

Fragmentation and cultural landscapes: tightening the relationship between human beings and the environment[☆]

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Abstract

Fragmentation is a research concept properly belonging to the biosciences and agriculture, yet it is one finding application in the planning and design fields. Cultural landscapes, on the other hand, is a concept uniquely rooted in landscape architecture and resource management. This paper links the two as a means of better grounding each in the decisions and processes affecting countryside planning and rural landuse, although both concepts have applications in urban settings, as well. However, in theory and in practice, both concepts are impacted by the man versus nature paradigm, in which planners and designers are challenged to consider whether human actions are “natural” actions, or whether they belong in a separate philosophical category. This position paper was developed as a keynote speech for the 2000 ISOMUL Conference at the Wageningen University and Research Center in The Netherlands. © 2002 Published by Elsevier Science B.V.

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1. Introduction to the problem

There is a fundamental problem in the planning and design fields, and not enough people are talking about it. These fields—particularly the design fields—are prone to practice quasi-science, adopting the language or position of other environmental disciplines more experienced than they in research (Taylor, 2000, p. 102.)

Landscape architecture in particular has embraced such concepts as xeriscape, new urbanism, green architecture, biodiversity and sustainability with the zeal of a convert, latching onto terms whose meanings vary according to who is using them. While such terms can generate interest among clients or the general public, their inexact usage retards a deeper, richer understanding of their origins, causing missed

opportunities to tighten the connections between human beings and the physical environment.

Fragmentation is one such concept now vulnerable to misuse. As a concept, fragmentation is appropriately rooted in agriculture and the biosciences, but the term is entering the vernacular of planning and design professionals eager to add credence to a world where taste and personal preference have long been preferred over scientific grounding. Fortunately, there are researchers and practitioners in these professions who are devoted to seeing that fragmentation retains its scientific grounding while it becomes further adopted by those who plan, then design, the environmental spaces upon which human beings live and draw their physical and psychological well being.

2. Fragmentation as a concept in North America

As a concept in North America, fragmentation is relatively new to landscape architecture, but it has

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been a significant topic in the biosciences and resource management since the late 1990s (Johnson, 2001). While the concept is applied easily to the multitude of biomes on the continent, its earliest use has been in the western states and provinces of US and Canada, where the healing capacity of land is prolonged due to extreme conditions of moisture and temperature.

The question for North American scientists is not whether fragmentation exists, but rather, what is its impact. And, because fragmentation occurs at macro- and micro-scales, the challenge to designers and planners is to discretely apply the concept to all scales of practice, from residential design to regional development.

But, of course, the impact of fragmentation is only valuable when understood against the man versus nature paradigm, in which one pits the fragmenting behaviors of human beings against those occurring independent of human causes. Because the study of fragmentation by planning and design professionals is relatively new in North America, opportunities exist for scientists and practitioners to co-test and co-develop theories about fragmentation as a natural occurrence whether caused by humans or not. Doing this can elevate the value of fragmentation as a concept by decreasing the frustration that accompanies intrinsic indictments of human behaviors as dangerous and undesirable.

For example, the hypothesis that urbanizing rural land causes fragmentation, in order to be balanced and far reaching, also must factor-in that de-fragmentation occurs once urbanization is complete. Currently, little of this approach is being considered. Yet, examples are plentiful of flora and fauna that adapt or re-establish themselves in newly urbanized spaces.

3. Enter cultural landscapes

One strategy for reducing the misuse of valid concepts like fragmentation is to tie them to other concepts already established in the arena of practice or the language of research. Cultural landscapes is such a concept, because like fragmentation, it is rooted in good science; in this case, social science. It also is experiencing friendly adoption by allied disciplines; in this case, resource management practitioners.

In US it is the National Park Service (NPS) which has elevated cultural landscapes to a new level of use

and understanding, derived from the agency's dual, sometimes competing obligations to provide for the preservation and use of its resources (Page et al., 1998). In less than a decade, NPS scientists and managers have applied cultural landscape principles with a great deal of success, so much so that state and local resource managers are now searching for ways to adopt these principles as part of their practice, further diffusing the concept as a means to assess the visual and environmental health of rural and urban spaces.

Cultural landscape analysis originated from pressures upon NPS field personnel to classify historic battlefields and cemeteries among the ranks of management sites under the agency's care. The agency's difficulty in classification resulted from uncertainty about how to fund, manage and interpret these distinctly cultural holdings. Since they were not traditional national parks, acquired because of their great "natural" beauty, non-traditional ways of managing these humanly influenced sites had to be devised. The result has been an evolving process that is spurring new scientific know-how for preserving and using the landscape. The applications and benefits of the process have only begun to emerge.

