new set of conditions consisting of a changed system and a changed environment at t_2. In the case shown, the changes are directively correlated, determining the same outcome and are, therefore, adaptive. There are of course, an infinite number of cases in which system and environment are not directively correlated and, therefore, stand in a maladaptive relationship.

The critical differences between models A and B are:

- the open system is a picture of a point *in time* with change expressed through learning and planning, while the directive correlation is a picture *over time*;
- the open system includes adaptive and maladaptive relations, while the directive correlation expresses precisely when adaptation is or is not occurring

Armed with both static and dynamic models, we can conceptualize, plan, execute and monitor practical progress in every component.

New environment. Along with this conceptualization, F. Emery & Trist (1965) also outlined changes in the social environment over human history. They discovered an entirely new type of environment, the Type IV, which for the first time is dynamic because value systems have become unstable; people are changing their minds about what they believe in. This means an increase in *"relevant uncertainty"* (p59) for any entity trying to plan or predict.

Organizational stability became precarious because what worked in the previous environment is not guaranteed to work in the Type IV.

To regain organizational stability, they suggested "values that have overriding significance for all members of the field" (p. 61), hard to find. They also recognized that the new environment demanded a different form of organization from the hierarchically structured forms to which we are accustomed, but how? The breakthrough came with discovery of the genotypical design principles (F. Emery, (1967) where the second principle suggested a new comprehensive strategy of active adaptation.

The interrelations of the four types of causal texture or environments identified gradually became clear over time. M. Emery (1982) investigated Type II cultures and then Baburoglu (1988) confirmed that approximations of the Type V environment (Emery & Trist, 1972b, p. xiii) emerge on the edges of Type IV. Together with Fred's work on the break between Type III and IV (below), they confirmed that Types II to IV formed a real historical sequence.

Despite the far reaching practical implications of the 1965 paper, it is much cited, rarely used (F. Emery, 1980b). The word 'turbulence', which Fred hated because it was misleading is thrown around with gay abandon. Turbulence was to many simply the result of sheer complexity of life, a thought Fred disputed (F. Emery, 1977, p. 14). The message that there is a new L_{22} demanding radical new approaches, is largely ignored.

Aetiology of New Environment. Fred was never afraid to change his mind. Researching the role of youth during the 1960s cultural revolution crystallized doubts about his previous explanations for the origin of the Type IV environment.

He realized the break point between the old society, the Type III and the new society Kerouac and Ginsberg were reporting, the Type IV, lay in the huge increase in productivity demonstrated during WWII and the advent of thermonuclear devices. These events caused the demise of two silent assumptions:

(a) That there is not enough to go around…and hence some centralized bodies or agreed practices must exist to ensure survival of the 'worthy'
(b) Preservation of the nation-state as the prior requirement for having adequate centralized power to allocate; and hence all individual aspirations must be sub-ordinated to the nation's requirements for waging war and to preserving and enhancing that power.

With these assumptions gone, "the last rationalization for the subordination of the individual to his institutions was crippled" (F. Emery, 1978, p. 15). With the bedrock of a stable value system shattered, people now had to work out for themselves what they valued. Voila! Relevant uncertainty.

People as purposeful systems

It seems obvious that a workable social science requires an accurate operational definition of a person yet social science features many species of impoverished human. Some are imprisoned within boundaries like skin or life space (e.g. Lewin), who must be taught to cooperate (e.g. the Human Relations school), are subject to irresistible forces (e.g. Freud,), and must guess reality from their instrument panel (e.g. Maturana & Varela, 1980).

In contrast, OST sees people who purposefully change the world through conversation (deLaguna, 1963) with a huge range of motives and affects (Tomkins, 1962, 1963),

influenced by their panorama of social ties (Greco, 1950). OST defines people as open purposeful systems producing:

(1) the same functional type of outcome in different structural ways in the same structural environment and (2) who can also produce functionally different outcomes in the same and different structural environments. Purposeful systems can, therefore, change their goals in constant conditions as well as the means by which to pursue them, displaying *will* (Ackoff & F. Emery, 1972, p. 31).

 'Purposeful' presupposes consciousness defined as "awareness of awareness" (Chein, 1972, p. 95). These are distinctively human properties defined over the ecosystem (Sommerhoff, 1969; Johnston & Turvey, 1980).

Ideals and maladaptions

Ideal seeking. In OST, people are not limited to being purposeful but can, under certain conditions seek ideals. Ideals started to become clear when Ackoff & F. Emery (1972) discussed using organizations as instruments and choosing between purposes. People may choose outcomes which are not necessarily possible in the time available, or perhaps, ever. These outcomes are the 'ideals', endlessly approachable but unattainable in themselves (F. Emery, 1977, p. 69).

Search Conferences which reliably elicit ideal seeking demonstrate its properties in uniting diverse groups and stabilizing a direction toward active adaptation. Ideals override values allowing diverse groups to unify. "There is an asymmetry between ideals and values" (F. Emery, 1977, p. 70). Constantly observing a value does not result in ideal seeking but pursuing an ideal generates values to guide that pursuit.

The set of ideals consists of is *homonomy* (Angyal, 1965), the sense of belongingness and interdependence, *nurturance* (cultivating and using those means which contribute to the health and beauty of the whole), *humanity* (expressing what is appropriate, fitting and effective for people) and *beauty* (that which is aesthetically ordered and intrinsically attractive) (F. Emery, 1977, pp.70–76).

Maladaptions. As noted above, some corresponding actions of system and environment result in maladaptions which emerge "where choice . . . becomes too difficult and too anxiety laden, and yet choice is unavoidable (so) we can expect the effects to be manifested on one or more of the . . . dimensions of purposeful choice" (F. Emery, 1977, p. 31). Some of those effects, the maladaptions, are passive because they are directed only at uncertainty reduction, not the source of it, by the masses who are usually not responsible for it. Others are active because when the elites perceive a social breakdown or an improvement, they initiate strategies to achieve changed ends.

The first maladaptions documented were passive: superficiality, segmentation and dissociation (F. Emery, 1972). Doomsday arrived five years later (F. Emery, 1977). Crombie (1972) contributed the first active maladaption, synoptic idealism.

A practical project then provided the impetus for two innovations, a usable framework for an analysis of 'the state of the nation' and a new method for transforming Search Conference data into snapshots of the mix of adaptations and maladaption, our societal health (F. Emery & M. Emery, 1979, p. 336). Translating raw qualitative data into a quantitative picture inspired further developments (below).

Genotypical organizational design principles

Social climates. Fred was very excited when he heard about Lewin's experiments (Lewin. Lippitt, & White, 1939) which found systemic differences between democratic and autocratic "social climates" and accidentally discovered a third named 'laissez-faire' (Lippitt, 1940). Many people practice laissez-faire, do your own thing, thinking that they are being democratic just because they are not controlling autocratically (White, 1990). But there are two states that are not democratic.

The three climates produced very different behaviors with democracy being most positive and productive (Lippitt & White, 1943, 1947).

