RESEARCH ARTICLE

Why did history vote many times in his favor? Four reasons for McHarg's achievements in socio-ecological practice research

Wei-Ning Xiang[1,2]

Abstract

In two articles recently published in this journal, Wei-Ning Xiang presents four instances of Ian McHarg's effective, time-honored socio-ecological practice research and raises the question of why he was so successful in discovering and articulating truth in these exemplary cases. In this *knowledge I&I* (implementation and impact) research article, the author digs into the question through a lens of ecopracticology (the study of socio-ecological practice, that is) and presents four reasons for McHarg's achievements: (1) a proud member of the "crypto-pseudo-quasi-scientist" club; (2) a pragmatic way of knowing; (3) an ethical belief in human beings' enlightened self-interest; and (4) a classic style of writing.

Keywords Ian McHarg · *Design with nature* · Socio-ecological practice research · Knowledge implementation and impact research · Ecopracticology · *Ecophronetic* scholar–practitioner · Pragmatism · Human beings' enlightened self-interest · Knowledge consilience

1 Why did history vote these many times in McHarg's favor?

In two articles recently published in this journal, Wei-Ning Xiang presents four exemplary instances to celebrate the achievements of American ecological scholar–practitioner and educator Ian McHarg (1920–2001) in socio-ecological practice research (Xiang 2019c, d).[1] These cases are,

1. McHarg's urban socio-ecological research and education endeavors in the 1960s (Xiang 2019c);
2. the 1968 Staten Island intrinsic land suitability study (Xiang 2019d, pp. 165–166);
3. the planning project he led for building ecological resilience in The Woodlands in the early 1970s (Xiang 2019d, pp. 166–167); and
4. his 1996 initiative for global ecological restoration (Xiang 2019d, p. 165).[2]

Together, these examples of effective, time-honored socio-ecological practice research make a compelling case for the statement that "history voted many times in McHarg's favor" (*Ibid*., p. 165). But, why is it that "McHarg had it right" *these many* times?[3]

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[1] Socio-ecological practice research is the fine-grained, evidence-based research of socio-ecological practice (Xiang 2019b, p. 11). "Socio-ecological practice is the human action and social process that take place in specific socio-ecological context to bring about a secure, harmonious, and sustainable socio-ecological condition serving human beings' need for survival, development, and flourishing. It … includes six distinct yet intertwining classes of human action and social process—planning, design, construction, restoration, conservation, and management" (*Ibid*., p. 8).

[2] By definition, ecological restoration is "[t]he process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed" (Society for Ecological Restoration, https://www.ser.org/, accessed March 18, 2019).

[3] The phrase "McHarg had it right" is borrowed from American ecological planner and educator Frederick Steiner (See Appendix in Xiang 2019d, p. 168). It was cited by Xiang in his showcase of McHarg's 1968 Staten Island study (Xiang 2019d, p. 166).

Table 1 McHarg's ideas as clear and simple presentations of time-honored truth

Instance	Idea	Contexts in which the idea was articulated	Year of initial articulation	History's confirmation votes
1	"The ecology of the city" (discussed in Xiang 2019c)	The discipline of (urban) ecology	1962	The late 1990s, 2016
2	"Unsuitability for urbanization" (discussed in Sect. 2 in Xiang (2019d))	Socio-ecological practice on Staten Island	1968	2012, the early 2014
3	"to determine densities and land use from the geohydrological properties of the soils" (discussed in Section 3 in Xiang (2019d))	Socio-ecological practice in The Woodlands	The early 1970s	1979, 1994, 2017
4	"to green the earth, to restore the earth, and to heal the earth" (discussed in Section 1 in Xiang (2019d))	Both the discipline and socio-ecological practice of ecological restoration	1996	2016, 2019

For details about the ideas in the second column and their implementation and impact in specific instances of socio-ecological practice, readers are referred to corresponding articles or sections as indicated in the parentheses. The instance numbers in the first column correspond to those in the above section "Why did history vote these many times in McHarg's favor?" A pragmatic interpretation on the meaning of these historical events to the underlying truth in each idea is provided in footnotes 5 and 6 of this article

2 In every idea behind McHarg's achievement there is a truth, time-honored

Every human achievement, writes American author Napoleon Hill, has its beginning in an idea (Hill 1937, p. xi).[4] All McHarg's achievements above-mentioned are no exception—each of them is powered by an insightful idea he *discovered* through socio-ecological practice research and *articulated* for practice. Table 1 provides a tabulation of these powerful ideas.

All these ideas, as Xiang demonstrated (Xiang 2019c, d), are verbal presentations of time-honored truth. Not only was each idea true and useful within the contexts discovered and articulated, but also remains true and useful decades later after the selfsame contexts have undergone substantial changes.[5] In this sense, all favorable vote from history is

a confirmation of the verbal expression and, in the Staten Island, The Woodlands and ecological restoration cases, material manifestation as well, of the truth.[6] Moreover, all these ideas were articulated with a natural language (instead of an academic language) in a straightforward, unflashy, yet accurate and revealing way. As such, each is a clear and simple presentation of time-honored truth.[7]

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[4] "[A]ll achievement, all earned riches, have their beginning in an idea!" (Hill 1937, p. xi).