4. The mankind versus nature paradigm

Cultural landscapes can be thought of as any landscape bearing the impact of human activity, historic or pre-historic. It is a concept emerging from increasing recognition that human beings are a part of nature.

One clear outcome from the growing interest in cultural landscapes is that it is forcing planners, designers and resource managers to rethink their position regarding what is natural and what is not. One can suppose that research on fragmentation is leading to similar introspection. Specifically, the planning and design community is being pressed to re-visit the dualism that separates human actions from natural actions. This age old philosophical rift is a major determinant in whether or not planners and designers are basing their professional decisions on good science or just good guesses.

To be specific, it often is assumed that nature is good and man is bad. From this perspective, it must be concluded that what nature does is tolerable,

acceptable and somehow benevolent in the end. Conversely, then, it must be concluded that what human beings do is intolerable, destructive and in the long run so self-absorbed that it works against the planet and its ongoing processes.

Logic, common sense, enlightened investigation—even theological principles—suggest another possibility: that what human beings do with and to the planet are part of what the planet is capable of bearing. This means, then, that fragmentation, when merged with respect for cultural use of the resource base, can be seen in an entirely different light. It can mean that human beings do indeed fragment the land—both rural and urban land—and that in doing so they simply are exercising adaptation, just like other species do when evolutionary forces spur them to do so. Without human beings, the planet is fragmented. With human beings, it also is fragmented, only moreso. What is so unnatural about that?

Of course, not all acts of adaptation result in permanent or even preferred outcomes. The same is true of fragmentation, which, if not conducted on the basis of good science or solid research, can harm people and their environment even if it is seen as a natural process. One way of determining whether or not there is value in fragmentation (or even de-fragmentation) is to assess it against another concept which also tests the mankind versus nature paradigm. Cultural landscapes is such a concept.

In other words, solid concepts such as fragmentation can have a longer shelf life when used by planners and designers, if these concepts are linked to other solid concepts such as cultural landscape analysis. More important than just shelf life, however, is the probability that linking such valid concepts can strengthen the scientific underpinnings upon which plans and designs need to be based.

5. A search for measurement

Measuring fragmentation can happen in many ways, depending upon the field of interest to which the measurer belongs. The rural planner can measure it on the basis of agricultural efficiency, while the bioscientist can measure fragmentation's immediate impact upon local populations of flora and fauna. The land planner can determine the cost of reuniting

fragmented acreage so that it can be converted to built space, or to other rural activities.

To further the point, measuring fragmentation from the perspective of the land planner can produce results that the bioscientist might not embrace. In fact, one can even conclude that the techniques for measuring fragmentation are apt to compete with one another, pitting one scientific community against another whose philosophical mission is different. Thus, the real question of finding appropriate measurement techniques is one of determining what one wants to measure, and specifying what is not being measured but what likely will be affected (Van Lier and Taylor, 1998).

For example, the bioscientist might want to measure the impact of fragmentation on flora and fauna, but the impact on landowners is not necessarily his or her concern. In such cases, the scientists can be content to leave measurement impacts to policy makers, thereby maintaining scientific objectivity, if not personal dignity.

However, there is a more fundamental issue involved in measurement techniques: if the researcher fails to balance the man versus nature paradigm in his or her measurements, the result is likely to be biased. To be sure, measurements carefully applied are objective. It is their interpretation that contains the potential for bias. Either way, the solution to this problem is to report the bias, or to include measurements derived from the counter perspective.

Unfortunately, little of this is being done. Much research begins and ends with environmental assumptions that nowhere in the research get challenged or modified.

Common in the literature are studies measuring or calling for sustainability, for example. In them, sustainability is assumed to be good, although its definition and its value remain entirely under the interpretation of the researcher. Sustainability, when traced to its agricultural or bioscience roots, refers to a balance between resources consumed and resources produced, suggesting somewhat of a closed or tightly woven system.

By their very nature, urban areas are neither closed nor tightly woven, especially when cultural values such as the market place of ideas are factored in. Neither are nations or regions or even individual farms, particularly under global forces which move

mankind toward mutual reliance and interdependence. Not allowing for the complexity of concepts such as sustainability in their measurements, renders planning and design processes weak, and vulnerable to inaccuracy or scientific disrespect.

Another important thing to remember about measuring techniques for concepts like fragmentation or cultural landscapes is that measuring one requires measuring the other. For example, when one assesses the environmental changes expected when fragmented rural land is converted to urban land, one can conclude that urbanization is a form of unification, or de-fragmentation. Because it is being done through intense culturalization neither alters the fact that fragmentation is being reduced, nor does it make de-fragmentation undesirable. In other words, planners and designers cannot assume automatically that urbanization is always bad.