Sociotechnical systems. Fred was even more excited when he learnt of the natural experiment that constituted the birth of sociotechnical systems (Trist & Bamforth, 1951). He recognized the continuity of results from the social climates research and went to work with Trist in 1951.

Like all coal miners, those in Britain worked in "small groups who took responsibilities for the whole cycle . . . [and] worked autonomously" (Trist, 1993 p. 37). New technology had destroyed the old team structure, changing it to 'one man, one job'. Rather than increase productivity and profit, the change brought an increase in accidents and the same pathologies observed in autocracy.

To reverse the damage, the men with union support matched the best features of the technology with the best features of old democratic social structure. This matching came to be known as "jointly optimized sociotechnical systems" (STS).

"The technological imperative could be disobeyed" (Trist, 1993, p. 38). The hugely positive economic and social benefits inspired a gold rush of research around the world (Trist, 1993). The main characteristics of STS were extracted (F. Emery, 1959), which groundwork led to the success of the Norwegian Industrial Democracy Project.

Principles discovered. By 1960, Norwegian industry needed urgent revitalization after the devastation of World War II, and representative democracy had not worked (F. Emery & Thorsrud, 1969). It still doesn't (Palmer & McGraw, 1996).

The Tavistock Institute was invited to try STS in four nationally significant experiments which was "risky, almost foolhardy" (F. Emery, 1985). However, the experiments successfully redesigned autocratic into democratic sites with increased productivity and lowered costs (F. Emery & Thorsrud, 1976). It was during this work that Fred discovered the two basic design principles that underlie all organizational structures, independently discovered by Eisler (1995, p. 105). He introduced them thus:
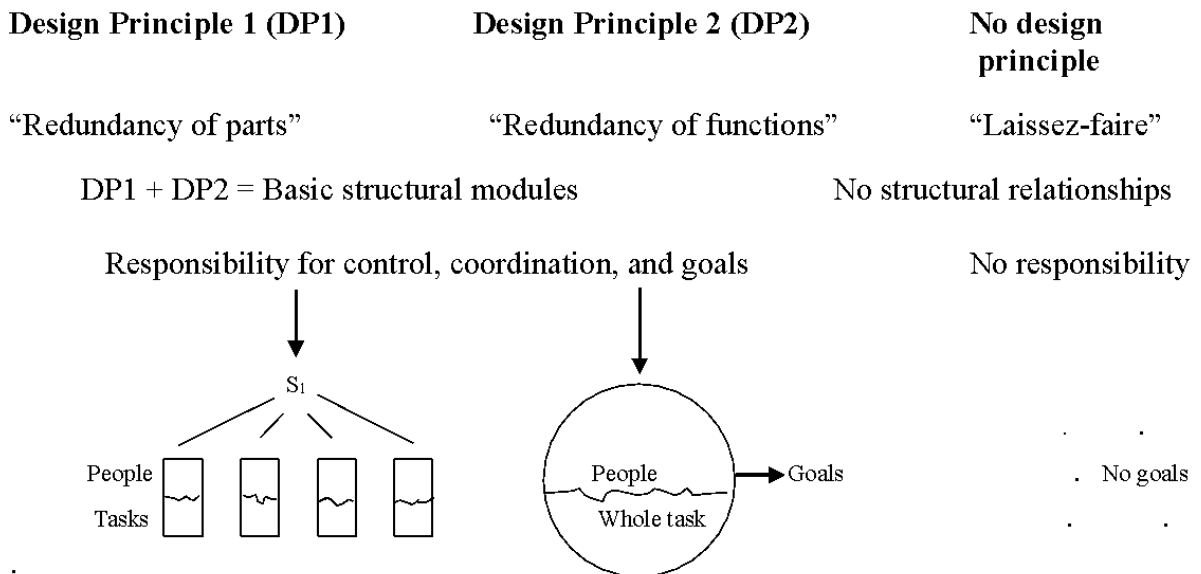
The choice in basic organizational design is really between strengthening and elaborating special social mechanisms of control or by increasing the adaptiveness of its individual members; the latter is a feasible strategy in a turbulent environment and one to which western societies seem culturally biased (F. Emery, 1967a, p. 924). In other words, the choice is between two principles on which to design an organizational structure, *design principles*.

Principles explained. The first design principle, DP1, is redundancy of parts because there are more parts (people) than are required to perform a task at any one given time. The second, DP2, is redundancy of function because more skills and functions are built into every person than that person can use at any one time. Later Fred realized location of responsibility

for coordination and control was a critical feature that further defined the two principles as mutually exclusive.

The principles are genotypical because they operate at the fundamental level, not the phenotypical level at which most 'restructurings' are performed.

Genotypical Design Principles and Psychological Requirements for Productive Work

Design Principle 1 (DP1)	Design Principle 2 (DP2)	No design principle
"Redundancy of parts"	"Redundancy of functions"	"Laissez-faire"
DP1 + DP2 = Basic structural modules		No structural relationships
Responsibility for control, coordination, and goals		No responsibility

Note: S_1 = first-line supervisor.

Figure 2: Genotypical Organizational Design Principles

In DP1 (Figure 2), responsibility for coordination and control is located at least one level above the action. Therefore, the DP1 organization is autocratic or bureaucratic. It is the master-servant relation in action where those above have the right and responsibility to tell those below what to do and how to do it. It is a structure of personal dominance, a dominant hierarchy.

To get ahead in DP1, one must compete. As soon as people are forced to compete, they must look after their own interests, and self-interest comes to dominate life in a DP1 structure. Years of exercises such as team-building have shown they cannot change this dynamic.

In DP2, responsibility for coordination and control is located with the people performing the task. The self-managing, previously called semiautonomous, group (F. Emery, 1980c), works to a comprehensive set of agreed and measurable goals. Large DP2 structures are non-dominant hierarchies of function where all change is negotiated between peers.

Rather than individual jobs, the whole group is now jointly responsible for every aspect of the task. Because they are working together to achieve agreed goals for which they are collectively responsible, DP2 engenders cooperation.

Over time DP1 deskills and demotivates, DP2 skills and motivates (F. Emery & M. Emery, 1974). DP1 causes dependency, fight or flight, pairing (M. Emery, 1999) and amplifies communication problems and personality conflicts (F. Emery & M. Emery, 1976; M. Emery, 2004). These design principles also appear to operate across the animal, biological or cellular and mechanical realms (M. Emery, 2003).

They are also major determinants of intrinsic motivation measured by the psychological requirements for productive work, or the '6 criteria' (F. Emery & Thorsrud, 1969). It is difficult to get good scores on the 6 criteria from DP1 structures, even when people appreciate their extrinsic motivators such as pay. Norway deemed the 6 criteria sufficiently important to encode them into their work environment law in 1977 (Gustavsen, 1987).

The six criteria are:

1. Elbow Room, optimal autonomy in decision making
2. Continual Learning for which there must be
   (a) some room to set goals
   (b) receipt of accurate and timely feedback
3. Variety
4. Mutual Support and Respect, helping out and being helped out by others without being asked, respect for contribution rather than IQ for example
5. Meaningfulness which consists of
   (a) doing something that society values
   (b) seeing the whole product or service to which the individual contributes
6. A desirable Future, not having a dead end job. (Adapted from Emery & Emery, 1974).