[5] There are different ways by which truth is defined and proved. The one adopted in this article is that of pragmatism defined by William James. Along with Charles Sanders Peirce and John Dewey, James is one of three founding fathers of pragmatism, a school of philosophical thought that began in the United States in the late 19th century as a rejective response to certain then-dominant epistemological assumptions in philosophy about the nature of truth, objectivity, and rationality (LaFollette 2000, p. 400). In a 1907 article entitled "Pragmatism's conception of truth," James states, "Truth … is a property of certain of our ideas. It means their 'agreement,' as falsity means their disagreement, with 'reality'" (James 1907, p. 141). "Realities mean, then, either concrete facts, or abstract kinds of things, and relations perceived intuitively between them. But what now does 'agreement' with such realities mean? … Any idea that helps us to deal with either the reality or its belongings, that doesn't entangle our progress in frustrations, that *fits*, in fact, and adapts our life to the reality's whole setting, will agree sufficiently to meet the requirement. It will hold true of that reality" (*Ibid.*, pp. 146–147). In short, truth of

Footnote 5 (continued)

an idea or concept is preeminently to be tested by its practical consequences (Merriam-Webster Dictionary, https://www.merriam-webster.com/dictionary/pragmatism, accessed March 27, 2019). It is noteworthy that this pragmatic ideal of truth is shared among many thinkers around the world and across history. For example, in a 1937 essay entitled *On practice: on the relation between knowledge and practice, between knowing and doing*, Chinese philosopher Mao Tse-Tung presents a famous phrase "[o]nly social practice can be the criterion of truth" (Mao 1937, p. 297) [a translation of "真理的标准只能是社会的实践" (毛泽东 1937, p. 284)], and calls the pragmatic ideal "the primary and basic standpoint in the dialectical-materialist theory of knowledge" (*Ibid.*). In the same pragmatic vein, a piece of knowledge, or an idea, is *useful* to practitioners if and only if it is *directly relevant, immediately actionable, and foreseeably efficacious* (Xiang, 2019a, p. 1; Xiang 2019b, p. 9).

[6] Such a confirmation coincides with what James calls an "event" (James 1907, p. 142) in "the truth-process" (*Ibid.*, p. 144). "The truth of an idea is not a stagnant property inherent in it. Truth happens to an idea. It (the idea—the author) becomes true, is made true by events. Its verity is in fact an event, a process, the process, namely, of its verifying itself, its verification" (*Ibid.*, p. 142).

[7] This statement and the title of Table 1 are both inspired by a 2011 book entitled *Clear and simple as the truth* by American literary scholars Francis-Noël Thomas and Mark Turner. In this book, the authors advocate a writing style through which writers present truth in a clear and simple way. A discussion about McHarg's effective use of this style of writing in his articulation of those nuggets of truth in Table 1 is provided in Sect. 6 of this article.

This finding comes as no surprise. In one sense, it is simply another piece of evidence for a remarkable dual trait McHarg demonstrated consistently in fulfilling "his commitment to truth" (Orr 2007, p. 9)—astute observation and eloquent articulation. "He was a perceptive observer … *His far-ranging observations and broad descriptions were remarkably accurate,*" praises David Orr, an American environmental scholar and one of McHarg's former students (Orr 2007, p. 9; italics by the author).

In discovering truth, a conventional wisdom is that astute observers often have an advantage—a greater chance for good luck. According to a 2013 editorial in *Nature*, one of the most recognizable scientific journals in the world, astute scholars "often make their own good luck—finding themselves in the right place at the right time by being alert to the way the world is moving and engaging more broadly with interests around their disciplines than less adventurous academics might" (Anonymous 2013). However, as American author Jim Collins demonstrates in his bestseller *Good to great*, there is no evidence that pure luck, a greater chance for good luck, or even good luck alone can explain fully why effective people, astute or otherwise, could have greater access to time-honored truth and brilliant decisions (Collins 2001, pp. 33–35). Besides luck, in other words, there are, and must be, something else.

For McHarg, then, what are the reasons for, or even the secrets of, his success in discovering those nuggets of time-honored truth (in Table 1) and articulating them so clearly and simply, besides the advantage he had as an astute observer with a shrewd mind?[8]

3 Reason one: a proud member of the "crypto-pseudo-quasi-scientist" club

In "The theory of creative fitting," an essay published 6 years after his decease,[9] McHarg writes,

"I once gave a lecture on this theory (of creative fitting—the author) to Brookhaven National Laboratory.[10] At the end, the president of that lab said that mine was a most astonishing theory—astonishing, he said, because the theory had come from a landscape architect! Nonetheless, it was sufficiently good that it deserved the attention of better men (the scientist audience—the author). As someone who might be called a 'crypto-pseudo-quasi-scientist,' this was, I think, the best encomium I have ever enjoyed." (McHarg 2007, p. 21)

To be sure, McHarg is only one among many "crypto-pseudo-quasi-scientist(s)," or "enlightened amateur(s)" (Taleb 2012, p. 226), who received encomiums of this kind. As American essayist Nassim Nicholas Taleb notes, many important theories of time-honored truth are developed by the hobbyists and British rectors in the nineteenth and early twentieth centuries; the most famous among them are the Reverends Thomas Bayes (as in Bayesian probability) and Thomas Malthus (Malthusian overpopulation) [*Ibid*.]. Furthermore, American-British author William Bryson found ten times more such "enlightened amateur(s)," mostly vicars and clergymen, leaving recorded traces for posterity than scientists, physicists, economists, and even inventors (*Ibid*., pp. 226–227).[11]

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[8] Knowing reasons for McHarg's success is a first and critical step to following his example as a leader in socio-ecological practice research. However, leadership in general, and reasons for leadership success (or failure) in particular, have rarely, if ever, been topics of scholarly inquiry on socio-ecological practice. To attend this missing link, in his 2019 article "*Ecopracticology*: the study of socio-ecological practice," Xiang calls for investigations into questions pertaining to practitioners' leadership in socio-ecological practice, and to scholar–practitioners' leadership in socio-ecological practice research (Xiang 2019b, p. 9). One of these is the question about "why some practitioners at leadership level performed well (in socio-ecological practice—the author), while others did not"; and the other "in the exemplary cases of socio-ecological practice research that have lasting, positive impacts, how ecophronetic scholar–practitioners (i.e., scholar–practitioners of ecological practical wisdom) worked in Pasteur's quadrant to create the type of knowledge that is useful to practitioners and enlightening to fellow scholars" (*Ibid*.). The inquiry in the following sections is an attempt in this direction.