There is one caution, however. Measuring cultural landscapes or fragmentation is apt to have political consequences. What one reveals in such measurements has the potential to stop a project. At the minimum, it can focus public attention on findings that can force land managers or developers to rethink their jobs. Measurement results can raise opposition, but they also can elevate support, particularly if the projects that emerge from them balance respect for cultural precedents with sound, environmentally diverse solutions.

Part of the reason that political support can rise from cultural landscape findings is that the process requires a bit of forensic science, adding mystery—which can generate public interest—to the process. Cultural landscape analysis requires those who measure cultural landscapes to reconstruct the layered uses that have occurred on the land during historic or pre-historic times. The steps include an inventory and accompanying documentation of the value of the cultural landscape features found. An inevitable outcome is a contextual reconstruction of what happened, when it happened, and an evaluation of the historical value of it all. In US many of these assessments are rooted in the requirements for inclusion on the National Registry of Historic Sites.

Landscape evaluation using this “reconstruction” procedure is equally complicated whether the land is urban or rural, fragmented or not. In the urban setting, only a few years need pass before interested scientists

such as archaeologists, sociologists, anthropologists or landscape architects become interested in past landuse patterns and former landuse activities. When such interest appears, the cultural landscape analysis can be said to have started. Any number of events can bring these curious professionals to the scene. Commercial redevelopment, parkland modifications or major public or private projects from airports to shopping malls now are seen as opportunities to assess the historic value of a property, to temporarily peel back the palimpsests to peek at what once occurred on a particular piece of property, and why (Quaid, 1996). In fact, in much of the world, the law requires that such analyses take place, at least when obvious artifacts are uncovered. As mentioned, measurements at this point take the form of archaeological inventories, marking exact locations as the beginning of understanding context.

Actual contextual analysis can come later, even after site modifications are underway, assuming that inventories are adequate. From these analyses one can determine physiographic causes for prior human activities. For example, new residents in rapidly developing urban regions can learn just what the land that now supports their homes used to support, agriculturally and pre-agriculturally.

In much of the developed world, this means coming face-to-face with the fact that arable lands are giving way to non-arable, hard surface uses. However, the impact of this awareness is unknown, to scientists and to those who manage, develop or redevelop urban lands. If known, however, this awareness can create opportunities for enlightened development decisions resulting in a healthier mixing of developed and undeveloped land or water features. Such an outcome, in turn, can lead to greater public awareness of the environmental conditions which sustained pre-development uses of these resources, and of the gains and losses which resulted from changes in use, or fragmentation.

For urban and regional park agencies, such outcomes can lead to increased budgets for acquisition and maintenance of open space resources. As Lewis, the imaginative innovator of the greenway concept a half century ago, recently noted, this awareness allows drainage systems, historic sites, abandoned railroad rights-of-way, existing parks, preserves, private gardens and physiographic features to be properly

included as planning determinants for retrofitting metropolitan regions with amenities preferred by residents (Lewis, 2000).

One can assume that these are the components of what planners and designers like to call sustainable cities, but, even here the term is misused. In reality, this process is nothing more than wise, state-of-the-art planning and design. It uses data, perspectives and reasoning that are based on good science, mixed with market and regulatory requirements and design talent, in ways that encourage environmental awareness among human users.

6. A research question

But, the real question is this: what does it matter? Asked another way, what is the value of knowing what the space was like on which human beings now live, before they lived on it? It requires inclusive thinking to ask to answer this question.

Even if planners and designers ask and answer the question, and can do so based on good science, they still are left with making some decisions based upon the best information available at the time. The fact is that even decisions based on good science are subject to error because knowledge is generated continuously. What is seen as adequate or best information today, is apt to be proven otherwise tomorrow. It is now known, for example, that simply preserving or recreating greenways through urban areas is not enough, if habitat diversity is a goal. Greenways need accompanying large regional spaces, capable of harboring species that cannot totally sustain themselves in the environmental edges which greenways surely are.

Even under the guise of good science, some planning and design decisions also can prove inadequate, if they are grounded only in what is popular at the moment, scientifically speaking. No one has yet verified that communities so developed are better for the people, the flora or the fauna which will inhabit them. Just as in prior years, such decisions are grounded firmly in the faith that nature is good and mankind is bad.