Similarly, DP1 structures amplify, while DP2 structures attenuate errors (Beer, 1972, in F. Emery, 1977) so only DP2 produces an organization "structured in such a way that its members can learn and continue to learn within it" (M. Emery 1993a, p. 2). There is no implication here that organizations can learn.

The design principles operate in every organization throughout society, including political or governance systems. DP1 produces representative government, DP2 alternatives are available (F. Emery, 1974, 1976a, 1989).

Autocratic social climate	Democratic	Laissez-faire
Non jointly optimized socio-tech*	jointly optimized	Neither
DP1 structure	DP2 structure	No design principle
		No structural relationships
* Where sociotechnical includes sociopsychological and socioecological		

The box above presents the historical changes. The three options form a complete set. If there is responsibility for coordination and control then it is either held by the actors or it isn't. Many of today's problems flow not from 'human nature' but from treating people as less than purposeful systems in DP1 structures. Solving them requires changing the principle.

Ecological learning

Fred learnt from his perceptions that all creatures learn from theirs. Pondering disputes about educational media in schools he found "the core of the traditional educational paradigms lies in epistemology, not in educational practice" (F. Emery, 1980a, p. 43).

He tracked the Western education system back to Locke, Berkeley and Hume who arguing from Newton's universe, determined that the mind began as a *tabula rasa,* blank slates on which to inscribe knowledge. From there to Kant onto Herbart we arrived at our rational, mechanistic educational system. As we become literate, we learn to distrust perceptual learning in favour of abstractions.

But Einstein disputed Newton and Heider (1958; 1959) established that human perceptual systems were evolved to directly extract environmental information. When Gibson (1966) confirmed that with fighter pilots, the Lockean paradigm was proven wrong.

Further evidence has shown we directly extract information from face-to-face social and conversational fields (F. Emery & M. Emery, 1976, pp. 20–26) and the perceptual system acts as a unit (M. Emery, 1999, pp. 54–67). Only confidence in our perceptions limits our ability to learn directly from the environment, which suggests education should pursue increasing acuity of perception (F. Emery, 1980a, p. 65). Balancing perceptual learning and teaching abstractions has additional advantages (M. Emery, 2006).

With a genuinely open system, the design principles, ideals and ecological learning, we have the sufficient conditions for ensuring that human behaviour as the product of an ecosystem is conceived as "a dynamic, evolving process where change is by transaction" between "mutually determining systems" (F. Emery, 1985b, p. 6; M. Emery, 2000a, p. 635).

Methods

OST methods are designed to produce active adaption through transaction.

Search Conference

The first Search Conference (SC) in 1959 was to merge two very different aero-engine companies. It had to be successful well into unknown future conditions so how to foretell the future? Available conceptual tools were not up the task (F. Emery, 1997, p. 37). This stimulated the conceptualization of the social field.

Using Asch's (1952) conditions for effective communication, Bion's (1952; 1961) group assumptions and Selznick's (1957) distinctive competence, the SC design covering six days is today called a "mixed mode" because it alternated between the two design principles (M. Emery, 1999, pp. 121–123). But the design principles had not been discovered.

There were numerous problems, outbreaks of dependency and fight/flight (Trist & F. Emery, 1960; M. Emery & Purser, 1996, pp. 293–297), the duration caused intellectual and emotional overload, different roles and a participant taking notes caused distrust (M. Emery & Purser, 1996, p. 298).

These problems illustrate how practicalities force theoretical development. Fred invented the rationalization of conflict (F. Emery, 1966) while continuing to experiment before intensive experimentation and conceptualization began in Australia. During the 1970s alone about four hundred Searches explored subjects as diverse as town planning by 16–25 years olds (M. Emery, 1974), Industrial Relations over 10 years which culminated in the First

Accord between Government and Unions (F. Emery, 1994), and transport where citizens designed a freeway while experts clashed with 'barefoot social scientists' (M. Emery & Purser, 1996, p. 300-301; M. Emery, 1982).

Many designs were tried (e.g., M. Emery, 1992a), from education (Williams, 1982; Davies, 1993a; Treyvaud & Davies, 1991) to Indigenous affairs (F. Emery, Konarik, & Paton, 1994; Paton & M. Emery, 1996). Periodically an event produced a breakthrough, for example, the precise relations of design principles to group assumptions were discovered in Canada in 1985 (M. Emery, 1997, 1999, pp. 121–136). Network meetings, or, 'flockings', diffused new knowledge (M. Emery & Purser, 1996, p. 305–306) and training began to counter over enthusiasm and exploitation (M. Emery, 1993b; M. Emery & Purser, 1996).

Participative design workshop (PDW)

The STS experimental phase ended in Norway with proof that there was an alternative to autocracy at work. It was time for diffusion based on people redesigning their own workplaces. Neither Fred nor Einar Thorsrud ever used the STS nine-step method (F. Emery, 1967b) again although it continued to be used elsewhere in modified form (e.g., Davis & Sullivan, 1980; Pava, 1983).

Fred and Einar had learnt that the workers knew all they needed about their work and needed only minimal concepts to design structures including mechanisms for coordination (F. Emery, 1980d). Besieged by multinationals wanting democratization, Fred designed a new method.

His simple workshop consisted of short conceptual briefings followed by staff analysing their current structure then redesigning it, building in all the practicalities required for good function. He tried it first at a government aircraft factory in 1971 and then put it through the five chemical and power plants at ICI Botany in 1972. We gradually ironed out crinkles, tested it in different countries and industries and eventually published it (F. Emery & M. Emery, 1974).

Every detailed design is unique and none may be imposed. All variations such as specialized work and demarcations, unstable or project work are covered. Mirror group and multigroup workshops increased efficiency of implementation (M. Emery, 1993c).

Since the First Accord in 1980, which repealed the Master-Servant Act and made Enterprise Bargaining Agreements legally enforceable, managements cannot overturn DP2 on a whim. We now have long lived DP2 organizations out-performing all the competition (Aughton & Butt, 2007). "There is little doubt . . . it creates highly productive, resilient organisations" with highly motivated workers, but most Australian organizations opt instead for authoritarian management styles, low productivity and poor staff motivation (James, 2009, p. 20).

Causal path analysis

In 1964, Fred devised a new systemic statistical method that reduces complexity not by predetermining a causal model and testing for goodness of fit but "by successively combining variables most like each other" (Emery, 1976b, p. 295).

This simple hierarchical linkage was revolutionary because it produces a unique solution for any matrix free of researcher bias where size of matrix is no object. The only possible subjectivity is determining the direction of causality but this obstacle is overcome by including independent variables such as demographics, which serve as anchors for causality.

New insights: enrichments, extensions, consolidation

Those inspired by Fred have contributed to OST in the last 20 years, researching, practicing, diffusing and similarly inspiring others.

Design principles continued

Laissez-faire

Laissez-faire (LF) organizations with no clear design principle, where no one takes responsibility for coordination and control, should have disappeared in 1940. Unfortunately they didn't so still demand our attention.