[9] When did McHarg actually write this essay? After much investigation, the author remained unsuccessful to find the answer.

[10] "Brookhaven National Laboratory (BNL) is a multipurpose research institution funded primarily by the U.S. Department of Energy's Office of Science. Located on the center of Long Island, New York, Brookhaven Lab brings world-class facilities and expertise to the most exciting and important questions in basic and applied science—from the birth of our universe to the sustainable energy technology of tomorrow" (https://www.bnl.gov/about/ accessed March 22nd, 2019).

[11] Why so? Taleb offers an interesting observation from a unique angle (Taleb 2012, p. 227). "Self-directed scholarship (of the enlightened amateurs—the author) has an aesthetic dimension. For a long time I had on the wall of my study the following quote by Jacques Le Goff, the great French medievalist, who believes that the Renaissance came out of independent humanists, not professional scholars … 'One is a professor (the professional scholar—the author) surrounded and besieged by hundred students. The other (the enlightened amateur humanist—the author) is a solitary scholar, sitting in the tranquility and privacy of his chambers, at ease in the spacious and comfy room where his thoughts can move freely. Here we encounter the tumult of schools, the dust of classrooms, the indifference to beauty in collective workplaces. There, it is all order and beauty …'."

It might be a bit of a stretch to compare McHarg to Bayes and Malthus. But as members of this transgenerational "crypto-pseudo-quasi-scientist" club, they did exhibit the same can-do spirit in fulfilling their commitment to truth, and a comparable intellectual quality to think outside the box—exploring ideas that are creative, unusual, and not limited by generally accepted rules or traditions in existent knowledge domains of arts and sciences. Most significantly, this club membership entitles McHarg to a pragmatic, ethical way of knowing and a classic style of writing which are distinct, but not separate, from their respective counterparts in what McHarg describes as "pure" science (McHarg 2007, p. 31).[12] They are discussed in the following three sections.

4 Reason two: a pragmatic way of knowing[13]

In the same 2007 essay in which he refers himself to be a "crypto-pseudo-quasi-scientist," McHarg reflects on his way of knowing in ecological planning. These reflections highlight some defining characteristics of his pragmatic approach to finding and presenting truth and thus help explain his success in discovering those nuggets of time-honored truth (in Table 1) and articulating them so clearly and simply.

4.1 Taking practice as the object of study

> This is the model I use as a teacher and as a practitioner in ecological planning. I take money from

people for services. I take money to help them in the course of creative fitting, whether it be a group of people who wish to build a new town, or to develop a metropolitan plan for a region, or simply to develop very small tracts of housing. My role in every case is to find, of all environments the most fit and to adapt that environment. I help the consumer(s—the author) adapt the environment and themselves to accomplish creative fitting. (McHarg 2007, p. 26)

This sheer focus on the practice of real-world practitioners and meeting people's specific needs through scholarly research, bonded by a commission, is also characteristic of the outstanding work of French microbiologist Louis Pasteur [1822–1895] (Xiang 2017a, p. 2244). Interested in both producing new knowledge and advancing practice, Pasteur developed fundamental understanding about the cause of infectious disease while, and only as a by-product of, conducting rigorous research to meet real-world practitioners' specific needs for preserving beer, cheese, and milk (*Ibid.*). The two most significant offsprings of his practice-inspired work, the process of *Pasteurization* and the intellectual field of *microbiology*, continue to serve the human society in the modern-day world. American political scientist Donald Stokes praises this way of "use-inspired basic research," and designates it as *Pasteur's quadrant* in his quadrant model of scientific research (Stokes 1997, p. 73). To recognize McHarg's similar way of research through which he made extraordinary contributions to socio-ecological practice, Xiang adds McHarg's name to Stokes' designation in *The Schön–Stokes model of research in socio-ecological systems* [Fig. 1, for descriptions of this model, see Xiang (2017a, pp. 2242–2245)].

Taking practice as the object of study in research under *Pasteur-McHarg's quadrant* is in stark contrast to the focus of much applied basic research under *Bohr's quadrant* in

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[12] The use of "crypto-pseudo-quasi-scientist" in this article serves a dual purpose. It honors with great admiration McHarg's humorous and humble self-designation, and helps highlight his own pragmatic, ethical way of knowing and classic style of writing which served well his socio-ecological practice and practice research in the four instances showcased in Xiang (2019c and 2019d). As such, it complements the remarks Orr makes in the following passages (Orr 2007, p. 9). "Just ignore his (McHarg's—the author) loud protest that he was not a scientist" and (ignore his own claim—the author) "that he was only a 'quasi-pseudo-crypto-scientist' (should be 'crypto-pseudo-quasi-scientist' instead–the author) with a non-status theory." "Although not a laboratory or experimental scientist, his commitment to truth, his keen recording skills, and his capacity for communication lead me to claim as vociferously as he denied it: McHarg indeed was a scientist."

[13] Classic readings on pragmatic ways of knowing include, but are not limited to, James (1907, 1975a), Mao (1937), and Thayer (1975a). For a comparative review of pragmatism and other major ways of knowing, that is, schools of epistemological thoughts, see Van de Ven (2007, pp. 38–62); for reviews of pragmatism in planning and design, see Innes and Booher (2018, pp. 27–28) and Melles (2008); for pragmatism in sustainability science, see Moore (2010, pp. 3–12). James (1975b), Kloppenberg (1996), and Thayer (1975b) are among classic readings on pragmatism; and LaFollette (2000) offers a succinct review of pragmatic ethics.