Here, one can argue that even the more scientific planners and designers simply extend the Romanticism of their non-scientific, emotionally charged counterparts mentioned earlier. Few biologists, few

planners, few sociologists offer substantiated, research-based reasons for avoiding fragmentation or for assessing—much less preserving—cultural landscapes. Instead, it simply is assumed that fragmentation needs to be reduced or reversed because human beings, culprits that they are, once again have interfered with natural processes. Likewise, it is assumed that cultural landscapes need to be interpreted or preserved simply because it can be done. Apparently, implementing plans that result in environmental complexity is the only atonement for these misdeeds even when the degree of complexity of what comprises it, remains unknown.

The literature is replete with strategies for modifying fragmented lands. A growing body of literature also is emerging regarding how cultural landscapes can be assessed (Birnbaum, 1996; Page et al., 1998; Feldman, 1998; Hopman, 1999). Hopefully, as the techniques for addressing these phenomena become more sophisticated, parallel research can reveal why doing these things is necessary.

7. In search of good science

From the bioscientist one hears that repairing fragmented lands (to what improved degree of fragmentation remains unclear) increases biodiversity, whatever that is. Is that good? To suggest otherwise is heresy in the current climate of ecological planning. (In some circles ecological planning was once called landscape architecture, causing one to wonder what was done by landscape architects that required such distancing by contemporary environmentalists.) Few bioscientists, and even fewer planners or designers, can pinpoint what environmental conditions they would reintroduce through repair of fragmented spaces. Nor can they explain why.

In North America, for example, is it a goal to re-establish and then manage habitats to conditions found before Europeans discovered the continent? Or, going back even earlier, should the conditions in place when the Vikings apparently sailed to the New World be the ones to target? Or, why not target 1890, the year that starlings (*Sturnus vulgaris*) were introduced to New York's Central Park? (These highly adaptive birds now range from Mexico to Alaska (Bull and Farrand, 1992).)

Such bases are so arbitrary in discussions about fragmentation, biodiversity and the like that one is forced to consider whether or not planning, design and good science can exist together. Fortunately, hidden deep in the intellectual underpinnings of the biosciences is a fragile, understated concept, which because of its innocence and honesty, serves as a linchpin, justifying any effort to establish even an arbitrary level of biodiversity. It is a concept-based partly on empirical data and partly on faith, and it is, that the greater the variety of life forms in any identifiable ecological community, the greater the opportunity for nurturing, to themselves and others, including human beings (Adams, 1996; Davis, 2000). The concept is so logical and non-threatening that even purists endorse it as a platform upon which to base environmental planning and design strategies, at least until more concrete grounding appear.

But, what of those sciences which try to explain human cause and environmental effect, or vice versa? For the reasons just discussed, one can conclude that until more data, better procedures, increased academic rigor and greater intellectual honesty fully drive environmental research, the true worth of the planning and design disciplines will remain under valued.

Therefore, to understand how such sciences explain the need to tighten couplings between human beings and the physical environment, one reflexively turns to the environmental psychologists. It is they, who, during the past quarter century, have brought landscape architecture to the arena of research. It is they who have helped planners, designers and society in general to know why good environmental decisions should be made: at least it is they who are adding scientific credence to the search until, and if, the physical sciences can better connect mankind and the environment in a tighter, mutually nurturing bond.

Kaplan and Kaplan (1995,) for example, suggest that the human drive to seek optimum habitats is connected to adaptation, or the finding of environments in which a species will prosper. This view also suggests that benefiting the human species is of value—a view not always shared in the scientific perspective of physical scientists, planners or designers.

Kaplan and Kaplan (1981, 1995) also suggest that Lynch's (1960) pioneering work on legibility is based upon an intrinsic ability of human beings to "read" the physical environment and thereby make both quick

and long-term judgments as to its suitability for habitation. This is not to suggest that a fast visual look at a space can inform one of the space's total environmental quality. It does suggest, however, that the human perception of order and logic, coupled with the senses, are tied to our ability to discern safety, survival and the potential for productivity, all of which are fundamental to continuance.

By extension, then, one can conclude that modifying the environment is necessary for human continuance. Fragmentation is one of those adaptive behaviors, apparently, and cultural landscape analysis is one of the techniques for chronicling these human-induced changes. If so, what is so bad about that?

It is hoped that future work will spawn serious investigation into the true value of environmental planning and design. In order for this to happen, the scholarly community of planners and designers will need to accept that design and research are compatible, and loosely coupled, meaning that to tighten the connection with one need not loosen connections with the other (Taylor, 2000). To not adopt this perspective is to perpetuate the reliance on popular topics, or pseudo-science, and on poorly grounded concepts. Understanding the connections between human beings and the environment, along with the reasons for them, is at risk otherwise.

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