Today they are commonly DP1 structures on paper but with such loosened controls that confusion exists about where responsibility for control and coordination is located. Most involve a cosmetic change from supervisor to Team Leader or Coach (M. Emery, 1992b) and maybe mistaken for empowered workplaces (de Guerre, 2000; de Guerre & M. Emery, 2008). They tend to fail (Trist & Dwyer, 1993) because of predominantly negative effects and cannot serve as a halfway house between bureaucracy and democracy (Fiorelli, 1988; F. Emery, 1988). Despite LF's dismal results (workshop communications), organizations continue to grab it in preference to changing their design principle.

Choosing LF, like choosing DP1, shows that the 'bottom line' is *not* the ultimate motivator for business. It also degrades the individual (F. Emery, 1984, p. 14) and collective (M. Emery, 1996, pp. 157–163) bottom lines as people shrunken by work, shrink our productive and cultural capacity. As the global economy continues to sink, Fred's (1993b, p. 218) words seem prophetic: "The criterion for survival can be somewhat misleading in circumstances where the competing parties are all organized on the first design principle. The big battalions win the wars but lose the peace because of the price they pay for victory."

Precise measurement

To improve precision of previous measurements (e.g. F. Emery & Phillips, 1976), we isolated the design principle components, measured each and scaled them. This approach strongly confirmed that DP2, not DP1, leads to intrinsic motivation and through various enabling conditions, to productivity and low sick days (M. Emery & Aughton, 2006).

Accelerating incidence of mental illness led us to add measurements of mental health and its hypothesized determinants (deGuerre et al., 2008). The results confirmed Kristensen, Borg, and Hannerz's (2002) conclusion that Karasek's (1979) demand model is not a reliable index of job strain. (Systemic work clarifies conflicting reductionist results by contextualizing them).

This 2008 study was the first to use all relevant organizational and mental health variables. Its causal path confirmed that DP1 is a determinant of Bion's negative group assumptions (M. Emery, 1997b) and mental ill health (Trist & Bamforth, 1951). Confirmation continues (M. Emery, 2014).

Ideals and maladaptions continued

Example 1: Alvarez and M. Emery (2000) showed for the first time how to integrate previously incommensurate organizational and environmental data from organizational

Searches into quantitative data for a picture of the US Forest Service (region 9) in environment. The causal path produced guided a strategy for reform.

They dispelled the following three myths: (1) measuring complex phenomena is difficult, (2) qualitative and quantitative data are incommensurate, and (3) only a small number of variables can be addressed simultaneously (Alvarez & M. Emery, 2000, p. 701).

Example 2: A group in Montreal wondered if '9/11' really did change the world. They called in Search records from around the world, coded the L_{22} data and began analysis. The first report illuminated the Arab Spring (Emery M, 2013).

Table 1. Derivation of classification system (Emery M, 2013)				
		Possible scenarios		
			Maladaptive	
Parameters of open systems	*Parameters of choice*	*Adaptive (ideals)*	*Passive*	*Active*
L11-system	Probability of choice	Homonomy [sense of belonging]	Segmentation	Law & order
L21- environment acting on system learning	Probable effectiveness	Nurturance	Dissociation	Evangelicism
L12-system acting on environment	Probability of outcome	Humanity	Doomsday	Social engineering*
L22-environment	Relative intention	Beauty	Superficiality	Synoptic idealism

*previously called eugenics

Our understanding of the ideals and maladaptions (Table 1) have evolved from 1979:

Segmentation: the whole field fragments; *Dissociation:* denial that cooperation is more effective than acting alone; the *Doomsday:* denial that an outcome is possible, hopelessness; *Superficiality:* loss of meaning in life.

Law and Order: the elites attempt to reduce divisions, restore the whole; *Evangelicism:* uniquely initiated by the people, who identify with a person or idea for emotional support to reduce the psychic pain of isolation endured in dissociation; *Social Engineering:* to reassert the probability of an outcome; *Synoptic Idealism:* to restore lost meaning through planning for the whole.

Methods continued

Searching

After five iterations of *Searching* (M. Emery, 1976; M. Emery & F. Emery, 1978; M. Emery, 1982; M. Emery & Purser, 1996; M. Emery, 1999), today's Search Conference shares commonalities with, and differs from, its ancestor. Some original concepts are retained but, for example, while F. Emery and Trist did not expect to sustain the creative working mode (M. Emery & Purser, 1996, p. 294), we certainly do today (M. Emery, 1996, p. 149). Every aspect of design and management is now governed by internally consistent theory.
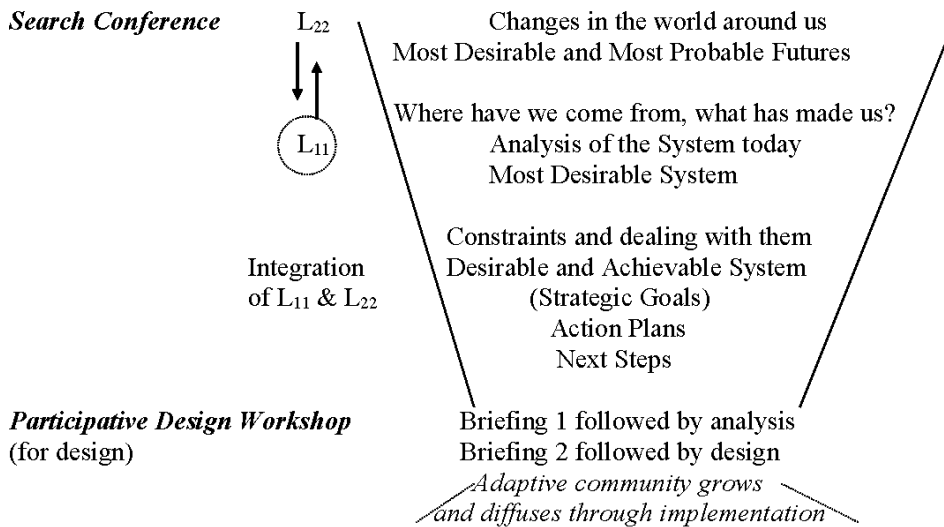
Search Conference L_{22} Changes in the world around us
                                    Most Desirable and Most Probable Futures

                          L_{11} Where have we come from, what has made us?
                                    Analysis of the System today
                                    Most Desirable System

                                    Constraints and dealing with them
        Integration   Desirable and Achievable System
        of L_{11} & L_{22} (Strategic Goals)
                                    Action Plans
                                    Next Steps

Participative Design Workshop   Briefing 1 followed by analysis
(for design)   Briefing 2 followed by design
                                    Adaptive community grows
                                    and diffuses through implementation

Figure 3. The Design of the Complete (2 stage) Model

The Search Conference translates the concept of the open system into three phases where the L_{11} and L_{22} provide the content of the work and the process is integrated learning and planning (Figure 3). Individual designs differ markedly as there is no recipe, only conceptual guidelines.