Quest for fundamental understanding & interest in theoretical problems	∞	**Bohr's quadrant** of pure basic research or applied basic research	**Pasteur-McHarg's quadrant** of use-inspired basic research for practice /practice research
		Johnson's quadrant of free roaming, a precursor of research in other quadrants	**Edison-Li Bing's quadrant** of pure applied research /action research
	0 0		∞

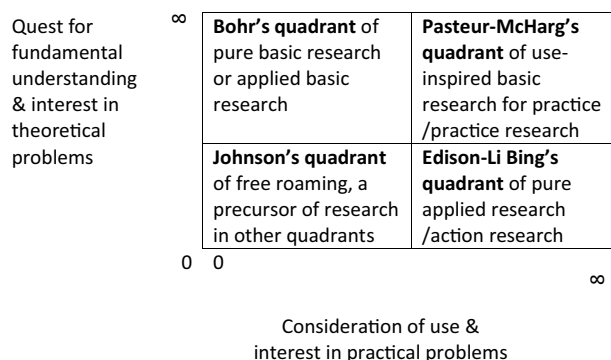Consideration of use & interest in practical problems

Fig. 1 The Schön–Stokes model of research in socio-ecological systems (after Xiang (2017a, p. 2243) and Xiang (2019a, p. 2). It should be noted that Stokes (1997) used the term "quadrant" as a synonym for "way of knowing in research"; and so did Xiang (2017a))

Fig. 1 (Xiang 2019b, p. 10). Instead of an object of study, applied basic research often treats ecological planning and design as an experiment field or demonstration site of scientific principles and technological advancement (Buchanan 1992, p. 19; Innes 1995, pp. 183–184; Xiang 2017a, pp. 2243–2244). The pertinent scholarly pursuits, often funded through grants by a third party from outside the planning region, have mainly been focused on better communication and more effective translation of "epistemically privileged" (Kidd 2015, p. 345) scientific theories and technological advancement to "inform," "influence," and "improve" practice (Palmer 2012, p. 6). In doing so, scholars of applied basic research were usually left no choice but having to adopt "procrustean strategies" (Schön 2001, p. 192) so that the problems in "the uncertain, subjective, and biased contexts of human understanding, social factors, and governance" (Cook and Spray 2012, p. 93) can be cut-to-fit available theories and techniques (Churchman 1967, p. B-142; Schön 2001, pp. 192–193; Xiang 2017a, p. 2243). They often formulated and used *imaginative* practitioners who were in *speculative* needs within an *artificialized* context (Churchman 1967, pp. B-141–B142; Schön 2001, p. 188, pp. 191–193; Xiang 2017a, p. 2244).[14] In addition, although both focus on practice, research in *Pasteur-McHarg's quadrant* and that in *Edison's quadrant* differ from each other significantly in that the former also aims to pursue a fundamental understanding while the latter does not (Xiang 2017a, p. 2244). This is why Xiang adds Chinese ecological engineer Li Bing to the designation of *Edison's quadrant* in Fig. 1 (*Ibid*., p. 2243). In 256 BC, Li Bing led the initial development of the 2300 year-old Dujiangyan irrigation system in Sichuan, China, yet left no record of his research on the undergirding principles.[15]

4.2 Listening to nature and learning from culture for practice[16]

"The game of ecological planning … is to match people's needs and desires to the environmental opportunities" (McHarg 2007, p. 34). To play the game well, McHarg developed an approach to explicitly linking local nature and culture through a listening–learning process (In the following three paragraphs of quotations, words in parentheses are added by the author for logical connections between sentences; italics are also by the author).

> "(Through the) synthesis of *an ecological model* … (we first seek) some understanding about the region (the planning area) in terms of both (natural) phenomena and process(es)." (McHarg 2007, p. 30) "We (then) try to identify the region in terms of human phenomena and human processes. We try to make *a human ecological model*." (*Ibid*., p. 34) "(Such a model allows us) to see people in context of their historical adaptation to a known biophysical field (that is, the planning area as described by the ecological model) … Their adaptations are reflected in their institutions, in how they invest their capital and their infrastructure: buildings, places, and spaces. We now are able to see the present in terms of the interaction of a people on a biophysical field over time." (*Ibid*., p. 39)

> Next we try to return to the biophysical field and to review the opportunities and constraints it offers both to present consumers and to the future … When we have done this … we (will) have developed an intrinsic social value system in which every part of that system is more or less suitable for every prospective land use. (*Ibid*., pp. 43–44)

> After "[w]e have asked Nature to tell Man what it (the intrinsic land suitability) is, in the way of opportunities and of constraints for all prospective land-uses … we need to talk to the people, or consumers, of the

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[14] This is in fact the "rarely explicated yet perhaps more plausible reason" for "the untenable *status quo* of the ES (ecosystems services—the author) scholarly enterprise in accomplishing the ambition to inform, influence, and direct practitioners in planning and management" (Xiang 2017a, p. 2243).

[15] In ancient world, knowledge was either passed on orally or handwritten on scrolls or ancient texts (Howitt and Wilson 2014, p.482). The earliest record of Dujiangyan irrigation system is found in the classic Chinese history book *Shiji* (《史记》, *Records of the historian*, circa 94 BC). Based on his firsthand field survey a century after the system's initial construction (Peng 2008, p. 540), the author Sima Qian (司马迁, *cira* 145BC–86BC) (Sima 1959) documented the successful operation (instead of the arts and crafts of construction) of the Dujiangyan irrigation system. Two millennia later, the scientific principles undergirding Li Bing's work were extrapolated from the technical characteristics of the irrigation system [for reviews, see Cao et al. (2010), Li and Xu (2006)].