All structures are DP2, participants use ecological learning and move from purposeful to ideal seeking in pursuit of the task. Nothing is allowed to interfere with the conditions for effective communication. Trained, experienced managers can design on the run as participants become creative, grasping additional possibilities in the task.

Two-stage model

The Search Conference is designed to produce learning planning communities who take responsibility for their own affairs. It is "quite explicitly an experience of participative democracy" (M. Emery, 1999, p. xxiii). Failures in implementation (Davies, 1992, p. 281; Baburoglu, Topkaya, & Ates, 1996), however, revealed a theoretical gap.

Conceptual analysis confirmed intuitions of a missing link. The connection between the two parts of active adaptation, between the system and its environment and within the system, had been lost as the SC and PDW developed as separate methods.
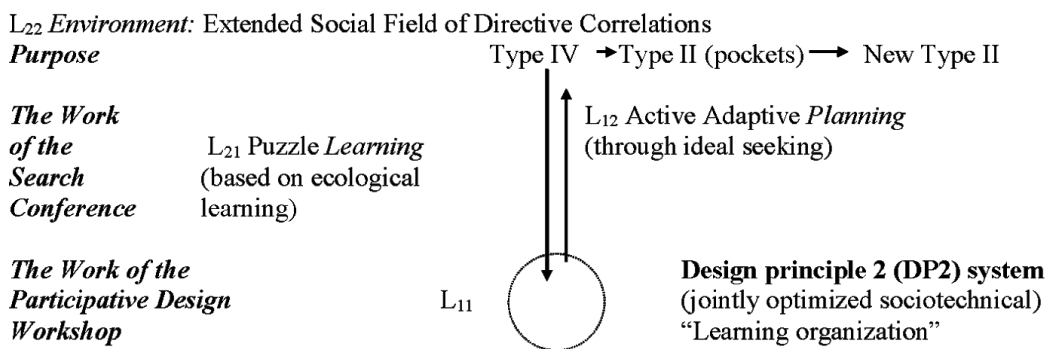
L_{22} *Environment:* Extended Social Field of Directive Correlations
Purpose   Type IV → Type II (pockets) → New Type II

The Work L_{12} Active Adaptive *Planning*
of the L_{21} Puzzle *Learning*   (through ideal seeking)
Search   (based on ecological
Conference   learning)

The Work of the   **Design principle 2 (DP2) system**
Participative Design L_{11} (jointly optimized sociotechnical)
Workshop   "Learning organization"

Figure 4. The 2 Stage Model for Active Socioecological Adaptation

14

The solution (Figure 4) was a PDW modified to design a new, not redesigned, structure (M. Emery, 1999, pp. 17–24). Early tests in Australia, Canada and the USA confirmed the two-stage model could overcome the implementation problem (M. Emery & deGuerre, 2007). This second stage, modified PDW, is simpler and quicker than the original, easy to adapt for project design and greenfield sites (M. Emery, 1999, pp. 212–215).

Unique designs (UD)

Not every circumstance requires strategic planning or structural design but all deserve care. "UDs are processes which by definition are idiosyncratic to the unique purpose of the work that needs to be done, covering problem as well as puzzle solving. They consist of relevant OST principles and processes rearranged into unique events." They complement the original methods by providing flexibility to deliver reliable results for virtually any type of work (M. Emery & deGuerre, 2007). Each UD employs some concepts and steps from the original methods appropriate to its purpose and circumstances.

Unique Designs are designed backwards:

1. Define the *outcome*, clearly and precisely.
2. Decide exactly what information the participants will need to accomplish the task. For example, would participants benefit from reviewing the history of the problem? Do they need to analyze the current context in which the problem has reappeared? Each of these pieces of information forms a discrete, participative step.
3. Arrange the required information into a smooth, logical flow of work.

Large projects like the future of Brandon, Manitoba, involve many unique events as well as two-stage models.

There is no limit on numbers or time. Even short meetings benefit from design work. UDs are not 'anything goes' but are more demanding of theory as mixing incompatible concepts causes confusion, dependency or resistance.

Legacies and unfinished business: ancient knowledge in modern form

OST is as old as humanity, when we first looked around and said, "uh oh—what do we do now?" That is an apt image for the development of OST as a social science that works. The world continues to throw up novel challenges but there is one problem above all others that requires our attention.

As neoliberalism or economic rationalism (Quiggin, 1997), seduced business away from the transformative potential inherent in DP2, back toward domination/subordination, we reap what we have sown. It is the widespread belief that we are above, can dominate, the planet that lies behind our gathering ecological catastrophe.

System crises always challenge the socially dominant worldview and the survivors will necessarily rediscover the ancient laws of life such as cooperation with people and planet. Whatever their specific requirements, OST will provide basic and reliable guidance (e.g. Emery, 2014).

Further reading

Because OST is evolutionary, old references cannot impart current theory or practice. The best sources incorporating both are:

Trist, E. L., & Murray, H. (Eds.). (1990; 1993). *The social engagement of social science: A Tavistock Anthology* (Vols. 1–2). Philadelphia: University of Pennsylvania Press. Also available from http://moderntimesworkplace.com

Trist, E. L., Emery, F., & Murray, H. (Eds.). (1997). *The social engagement of social science: A Tavistock Anthology* (Vol. 3). Philadelphia: University of Pennsylvania Press. Also available from http://moderntimesworkplace.com

Emery, M. (Ed.). (1993). *Participative design for participative democracy.* Canberra: Centre for Continuing Education, Australian National University

Emery, M. (1999). *Searching: The theory and practice of making cultural change.* Philadelphia: John Benjamins

References

Ackoff, R. L., & Emery, F. E. (1972). *On purposeful systems*. London: Tavistock.

Alvarez, R. A., & Emery, M. (2000). From action research to system in environments: A method. *Systemic Practice and Action Research. 13*(5), 683–703.

Angyal, A. (1941a). *Foundations for a science of personality*. The Commonwealth Fund. Harvard University Press. (1958)

Angyal, A. (1941b). A logic of systems. In F. E. Emery (Ed.), *Systems Thinking* (Vol. 1, pp. 27-40)*.* London: Penguin.

Angyal, A. (1965). *Neurosis & treatment: A holistic theory*. Hoboken, New Jersey: John Wiley & Sons.

Asch, S. E. (1952). *Social psychology*. New York: Prentice Hall

Aughton, P., & Butt, P. (2007). *Evolution or extinction: Organizational development for survival.* Presentation at the June meeting of the Australian Human Resources Institute National Convention, Sydney, Australia

Baburoglu, O. N. (1988). The vortical environment: The fifth in the Emery-Trist levels of organizational environments. *Human Relations. 41*(3), Baburoglu, O. N. (1988). pp. 181–210

Baburoglu, O. N., Topkaya S., & Ates, O. (1996). Post-search follow-up: Assessing Search Conference based interventions in two different industries in Turkey. *Concepts and Transformations. 1*(1), 31–50.

Beer, S. (1972). *The brain of the firm.* London: Professional Library.

Bertalanffy, L. Von. (1950). "The theory of open systems in physics and biology." In F. E. Emery, *Systems Thinking* (pp. 83–99)*.* (1981). Vol. I.

Bion, W. R. (1952). Group dynamics: A review. *International Journal of Psychoanalysis, 33*, 235–247.

Bion, W. R. (1961). *Experiences in groups*. London: Tavistock.

Chein, I. (1972). *The Science of behavior and the image of man*. New York: Basic Books

Crombie, A. D. (1972). *Planning for turbulentsSocial fields*, Ph.D. Thesis, Australian National University.

Crombie, A. (1986). The contextualist: Frederick Edmund Emery. *Quality of Work Life*. *3*(1–2), 23–26.

Davies, A. T. (1992). Setting national and local priorities: Australian consumer forum for the aged. In M. R. Weisbord (Ed.), *Discovering common ground* (pp. 265–281). San Francisco: Berrett-Kohler.

Davies, A. T. (1993a). An alternative general studies curriculum: A description, results and evaluation. In M. Emery (Ed.), *Participative design for participative democracy* (pp. 258–270). Canberra: Centre for Continuing Education.

Davies, A. T. (1993b). Participation and self-management in course, workshop and conference design: Principles and methods. In M. Emery (Ed.), *Participative design for participative democracy* (pp. 271–313). Canberra: Centre for Continuing Education, Australian National University.

Davis, L., & Sullivan, S. (1980). A new type of labor-management contract involving the quality of working life. In E. Trist & H. Murray (Eds.). (1993). *The social engagement of social science: A Tavistock Anthology: Vol. 2* (pp. 532–553). Philadelphia: University of Pennsylvania Press.

deGuerre, D. W. (2000). The codetermination of cultural change over time. *Systemic Practice and Action Research, 13*(5), 645–663.

deGuerre, D. W., & Emery M. (2008). Modern forms of laissez-faire organization. Available from authors.

deGuerre D. W., Emery M., Aughton P., Trull, A. S. (2007) Mental health in the workplace: recent results from a joint Canadian and Australian study. Presented at *Academy of Management Symposium on Socioecology: The legacy of Emery & Trist*, Philadelphia, PA

deGuerre, D. W., Emery, M., Aughton, P., Trull, A. S. (2008). Structure underlies other organizational determinants of mental health: Recent results confirm early sociotechnical systems research. *Systemic Practice and Action* Research*, 21, 359–379.

deLaguna, G. A. (1963). *Speech: Its function and development*. Bloomington, IN: Indiana University Press.

Eisler, R. (1995). *The chalice and the blade*. San Francisco: HarperCollins

Emery, F. E. (1946). Democracy Ltd. *Black Swan*. Perth. Student Union, University of Western Australia.

Emery, F. E. (1959). Characteristics of socio-technical systems. London, Tavistock Institute Document 527. In Trist, Eric & Murray, Hugh (Eds.). *The social engagement of social science: A Tavistock Anthology.* Vol II. (pp. 157–186). Philadelphia: University of Pennsylvania Press.

Emery, F. E. (1960). Some matter affecting the feeding of cats. Tavistock document T159. London. Tavistock Institute.

Emery, F. E. (1964). Report on environmental pollution. Tavistock document T.387. London. Tavistock Institute.

Emery F. E. (1966). The rationalisation of conflict: A case study. Tavistock TIHR Document, No. T821. London. Tavistock Institute.

Emery, F. E. (1967a). The next thirty years. *Human Relations, 20,* 199–237. Reprinted with postscript in *Human Relations* (1997), 5*0*(8), 885–935

Emery, F. E. (1967b). The nine-step model. In Trist, Eric & Murray, Hugh (Eds.). *The social engagement of social science: A Tavistock Anthology. Vol. 2* (pp. 567–579). Philadelphia: University of Pennsylvania Press

Emery, F. E. (1969). The historical validity of the Norwegian industrial democracy project. Tavistock Document HRC 210. In E. Trist & H. Murray (Eds.). *The social engagement of social science: A Tavistock Anthology. Vol. 2* (pp. 154–258). Philadelphia: University of Pennsylvania Press

Emery, F. E. (1972). The next thirty years: Concepts, methods and anticipations. In Emery & Trist *Towards a social ecology: Contextual appreciation of the future in the present (pp.3-79).* London: Plenum Press.

Emery F. E. (1974). Adaptive systems for our future governance. In Emery M. (Ed.) (1993). *Participative design for participative democracy.* Canberra: Centre for Continuing Education, Australian National University

Emery, F. (1976a). The jury system and participative democracy. In M. Emery. (Ed.) (1993). *Participative design for participative democracy* (pp. 207–211). Canberra: Centre for Continuing Education, Australian National University

Emery, F. E. (1976). Causal path analysis. In Emery, F. E. (Ed.) (1981). *Systems Thinking.* Vol. I. (pp. 293–298). Penguin.

Emery, F. E. (1977). *Futures We Are In.* Leiden. Martinus Nijhoff Social Sciences Division.

Emery, Fred. (1978a). The fifth wave? Embarking on the next forty years. In Emery F. E. *Limits to Choice,* (pp. 95–131). Canberra. Centre for Continuing Education, Australian National University. Also in *Human Futures*, Winter, 1–12.

Emery, F. E. (1978b). Youth - vanguard, victims, or the new vandals? In Emery F. E. *Limits to Choice,* (pp. 5–32). Canberra. Centre for Continuing Education, Australian National University.

Emery, F. E. (1980a). Educational paradigms: An epistemological revolution. In Emery, M. (Ed.) (1993). *Participative d*e*sign for participative democracy,* (pp. 40–85). Canberra. Centre for Continuing Education, Australian National University.

Emery, F. E. (1980b). This week's citation classic. In Neil J. Smelser (Compiler). (1987). *Contemporary classics in the social and behavioural sciences* (p. 292). Philadelphia: ISI Press.

Emery, F. E. (1980c). Designing systems for greenfield sites. *Journal of Occupational Behaviour*, (*1)*19–27.

Emery, F. E. (1982). Socio-technical foundations for a new social order. *Human Relations.* 35. 1095–1122. In Harvey Kolodny, & Hans van Beinum. (Eds). (1983). *The quality of working life and the 1980s* (pp. 109–137). New York: Praegar.

Emery F. E. (1984). Foreword to De, Nitish, (1984) *Alternative designs of human organizations*. Sage: New Delhi.

Emery F. E. (1985a). In memoriam Einar Thorsrud. *Quality of Work Life*. 2(3–4), 158–159.

Emery F. E. (1985b). Public policies for healthy workplaces. *Quality of Work Life*. 2(1–2), 5–11.

Emery F. E. (1986). On the nature of the next generation of issues. *Quality of Work Life*. *3*(1–2), 95–104.

Emery, F. E. (1987). In memoriam – Nitish De. *Quality of Work Life*. *4*(1–2), 12–13.

Emery, F. E. (1988). Laissez-faire vs democratic groups. In M. Emery (Ed.), *Participative design for participative democracy* (pp. 172–175). Canberra: Centre for Continuing Education, Australian National University.