[16] Why should ecological planners be listening to nature and learning from culture in their practice? In an earlier piece of his writing entitled "Ecological planning: the planner as catalyst," McHarg outlines the rationale (McHarg 1978, p. 88). "People in a given place with opportunities afforded by the environment for practicing a means of production, will develop characteristic perceptions and institutions. These institutions will have perceptions and values that feed back to an understanding of the environment—both national and social—and that have a modification of technology. Thus, I believe, we have a continuous model, which emanates from the physical and biological, and extends to the cultural … The most critical factor is the value system, for it determines the planning solution … Most of the important values are particular and there is no substitute for eliciting them from the constituents themselves. These values themselves become the data, whether it be for describing rocks, soils, animals, people, or institutions. Planners must elicit these data from their client if they are going to help solve the problems posed by the particular system within which the client functions. This, in fact, is the planner's most important role."

region who have hired us, and find out their strongest needs and desires, and their most serious problems and concerns … We then return to the description of the region … in terms of (the) human ecological model …" (*Ibid*., p. 44) "to match people's needs and desires to the environmental opportunities." (*Ibid*., p. 34)

Through such a listening–learning process, this approach provides local people a way to participate in their co-evolution with the regions they live in toward negentropy (McHarg 1969, p. 53; Steiner 2019, p. 34). It was employed in most of McHarg's ecological planning projects, including the Staten Island study and The Woodlands project (Table 1, for details see Xiang 2019d).[17] Its kernel, acquiring knowledge about local nature and culture and planning with it, manifests two ideals of pragmatism. These are (Merriam-Webster Dictionary, https://www.merriam-webster.com/dictionary/pragmatism, accessed March 27, 2019):

1. knowing for acting—"the function of thought is to guide action"; and
2. knowing grounded in particulars of practice—"the meaning of conceptions is to be sought in their practical bearings".

Consequently, the outcome of the listening–learning process under this approach is "a realist solution, one that is the most fit within the region… (which) may not be anything like the most fit in another (region)" (McHarg 2007, p. 42). This underscores the importance of using a pragmatic lens, rather than "a pure, successful scientist('s)" lens (McHarg 2007, p. 31), in examining and assessing what Canadian landscape designer and scholar Susan Herrington calls "[t]he nature of Ian McHarg's science" (Herrington 2010, p. 1). Through an apparent "pure, successful scientist('s)" lens, for example, one assessment stated, "In the 1970s the U.S. Department of Housing and Urban Development hailed The Woodlands, WMRT's (Wallace McHarg Roberts and Todd, the firm through which McHarg led the ecological planning project in The Woodlands—the author) award winning project in Texas, as a great success. Other awards followed, but the project gained its fame as an application of McHarg's ecological approach conjoined with The Woodlands' status as a Housing and Urban Development New Town, not through *the replication* and testing *of the design solution*" (Herrington 2010, p. 14, italics by the author). Testing replicability of a design solution most fit in one region implies looking for solution's *generality*, which, according to

American biologist E.O. Wilson, is one of the four qualities natural and physical scientists look for in theories (Wilson 1998, p. 198). Under the premise that "the greater the range of phenomena covered (by a theory—the author), the more likely it (the theory—the author) is to be true," a theory of generality is one that "works exactly for all." (*Ibid*.) An assessment through the pragmatic lens, on the contrary, looks for particularity about "extremes" of good or bad practice, not generality about "averages" (Xiang 2019b, p. 9). As such, it is more accurate and suitable, and results are more useful for socio-ecological practice and socio-ecological practice research (*Ibid*.).

4.3 Building knowledge consilience with practice for practice

In listening to nature and learning from culture, McHarg recognized the fragmented state of modern science. To advance the socio-ecological practice of ecological planning and design, he stressed the need for building knowledge consilience with practice.

> "Humpty Dumpty sat on a wall, Humpty Dumpty had a fall. All the King's horses and all the King's men, [c]ouldn't put Humpty together again.

> This is what modern science is: the egg is shattered, all the fragments lie scattered on the ground. The fragments are called geology and physics and chemistry and hydrology and soil science, plant ecology, animal ecology, molecular biology, and political science … Information (knowledge—the author) fragmented is of no use to anybody. What we always need to proceed is really the one whole system, the region in question, so for design of sensible human land-use somebody has to put it (the fragmented modern science—the author) together again." (McHarg 2007, p. 31)

> "Our job is to reconstitute the region (the planning area in a project—the author) and all its processes again, like putting together Humpty Dumpty." (*Ibid*.)

While these observations and descriptions are hardly new and are in line with those by some thoughtful "pure, successful scientist(s)" (McHarg 2007, p. 31),[18] McHarg was

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[17] American landscape ecologist Richard Forman regards The Woodlands to be an exemplary case of "[p]lanning for nature and culture" (Forman 2002, p. 102), and praises that it is "an ecologically remarkable community" with "distinctive natural and cultural attributes" (*Ibid*., p. 104).

[18] For example, in 1984, Wilson provided a brief yet insightful review of human knowledge fragmentation in his book *Biophilia* (Wilson 1984, pp. 47–49). In 1998, in *Consilience: the unity of knowledge*, he made the observation that "[t]he ongoing fragmentation of knowledge and resulting chaos in philosophy are not reflections of the real world but artifacts of scholarship" (Wilson 1998, p. 8). With the premise that "[t]he greatest enterprise of the mind has always been and always will be the attempted linkage of the sciences and humanities" (*Ibid*.), he expressed reasoned optimism in the reinvigoration of consilience between the knowledge domains of sciences and humanities (*Ibid*., pp. 266–298).

able to make a move well ahead of most of them—in doing socio-ecological practice research, he found a pragmatic way of building knowledge consilience.

> "When I have a client who insists that I interpret the region, the whole system, then of course I have to find scientists who will make the system whole—and I pay them.
>
> And so we set the scientists this very difficult task for which they are remarkably untrained. We ask them to group together all these independent spectral views of the universe (the planning region—the author) into one whole system. It is very difficult, but once one has it, one has the best description natural science can give us of the (planning—the author) region that functions as a single interacting process understood in the context of its long past. By this time, we have an ecological model (of the planning region—the author)." (McHarg 2007, p. 32)

To aid this knowledge consilience building process, McHarg ingeniously used the map-overlay method. "Each (scientist's—the author) identification of these phenomena (in the planning region—the author) I put on a single map. Then I overlay one on top of another." The purpose of map overlays is simply to help planners to understand the region as a whole. "I develop a layer cake (of scientific knowledge—the author) … about a region in this way because it allows me to see causality" (McHarg 2007, p. 28). It is noteworthy that besides ecological planning, his innovative, effective, and practical use of map overlay as a "tool for thinking," to borrow a phrase from British management scholar Pidd (2009), has been beneficial to many other fields as well. For example, the technology of geographic information systems (GIS) and the field of geographic information science (GIScience) are among these beneficiaries, although benefactor's contributions are often underappreciated. "The multi-layered model that McHarg experimented with, initially using transparent overlays, has evolved through GIS technology," observed Steiner in 2004 (Steiner 2004, p. 147); and nowadays, "almost every geographic information systems (GIS) presentation begins with a depiction of a layer cake, although rarely crediting McHarg and often without his eloquence or insight into how the data should be collected and analyzed." (*Ibid.*, p. 142)

It should also be noted that the idea of building knowledge consilience with practice for practice is inspirational, and has opened up new lines of inquiry. For example, in 2018, Xiang coined the term *ecopracticology*, and defined it to be a legitimate field of scholarly inquiry into socio-ecological practice (Xiang 2019b). An illustration of ecopracticology in relation to other, pertinent fields of inquiry (Xiang 2019b, p. 11) resonates much of McHarg's idea (see Fig. 2).
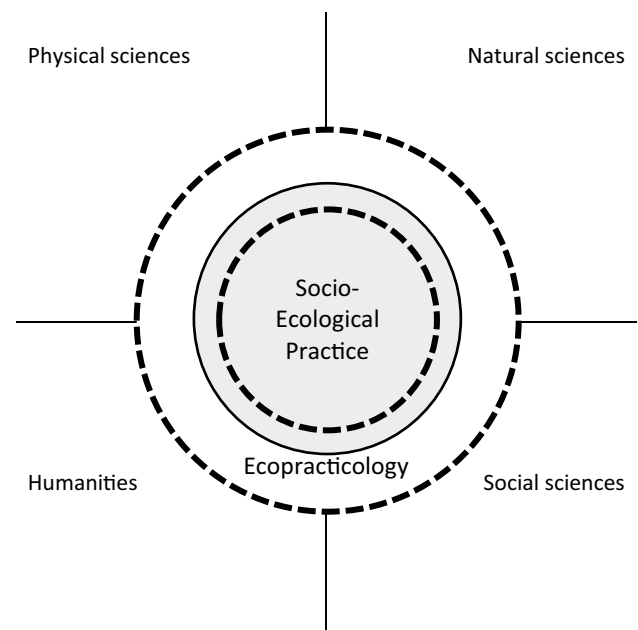

Fig. 2 Ecopracticology builds knowledge consilience with socio-ecological practice for practice. (Fields that reside dispersively in branches of sciences and humanities and are relevant to socio-ecological practice include, but are not limited to, anthropology, architecture, biology, earth sciences, ecological esthetics, ecological engineering, ecology, environmental engineering, environmental ethics, environmental justice, environmental science, geographic information science, geography, geology, landscape architecture, planning, public health, public policy, sociology, sustainability science, and urban design. They should also include such emerging fields as actionable science, knowledge brokering, landscape sustainability science, planning support systems, and translational ecology) (after Xiang 2019b, p. 11)

5 Reason three: an ethical belief in human beings' enlightened self-interest

Undergirding McHarg's pragmatic way of knowing is an ethical stand which American conservationist Aldo Leopold refers to as human beings' "enlightened self-interest" in his 1949 articulation of "ecological conscience" (Leopold 1949, p. 208). With the premise that there exists a relationship of human–nature reciprocity, it states plainly that it is in human beings' self-interest—ethical, moral, physical, as well as material—to respect and appreciate the intrinsic value of all living and non-living beings on the earth (Berkes 2012, pp. 286–287; Cafaro 2001, p. 4, p. 16; Leopold 1949, pp. 207–210; McHarg 1963, pp. 12–14).[19]

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[19] Not only is this notion of "human beings' enlightened self-interest" a "dominant theme" in many ancient indigenous societies (Redman 1999, p. 24), but it also has profoundly inspired the development of a series of comparable ideas in environmental virtue ethics of the modern world (Xiang 2016, p. 56). These include, but may not be limited to, ideas of Rachel Carson, Aldo Leopold, James Lovelock, George Marsh, Arne Naess, Albert Schweitzer, and Henry David Thoreau (Berkes 2012, p. 287; Cafaro 2001, pp. 14–16; Lyle 1999, p. 208, 225; Redman 1999, p. 22, pp. 25–27).