Emery, F. E. (1989). *Toward real democracy and towards real democracy: Further problems*. Toronto. Ontario Ministry of Labor; *Per una democrazia della partecipazione*. Torino. Rosenberg & Sellier. 1990

Emery, F. E. (1993a). Policy: Appearance and reality. Ch 6 De Greene, Kenyon B, *A systems-based approach to policymaking*. Boston. Kluwer Academic Publishers

Emery, F. E. (1993b). The second design principle: Participation and the democratization of work. In Trist, Eric & Murray, Hugh (Eds.). *The social engagement of social science: A Tavistock Anthology. Vol. 2* (pp. 214–233). Philadelphia: University of Pennsylvania Press.

Emery, F. E. (1994). "Some observations on workplace reform: The Australian experience." *International Journal of Employment Studies*. 2(2) 327–342. Also in E. L. Trist, F. E. Emery, & H. Murray (Eds.). *The social engagement of social science: A Tavistock anthology. Vol. 3* (pp. 637-49). Philadelphia: University of Pennsylvania Press.

Emery, F. E. (1997). Introduction to volume III. In E. L. Trist, F. E. Emery, & H. Murray (Eds.). *The social engagement of social science: A Tavistock anthology. Vol. 3* (pp. 36-46). Philadelphia: University of Pennsylvania Press,

Emery, Fred. (1999). The perceptual logic of creativity. In R. E. Purser & A. Montuori (Eds.), *Social creativity: Vol. 2* (pp. 91–124). Cresskill, NJ: Hampton Press

Emery, F., & Emery, M. (1974). Participative design: work and community life. In Emery M. (Ed.). (1993). *Participative design for participative democracy* (pp. 100–119). Centre for Continuing Education Australian National University, Canberra,

Emery, F., & Emery, M. (1976). *A Choice of Futures*. Leiden. Martinus Nijhoff.

Emery, F., & Emery, M. (1979). Project Australia: Its Chances. In E. L. Trist, F. E. Emery & H. Murray (Eds.) (1997). *The Social Engagement of Social Science Vol. III*. (pp. 33–353). Philadelphia: University of Pennsylvania Press

Emery F., & Emery, M. (1997). Towards a logic of hypotheses: Everyone does research. *Concepts and Transformations*. *2*(2), 119–144.

Emery, F. E., & Phillips, C. (1976). *Living at work*. Canberra, Australia: Australian Government Publishing Service.

Emery, F., & Thorsrud, E. (1969). *Form and content in industrial democracy,* London, Tavistock.

Emery, F., & Thorsrud, E. (1976). *Democracy at work*. Leiden. Martinus Nijhoff Social Sciences division.

Emery, F. E., & Trist, E. L. (1960). Socio-technical systems. In Emery, F.E. (Ed.), (1969). *Systems Thinking*, pp. 281–296. Penguin.

Emery, F. E., & Trist, E. L. (1965). The causal texture of organizational environments. *Human Relations,* (18), 21–32. In E. L. Trist, F. E. Emery, & H. Murray (Eds.) (1997). *The social engagement of social science: A Tavistock anthology. Vol. 3* (pp. 53–65). Philadelphia: University of Pennsylvania Press.

Emery, F. E., & Trist, E. L. (1972). Introduction. *Towards a social ecology: Contextual appreciation of the future in the present.* London: Plenum Press

Emery, F. E., & Trist, E. L. (1972b). *Towards a social ecology: Contextual appreciation of the future in the present.* London: Plenum Press

Emery, M. (Ed.) (1974). *Planning our town: Gungahlin.* Canberra, Australia: Centre for Continuing Education, Australian National University

Emery, M. (Ed.) (1976). *Searching: For new directions, in new ways, for new times.* Centre for Continuing Education, Australian National University

Emery, M. (1982). *Searching: For new directions, in new ways, for new times.* Canberra, Centre for Continuing Education. Australian National University,

Emery, M. (1992a). Workplace Australia: Lessons for the planning and design of multisearches. *Journal of Applied Behavioural Science.* 28(4). 520–533.

Emery, M. (1992b). The concept of TLC-trainer, leader, coach. In M. Emery (Ed.) (1993). *Participative d*esign *for participative democracy*. (pp.148–152). Canberra. Centre for Continuing Education, Australian National University.

Emery, M. (1993a). Introduction to the 1993 edition. In M. Emery (Ed.), *Participative design for participative democracy* (pp. 1–6). Canberra: Centre for Continuing Education, Australian National University

Emery, M. (1993b). Training Search Conference Managers. In M. Emery (Ed.), *Participative design for participative democracy* (pp. 226–257). Canberra: Centre for Continuing Education, Australian National University

Emery, M. (1993c). Further learnings about participative design. In M. Emery (Ed.), *Participative design for participative democracy* (pp. 123–140). Canberra: Centre for Continuing Education, Australian National University

Emery, M. (1996). The influence of culture in Search Conferences. *Concepts and Transformation. (1)* 2/3, 143–164.

Emery, M. (1997a). Fred, the western, ideals and the hero. *The Journal for Quality and Participation. 20(4*), 64–69

Emery, M. (1997b). The Search Conference: Design and management with a solution to the 'Pairing' puzzle. In Trist et al (Eds.), (1997). *The Social engagement of social science: A Tavistock anthology.* Vol III. (pp.389–411). Philadelphia. University of Pennsylvania Press.

Emery, M. (1999). *Searching: The theory and practice of making cultural change.* Amsterdam & Philadelphia: John Benjamins Publishing Company

Emery, M. (2000a). The current version of Emery's open systems theory. *Systemic Practice and Action Research, 13*(5), 623–643

Emery, M. (2000b). The evolution of open systems to the 2 stage model. In M. M. Beyerlein (Ed.), *Work teams: Past, present and future* (pp. 85–103). Norwell, MA: Kluwer Academic

Emery M, (2003). Are there universal principles governing architecture in the mechanical, biological and social realms? The evidence so far. In *Conference Proceedings, 9th ANZSYS Conference, Systems in Action,* 18–20 November, ANZSYS 2003. Monash University Conference Managing Office, Melbourne.

Emery, M. (2004). Open systems theory. In Japp J. Boonstra (Ed.), *Dynamics of organizational change and learning* (pp. 43–69).Chicester, UK: John Wiley and Sons

Emery, M. (2006). *The future of schools: How communities and staff can transform their school districts.* Lanham, Rowman & Littlefield Education

Emery, M. (2012). Open or closed systems? Bridging the gap. *Systema*. (2013) Vol I (2) www.bertalanffy.org/research/conferences/emcsr-2012

Emery, M. (2013). From Tunisia to occupy and beyond: The new wave of social change, past, present and future. In Jared A. Jaworski (Ed.), *Advances in Sociology Research*, (14), 1–67.

Emery, M. (2014). Better late than never: Open systems theory's plan for dealing with climate change. In Gary S. Metcalf, (Ed.), *Social Systems and Design*, 185–211.