To McHarg, this ethical belief serves as what Austrian system scientist Eric Jantsch calls "a regulatory device" (Jantsch 1980, p. 14) of "effectively action-guiding" function (Rorty 1988a, p. 15; b, p. 273). It provides both a benchmark for judging what is right to choose and the guidelines for deciding how to act rightly in all circumstance of socio-ecological practice (Xiang 2016, p. 56). His commitment to this ethical stand is long self-evident. Before his 1969 articulation of *design with nature* as a standardly ethical way to "give expression to the potential harmony of man-nature" (McHarg 1969, p. 5), he had been advocating this ethical stand in the socio-ecological practice of ecological planning.

> "If you take an area like the Delaware River Basin (in the United States—the author) … [b]efore you locate new towns and developments anywhere you like on the basis of some economic determinism, let's add this parameter to your planning! Look and see what *intrinsic functions* actually occur in this supposedly undifferentiated green space and *see the degree to which these intrinsic functions can co-exist with the development which you propose*." "The intrinsic functions of the forested upland sponge,[20] the agriculture piedmont, the estuary marsh, the underground aquifer, the aquifer recharge area, the rivers, the streams, the flood plains and the riparian land can be identified, their areas can be demarked. Each is expressive of its particular role or process." (McHarg 1962, p. 102, italics by the author)[21]

Admittedly, in practicing ecological planning with this ethical stand, neither is McHarg the first, nor alone. Between him and "the 'father of American landscape architecture'—Frederick Law Olmsted, Sr." (1822–1903), for example, American landscape planner and educator Julius Gy. Fabos notes such an ethical commonality (Fabos 1979, p. 48). With "a desire to work in harmony with nature … Olmsted always assessed the land and its capabilities before formulating a plan for its development. This philosophical consanguinity Olmsted shares with today's landscape planners is perhaps nowhere more evident than in the title of Ian McHarg's famous book on ecologically sensitive planning—*Design with Nature* (1969)" (*Ibid.*, pp. 49–50). For another example, Xiang acknowledges that integral to the exemplary socio-ecological practice in the 2300 year-old Dujiangyan irrigation system in Sichuan, China, is the same "(moral) covenant

between human communities and other living communities" (Van der Ryn and Cowan 1996, p. 104) observed in The Woodlands case (Xiang 2016, p. 56).[22] In the covenant, "[t]he dominant theme is mutuality, that is, existing under a moral order that blends together humans, nature, and sometimes even the gods into one family."(Redman 1999, p. 24; cited in Xiang 2016, p. 56)

6 Reason four: a classic style of writing

Besides a pragmatic, ethical way of knowing, the "crypto-pseudo-quasi-scientist" club membership also entitles McHarg to a classic style of writing which is distinct from its popular counterpart of five-legged articles in "pure" science.[23]

In a 2011 book *Clear and simple as the truth*, American literary scholars Francis-Noël Thomas and Mark Turner

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[20] Advocates for "sponge cities" and "sponge infrastructure" (Liu 2016) would appreciate this early usage of "sponge" by McHarg in the socio-ecological practice of ecological planning.

[21] "Intrinsic function" here could well be a precursor of the concept "intrinsic suitability" he defined later in *Design with nature*: "Once it has been accepted that the place is a sum of natural processes and that these processes constitute social values, inferences can be drawn regarding utilization to ensure optimum use and enhancement of social values. This is its intrinsic suitability." (McHarg 1969, p. 104).

[22] The 2300-year-old irrigation system has been providing multiple, lasting benefits to both human and nonhuman beings on the Chengdu Plain (roughly the size of the state of Delaware in the United States) for over two millennia (Needham et al. 1971, p. 288; Xiang 2014, pp. 65–66). In January 2000, the United Nation Educational, Scientific and Cultural Organization (UNESCO) designated the Dujiangyan irrigation system and nearby Mount Qingcheng, a mountainous Daoist sanctuary, as a World Cultural Heritage Site (UNESCO 2000). As Mount Qingcheng is where the first organized Daoist establishment *Tianshidao* (天师道) was founded some 400 years after the initial development of the irrigation system, the UNESCO designation is regarded as a recognition of the philosophical bond between the exemplary socio-ecological practice and Daoism (Xiang 2016, pp. 65–66). Similarly, American ecological planner and educator John Lyle regards The Woodlands as an exemplary instance of "[t]he Taoist (Daoist, that is—the author) approach in recent practice (of ecological planning and design—the author)" (Lyle 1999, p. 237).

[23] The five-legged article refers to those that are composed with the IMRAD format of scientific writing. A typical article of the IMRAD format consists of five parts: introduction, method(ology), results, discussion, and conclusions. Among the critics of the prevalence of this style of writing is the 1960 Nobel laureate Peter Medawar. He writes in a 1964 essay, "What is wrong with the traditional form of scientific paper is simply this: that all scientific work of an experimental or exploratory character starts with some expectation about the outcome of the inquiry" (Medawar 1964, p. 43; for a recent, still critical account, see Howitt and Wilson 2014). Nonetheless, the IMRAD format, originated in the experimental and laboratory sciences, has now become a predominant style of writing and regularly appeared in academic journals across a wide range of disciplines, including journals in planning, design, and management. The designation of IMRAD-style articles as "five-legged articles" here is inspired by that of "eight-legged essay"(*baguwen*, 八股文), a traditional Chinese style of writing created for, and used over 1000 years in, the required eight-part response to civil service examination questions based on Confucian thought [for a succinct review, see Elman (2009)]. The five-legged articles (i.e., *wuguwen*, 五股文), with its highly formalized structure and sanitized content (Howitt and Wilson 2014, p. 481), resemble in many ways the eight-legged essays, though less restrictive and rigid.

identify *classic style* as an exemplar for expository prose writing. "Classic style (of writing—the author) … adopts the stance that its purpose is presentation; its motive, disinterested truth. Successful presentation consists of aligning language with truth, and the test of this alignment is clarity and simplicity… (This) implies that truth can be known; truth needs no argument but only accurate presentation; … a natural language is sufficient to express truth; and the writer knows the truth before he puts it into language" (Thomas and Turner 2011, pp. 2–3). With its stylistic virtues, which they summarize as being "clear and simple as the truth" (*Ibid.*, p. 2, also in the book's title), classic style is "a general style of presentation suitable to any subject whatever" (*Ibid.*, p. 3).

McHarg clearly used the classic style of writing effectively when he articulated those nuggets of truth tabulated in Table 1. In all four exemplary instances showcased in Xiang (2019c, d) and listed in Sect. 1 of this article, he discovered the truth before he set off to write; his purpose was to present (not make an argument about) what he knew to a reader; he used natural language (as opposed to scientific or technical jargons) and achieved a perfect alignment of language with the truth. As a result, all the four ideas are indeed clear and simple presentations of truth.

Writing as "clear and simple as the truth" (Thomas and Turner 2011) is important to both socio-ecological practice and socio-ecological practice research. According to Richard Forman, ecological planning and design theories "must become clearly stated… the central body of principles needs to be delineated and refined, both to solidify the field (of ecological planning and design—the author) and to underpin dependable practice" (Forman 2002, p. 86). Unfortunately, this classic style of writing is rare in academic publications, notes Canadian–American cognitive psychologist Steven Pinker in his 2014 essay "Why academics stink at writing?" published in *The Chronicle of Higher Education*. This is mainly, but not entirely, because many members of the academy "who devote their lives to the world of ideas are so inept at conveying them" (Pinker 2014, p. 3). The author of this article concurs with Pinker's observation and assessment from his own experience as the former co-editor-in-chief (2011–2018) of *Landscape and Urban Planning*, a leading "international journal of landscape science, planning, and design" (https://www.journals.elsevier.com/landscape-and-urban-planning), and as the founding editor-in-chief of this journal (2019–present). Colleagues in the field of ecopracticology are fortunate to have McHarg, a prolific writer of classic style, as a role model in their pursuit of writing as clear and simple as the truth.

7 To McHarg, what do we have to say?

Many congratulations, Ian, on the favorable votes your ideas and their manifestations have received! From what you had written, we have tried and seemed to have figured out some reasons for your success in discovering those nuggets of time-honored truth, and in articulating them so clearly and simply.

You set such a great role model for all of us, as an eco-practicologist committed to generating knowledge of socio-ecological practice that has truth, beauty, fertility, and usefulness[24]; and as an *ecophronetic* scholar–practitioner dedicated to making a difference in the world through honorable, creative, and ethical endeavors.[25] We will follow your lead.

We know that your mind's eye has been watching from space the greening operations on the earth,[26] and are sure that you would have been thrilled about the good news from NASA on February 11th, 2019 (see Xiang 2019d, p. 165). On behalf of all the comrades from around the world who are combatting triumphantly along the frontiers of greening cities, we present you a little poem by one of your former students (after Xiang 2017b, p. ix)[27]:

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[24] "According to American planning scholar–practitioners Judy Innes and David Booher, a good theory "has truth because it accounts for the evidence in a way that rings true. It has beauty because of its ultimate simplicity and because it reveals what has not been seen before. It has fertility because the ideas open up new lines of inquiry" (Innes and Booher 2018, p. 18). Further, "[n]othing is as practical as a good theory" (Steiner 2004, p. 142). A good theory also has practical usefulness, in that it "provides ways of seeing how and why practices do or do not work in particular ways; it offers a critical distance that helps surface unexamined assumptions and places activities in perspective; it provides a basis for an evaluative framework…" (Innes and Booher 2018, p. 17)" (Xiang 2019b, p. 7).

[25] The adjective *ecophronetic* is from *ecophronesis* (ecological practical wisdom), a term coined and defined by Xiang (2016) and further expanded by Austin (2018); for ecophronesis' genesis within the context of ecological wisdom conception, see Xiang (2019e); for the relevance of *ecophronesis* to socio-ecological practice and practice research, see Gross et al (2019), Jim (2019), Steiner (2019), and Wang (2019).

[26] "We must learn to green the earth, to restore the earth, and to heal the earth. I long to live to see it" (McHarg 1996, p. 374). "I would love to be here when this process (of greening, restoring, and healing the earth—the author) is apace … In my mind's eye I see myself with a group of scientists, looking at the earth from space, viewing the shrinking deserts, the burgeoning forests, the clear atmosphere, the virgin oceans, smiling at the recovery, anticipating the day when a successor will announce, 'the earth is healed, the earth is well'" (*Ibid.*, p. 375).

[27] For recent progress in greening cities, see Jim (2017, 2019) and Liao (2019) among others.

To Ian, from the battle ground of greening cities

Continuing in fractured cyborg cities,
Is our brutal battle for greening city;
Block by block, building by building,
Our troops advance steady;
Foot by foot, inch by inch,
Is greenery burgeoning horizontal and vertically;
Inspired by your time-honored ideas, Ian,
Comrades found the treasure of ecopracticology;
To accomplish the noble mission,
Ecophronetic scholar-practitioners are whom we strive to be!

The 21st century brigade of ecopracticologists and socio-ecological scholar-practitioners
On the 50th anniversary of *Design with nature*

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