Emery M,. & Aughton P. (2006). Organization health and innovation survey. Amerin, Melbourne. www.amerin.com.au

Emery, M., & deGuerre, D. W. (2007). Evolutions of open systems theory: The two stage model and unique designs for active adaptation. In H. Peggy, T. Devane and S. Cady, (Eds.). *The Change Handbook (*2nd ed*.).* Berrett-Koehler Publishers, Inc: San Francisco

Emery, M., & Emery, F. (1978). Searching: for new directions, in new ways, for new times. In John W. Sutherland (Ed.). *Management handbook for public administrators*. Van Nostrand Reinhold Co. 257–301

Emery, M., Konarik, S., & Paton, J. (1994). "Final report: Torres strait community planning." Available from the authors.

Emery M., & Purser R. (1996). *The search conference: A powerful method for planning organizational change and community action.* San Francisco: Josey Bass.

Fiorelli, J. (1988). Power in work groups: Team member's perspectives. *Human Relations, 41*, 1–12

Feibleman, J. K. (1946). *An introduction to peirce's philosophy interpreted as a system*. New York: Harper & Brothers

Gibson, J. J. (1966). *The senses considered as perceptual systems*. Houghton Mifflin Co.

Greco, M. C. (1950). *Group Life.* NY. Philosophical Library.

Gustavsen, B. (1987). The law and organization of work: The Norwegian work environment act art. 12. *Quality of Work Life*. *4*(1–2), 95–110.

Heider, F. (1958). *The psychology of interpersonal relations*. John Wiley and Sons, Inc.

Heider, F. (1959). *On perception and event structure and the psychological environment: selected papers*. New York: International Universities Press.

James, David. (2009). Obama's model of motivation. *Business Review Weekly*. *31*(4), 20–21.

Johnston, T. D,. & Turvey, M. T. (1980). A sketch of an ecological metatheory for theories of learning. *Psychology of Learning: Motivation*. Vol. 14. Academic Press Inc. 147–205.

Karasek R.A. (1979). Job demands, job decision latitude and mental strain: Implications for job redesign. *Administrative Science Quarterly* (24), 85–308

Karasek, R., Baker, D., Marxer, F., Ahlbom, A., Theorell, T. (1981). Job decision latitude, job demands, and cardiovascular disease: a prospective study of Swedish men. *Am J Public Health* (71), 694–705.

Katz, F. M., & Emery, F. E. (1951). Social theory & minority group behaviour. *Australian J. of Psychology*. (3), 22-35, (4), 24-27.

Kristensen, T. S., Borg, V., & Hannerz, H. (2002). Socioeconomic status and psychosocial work environment: Results from a Danish national study. *Scandinavian Journal of Public Health* 30(3), 41–48.

Lewin, Kurt. (1936). *Principles of topological psychology*. NY. and London. McGraw-Hill Book Co. Inc

Lewin, K., Lippitt, R., & White, R. (1939). Patterns of aggressive behaviour in experimentally created social climates. *Journal of Social Psychology, 10*, 271–99.

Lippitt, R. (1940). An experimental study of the effect of democratic and authoritarian group atmospheres. *University of Iowa Studies in Child Welfare*, *16*(3), 43–195.

Lippitt, R., & White, R. K. (1943). The "social climate" of children's groups. In R. G. Barker, J. S. Kounin, & H. F. Wright (Eds.), *Child behavior and development* (pp. 485–508). Norwood, NJ: Ablex.

Lippitt, R., & White, R. (1947). An experimental study of leadership and group life. In T. M. Newcomb & E. L. Hartley (Eds.), *Readings in social psychology* (pp. 315–330). New York: Henry Holt.

Maturana, H. R., & Varela, F. J. (1980). *Autopoiesis & cognition*. Dordrecht: Reidel.

Mead, G. H. (1932). *The philosophy of the present.* Open Court. Chicago

McQuitty, L. L. (1960). Hierarchial linkage analysis. *Educational and Psychological Measurement,* (20), 55–67.

Oeser, O. A., & Emery, F. E. (1954). *Social structure and personality in a rural community*. London. Routledge Kegan Paul,

Palmer, I., & McGraw, P. (1996). A new era for joint consultation? Human resources managers perceptions of JCCs and enterprise bargaining. In D. Mortimer, P. Leece, & R.

Morris (Eds.), *Workplace reform and enterprise bargaining* (pp. 173–185). Sydney, Australia: Harcourt, Brace.

Paton, J., & Emery, M. (1996). Community planning in the Torres Strait. *Journal of Quality and Participation, 19*(5), 26–35.

Pava, C. (1983). Nonroutine office work. In E. Trist & H. Murray (Eds.). (1993). *The social engagement of social science: A Tavistock anthology: Vol. 2* (pp. 644–661). Philadelphia: University of Pennsylvania Press.

Pepper, S. C. (1942). *World Hypotheses.* University of California Press. (1970).

Quiggin, J. (1997). Economic Rationalism, *Crossings*, *2*(1), 3–12.

Selznick, P. (1957). *Leadership in Administration*. Harper and Row.

Singh, H. A personal note for Fred. *Quality of Work Life*. *3*(1-2), 7–8.

Sommerhoff, G. (1950). *Analytical Biology*. London: Oxford University Press.

Sommerhoff, G. (1969). 'The abstract characteristics of living systems'. In F. E. Emery (Ed.), (1981). *Systems Thinking* (pp. 144–203). Vol 1.

Tomkins, S. S. (1962; 1963). *Affect imagery consciousness, Vols. I & 2.* New York: Springer.

Treyvaud E. R., & Davies, A. T. (1991). *Cooperative education for professsional development in regional areas*. Department of Employment, Education and Training, Canberra.

Trist, E. (1993). Introduction to volume II. In E. Trist & H. Murray (Eds.) (1993). *The social engagement of social science: A Tavistock anthology: Vol. 2* (pp. 36–60). Philadelphia: University of Pennsylvania Press.

Trist, E. (1997). The last time around, 1949 – Eric Trist. In Trist et al (Eds.) (1997). *The Social engagement of social science: A Tavistock anthology* (pp. 676–677). Vol III. Philadelphia. University of Pennsylvania Press.

Trist, E. L., & Bamforth, K.W. (1951). Social and psychological consequences of the longwall method of coal-getting. *Human Relations*, IV, 1, 3–38.

Trist, E., & Dwyer, C. (1993). The limits of laissez-faire as a socio-technical change strategy. In E. Trist & H. Murray (Eds.), *The social engagement of social science: A Tavistock anthology: Vol. 2* (pp. 449–473). Philadelphia: University of Pennsylvania Press.

Trist, E. L., & Emery, F.E. (1960). Report on the Barford conference for Bristol/Siddeley, aero-engine corporation. July 10-16, TIHR, Document No. 598. London. Tavistock Institute.

Watkins, G. (1986). Fred Emery – a personal comment. *Quality of Work Life*. *3*(1–2), 9–10.

Williams, T. A. (1982). *Learning to manage our futures*. New York: Wiley and Sons.

White, R. (1990). Democracy in the research team. In S. A. Wheelan, E. A. Pepitone, & V. Abt (Eds.), *Advances in field theory* (pp. 19–22). Newbury Park, CA: Sage.